INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE TWELFTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/12)

BANGKOK, THAILAND - 20 – 24 AUGUST 2001

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

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

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PART I - HISTORY OF THE MEETING

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1.1 Introduction

1.1.1 The Twelfth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/12) was held in Bangkok, Thailand from 20 to 24 August 2001 at ICAO Asia and Pacific Office.

1.2 Attendance

1.2.1 The meeting was attended by 80 participants from 15 Member States, 8 other Contracting States of the ASIA/PAC Regions and 4 International Organizations.

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

1.3 Opening of the meeting

1.3.1 The ICAO Regional Director, Mr. L.B. Shah, in welcoming the participants from the APANPIRG member States, non-member States and the International Organizations, noted that APANPIRG serves as a body that is designated as the guiding and coordinating organ for all activities conducted within ICAO concerning air navigation system for the Asia/Pacific regions.

1.3.2 He acknowledged the participation of Tonga, represented by Mr Mapa Faletau, the Secretary for Civil Aviation who will be presenting his proposal for APANPIRG membership and thanked Tonga for seeing value in the Group. He also welcomed the participation of Mr. Jone Koroitama, Chief Executive, Airports Fiji Ltd, the founding chairman of APANPIRG who oversaw some very exciting developments in the region and who had served the body for a long period. With regard to International Organization, Mr. Shah welcomed the presence of Mr. Donald Spruston, former Director-General of Civil Aviation Canada and currently the Director-General of International Business Aviation Council (IBAC), who will make a presentation on IBAC's application for regular attendance at APANPIRG. He also welcomed the presence of Mr. Vladimir Zubkov, Chief of Regional Affairs Office of ICAO Headquarters at the meeting.

1.3.3 Mr. Shah informed the meeting that the ASIA/PAC Basic ANP and FASID was approved by the President of the Council on 11 August 2001 and the immediate task ahead will be to fully utilise the documents for rapidly enhancing the implementation of all facilities and services in air navigation.

1.3.4 He highlighted some of the noteworthy developments in the region such as the successful execution of the IUSOAP and follow-up audits, cooperative development on operational safety and continuing air worthiness (COSCAP-SEA) which became operational on 09 July 2001 and the signing of an MOU between the President of the Council and the Honourable Minister of Communications and Information, Singapore in August 2001 on the development of a Country Training Programme providing 100 fellowships for developing countries.

1.3.5 Mr. Shah congratulated the Singapore Aviation Academy as the recipient of the prestigious Edward Warner Award for the year 2000 and looked forward to the dynamic role of the Academy in fulfilling much of the training needs in the Asia Pacific regions.

1.3.6 He also touched on some of the issues that lay ahead such as the 33rd General Assembly, expansion of IUSOAP to cover Annex 11 and 14, setting up of International Financial

Facility for Aviation Safety (IFFAS), Global Air Transport Conference in March 2003, Global Air Navigation Conference in November 2003, importance of preparation for WRC-2003 and the 38th Conference of Directors-General of Civil Aviation in November 2001.

1.3.7 He underscored the important issue of establishing airspace system performance monitoring organization and funding arrangements for the implementation of reduced separation and CNS/ATM systems.

1.3.8 Mr Shah also took the opportunity to thank the Royal Thai Government, the host country of the Regional Office, for their generous support in the development of the new Conference Facility, which is expected to commence by end of 2001.

1.3.9 The Chairperson, Mr. H. S. Khola in welcoming participants informed that the work of the APANPIRG has been appreciated by ICAO ANC and Council. Its importance is also reflected from the fact that not only all the members of APANPIRG but eight other observer States, four International Organizations and the Chief of Regional Affairs Office, ICAO Headquarters are also participating in this meeting.

1.3.10 He also pointed out the need to have pro-active approach in the work so as to meet the future growth and safety requirements. Mr. Khola, however, expressed concern at the slow pace of implementation of SARPs and the Conclusions and Decisions of APANPIRG and also the resolution of the Shortcomings and Deficiencies identified by the ICAO Regional Office. He stressed the need to have focussed follow-up actions with target dates. While noting that the Regional Office is doing its best, the cooperation of States is needed to accelerate the pace of implementation. In order to achieve this goal, he exhorted that all possible forums such as the annual Conference of Directors-General of Civil Aviation, various workshops and seminars be utilised.

1.3.11 Mr. Khola thanked the ICAO Regional Office for the excellent arrangements made for the meeting.

1.4 Officers and Secretariat

1.4.1 Mr. H.S. Khola, DGCA, India as Chairperson of the Group presided over the meeting. Mr. Lalit B. Shah, ICAO Regional Director, Asia and Pacific Office, was the Secretary of the meeting assisted by Mr. K. W. Cheong, Regional Officer/AGA from the ICAO Asia and Pacific Office. Mr.V. Zubkov, Chief of Regional Affairs Office, ICAO Headquarters, was adviser to the meeting.

1.4.2 The meeting was also assisted by Mr. Shaukat A. Ali, Deputy Regional Director, Mr. H.V. Sudarshan, Regional Affairs Officer, ICAO Headquarters, Dr. E. Lysakov, Regional Officer/MET, Mr. J. E. Richardson, Mr. David Moores and Mr. Hiroshi Inoguchi, Regional Officers/ATM, Mr. K.P. Rimal and Mr. Li Peng, Regional Officers/CNS, Mr. Tulsi Kesharwani, Regional Officer/AT and Mr. Roger Mulberge, Regional Officer/FS from the ICAO Asia and Pacific Office.

1.5 Agenda of the meeting

1.5.1 The Agenda adopted by the meeting was as follows:

Agenda Item 1 Review of Council and ANC actions on APANPIRG/11 Report

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

2.1 ATS/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 Shortcomings and 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.

List of Conclusions and Decisions are given on pages i-6 to i-8.

1.8 **Terms of Reference of APANPIRG**

1.8.1 The revised Terms of Reference of APANPIRG approved by the Council of ICAO (4th Meeting of its 159th Session on 28 February 2000) are as follows

The objectives of the Group are to:

a) ensure the continuous and coherent development of the plans for Asia/Pacific Regions and ensure harmonization with global plan and those of adjacent regions;

b) develop proposals for improvements in the implementation of the ASIA/PAC Air Navigation Plan on the basis of new technological developments;

c) identify specific problems in the air navigation field and propose in appropriate form, action aimed at solving these problems; and

d) develop, with due regard to the primacy of safety, business cases for various options taking into account the environmental benefits and the need to facilitate financing of preferred options in planning and implementation of air navigation facilities.

To meet these objectives the Group shall:

(a) keep under review, and propose when necessary target dates for implementation of facilities, services and procedures. This will ensure the co-ordinated development of the Air Navigation System in the Asia and Pacific Regions;

(b) assist the ICAO Regional Office providing services in the ASIA and PACIFIC Regions in its assigned task of fostering implementation of the ASIA/PAC Regional Air Navigation Plan;

(c) monitor developments in the air navigation field and develop proposals for consequential improvements in air navigation in the Asia and Pacific regions;

(d) review any shortcomings in the Asia and Pacific Regional Air Navigation System and develop recommendations for remedial action;

(e) originate, as necessary, in co-ordination with affected State, amendments to the Plan for the ASIA/PAC Regions;

(f) keep under review the Statement of Basic Operational Requirements and Planning Criteria. Recommend to the Air Navigation Commission such changes to them as may be required in the light of developments mentioned in (c); and

(g) use an appropriate mechanism to prepare cost/benefit analysis and business cases inclusive of environmental assessments and provide related guidance material in support of "prototype" sets of planned facilities and services. The Group may utilize the services of financial institutions, as required, on a consultative basis.

1.9 Concluding Remarks

1.9.1 The Chairperson, Mr. Khola, in closing the meeting, thanked the delegates for their active participation, co-operation and contribution that made APANPIRG/12 so productive and successful. He also appreciated the support that was provided by the Secretariat and requested continued support of ICAO and other international organizations. In noting that he had served as the Chairperson of APANPIRG since APANPIRG/9 in 1998, Mr. Khola informed the meeting that this could well perhaps be his last year serving APANPIRG due to his impending retirement next year.

1.9.2 The delegates expressed that they were truly grateful and appreciative of the efficiency on the conduct of the meeting and thanked the Chairperson for his significant contribution and excellent stewardship.

1.9.3 Mr. Vladimir Zubkov, Chief of Regional Affairs Office, ICAO Headquarters, congratulated Tonga and IBAC on the acceptance of their applications by APANPIRG.

1.9.4 In congratulating APANPIRG for the good work done, he noted that APANPIRG had been in the forefront in initiating a number of pioneering efforts such as the FANS concept, CNS/ATM, trials and demonstrations, RVSM and other monitoring arrangements and plans.

1.9.5 He also informed the meeting of the positive remarks made by the members of the ICAO Air Navigation Commission who visited the Regional Office a few weeks ago and of the favourable impression by the members of the Commission on the sustained efforts and high quality of work produced by the Regional Office.

List of Conclusions

List of Conclusions (contd.)

Conclusion 12/20	**-**	**Requirement for a new WAFS area of coverage "M"**
Conclusion 12/21	**-**	**SADIS Strategic assessment tables**
Conclusion 12/22	**-**	**GRIB Training Workshop**
Conclusion 12/23	**-**	**WAFS Area of Coverage "E"**
Conclusion 12/24	**-**	**Amended ASIA/PAC WAFS Transition Plan and Procedures**
Conclusion 12/25	**-**	**Application of EUR OPMET update procedure in the ASIA/PAC Regions**
Conclusion 12/26	**-**	**Tropical cyclone advisories with the data designator "FK"**
Conclusion 12/27	**-**	**Composition of the SADISOPSG**
Conclusion 12/28	**-**	**Proposal for amendment of ICAO SUPPs, Doc 7030/4**
Conclusion 12/29	**-**	**Gia Lam Meteorological Watch Office (MWO)**
Conclusion 12/30	**-**	**Operation of the VAACs**
Conclusion 12/31	**-**	**Volcanic ash advisory centre**
Conclusion 12/32	**-**	**Volcanic Ash Advisory and SIGMET in graphical format**
Conclusion 12/33	**-**	**Honolulu Tropical cyclone advisory centre**
Conclusion 12/34	**-**	**New FASID Charts MET2 and MET3**
Conclusion 12/35	**-**	**ASIA/PAC Basic ANP and FASID, Part VI - Meteorology**
Conclusion 12/36	**-**	**Chapter 8 – Meteorology of the ASIA/PAC CNS/ATM Plan**
Conclusion 12/38	**-**	**Revision and Publication of Guidance Material on CNS/ATM Operations in the Asia/Pacific Region**
Conclusion 12/42	**-**	**State regulatory framework for safety oversight**
Conclusion 12/43	**-**	**Provision of ICAO guidance material on the establishment of airspace safety arrangements**
Conclusion 12/45	**-**	**Key Priorities for CNS/ATM Implementation**

List of Decisions

PART II - REPORT ON AGENDA ITEMS

AGENDA ITEM 1: REVIEW OF ACTIONS TAKEN BY ANC AND THE COUNCIL ON THE REPORT OF APANPIRG/11 MEETING

AGENDA ITEM 1: REVIEW OF ACTION TAKEN BY ANC AND THE COUNCIL ON THE REPORT OF APANPIRG/11 MEETING

1.1 The meeting was presented with actions taken by the Air Navigation Commission and the Council during their review and approval of the Report of the Eleventh Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) held in Bangkok, Thailand, from 2 to 6 October 2000. The meeting noted the specific actions taken by the ANC, the Council and the follow-up by the States and Secretariat on Conclusions and Decisions of the meeting as contained in Appendix A to the Report on Agenda Item 1.

1.2 In relation to Conclusion 11/1 (RVSM minimum monitoring requirements), the group noted that ICAO was studying the short and long term objectives for RVSM monitoring.

1.3 With regard to 4.7 of the APANPIRG/11 report, regarding slow progress on the resolution of shortcomings and deficiencies in air navigation field, the Group noted the need to put in place appropriate management tools to expedite in addressing this issue. Consequently, the Group, as an initial step decided that the ICAO should develop an approach paper on the subject of resolving shortcomings and deficiencies and bring it to the attention of the forthcoming Annual Conference of Directors-General of Civil Aviation, Asia/Pacific scheduled to be held in November 2001. In this regard the Group was informed about different types of mechanisms already existing in other regions in addressing the shortcomings and deficiencies in air navigation field.

1.4 The meeting thanked the Council and ANC for their valuable guidance on various activities of the Group.

Appendix A to the Report on Agenda Item 1

STATUS OF CONCLUSIONS / DECISIONS OF APANPIRG/11

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/1	ANC	**RVSM Minimum Monitoring Requirements** That, ICAO be requested to develop globally applicable short and long-term RVSM minimum monitoring requirements for aircraft. Noted the conclusion and that SASP is studying the short- and long –term objectives for RVSM monitoring.	The ICAO Separation and Airspace Safety Panel (SASP) is studying the short- and long-term objectives for RVSM monitoring.	On-going
C 11/4		**Guidance Material on CNS/ATM Operations in the Asia/Pacific Region** That, the revised Guidance Material on CNS/ATM Operations in the Asia/Pacific Region be adopted and circulated to States and appropriate International Organizations.	The Air Navigation Commission on reviewing the report of APANPIRG/11, was of the view that the revised edition of the document should not include material on the application of separation based on ADS until proposed amendments to the Procedures for Air Navigation Services – Rules of the Air and Air Traffic Services (PANS-RAC, Doc 4444), had been approved by ICAO. The revised Guidance Material on CNS/ATM Operations in the Asia/Pacific Region will be published in accordance with the guidance provided by the Air Navigation Commission, as soon as practicable.	On-going
C 11/6		**Mandatory Carriage and Operation of Pressure-Altitude Reporting Transponders** That, States take immediate steps to mandate the carriage and operation of pressure-altitude reporting transponders within all FIRs in the Asia/Pacific Region.	Two surveys have been conducted in conjunction with the survey relating to the carriage of ACAS II for the purpose of monitoring the implementation status in the region.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/7		**Implementation of ACAS II** That States; a) promulgate their implementation plans mandating the carriage and operation of ACAS II; and b) where this is in advance of the globally agreed date of 1 January 2003, provide for the continuing use of TCAS with Version 6.04A logic with a transition plan to phase out systems with Version 6.04A logic by 1 January 2002.	Two surveys have been conducted. The secretariat continues to monitor the implementation The results was presented to APANPIRG in the ATS/AIS/SAR/SG/11 Report	On-going On-going
	C	Noted the conclusion and requested the Secretary General to urge States to take action to mandate the carriage of ACAS II by the globally agreed date of 1 January 2003.		
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 2001 to permit the periodic update of the Matrix.	The "SAR Capability Matrix" was distributed to States Updated information was presented at ATS/AIS/SAR/SG/11	On-going On-going
C 11/9		**Search and Rescue Agreements between States and Establishment of a Search and Rescue Register** That, States are to complete their SAR agreements with their neighbouring States and forward such agreements to the ICAO office to be included in a register on SAR Agreements.	States have been urged to complete their SAR agreements with their neighboring States. Information has been received from some ASEAN States on signed agreements with their neighbours.	On-going
	C	Noted the conclusion and requested the Secretary General to urge States to complete SAR agreements with their neighbouring States and forward such agreements to ICAO.		

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/10		**Development of a Revised ATS Route Structure - Asia to/from Europe/Middle East, South of the Himalayas (EMARSSH)** That, taking into account the introduction of Required Navigation Performance (RNP), Area Navigation (RNAV) and Reduced Vertical Separation (RVSM) into the Asia Pacific region, States, ICAO and IATA develop a revised ATS route structure - Asia to/from Europe and the Middle East south of the Himalayas, to gain the benefits of existing aircraft capabilities together with CNS/ATM enhancements.	A Task Force was established, led by a Core Team. Three sub-regional meetings have taken place. Further Task Force meetings are planned to complete the work. Implementation of the revised route structure is scheduled for AIRAC Date of 28 November 2002.	On-going
	ANC	Noted the conclusion and requested the Secretary General to organize an interregional coordination meeting to address interface issues to ensure end-to-end connectivity in the revised ATS route structure.		
C 11/11		**Planning and Implementation Strategy** That, to achieve the success of the project, the following Strategy will be used: a) development of a set of principles for restructuring the routes; b) development of a project plan; c) form a small project or core team to initiate, develop and lead the project through to implementation; d) plan a number of sub-regional meetings to progress the work; and, e) full co-ordination with adjacent regions with regard to the development of the route structure and procedures to be maintained.	A set of Principles were adopted and agreed to. A project plan has been formulated. A Core Team was established consisting of Australia, Hong Kong, China, India, Singapore, IATA and ICAO as Chairman of the Core Team. Meetings have taken place in Brisbane, Bangkok and Cairo. Further meetings are planned for Paris and Delhi this year. Inter-regional coordination is being conducted throughout the planning and implementation of this project.	Completed On-going Completed On-going On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/12		**Principles to be Used in the Development of the Route Network** That, the following Principles will be used in developing this route structure: 1. That, using the advantages of CNS/ATM implementation, a revised ATS trunk route structure between Southeast Asia and Europe/Middle East will be developed. The planning of these routes structures should take advantage of existing and on-going CNS/ATM technologies in order to provide safe and efficient air traffic management with the least impact to environmental concerns; 2. that, these ATS trunk routes be developed primarily for international long-haul and medium-haul flights, however they may also be used where necessary for other regional and domestic operations; 3. that, as much as possible, planning of ATS trunk routes will be on the basis that each route is laterally separated from each other; 4. that, the development of these route structures will be fully co-ordinated amongst the involved Asia/Pacific ATS Providers and airlines. Also, due to the length of these trunk routes, harmonisation is required with both MID and EUR Regions; and 5. that co-operation is required between all concerned states and the aviation industry to ensure an efficient flow of international aircraft operations between Asia, Europe and the Middle East.	All 5 Principles are being considered in the development and implementation of the revised ATS route structure.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/14		**Use of digital circuits** That, States consider implementing digital communication networks or circuits in a co-ordinated manner in order to meet current and future AFS communication requirements for data/voice communications and to facilitate the introduction of ATN.	The Conclusion was brought to the attention of States. Where feasible, States have upgraded to digital circuits. This action is an on-going action by States.	On-going
C 11/15		**Alternative arrangements for VSAT** That, States consider the provision of an alternative communication links for: a) critical AFS communications which are supported by a single VSAT system between States; and b) remote control air-ground (RCAG) VHF stations supported by a single VSAT link.	The Conclusion was brought to the attention of States for action. Some States have already taken remedial action as recommended. This is an on-going action by States.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/16		**Amendment to ASIA/PAC ANP** That, the ASIA/PAC ANP be amended as follows: 1) the entry/exit points: a) between ASIA/PAC and AFI should be Mumbai and Brisbane; b) between ASIA/PAC and EUR should be Bangkok, Singapore and Tokyo; c) between ASIA/PAC and MID should be Mumbai, Singapore and Karachi; d) between ASIA/PAC and NAM should be Nadi, Brisbane and Tokyo; e) between ASIA/PAC and SAM should be Brisbane. 2) delete reference to Honolulu in Chart COM 1	Action completed. The changes are incorporated in the ASIA/PAC Basic ANP Part IV, Para 2.2.1.6.	Completed
D11/17		**Revision of the Subject/Tasks List of ATN Transition Task Force** That, the updated Subject/Tasks List of the ATN Transition Task Force be adopted as shown in Appendix A to the Report on Agenda Item 2.2	Third ATN Transition Task Force meeting held in March 2001 noted the updated Subject/Tasks List.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/18		**Amendments to the Guidance Material for Ground Elements in ATN Transition** That, the updated Guidance Material for Ground Elements in ATN Transition be published as Issue 2.	Issue 2 of the Guidance Material was published.	Completed
C 11/19		**ATN Seminar** That, a) ATN Seminar be conducted by ICAO prior to the Third ATN Transition Task Force meeting in 2001; b) Invitation be extended to all the States in the ASIA/PAC region and States in the adjacent Region to attend the Seminar; and c) States, in a position to do so, provide speakers to the Seminar.	The Seminar was held from 26 to 27 March 2001 and was attended by 78 participants.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/20		**Regional GPS Measurement Campaign** That: a) Singapore develop and coordinate a GPS measurement campaign, based on the documentation and practices reported, to determine normal and peak excursion of GPS performance; and b) States in a position to do so participate in the conduct of the measurement campaign. Noted the Conclusion with the understanding that the measurement methodology would take into account the guidance for GNSS data recording which is being finalized by the GNSS Panel.	Materials were developed by Singapore and a State Letter was issued requesting States interested to participate in the campaign to provide details to Singapore directly. 6 States confirmed participation in the campaign to be conducted on 11 and 25 September 2001 using L1 and L2 and on 9 October 2001 using L1.	On-going
	ANC	Noted the conclusion with the understanding that the measurement methodology would take into account the guidance for GNSS data recording which is being finalized by the GNSS Panel.		

Appendix A to the Report on Agenda Item 1

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/21	ANC	**Strategy for the Provision of Precision Approach and Landing Guidance System** That, the Strategy for the Provision for the Precision Approach and Landing Guidance System provided in Appendix B to the Report of the Agenda Item 2.2 be adopted. Noted the Conclusion and requested the Secretary General to monitor related developments in other regions to ensure harmonization.	The strategy was brought to the attention of States.	Completed
C 11/22		**Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC Region** That, the Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC Region provided in Appendix C to the Report of the Agenda Item 2.2 be adopted.	The strategy was brought to the attention of States for appropriate action.	Completed
C 11/23	ANC	**GNSS Implementation Workshop** That, ICAO, with the support of experts, conduct a workshop to assist States in the development and implementation of GPS procedures for en-route and non-precision approach navigation. The workshop should draw on ICAO SARPs, PANS-OPS and other publications together with the practical experience of States gained through implementation of GPS applications. Noted the Conclusion and requested the Secretary General to hold seminar workshops focusing on the development of instrument approach procedures based on GNSS in other regions.	The workshop was held from 8 to 11 May 2001 and was attended by 47 participants.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/24		**Protection of Aeronautical Frequency Spectrum** That States, a) assign high priority to the aeronautical spectrum management; b) participate in the development of States' position for WRCs at the national level to ensure support to ICAO position; c) ensure to the extent possible aviation representatives are included in States delegation to the APT Conference Preparatory Group meetings and at WRCs. d) designate a focal point contact person responsible for the preparation of WRC-2003 issues and provide notification of appointment to the ICAO Regional Office.	ICAO Preliminary views were presented at the First APT APG 2003-1 meeting held from 4-7 September 2000. Need to support ICAO position was discussed at APEC TPT WG, SN&C Advisory Committee meeting on 3 April 2001. ICAO's Preliminary Position was presented to the APG-2003-2 meeting held from 4-7 June 2001. Three more APG meetings are planned prior to WRC-2003. States have been requested to designate a focal point of contact to make a concerted effort to secure support for ICAO position at APT APG meetings and at WRC-2003.	Completed
	ANC	Noted the Conclusion and requested the Secretary General to accord high priority to the ICAO's role in safeguarding the aeronautical interest at WRC – 2003.		

Appendix A to the Report on Agenda Item 1

STATUS OF CONCLUSIONS/DECISIONS OF APANPIRG/11 IN MET FIELD

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/25		**SADIS strategic assessment tables** That, the ASIA/PAC SADIS strategic assessment tables, as given in Appendix E to the report, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.	The ASIA/PAC SADIS strategic assessment tables were reviewed by the SADISOPSG/6 meeting.	Completed
C 11/26	ANC	**Authorized access to the global WAFS graphical products via the Internet** That, ISCS and SADIS provider States consider the possibility of providing global availability of WAFS products via the Internet, to the authorized ISCS and SADIS users. Noted the conclusion and that the Secretary General was developing a policy for the operational use of the Internet by States to access WAFS products as well as OPMET data, and for the dissemination of AIS Information.	The subject matter was discussed by the SADISOPSG/6. The United Kingdom agreed to implement the SADIS internet-based service as a back-up to the SADIS broadcast to be provided only to States and users authorized to receive SADIS and ISCS broadcasts. A policy for the operational use of the Internet by States is being developed by ICAO. It was proposed to be included in the agenda of the MET Divisional meeting to be held in September 2002.	On-going
C 11/27		**Issuance of SWH chart by WAFC Washington** That, the United States be invited to consider issuing a SWH chart by WAFC Washington with the same coverage, scale and map projection as the current chart produced by RAFC Tokyo.	As a follow up, the United States provides the SWH chart by the WAFC Washington effective 9 July 2001. WAFSSG/8 agreed that the new area of coverage would be labelled “M”. The APANPIRG agreed to amend the ASIA/PAC ANP (FASID) to add requirement for the new WAFS area “M”.	Completed

Appendix A to the Report on Agenda Item 1

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/28		**Requirements for WAFS SWM charts** That, IATA be requested to urgently confirm the requirement(s) for SWM chart(s) in the ASIA/PAC Regions.	ICAO letter was sent to IATA requesting to urgently confirm a requirement of SWM chart in the ASIA/PAC Regions.	Completed
C 11/29		**Amended ASIA/PAC WAFS Transition Plan and Procedures** That, the ASIA/PAC WAFS Transition Plan and Procedures for the transfer of responsibilities from RAFCs to the WAFCs London and Washington be amended as shown in Appendix G to the report on Agenda Item 2.2.	The ASIA/PAC WAFS Transition Plan and Procedures is being successfully implemented.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/30		**Transfer of production of SIGWX charts to WAFCs and closure of RAFCs New Delhi, Melbourne and Wellington** That, a) Responsibilities for production of SWM and SWH charts (area D and Asia South) from RAFC New Delhi be transferred to WAFC London; b) Responsibilities for production of SWH charts (areas E and F) from RAFC Melbourne be transferred to WAFCs London and Washington; c) Responsibilities for production of SWH charts (areas J and F) from RAFC Wellington be transferred to WAFC Washington; d) WAFCs London and Washington assume their responsibilities effective 1 September 2000; and e) Following successful implementation of the transfer, RAFCs New Delhi, Melbourne and Wellington be closed on 1 March 2001.	Responsibilities for production of SIGWX charts have been transferred from the ASIA/PAC RAFCs to WAFCs London and Washington. RAFCs New Delhi, Melbourne and Wellington have ceased the operations.	Completed
	C	Noted the conclusion and its relation to the agreed plan for transition to the final phase of the WAFS.		

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/31		**Transfer of production of SIGWX charts to WAFCs and closure of RAFC Tokyo** That, a) Responsibility for production of SWH charts (areas I, E and G) from RAFC Tokyo be transferred to WAFCs London and Washington effective 1 March 2001; and b) RAFC Tokyo be closed on 1 March 2001.	Responsibility for production of SIGWX chart has been transferred from Tokyo RAFC to WAFCs London and Washington. RAFC Tokyo has ceased its operation.	Completed
	C	Noted the conclusion and its relation to the agreed plan for transition to the final phase of the WAFS.		
C 11/32		**WAFS Tables MET 5 and 6 of the ASIA/PAC ANP (FASID)** That, Tables MET 5 and 6 of the ASIA/PAC ANP (FASID) be amended as shown in Appendices H and I to the report.	The ASIA/PAC Basic ANP and FASID have been approved by the Council. Formal proposal for amendment to Tables MET 5 and 6 will be processed after approval.	On-going
C 11/33		**SIGMET Special Implementation Project** That, ICAO urgently consider a proposal for the ASIA/PAC Special Implementation Project be established with the primary objective to improve implementation of SIGMET procedures.	The SIP Project Proposal will be put forward for Council approval in 2001.	On-going
	C	Noted the conclusion and that such project would be put forward for Council approval through established procedures.		

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
D 11/34		**Amendments to the Title, Terms of Reference and Subject/Tasks List** That, proposed amendments to the Title, Terms of Reference and the updated Subject/Tasks List of the COM/MET/NAV/SUR Sub-Group presented in Appendix K to the Report on the Agenda Item 2.2 was adopted.	The CNS/MET/ SG/5 noted the changes in the Title, Terms of Reference and Subject Tasks/List.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/35	C	**Amendments to the ANP Regional Plan for the New CNS/ATM Systems** That, a) the amendments proposed in Chapter 5 & 7 and to the CNS/ATM system transition tables of the Asia/Pacific Regional Plan for the New CNS/ATM Systems be adopted and incorporated in the plan: and, b) ICAO issue a new addition of the Asia/Pacific Regional Plan for the New CNS/ATM Systems. Noted the conclusion and requested the Secretary General to transfer this information to the facilities and services implementation document as and when the material contained in the Regional Plan for CNS/ATM Systems gained maturity.	The Plan was updated and will be published as issue 6.	On-going
C 11/36		**Key Priorities for CNS/ATM Implementation** That, the updated Key priorities for CNS/ATM Implementation at Appendix C to the Report on Agenda Item 3, be adopted.	All Sub-Groups have further updated the Key Priorities in the year 2001 meeting cycle.	On-going
C 11/37		**CNS/ATM Implementation Planning Matrix** That, the Secretariat be requested to develop and maintain a matrix listing all Asia/Pacific FIRs and the associated status of implementation of various major CNS/ATM elements.	A questionnaire was developed in consultation with IATA. State Letter was issued with this questionnaire to obtain required information. Replies from 12 States have already been received. A Matrix is being developed incorporating information provided by States.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/38		**Framework for Establishing Business Cases for the Development and Implementation of the New CNS/ATM Systems within and through the Asia/Pacific Region.** Noting that: Co-operation and agreement is required amongst all States and the aviation industry to ensure the realisation of full benefits of the CNS/ATM systems. In an effort to facilitate this it is essential that sound Business Cases, where a need is identified by the States concerned, should be developed on a traffic flow basis for the Asia/Pacific Region. Business Cases shall: a) be based on the Global Air Navigation Plan for CNS/ATM Systems, Regional Plans for CNS/ATM Systems and National Plans where appropriate; b) concentrate on international flight operations while taking into account the operational characteristics of domestic services; c) Concentrate on enhancement of safety, airspace capacity, operational efficiency and environmental benefits; and, d) Ensure harmonisation of traffic flows within the Asia/Pacific Region and the adjacent regions.	Conclusions 11/38, 11/39/ 11/40 & 11/41 will be the subject of a special implementation project which will be submitted to the ICAO Council for approval using established procedures.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/39		**Methodology for a Business Case Study** That, the following methodology be used in the development of a Business Case Study: a) Establish needs and extent of implementation of CNS/ATM systems by both States and users; b) Develop a plan for CNS/ATM systems implementation using a progressive, cost effective approach recognizing that co-operation between States is essential; c) Define the objectives to be obtained - financial and non-financial (operational, safety enhancement etc); d) Establish infrastructure and other costs based on the implementation plan; e) Visit, if required, and evaluate the inputs of individual States and service providers or both; f) Undertake a cost-benefit analysis including distribution of revenues & expenses; g) Develop a financial mechanism & cost recovery; h) Identify sources of financing for capital investment; and i) Incorporate above into a Business Plan.	Conclusions 11/38, 11/39/ 11/40 & 11/41 will be the subject of a special implementation project which will be submitted to the ICAO Council for approval using established procedures.	On-going

Appendix A to the Report on Agenda Item 1

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 11/40	C	**Business Case Study Special Implementation Project** That, ICAO considers a proposal for an Asia Pacific Special Implementation Project to be established with the primary objective of developing a business case study of various options in the implementation of air navigation facilities based on CNS/ATM. Noted the conclusion and that such a project should take into consideration the ICAO guidance material on the development of business cases and that the SIP would be put forward to the Council for approval through established procedures.	Conclusions 11/38, 11/39/ 11/40 & 11/41 will be the subject of a special implementation project which will be submitted to the ICAO Council for approval using established procedures.	On-going
C 11/41		**Provision of Data** That, a) States make readily available all appropriate information/data to ICAO in order to facilitate studies on cost/benefit analysis and business cases, and b) Service Providers/Users shall co-operate fully with States in facilitating this task.	Conclusions 11/38, 11/39/ 11/40 & 11/41 will be the subject of a special implementation project which will be submitted to the ICAO Council for approval using established procedures.	On-going

AGENDA ITEM 2: ASIA/PAC AIR NAVIGATION SYSTEM AND RELATED ACTIVITIES

AGENDA ITEM 2.1: ATS/AIS/SAR MATTERS

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

2.1 **ATS/AIS/SAR Matters**

2.1.1 The meeting reviewed the report of the Eleventh Meeting of the Air Traffic Services/Aeronautical Information Services/Search and Rescue Sub-Group (ATS/AIS/SAR/SG/11) as well as working papers covering various ATS/AIS/SAR issues. The meeting expressed its appreciation for the work progressed by the Sub-Group.

RVSM Implementation

2.1.2 The meeting reviewed the work of the ICAO RVSM Implementation Task Force (RVSM/TF).

2.1.3 The RVSM/TF met three times and conducted an ICAO RVSM Seminar since its activities were reported to the APANPIRG/11:

TF/9 – Bangkok, 8-12 January 2001
TF/10 – Honolulu, 29-30 January 2001
RVSM Seminar/4 – Kuala Lumpur, 25-27 April 2001
TF/11 – Kuala Lumpur, 30 April-4 May 2001

2.1.4 The RVSM/TF meetings have had wide representation from States planning to implement RVSM, States considering implementing RVSM, operators, international organizations and industry groups.

Pacific Implementation

2.1.5 The meeting recalled that RVSM was successfully implemented on 24 February 2000 between flight levels (FLs) 290 and 390, inclusive, in the Tokyo, Naha, Anchorage, Oakland, Nadi, Tahiti, Honiara, Nauru, Auckland and Brisbane FIRs, and on 13 April 2000 in the Port Moresby FIR.

2.1.6 The meeting noted that RVSM/TF/10 undertook a one-year post implementation review and addressed the issues below.

Operational Considerations

2.1.7 The meeting noted that in general, the implementation of RVSM had been successful and the use of RVSM was reported as being operationally beneficial. Further expansion of the RVSM FL band in Australia, Fiji, Japan, New Zealand and U.S.A. after the initial implementation was also noted.

2.1.8 The meeting was briefed on various operational events and action undertaken in relation to RVSM in the Pacific as below:

a) the suspension of RVSM based on actual reports of greater than moderate turbulence, not forecasts;

b) operation of a non-RVSM aircraft through RVSM exclusive airspace for reasons other than those promulgated in the various State AIPs;

c) the carriage of a spare engine pod;

d) wake turbulence experienced by opposite direction aircraft vertically spaced by 1000 ft;

e) a loss of required separation due to inadequate notification of non-RVSM capability in Oakland, Tokyo and Fiji FIRs; and

f) review of the standard phraseologies planned for use in European RVSM airspace.

Airworthiness and Aircraft Operations

2.1.9 The meeting noted that procedures for contingency, weather deviation and RVSM offset were reviewed for publication by States' AIP, and subsequent formal revisions to the *Regional Supplementary Procedures* (Doc 7030) will be developed.

2.1.10 It was advised that the RVSM web site being maintained by the FAA on behalf of the Task Force contains documents and policy applicable to all RVSM operations and guidance applicable to individual areas of operation such as the North Atlantic, Pacific and Europe.

2.1.11 The meeting recognized the concern expressed by the RVSM/TF that individual regional monitoring agencies required separate notification of both airworthiness and operational approval. The RVSM/TF noted that aircraft approved for RVSM in accordance with existing FAA, European Joint Airworthiness Authorities (JAA) or equivalent State documents were eligible for RVSM operations worldwide.

2.1.12 In this regard, the RVSM/TF leadership agreed to co-ordinate with the other regional monitoring agencies (RMA) to:

a) advocate that once an operator has received operational approval to use a specific aircraft type in RVSM operations, it should be considered RVSM eligible for RVSM operations worldwide;

b) advocate that regional authorities recognize that existing ICAO standards and State regulations require operators to adopt regional policy/procedures and therefore separate notification should not be required;

c) advocate that RMA's utilize databases from other regions to the maximum extent possible; and

d) advocate that individual regions clearly explain on web sites and in appropriate documents, RVSM implementation policies that are unique to that region in such areas as ATS policies, contingency procedures and monitoring.

Safety and Airspace Monitoring

2.1.13 The meeting was advised the result of updating the pre-implementation safety assessment conducted by the APARMO indicated that the overall risk of collision associated with the RVSM was estimated to be about 30 percent below the TLS value. The meeting noted with satisfaction that this updated estimated risk value was lower than that which was taken into account when making the decision to implement the RVSM.

2.1.14 With respect to ongoing safety assessment, it was noted that the APARMO continued to receive monthly reports concerning instances of errors in granting or following ATC clearances in Pacific airspace where the RVSM was applied. The meeting noted with satisfaction that the APARMO's review of these reports indicated that the frequency and duration of such errors had decreased in relation to that observed in the 12 months prior to RVSM implementation.

2.1.15 It was informed that the RVSM/TF agreed that there was a need to monitor factors affecting the continued safe use of the RVSM in Pacific airspace and endorsed the long-term requirement for collection and analysis of information related to instances of large height deviations arising from turbulence, incorrect application of aircraft contingency procedures, response to airborne collision avoidance system alerts and errors in granting or following ATC clearances. Accordingly, the RVSM/TF agreed that existing requirements for reporting such events to the APARMO would continue. In particular, the RVSM/TF reaffirmed the requirement that ATC units in the Pacific continue their monthly reports to the APARMO concerning the occurrence of errors in granting or following ATC clearances.

2.1.16 It was advised that there were efforts underway in the ICAO Separation and Airspace Safety Panel (SASP), formerly the Review of the General Concept of Separation Panel (RGCSP), to develop a long-term policy addressing aircraft height-keeping performance monitoring in connection with continued use of the RVSM. In this regard, the meeting recalled the APANPIRG *Conclusion 11/1-RVSM Minimum Monitoring Requirements* which calls for development of globally applicable short and long-term RVSM minimum monitoring requirements for aircraft.

2.1.17 The meeting noted that the ICAO EUR/NAT Office had facilitated a 24-25 January 2001 EUROCONTROL-hosted meeting of representatives from the NAT Central Monitoring Agency, EUROCONTROL, the APARMO and other bodies working to implement RVSM regionally. The agenda for this gathering included formulation of a long-term monitoring policy, among other topics. Noting that the APARMO did not offer any contributions to development of such a policy, the meeting understood that no firm conclusions resulted from this EUROCONTROL-hosted meeting.

2.1.18 It was also noted that after reviewing the overall status of height-keeping performance monitoring in the EUR/NAT Region, the RVSM/TF established an ad-hoc working group in order to pursue development of a policy for long-term monitoring of aircraft height-keeping performance in the Asia/Pacific Region.

2.1.19 The meeting reviewed the history of establishing the APARMO as the official monitoring agency for the Asia/Pacific Region and selecting of a private-sector firm to act on its behalf in administration of the GPS Monitoring Units (GMUs) used to monitor aircraft height-keeping performance. The meeting recognized the following principles governing actions by the APARMO and guiding RVSM safety oversight in the Region:

a) the APARMO will act on behalf of the Asia/Pacific Region to set standards for recognition of the State approvals provided by any newly established regional monitoring agencies;

b) the APARMO is empowered to establish standards related to the acceptability of aircraft height-keeping performance monitoring source data and results developed within the Asia/Pacific Region;

c) the APARMO is not obliged to accept monitoring results from another Region unless those results meet standards set by the APARMO; and

d) the APARMO is not obliged to accept any ground-based or GMU data collected within the Asia/Pacific Region unless such data meets standards established by the APARMO.

2.1.20 The meeting was advised of some possible long-term monitoring policies developed by the APARMO for further consideration. The APARMO focused these policies on monitoring the 1210 aircraft that received State RVSM approval in connection with the February 2000 introduction of RVSM into the Pacific. Based on examination of North Atlantic and EUROCONTROL information on traffic movements, the APARMO determined that the majority of these aircraft currently operate only within the Asia/Pacific Region. Hence, monitoring the majority of these 1210 aircraft will need to be accomplished using the GMUs within the Asia/Pacific Region. In this regard, it was noted that experience with application of the GMUs in connection with Pacific RVSM implementation indicated that it is possible to monitor 25 to 30 aircraft per month with current GMUs assets and personnel resources.

2.1.21 It was informed that based on widely held assumptions about the stability of aircraft altimetry system error (ASE), the APARMO concentrated on developing long-term monitoring policies which anticipated that the altimetry system performance of an aircraft would remain consistent over at least a two-year period. However, there appears to be strong evidence that some airframe ASEs do drift with respect to time and there is also evidence that the variance of ASE can also change through time. As a result of these findings, the APARMO did not believe that it would be possible to pursue successfully development of a long-term monitoring policy for the Asia/Pacific Region until the uncertainty associated with ASE stability is resolved, and decided to continue using this two-year period as a means of developing and evaluating possible long-term monitoring policies. The APARMO was of the view that a meeting of RMA representatives should be convened promptly to address this matter.

2.1.22 The meeting was provided with further updated information that analysis of data had indicated that ASE had largely remained stable over the last 4 years; however the mathematicians working group of the NAT SPG recently analyzed data from a number of RVSM approved airframes that indicate that some airframe ASEs drifted with time and that in the majority of cases examined, the drift was towards more negative ASE. It was noted that these results do not automatically indicate that ASE is unstable. Until more data is gathered on more individual airframes of various types over a longer period, the “evidence” from the most recent study should be treated with caution.

2.1.23 Thus, the meeting felt that a meeting of RVSM RMAs specifically to review evidence concerning the lack of stability of airframe aircraft ASE and to develop a work program in light of the findings would not be necessary at this stage. However, the meeting recognized the importance of information sharing among those RVSM RMAs to verify the stability of ASE, and agreed that ICAO should keep the RMAs updated of future findings regarding the stability of ASE.

2.1.24 The meeting noted that the RVSM/TF re-emphasized the need for continued application of existing Pacific procedures which result in monitoring the occurrences of large aircraft assigned altitude deviation (AAD), the effects of responses to ACAS advisories and aircraft emergency descents without clearance, and ATC loop errors.

2.1.25 The meeting was advised that the assessment of the identification of non-RVSM approved operators using Asia/Pacific airspace were conducted by the APARMO twice. The assessment presented at RVSM TF/10 used actual Pacific traffic movement data collected during April through May 2001 from the Brisbane, Naha, Tokyo, Auckland, Tahiti, Anchorage, and Oakland Oceanic FIRs. The APARMO compared all observed aircraft operations flying between FL290 and

FL390 inclusive, against RVSM operational approvals noted in either the Pacific or the North Atlantic approvals database.

2.1.26 It was advised that the APARMO identified potentially non-RVSM approved air carrier operations and summarized representative cases of the identified operators and aircraft types. It revealed possible cases of non-RVSM approved operations, with some possibly non-approved operations showing RVSM equipment suffix (W) in Field 10 of the ICAO flight plans.

2.1.27 Of particular concern were instances in which the State approval status of an operator or operator/aircraft-type combination was rendered unclear due to one or more of the following circumstances: the aircraft was "wet-leased" by Operator A to Operator B, the aircraft was "dry-leased" by Operator A to Operator B, the aircraft was operated as a charter flight, the aircraft was operated under a code-sharing agreement between operator A and Operator B, the aircraft was owned by multiple operators – an arrangement termed "fractional ownership."

2.1.28 The meeting recalled the APARMO has the following principal duties and responsibilities that are relevant to the assessment of non-RVSM approved operators using the Asia/Pacific airspace:

a) provide the means for identifying non-RVSM approved operators using Asia Pacific airspace where RVSM is applied, and notifying the appropriate State approval authority; and

b) establish and maintain a database containing the results of height-keeping performance monitoring and all altitude deviations of 300 ft or more within Asia/Pacific Region airspace, and to include in the database the results of APARMO requests to operators and States for information explaining the causes of observed large height deviations (reports are to include those deviations due to Traffic Alert and Collision Avoidance System (TCAS) alerts, turbulence, and contingency events).

2.1.29 In the area of safety oversight, the APARMO is watching what affects system safety with particular interest in obtaining as many reports as possible of large height deviations in the Asia/Pacific airspace where RVSM is applied. These reports can be obtained from ATC units, civil aviation authorities, Pacific operators, and other sources such as the Aviation Safety Reporting System (ASRS) that is maintained by the US National Aeronautics and Space Administration. Some of these reports, such as TCAS alerts, for example, may lead to the identification of non-RVSM approved operations in the Pacific airspace where RVSM is applied, as well as providing information in the safety oversight arena.

2.1.30 In light of the problems uncovered in examination of the State approval status of operations, the meeting agreed that the APARMO should enhance its procedures for registration of State approvals in its database to take into account the special circumstances described above. Noting that the APARMO is in the process of contacting State authorities, where appropriate, to ask that they investigate RVSM approval status of operators and aircraft whose status is otherwise unresolved, the meeting formed the following Conclusion:

Conclusion 12/1 – Observation of non-compliance of RVSM operational approval procedures

That, States are urged to co-operate with APARMO to investigate RVSM approval status of operators and aircraft with the aim of resolving problems of RVSM non-compliant operations.

2.1.31 The meeting noted the need of the APARMO to collect a 4-week sample of traffic movements in early calendar year 2002 from those Pacific FIRs where RVSM is applied in order to perform another analysis.

2.1.32 In this regard, the meeting expressed its support for such traffic data collection by the APARMO and agreed to refer this matter to the RVSM/TF for further development.

Implementation Management

2.1.33 The meeting noted that the effect of reducing RVSM had the dual results of increasing airspace capacity and allowing flight 2000 ft closer to optimum cruise levels. The economic argument for RVSM introduction would be quite different depending on the importance of airspace capacity. Within the Asia/Pacific Region there was generally a lesser emphasis on the airspace capacity problem, but a greater emphasis on cruise flight efficiency. So the economic and operational arguments for the introduction of RVSM are far less obvious to the airspace users and managers.

2.1.34 The benefits cited by operators are summarized below:

a) airlines in the North Atlantic have consistently been quoted as saying the fuel burn in the cruise was reduced between 0.5% and 1.0 % annually by being able to always fly close to the aircraft's optimum cruise level. The North Pacific routes are approximately twice the flight time of the North Atlantic, but the flight numbers are about half, therefore flight hours per annum in each of these airspace is approximately equal. The fuel tonnage burned on the Pacific is however, greater as the average aircraft size is significantly greater due to the predominance of the larger B747 in the Pacific Ocean operations;

b) one airline in the Asia/Pacific region did their own pre-1000 ft vertical separation minimum implementation study in 1997 and came up with the familiar 0.5% to 1.0 % reduction in fuel burn number for their fleet in Australasian operations, based on flight efficiency in the cruise, not airspace capacity reasons. IATA considered that, using the North Atlantic and Australasian examples of a percentage fuel burn reduction using optimum flight levels to calculate a North Pacific economic result, would probably be valid. The fuel burn reduction would be applicable to the 203 average flights per day across the North Pacific where the average oceanic cruise flight times are approximately eight or nine hours. This constituted about 50% of the Pacific traffic. The fleet fuel cost, at the current fuel price[1] of jet fuel, would be reduced something like US $8.0 million per year for the modest 0.5% fuel burn reduction;

1 Singapore December 2000 average

c) reduced fuel burn also translated directly into reduced air pollution and that this should not be overlooked in reporting the benefit of implementing RVSM in the region;

d) United Airlines informed that the reductions in delays had been significant since the implementation of RVSM in the Pacific Region. The delay reduction had reduced the number of missed connections for passengers at the hub airports. United Airlines also advised that they had reduced fuel burn by reducing the number of re-routes for aircraft, particularly in the North Pacific. With the ever-increasing cost of fuel, the savings amounted to millions of dollars. The most notable benefit was seen as the availability of 1000 ft climbs, particularly on the South Pacific routes; and

e) Air New Zealand noted that the availability of 1000 ft incremental flight levels had enabled the removal of the 10-minute spacing between aircraft departing Los Angeles for the South Pacific, which had been of considerable benefit.

2.1.35 After a full review of all aspects of the implementation of RVSM in the airspace of the Pacific since 24 February 2000, the meeting considered it timely and appropriate to declare full operational capability of RVSM in the Pacific.

Asia Implementation

2.1.36 The meeting noted that the RVSM/TF agreed that RVSM be implemented in the Western Pacific/South China Sea area, except for the Hong Kong FIR and the Sanya AOR on 21 February 2002, followed by the traffic flows from Asia to Europe south of the Himalayas in November 2003.

2.1.37 It was noted that the RVSM/TF/8, 9 and 11 focused on plans for implementation of RVSM in the Western Pacific/South China Sea, and began early preparation for implementation of RVSM on the major traffic flows in southeast Asia and from Asia to Europe south of the Himalayas.

2.1.38 Furthermore, the meeting was informed that the Fourth ICAO Asia/Pacific RVSM Seminar (RVSM Seminar/4) was conducted in Kuala Lumpur on 25-27 April 2001 and attended by 95 participants. The purpose of this seminar was to provide information regarding aircraft and operator approval, safety and monitoring considerations, air traffic management considerations, and air traffic control procedures and training experience in preparation for the Western Pacific/South China Sea implementation.

Cost Benefit Analysis

2.1.39 The meeting was provided with information concerning the benefits and costs associated with RVSM implementation examined by the RVSM/TF in accordance with the current Terms of Reference of the Task Force. Based on the November 2000 traffic sample of operations in the Western Pacific/South China Sea reported at RVSM/TF/9, and an assessment of fuel-burn reduction presented at RVSM/TF/8, an annual savings of roughly US $8 million in fuel costs is forecasted after RVSM implementation in the Western Pacific/South China Sea area. In conjunction with RVSM implementation costs of US $10.4 million presented at the meeting, it was thus possible to forecast that introduction of the RVSM would lead to positive benefits for operator fleets as a whole after roughly 16 months. This forecast does not include the benefits of increased revenue making payloads or the savings resulting from the reduction of ground delays. It was noted that these results

pertained to the present airspace configuration of the Western Pacific/South China Sea and did not take into account the planned November 2001 restructure.

2.1.40 Recognizing the forecast benefits from the implementation of RVSM in the Western Pacific/South China Sea area, the meeting developed the following Conclusion:

Conclusion 12/2 – Implementation of RVSM in the Western Pacific/South China Sea area

That, States are urged to continue their efforts to implement RVSM in the Western Pacific/South China Sea area in order to realize the foreseen benefits as early as possible.

2.1.41 In this regard, China wished their support to this Conclusion to be recorded in the Report.

Operational Considerations

2.1.42 The meeting noted the operational plan for the implementation of RVSM in the Western Pacific/South China Sea area, in conjunction with the revised ATS route structure for the South China Sea. All States concerned, except China and Hong Kong, China, agreed to the implementation of RVSM on 21 February 2002. China and Hong Kong, China expressed concern that the establishment of the Sanya Area of Responsibility (AOR) and the implementation of the revised ATS route structure over the South China Sea on 1 November 2001 would not provide sufficient time to train their operational staff for the implementation of RVSM operations in February 2002. China and Hong Kong, China informed the RVSM/TF that they would defer the implementation of RVSM in the Sanya AOR and Hong Kong FIR to 31 October 2002.

2.1.43 Recognizing the benefits of RVSM, the RVSM/TF decided that a phased implementation of RVSM for the Western Pacific/South China Sea area should be considered. RVSM would be implemented as planned on 21 February 2002 in the FIRs that would be operationally ready. The RVSM/TF therefore analyzed the changes in air traffic management that would be required for States to apply RVSM in the FIRs, excluding the Hong Kong FIR and Sanya AOR. It was recognized that there would be a need for another transition area from conventional vertical separation minimum to RVSM levels for aircraft operating on RNAV route L642 and vice versa on RNAV route M771 in the Ho Chi Minh FIR.

2.1.44 It was noted that Viet Nam had reviewed the impact of the transition on controller workload and operations, taking into account the traffic flow that would be expected on the routes, and had expressed their intention to implement RVSM on the planned date of 21 February 2002.

2.1.45 The meeting recognized that there would be significant benefits to implement RVSM over the Bay of Bengal and beyond, in terms of improving the availability of efficient cruising levels and reducing ground delays for flights from Asia to Europe south of the Himalayas. It was noted that the ICAO Middle East (MID) Regional Office proposed that States of the western part of Asia that were not ready to implement RVSM on 21 February 2002, join the MID Region to implement RVSM on 27 November 2003.

2.1.46 India expressed their support for the RVSM implementation in the area over the Bay of Bengal and beyond because of benefits expected, particularly from the increased availability of optimum flight levels.

2.1.47 It was also considered most desirable, not only from efficiency point of view but safety point of view, that there would be no transition area between RVSM and non-RVSM airspace along flights between Asia/Middle East and Europe.

2.1.48 The meeting confirmed that as part of the requirements for RVSM implementation, safety assessment and cost/benefit analysis will be conducted in accordance with the ICAO RVSM Manual (Doc 9574). The meeting recognized the need of traffic data collected by States in order to achieve these essential process, and urged all States in the Bay of Bengal area to participate in the future RVSM meetings.

2.1.49 In reviewing the Asia/Pacific Region RVSM Implementation Plans Status Report at Appendix A, the meeting noted that information from a few States was not available while the majority of States already indicated their intention to implement RVSM on 27 November 2003. In this regard, the meeting requested ICAO to approach the individual States to confirm their intention as soon as possible.

2.1.50 In light of the above discussion, the meeting formed the following Conclusion:

Conclusion 12/3 – Implementation of RVSM in the Bay of Bengal area and beyond in conjunction with the planned implementation in the Middle East Region

That, States are urged to implement RVSM in the Bay of Bengal area and beyond in conjunction with the planned implementation in the Middle East Region on 27 November 2003 in order to realize the end-to-end seamless RVSM operation between Asia/Middle East/Europe south of the Himalayas.

Conclusion 12/4 – Inter-regional co-ordination between the Asia and Middle East Regions in relation to RVSM implementation

That, ICAO facilitate inter-regional co-ordination between the Asia and Middle East Regions involving States concerned with the aim of joint harmonized implementation of RVSM.

Airworthiness and Aircraft Operations

2.1.51 The meeting was informed that 57 percent of flights in the Western Pacific/South China Sea area are currently conducted by RVSM approved aircraft. It was also informed that based on a survey conducted by IATA, most airframes in the Western Pacific/South China Sea area would be RVSM approved before 21 February 2002. The meeting noted that operators should take steps to obtain RVSM approval, as soon as possible, in order to meet the requirement that 90 percent of flights be projected to be conducted by RVSM approved aircraft.

2.1.52 The meeting noted that the APARMO had received additional data from FIRs and had used a sample from the Bangkok, Calcutta, Chennai, Karachi, Kuala Lumpur, Lahore, Mumbai, Palam, and Tehran FIRs to characterize the traffic movements of Asia/Europe south of the Himalayas. This sample was considered in conjunction with the APARMO database of State RVSM approvals to carry out this assessment. The summary results of the assessment indicated that about 55 percent of the flights in the sample were conducted by operator aircraft pairings with full State RVSM approval.

Safety and Airspace Monitoring

2.1.53 The meeting noted the need for a sample of traffic movement data from the Western Pacific/South China Sea area to support the RVSM implementation decision-making, and agreed that all FIRs/AOR in the Western Pacific/South China Sea area planning February 2002 implementation of the RVSM should provide the APARMO with a sample of traffic consisting of all movements for the period 15 November through 14 December 2001 to reflect the planned restructure of ATS routes in the South China Sea area.

Implementation Management

2.1.54 It was recalled that prior to the implementation of RVSM in the Pacific Region, it was agreed that the next step for expansion of RVSM would be the Western Pacific/South China Sea area. In late 1999, the ICAO Regional Director, Asia and Pacific Office, wrote to the Administrator of the United States FAA seeking the continued support of the FAA for the implementation of RVSM in the Western Pacific/South China Sea area in order to provide continuity and to continue to share their experience. The level of activity requested from the FAA was to include conducting two Seminars and approximately seven Task Force meetings over a 27-month period and to end their involvement with the Western Pacific/South China Sea RVSM implementation in February 2002. The FAA agreed to support the RVSM implementation to the extent requested, and advised ICAO at that time that it would be expected that other experts within the Region would be identified to continue further expansion of RVSM in the Asia/Pacific Region.

2.1.55 The meeting was advised that the FAA would continue to provide full support to the RVSM/TF until that date. However, in order to meet other commitments after February 2002, the FAA would no longer be able to provide the level of support to the Asia/Pacific RVSM/TF that it had in the past. This would also include the services associated with the APARMO. The current FAA Chairpersons and the current APARMO would be available to work closely with the new Chairpersons/Monitoring Organization during the next two meetings in order to provide a smooth transition.

2.1.56 The meeting noted that RVSM/TF has been in the process of identifying a new Task Force Chairperson, new Chairpersons for the Work Groups as appropriate, and a new organization to provide the services associated with the APARMO as quickly as possible to allow for an adequate transition period with the current Chairpersons. After consideration, the meeting agreed that this matter should be left to the decision of the RVSM/TF with a view to finalizing at the RVSM/TF/12 scheduled in September 2001 in Indonesia.

2.1.57 In this regard, the meeting expressed appreciation to the Chairpersons of the RVSM/TF and its Work Groups for their contribution to date.

RVSM Implementation Plan Status Report

2.1.58 The meeting noted the status of the RVSM implementation plan for the Asia/Pacific Region updated by the RVSM/TF, which is at Appendix A to this Report on Agenda Item 2.1.

2.1.59 Regarding the RVSM implementation status report, the meeting noted that Indonesia plans to implement RVSM in Jakarta and Ujung Pandang FIRs in a phased manner, and this will be addressed by the RVSM/TF. The meeting was also advised that Australia plans to implement RVSM in the remaining airspace of the Brisbane FIR and the Melbourne FIR on 1 November 2001.

Future Work

2.1.60 The following tentative schedule of the RVSM/TF meetings has been agreed:

RVSM/TF/12:	10-14 September 2001 in Denpasar, Indonesia
RVSM/TF/13:	14-18 January 2002 location TBA
	Target Implementation Western Pacific/South China Sea AIRAC date 21 February 2002
RVSM/TF/14:	2 days May 2002 location TBA (Western Pacific/South China Sea Review)
RVSM/TF/15:	5 days May 2002 location TBA
RVSM/TF/16:	5 days September 2002 location TBA
RVSM/TF/17:	5 days January 2003 location TBA
RVSM/TF/18:	2 days February 2003 location TBA (Western Pacific/South China Sea Review)
RVSM/TF/19:	5 days May 2003 location TBA
RVSM/TF/20:	5 days September 2003 location TBA
	Target Implementation Asia/Europe South-of-the-Himalayas AIRAC date 27 November 2003
RVSM/TF/21:	2 days February 2004 location TBA (Asia/Europe South Himalayas Review)
RVSM/TF/22:	2 days November 2004 location TBA (Asia/Europe South Himalayas Review)

Implementation of ACAS II and pressure-altitude reporting transponders

2.1.61 The meeting was presented with the results of the second survey conducted by the Regional Office in August 2000 in follow-up to the request of ATS/AIS/SAR/SG/10. This survey was intended to obtain detailed information clearly differentiating between the implementation plans for the carriage and operation of pressure-altitude reporting transponders and those of ACAS II. This was considered to be of more benefit to the airspace users in arranging their fleet modification and approval programmes to coincide with State implementation plans.

2.1.62 In reviewing the table and information provided by States at present, the meeting noted that:

a) thirteen (13) States have already mandated the carriage and operation of **pressure-altitude reporting transponders**;

b) six (6) have an implementation plan of the carriage and operation of **pressure-altitude reporting transponders**;

c) nine (9) have already mandated the carriage and operation of **ACAS but NOT ACAS II,** while two (2) have mandated the carriage of **ACAS II** specifically;

d) ten (10) have a plan to mandate the carriage of **ACAS II** specifically on or earlier dates before the worldwide applicability date of Annex 6, i.e. 1 January 2003;

e) one (1) has a plan to mandate the carriage of **ACAS II** specifically on dates after the worldwide applicability date of Annex 6, i.e. 1 January 2003; and

f) nineteen (19) States and Territories have not replied.

2.1.63 The updated tables concerning the implementation plans for the carriage and operation of pressure-altitude reporting transponders and those of ACAS II are at Appendices B and C respectively to the Report on Agenda Item 2.1.

2.1.64 The meeting recalled two APANPIRG/11 Conclusions

Conclusion 11/6 – Mandatory Carriage and Operation of Pressure-Altitude Reporting Transponders

That, States take immediate steps to mandate the carriage and operation of pressure-altitude reporting transponders within all FIRs in the Asia/Pacific Region.

Conclusion 11/7 – Implementation of ACAS II

That States;

a) promulgate their implementation plans mandating the carriage and operation of ACAS II; and

b) Where this is in advance of the globally agreed date of 1 January 2003, provide for the continuing use of TCAS with Version 6.04A logic with a transition plan to phase out systems with Version 6.04A logic by 1 January 2002.

2.1.65 The meeting noted that the ICAO Council, upon reviewing the Report of APANPIRG/11, had noted the APANPIRG Conclusion 11/7 and in view of the slow progress of its implementation, requested the Secretary General to urge States to take action to mandate the carriage of ACAS II by the globally agreed date of 1 January 2003.

2.1.66 To this end, the meeting re-confirmed the importance of the Conclusion 11/7. Also the meeting reiterated the critical importance of aircraft not equipped with a pressure-altitude reporting transponders not being permitted to share airspace used by aircraft equipped with airborne collision avoidance systems. The performance of ACAS II is totally dependent on all aircraft in the vicinity being equipped with pressure-altitude reporting transponders, in order to detect conflicting traffic and offer resolution advisories.

2.1.67 In this connection, the meeting noted that Annex 6, Part 1 (International Commercial Transport-Aeroplanes) contains a Standard which states:

> *"All aeroplanes shall be equipped with a pressure-altitude reporting transponders which operates in accordance with the relevant provision of Annex 10, Volume IV."*
>
> *Note.- This provision is intended to improve the effectiveness of air traffic services as well as airborne collision avoidance systems.*

2.1.68 In light of the above requirement and the safety concern, the meeting considered it necessary that situations where States had not established the requirement for the carriage and operation of pressure-altitude reporting transponders specified as a Standard in Annex 6, be listed as a "Deficiency" in the list of air navigation shortcomings and deficiencies in the Asia/Pacific Region.

2.1.69 The meeting noted that the existing ICAO Regional Supplementary Procedures in relation to the carriage of pressure-altitude reporting transponders and ACAS II in the MID/ASIA and PAC contained the word "shall" which is to be used to indicate a Standard, while the word "should" is used for a Recommended Practice. It was also noted that the Regional Supplementary Procedures do not have the same status as Standards and Recommended Practices.

2.1.70 Accordingly, the meeting considered it appropriate to replace the word "shall" with "should" in the relevant procedures pertaining to the carriage of pressure-altitude reporting transponders and ACAS II in the Regional Supplementary Procedures.

2.1.71 Furthermore, the meeting confirmed that the carriage and operation of ACAS is not required for RVSM operations in any airspace. However, because RVSM affects ACAS operating characteristics, it is required that pilots be trained on ACAS operating characteristics in a RVSM environment.

2.1.72 In addition, the meeting was reminded that when States are planning the implementation of ACAS II with respect to specific portions of airspace, consideration should be given to the needs of State aircraft.

Implementation of ATS Routes

2.1.73 The meeting was advised that the ATS/AIS/SAR/SG/11 was presented with a list of ATS routes which had not been implemented, including ATS routes which had been implemented, but not in accordance with Air Navigation Plan (ANP) requirements.

2.1.74 In reviewing the above list, the meeting identified shortcomings and deficiencies related to ATS route network in the Asia/Pacific Region, and included those non-implemented ATS routes as shortcomings in the list of air navigation shortcomings and deficiencies.

2.1.75 The meeting noted that since APANPIRG/11, no further updated information including the action agreed to be taken by States concerned has been provided to the Regional Office by States despite the APANPIRG Conclusion 9/8 which calls upon States to provide information regarding implementation, re-alignment and decommissioning of ATS routes to the Regional Office by 30 April of each calendar year.

2.1.76 The meeting noted that ANP amendment proposal APAC 95/16-ATS (revised ATS route structure across the South China Sea) was approved by the President of the Council on 7 May 1997. This amendment deleted or amended most of the existing ATS routes and introduced a system of RNAV routes. Since States concerned agreed to implement the revised South China Sea ATS route structure, with some modification on 1 November 2001, the South China Sea ATS Route Structure Implementation Task Force (SCS/TF) has been progressing significant work and co-ordination in order to implement the route structure on the agreed date. As such, the ANP no longer lists the requirement for the existing route network, which will be in place until 1 November 2001, and the updated list does not include routes associated with APAC 95/16-ATS.

2.1.77 The meeting noted that Pakistan had agreed in principle to the establishment of EMARSSH related ATS routes in both the Karachi and Lahore FIRs to complement the route structure from Asia to Europe and the Middle East.

2.1.78 In addition, the meeting was advised by Pakistan that they propose to change an ATS route of their domestic route structure to an international route designator to allow airlines to transit Pakistan airspace from North America and the polar route system via China to South Asia.

Revised ATS route structure - Asia to/from Europe/Middle East, South of the Himalayas

2.1.79 The meeting recalled that the EMARSSH project was approved by APANPIRG/11 (C11/10, C11/11, C11/12), and subsequently noted by the Air Navigation Commission (ANC) and the ICAO Council.

2.1.80 The meeting noted that to progress this project, it was decided to hold sub-regional Task Force meetings, guided by a small Core Team, in various locations to develop the proposed route structure in a phased approach commencing with the section from Australasia to Southeast Asia then working westwards across the Bay of Bengal, through India, then branching to Pakistan and Afghanistan for Northern European destinations, through I.R. Iran to Southern European ports or across the Arabian Sea to the Middle East.

2.1.81 The meeting was advised that three EMARSSH Task Force meetings had already been held this year. A summary of activities and actions taken at these meetings was provided.

EMARSSH TF/1 meeting – Brisbane, Australia, 5-9 February, 2001

2.1.82 The meeting noted that EMARSSH TF/1 decided to restrict the area under consideration to a block of airspace from Australasia to South East Asia, which covered routes from Australia/New Zealand to South East Asia with the eastern limit being the Philippines, western limit Sri Lanka and the northern limit to join the South China Sea revised ATS route structure which was being developed by the South China Sea Task Force.

2.1.83 The area west of Australia was not considered. It was recommended that subsequent EMARSSH Task Force meetings would address the traffic requirements of this area where appropriate.

2.1.84 City pairs were identified based on major traffic flows. Routes were reviewed between these identified city pairs and proposals made for some route segments to be realigned, as well as additional routes developed where necessary.

2.1.85 In order to provide uniform guidance to States a generic checklist for RNP implementation was developed as follows:

Regulatory requirements

a) **State approvals** – airworthiness and operational approval

b) **Monitoring requirements** – monitoring of navigational errors and identification of a Central Reporting Agency;

c) **Survey of RNP10 compliance**- survey of aircraft population and assessment of whether the 90% figure used in the Pacific as the minimum percentage required for implementation is appropriate; and

d) States should give due considerations to the following:

i. Use of WGS-84 as the standard datum for RNP airspace/routes and to ensure that the source data is reliable and accurate;

ii. Determination of RNP value to be applied (RNP 10 / RNP 4);

iii. RNP area of application – could be defined by route, geographically and vertically, taking into account domestic/international movements, update capability from ground based navigation aids and transition areas;

iv. Identification of transition areas between RNP and non-RNP airspace should ideally be in an area of radar surveillance when transitioning between the different separation criteria;

v. Assessment of whether the RNP application should be in exclusive (non-RNP aircraft may not flight plan into the airspace) or non-exclusive airspace (non-RNP aircraft may flight plan);

vi. Assessment of communication capability within the airspace to determine what lateral and/or longitudinal separations can be applied;

vii. Safety assessment of the airspace prior to implementation; and

viii. Update AIP documents.

Aircraft operator requirements

i. Pilot training material; and

ii. RNP approval programme.

ATS requirements

i. Indication of aircraft RNP status (equipment suffix) to ATC on flight progress strips/aircraft situation displays;

ii. ATC training and guidance material - operational material including RNP concept of operations and contingency procedures;

iii. Review radar and VHF coverage to ensure that the air traffic services available on the revised routes are appropriate prior to the EMARSSH route implementation date;

iv. Need to assess CNS/ATM requirements for the introduction of RNP.

v. Establishment of RNP routes does not necessarily require additional communications, navigation and surveillance enhancements. However, where reduced separation minimum is incorporated with RNP, (e.g. 50 NM Longitudinal in RNP 10), then direct controller/pilot communications (DCPC) must be met. This may require States to review their current level of equipage; and

vi. For enhancement of air safety, States are encouraged to consider ADS and CPDLC, particularly in areas of poor surveillance and communication.

ICAO Requirements

a) ICAO to determine if an amendment to *Regional Supplementary Procedures* (Doc 7030) and Basic ANP/FASID are required.

2.1.86 The meeting was advised that RNP airspace is not necessarily required for the implementation of the EMARSSH route structure, although in some areas, RNP may be necessary to allow separation to be reduced, for example, implementation of RNP 10 to allow lateral route spacing of 50 NM. Implementation of RNP 10 would most likely be over the oceanic and remote areas outside radar coverage. States should be encouraged to implement RNP in areas where there is a benefit such as the reduction of protected areas between parallel or near parallel tracks.

EMARSSH TF/2 meeting – Bangkok, Thailand, 12-16 March 2001

2.1.87 The meeting noted that EMARSSH TF/2 decided that the area under consideration would be restricted to the Bay of Bengal, India and North to Nepal. ATS routes in Pakistan were not reviewed as Pakistan was not represented. However, the EMARSSH route structure had been addressed by Iran, Pakistan and IATA in IATA Joint Route Development Group (JRDG) meetings with each State held prior to EMARSSH TF/2.

2.1.88 The meeting was advised that ATS routes based on major South East Asia and Europe/Middle East city pairs proposed by IATA had been used as a starting point in developing a new EMARSSH route structure across the Bay of Bengal westwards. These routes are shown in a chart at Appendix D to the Report on Agenda Item 2.1. It was realized that the routes interfacing with Middle East Region over the Arabian Sea would be subject to further discussions at the EMARSSH TF/3 meeting. On the eastern shoreline of the Bay of Bengal, additional work will be required on transitions between the new routes and the existing route network.

2.1.89 The meeting noted that in order to implement RNP10, a safety assessment was required, together with the establishment of an aircraft navigational error monitoring programme. The Task Force decided to refer the appointment of a Central Monitoring Agency (CMA) and the completion of a Safety Case Analysis to the ICAO Asia/Pacific Regional Office for further action.

Letters of Agreement (LOA) for the monitoring of aircraft navigation errors within the airspace concerned would be required between implementing States.

2.1.90 It was decided that the methodology and the format relating to data required shall be determined in co-ordination with the CMA and the Safety Analyst.

2.1.91 The meeting was informed that the MID Region was implementing RNP 5 on selected priority routes on 22 March 2001 as phase 1, and further implementation of phase 2 RNP 5 would take place on 22 March 2002. The United Arab Emirates (UAE) had offered to be the designated Air Navigation Error Monitoring Agency for the MID Region.

Required Navigation Performance (RNP) – Airworthiness and Operational Approval

2.1.92 The meeting noted that the *Manual on Required Navigation Performance* (Doc 9613) was available for States to assist in the implementation of RNP. It was also noted that the *South Pacific Operations Manual* (SPOM) addresses RNP and is available on the Internet. This material complements ICAO *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region.*

2.1.93 It was further noted that there was now new ICAO guidance material (Doc 9613, Appendix E) relating to airworthiness and operational approval for RNP 10 operational approval. This was based on the procedures developed by the Federal Aviation Administration (FAA), USA and the Civil Aviation Safety Authority of Australia (CASA). Also this material had been placed on the web sites listed below:

http://www.faa.gov/ats/ato/rnp.htm
http://www.casa.gov.au/avreg/rules/download/caaps/ops/rnp10.pdf.

Exclusive/Non-Exclusive RNP Airspace

2.1.94 The issue of whether RNP Designated Airspace should be Exclusive or Non-Exclusive was considered. Where airspace cannot be designated as exclusive, the States would consider introduction of a vertical limit to define exclusive and non-exclusive airspace.

Publication of Aeronautical Information Circular (AIC) and other documentation

2.1.95 The meeting was informed that the need for early notification of the introduction of RNP Routes/Airspace, through publication of an AIC to give sufficient advance notice of intent to the airline operators and other users was recognized. It was agreed by the Task Force that State AICs should be published as soon as possible, but in any case no later than 1 November 2001.

2.1.96 It was noted that there was a requirement for documentation to be in place as per the Implementation Work Program. This documentation includes:

a) AIC
b) Operational Letters of Agreement
c) AIP Supplement
d) Amendment of Doc 7030
e) Charts (including SIDs and STARs)
f) Training syllabus
g) ATC Procedures

2.1.97 The meeting noted that EMARSSH would adopt the model of the Navigational Error

Monitoring Letters of Agreement used successfully by the South China Sea Task Force.

Contingency Procedures

2.1.98 The meeting noted that the Task Force considered that appropriate Contingency Procedures should be published in relevant documentation, in addition to that published in Doc 7030.

2.1.99 Contingency procedures which should be considered, include:

a) weather Deviations
b) navigational errors
c) environmental factors (e.g. volcanic activity)

Training considerations

2.1.100 The Task Force considered that the list of training considerations developed by the South China Sea Task Force would be also suitable, with some variations, for the EMARSSH project.

Military considerations

2.1.101 The meeting was advised that within the area of consideration, there are many military areas, which may affect EMARSSH implementation.

2.1.102 The benefits that could be achieved through the application of reduced lateral separation standards associated with ATS Routes within designated RNP 10 airspace and adjacent military airspace was considered to be a benefit.

HF congestion

2.1.103 The Task Force appreciated that HF congestion was a problem in the area. It was noted that HF congestion could be reduced through several means, including:

a) reduction in the number of mandatory reports, by ensuring that Reporting Points are appropriately spaced (i.e. not too close);

b) the adherence to standard R/T procedures and phraseologies;

c) a review of R/T requirements for aircraft entering neighbouring FIRs (e.g. inbound reports prior to the FIR Boundary);

d) judicious use of the available MWARA frequencies.

2.1.104 The Task Force acknowledged that HF congestion was expected to be reduced through the increased use of CPDLC/ADS and enhancement of VHF coverage by installation of appropriate RCAG stations.

2.1.105 The meeting noted that the possibility of using existing CPDLC facilities for traffic operating on adjacent ATS routes should also be explored.

RVSM

2.1.106 The Task Force considered that the implementation of RVSM, planned for 27

November 2003, will further enhance the airspace capacity available under the EMARSSH Route Structure.

Implementation

2.1.107 The meeting noted that implementation of the EMARSSH project is planned for 28 November 2002, however States may consider implementing EMARSSH Routes on a Sub-regional basis at an earlier date subject to harmonization with the present route structure and agreement between States concerned. The meeting was informed that the section of airspace Australasia to Southeast Asia is planned to be implemented in November 2001.

EMARSSH Web-site

2.1.108 The meeting was advised that the benefit of establishing a web site for facilitating inter-State co-ordination, documentation and project management had been encouraged.

EMARSSH TF/3 meeting – Cairo, Egypt, 7-11 May 2001

2.1.109 The meeting noted that the Asia/Pacific members of the Core Team for the EMARSSH project attended this meeting to assist the Middle East in formulating a standardized and harmonized approach to the on-going project.

2.1.110 The Task Force agreed that the segment from Pakistan westwards through the Middle East region to the EUR boundary would be a suitable area for this meeting to consider the EMARSSH route structure. The Task Force focussed on Asia/Europe long-haul traffic flows and also some long-haul requirements from MID Region to either Asia or Europe, which had not as yet been addressed.

2.1.111 The meeting was advised that some segments of the route structure discussed at EMARSSH TF/2 required review and harmonization with the existing MID route structure to take into account MID region requirements. This caused little change to the overall structure previously developed. The EMARSSH provisional route networks within the Middle East Region is provided in a chart at Appendix E to the Report on Agenda Item 2.1.

2.1.112 It was brought to the attention of the meeting that there are significant differences between RNP 5 and RNP 10. RNP 5 approval does not automatically qualify an aircraft for RNP 10 operations, nor vice versa.

Transition between RNP 10 and RNP5 airspace

2.1.113 Under EMARSSH, RNP 10 air routes/airspace may have to interface with RNP 5 designated routes/airspace, as is the case coming from or going into the Arabian Sea area. It was considered essential that the transition point between RNP 10 and RNP 5 airspace occurs within the rated coverage of the referenced ground-based navigational aids.

Annotation of RNP requirements on charts

2.1.114 The meeting noted that until such time as guidance material relating to the annotation of RNP requirements on charts is published in the *Aeronautical Chart Manual* (Doc 8697), the following procedures should be adopted by the States:

a) where an RNP requirement applies to all routes within the boundaries of some defined airspace, the chart should contain a conspicuous note indicating the

RNP requirement and the vertical limits within which it applies;

b) where the RNP type is applicable only to individual routes or route segments, the RNP type should be indicated in association with the route designator in each applicable segment. Where the RNP requirement applies to all levels on the route, the RNP requirement should precede the vertical limits. Where the RNP requirement applies only to certain flight levels, the vertical limits for the route should be specified first, followed by the RNP requirement, followed by the vertical limits within which the RNP requirement applies.

Dynamic transition from old to new route structure

2.1.115 The meeting was advised that the experience of other regions/States who implement various RNP types prior to 28 November 2002, should be used as guidance for transition to EMARSSH route structure. Other examples where similar transition planning has been undertaken, included the South China Sea restructure, and the Y2K transition procedure. This latter procedure covered route structures over a wide area, similar to EMARSSH. Industry/airline advice and guidance would be sought to encourage a harmonized transition.

EMARSSH AIP Supplement - Model

2.1.116 The meeting noted that there was a need for a standardised notification to industry and ATS providers, of the changes associated with the implementation of the EMARSSH Route Structure.

Develop a co-ordinated action plan for the implementation of actions agreed by the meeting

2.1.117 The implementation plan of actions required for the development of the EMARSSH Route Structure and the introduction of RNP 5 and RNP 10 routes/airspace was considered. The meeting agreed that separate Task Lists and Schedules should be prepared for both the Asia/Pacific Region, and the Middle East Region. These are attached at Appendix F to the Report on Agenda Item 2.1.

2.1.118 The meeting noted that there were three traffic flows affecting the Middle East to be considered within the EMARSSH project. These traffic flows are between Asia and Europe, Asia and the Middle East Gulf States and the Middle East and Europe. It was noted that implementation is planned for 28 November 2002 however, States may consider implementing EMARSSH Routes on a coordinated Sub-regional basis at an earlier date.

2.1.119 The meeting noted the work already achieved in the three Task Force meetings to date. The meeting was advised that two further meetings have been planned for 2001. EMARSSH TF/4 is scheduled to be held in Paris in October, concentrating on the continuance of the route structure through the Southern CIS to the Black Sea. TF/5 has been planned to be held in Delhi, India in November. At this meeting, the Task Force will review the foundation which has been developed within Asia/Pacific and Middle East Regions and put in place the building blocks that would still be required to achieve the scheduled implementation date.

2.1.120 The meeting recalled that the EMARSSH project is an initiative of the participating States and international organizations and had been recognized by ICAO as a significant development that facilitates inter-regional co-operation to improve the ATS route structure from Asia to the Middle East and Europe. The project had been designed to ensure the provision of safe uniform procedures on an inter-regional basis. It was acknowledged by all concerned that the full implementation of the

proposed route system would result in benefits in terms of safety, efficiency and capacity enhancements that meet the objectives envisaged in the ICAO Global Air Navigation Plan for CNS/ATM Systems. To achieve the objective of the project, all concerned should be fully committed to early completion by the implementation date of 28 November 2002.

2.1.121 Taking into account the work already completed as well as further work to be done in Task Force 4 and 5 this year, the meeting formulated the following conclusion:

Conclusion 12/5 – Implementation of the EMARSSH Project

That, to gain benefits in terms of safety, efficiency and capacity enhancements that meet the objectives envisaged in the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750), participant States and international organizations concerned are urged to make full commitment to the EMARSSH project to meet the implementation date of 28 November 2002.

ATS Contingency Plans

2.1.122 The meeting noted that matters associated with the development and distribution of ATS Contingency Plans were considered by ATS/AIS/SAR/SG/11. This was particularly in relation to the exchange of Contingency Plans between States in order for a neighbouring State that might be able to provide assistance during a contingency, and be aware of what assistance or services might be required for example, the provision of communications or SAR alerting services.

2.1.123 The meeting noted that the ICAO Regional Office initiated action in 1995 for States to prepare ATS Contingency Plans. These plans proved to be extremely useful during the lead up to the Y2K rollover and should be used as the basis for the development of National ATS Contingency Plans. This matter is an ongoing item listed in the APANPIRG reports (C10/37) relating to the development of ATS Contingency Plans.

2.1.124 The meeting noted that a proposal for ATS Contingency Plans to be exchanged between States when necessary was presented and agreed at THE ATS/AIS/SAR/SG/11, noting that these plans would normally be coordinated between appropriate States during the development work.

2.1.125 In this context, the meeting was of the view that, given the ongoing APANPIRG item (C10/37) for the development of ATS Contingency Plans, the coordination activities that would normally take place during the development of these plans, and the likelihood that ATS Contingency Plans are already being exchanged when necessary, little further action needed to be taken by States for the moment.

2.1.126 The meeting also noted that the Secretariat considered that a survey of States be conducted to determine the status of contingency planning in the Region and the extent to which Contingency Plans are exchanged between States so that the magnitude of the issue can be more properly gauged.

2.1.127 The meeting therefore formulated the following Conclusion:

Conclusion 12/6 – Regional Contingency Planning Survey

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.

AIS Automation Task Force (AATF)

2.1.128 The meeting was informed that the Seventh Meeting of the AIS Automation Task Force (AATF/7) met in Brisbane, Australia 13 – 15 February 2001.

2.1.129 It was advised that the AATF developed a draft amendment for the Asia/Pacific FASID and draft guidance material relating to a quality system for Aeronautical Information Services in accordance with the terms of reference of the Task Force.

2.1.130 The meeting noted that the AATF carried out a survey as part of the work of the Task Force to determine the degree of automation of AIS systems in the Asia/Pacific Region, and to the extent possible, the degree of compliance by the States in the Reigon with the existing *Guidance Material on the Common Operating Procedures for the Asia/Pacific Automated AIS Systems*. Detailed results from the survey are summarized below:

a) Thirty-two (32) States/Territories out of forty-one (41) States responded to the Survey;

b) Sixteen (16) States have automated their AIS systems, and eight (8) States have a plan to automate;

c) Three (3) States have introduced a quality system with ISO 9000 certification, seven (7) States have a quality system in place without ISO 9000 certification;

d) Eleven (11) States have a plan to introduce a quality system with ISO 9000 certification;

e) Fourteen (14) States have an established aeronautical database, a further thirteen (13) States have a plan to establish an aeronautical database;

f) Eight (8) States are ready or will be ready to host other States' AIS;

g) Five (5) States are currently being hosted by other States;

h) Seven (7) fully utilize the Guidance Material, ten (10) partially use the material and twelve (12) did not make use of the material at all;

i) AATF/7 noted the results of the survey and considered that the following actions should be taken;

j) Facilitate an AIS Seminar to assist States understand the relevance and importance of aeronautical data and information;

k) Facilitate the provision of guidance material for quality systems which provides information about ISO 9000 certification; and

l) Working with individual States to provide guidance and assistance.

2.1.131 With regard to the draft amendment for inclusion in the Asia/Pacific FASID, PART VIII-AIS/MAP (Term of Reference a) of AATF refers), this matter was addressed with the development of a tabulated template for States to complete for inclusion in the FASID. Parts of the

matrix were left blank and the draft will require further input from the States to take it to a point of completion. The table that was developed is intended to provide a "snap shot" of the way in which services are provided in the Asia/Pacific Region, and to act as an inventory by which these services can be monitored as part of the quality system for continuous improvement.

2.1.132 The content of the amendment would provide a catalyst for the production of a wide ranging description of how the Integrated Regional Automated AIS System (IRAAS) in the Asia/Pacific Region operates to meet the extensive needs and requirements of air traffic in the Region and to meet the current and emerging CNS/ATM requirements for accurate, high-quality and timely aeronautical data and information.

2.1.133 The meeting noted that the draft amendment incorporating advice from the ATS/AIS/SAR/SG/11 meeting was forwarded to the CNS/MET/SG/8 meeting for further technical consideration relating to the communication requirement for integrated regional automated AIS system in accordance with the Terms of Reference. It was advised that the results of review by the CNS/MET/SG/8 meeting has been communicated the Chairperson of the ATS/AIS/SAR/SG from the Chairperson of the CNS/MET/SG.

2.1.134 The meeting reviewed the Draft Guidance Materials for AIS in the Asia/Pacific Region, noting the importance of this work towards the globalization of ATM.

2.1.135 The meeting noted that in addition to the requirements for Quality Systems described in Annex 15-*Aeronautical Information Services*, Chapter 9 of *the Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750-AN/963) makes the following comments:

> "9.4 The role and importance of aeronautical information/data has changed significantly with the implementation of RNAV, RNP and airborne computer-based navigation systems. These systems are all data-dependent, and in that respect aeronautical data have become the crucial and critical components of the system. Consequently, corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation. In this respect, as of 1 January 1998, each Contracting State must take necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each functional stage of the data process. Established quality systems must provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy established requirements for data quality (accuracy, resolution and integrity) and timeliness."

2.1.136 The meeting recognized the role of the AIS is one of the foundation building blocks for the successful transition to a global ATM system. At the core of this building block lies the Quality System that will provide quality and timely aeronautical data and information to the aviation community.

2.1.137 It was noted that Annex 15 recommends that:

> "3.2.2 **Recommendation** - *The quality system established in accordance with 3.2.1 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and certified by an approved organization.*
>
> *Note.- International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a*

quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization."

2.1.138 The meeting was advised that the results of the AIS Automation survey in paragraph 2.1.130 indicates that a number of States have yet to implement a quality system for AIS.

2.1.139 In this regard, the meeting considered that a range of Guidance Material developed by the AATF based on the ISO 9000 series of standards will assist States in the development of their own quality systems.

2.1.140 The draft guidance materials were structured to incorporate a number of separate components into one volume.

Title: ***Guidance Manual for Aeronautical Information Services in the Asia/Pacific Region***

Part 1: AIS Quality Systems

- Guidance Material – A Quality System for AIS
- Sample Quality Manual
- QA Implementation Planning Template *(Ver. 1.1)*

Part 2: Selection and Training Guidelines for AIS Personnel

Part 3: Common Operating Procedures for Automated AIS Systems

Part 4: Use of the Internet for Information Transfer

2.1.141 The meeting noted that at the ATS/AIS/SARSG/11 meeting a number of States sought the early release of the Draft Guidance Material for use to enhance AIS activities in the Region. Considering that the Draft Guidance Material developed by the AATF had reached a stage of maturity suitable for distribution to States within the Region after review and understanding that any advice or comment that might be forthcoming from Headquarters would, where appropriate, will be incorporated into the Draft Materials before publication, the meeting formulated the following Conclusion:

Conclusion 12/7 – Guidance Manual for Aeronautical Information Services in the Asia/Pacific Region

That, the *Guidance Manual for Aeronautical Information Services in the Asia/Pacific Region* shown at Appendix G to the Report on Agenda Item 2.1 be published in accordance with the established procedures.

2.1.142 The meeting considered that further work regarding the application of the Asia/Pacific regional guidance material would also benefit from further exposure at an AIS Seminar. In this regard, noting that ATS/AIS/SAR/SG already listed an AIS seminar in 2002 in its Task List in pursuant of APANPIRG C2/31, and recognizing requests expressed by States, the meeting placed an special emphasis on the need of AIS Seminar as a Special Implementation Project (SIP) in 2002 and formulates the following Conclusion:

Conclusion 12/8 – Special Implementation Project for an AIS Seminar in 2002

That, ICAO urgently consider a proposal for an Asia/Pacific Special Implementation Project to be established in order to hold an AIS Seminar in 2002 with the primary objective to improve AIS in relation to AIS automation and quality assurance programme.

2.1.143 The meeting also noted that the AATF has been undertaking a task to develop a concept concerning the use of Extensible Markup Language (XML) for the transfer of aeronautical data and information, which will form the Part 4 of the AIS Guidance Manual when it becomes mature enough.

2.1.144 The meeting expressed its appreciation to members of the AATF for the valuable work that had been done to enhance AIS practices and procedures in the Asia/Pacific Region.

Implementation of WGS-84

2.1.145 The meeting recalled that APANPIRG/11 developed the following Conclusion:

Conclusion 11/5 - Uniform format for the reporting of WGS-84 implementation

That States adopt the table available at the Appendix E (to the Report of APANPIRG/11 on Agenda Item 2.1) as a uniform format for reporting of WGS-84 implementation.

2.1.146 The meeting also noted that the fourth meeting of ALLPIRG/Advisory Group (ALLPIRG/4) developed a similar Conclusion as follows:

Conclusion 4/7 - Adoption of a uniform format for the reporting of WGS-84 implementation

That the table at Appendix D to the report (of ALLPIRG/4) on Agenda Item 2 be adopted as a uniform format for the reporting of WGS-84 implementation by PIRGs and States.

2.1.147 In addition, the meeting recalled APANPIRG Conclusion 9/2, which states:

Conclusion 9/2 - Transition to WGS-84 in the ASIA/PAC Region

That, in order to achieve uniformity in aeronautical data publication across the Regions, those States which have not yet determined and published WGS-84 data, urgently undertake to complete the task in the shortest possible time frame.

2.1.148 The meeting was informed that the Regional Office forwarded the new format with State Letter T3/10 – AP-ATM0834 dated 22 December 2000 and requested States and Territories in the Asia/Pacific Region to submit up-to-date and detailed information related to their WGS-84 implementation status. The results were presented at the ATS/AIS/SAR/SG/11 meeting and CNS/ATM/IC/SG/8 meeting and further updated.

2.1.149 In reviewing the table which is at Appendix H to the Report on Agenda Item 2.1, the meeting noted that the majority of States and Territories provided the required information; however there was still missing elements in the table. In this connection, the meeting urged States to provide information as required to the ICAO Regional Office as soon as possible.

2.1.150 IATA voiced their concern to the overall status of WGS-84 in the Region and the lack of action plans by some States. Aircraft rely on FMS databases, which rely on WGS-84. Therefore, WGS-84 has to be considered as an essential building block to CNS/ATM. IATA noted that the ICAO Shortcomings and Deficiencies programme is an available option to allow ICAO to work with States in developing WGS-84 action plans and identifying the necessary resources to assist in the implementation of WGS-84.

SSR Code Management in Asia/Pacific

2.1.151 The meeting was informed that following the directives from ATS/AIS/SAR/SG/10, the Secretariat took appropriate action to amend the text in the *ASIA/PAC SSR Code Management Plan (CMP)* in Part V – ATM of the FASID when the final draft of the new ASIA/PAC FASID was forwarded to ICAO HQ for approval in late 2000.

2.1.152 The meeting was advised that amendment to the SSR Code Allotment Table in FASID will be initiated after the first edition of the new Basic ANP and FASID are published.

2.1.153 The meeting noted that as there had been no request of SSR codes forwarded to the Regional Office, the SSR Code Management Task Force had been suspended until further notice.

Proposed Amendments to the *Regional Supplementary Procedures*

2.1.154 A question was asked on the status of the proposals for amendment to the *Regional Supplementary Procedures* (Doc 7030) (Serial No. APAC-S 98/11-MID/ASIA/PAC RAC and Serial No APAC-S 98/12-MID/ASIA/PAC/RAC) for 50 NM lateral and longitudinal separation minima. The meeting was informed that these proposals originated by APANPIRG, had been circulated to States and International Organizations on 29 November 1999 and submitted to ICAO Headquarters on 24 March 2000 for processing. Subsequently, an objection had been received from an international organization on technical problems they had with the proposals. As result of this objection, the proposals were not progressed.

2.1.155 The meeting noted that the Review of the General Concept of Separation Panel (RGCSP) had been developing revised mathematical models applicable to the 50 NM separation minima, and it would be necessary to wait the outcome of the RGCSP studies to resolve the outstanding problems. The tenth meeting of RGCSP in May 2000 revised the collision risk models applicable to 50 NM separation and these were approved by the Air Navigation Commission in November 2000.

2.1.156 The meeting was advised that the proposed amendments to the PANS-RAC recommended by RGCSP/10 were presently being circulated to States and international organizations for comment. When these proposals were approved by the Council with an applicability date in November 2002, it would be necessary to revise proposed SUPPS amendments APAC-S 98/11 and APAC-S 98/12 to be in line with the PANS-RAC amendment. The Secretariat will take action to revise the proposals to be applicable coincident with the November 2002 PANS-RAC amendment.

Implementation of Lateral Offsets in Oceanic and Remote Area Airspace

2.1.157 It was brought to the meeting's attention that guidelines on the use of lateral offsets were issued by ICAO by State letter (AN 13/11.6-00/96) dated 3 November 2000. These guidelines provided technical material intended to assist States and planning and implementation regional groups (PIRGs) to identify routes and airspace where application of lateral offsets could be authorized. The application of lateral offset procedures would mitigate against an increase in the risk of collision in the

event that vertical separation was lost when highly accurate navigation systems were used to obtain the navigation solution.

2.1.158 The material was developed by RGCSP who carried out a collision risk analysis on various route scenarios for oceanic and remote airspace where limited air traffic control service would be provided. The procedures should only be applied by aircraft operating highly accurate navigation systems, such as the global navigation satellite system (GNSS). At present, pilots were applying lateral offsets as a safety measure to reduce the risk of collision in the event of a loss of vertical separation.

2.1.159 A question was asked whether wake turbulence procedures had been taken into account, which permitted aircraft to deviate not more than 2 NM left or right of track to avoid turbulence encountered where RVSM was applied. Whereas, the ICAO guidelines recommends that an offset should be 1 NM to the right of track relative to the direction of flight. The meeting was informed that the wake turbulence procedures were contingency measures to be applied on a temporary basis, and aircraft were required to return to the route centre line once the wake turbulence was no longer a problem. In this case, RGCSP studies showed that the lateral collision risk with an adjacent track spaced at 50 NM would not be significantly affected by this procedure. However, in a route system using 50 NM lateral route spacing, a permanent 2 NM lateral offset would have an adverse effect on the lateral collision risk.

2.1.160 The meeting noted that there were a variety of multi-track route system configurations established, and the guidelines issued by ICAO would not be sufficient to address all types of operations. In particular, same direction traffic would not gain any benefit from offsetting 1 NM to the right, and it may be necessary to consider a staggered arrangement. As the ICAO guidelines only dealt with a limited operational scenario, it would be necessary to develop global procedures for all operating environments. This work was being carried out by a number of bodies such as the North Atlantic System Planning Group and the Separation and Airspace Safety Panel (SASP). The meeting recognized that providing global procedures applicable in all environments was a complex task, and it was desirable to keep the procedures as simple as possible.

2.1.161 In response to a question on whether States could introduce lateral offset procedures, the meeting was informed that it was ICAO's intent that the guidelines would be used by States to identify routes were lateral offsets could be applied to gain a safety benefit. In this regard, the ICAO guidelines would be effective when applied on single routes with opposite direction traffic and States could under the provisions of Annex 11, Chapter 3, 3.6.2.1.1 authorize aircraft to fly an offset procedure.

2.1.162 The meeting further recognized that the establishment of global lateral offset procedures for application by aircraft navigating using GNSS was becoming a significant safety concern as the number of GNSS equipped aircraft was increasing, and in some airspaces this was a significant number. In this regard, the meeting agreed that there was some urgency in progressing this work, and a task should be established under the ATS/AIS/SAR Sub-Group to examine the use of lateral offsets for application in the region. Also, it was important to establish close co-ordination with other groups involved in such work to avoid a proliferation of procedures.

2.1.163 In light of the foregoing, the meeting developed the following Decision:

Decision 12/9 – Development of lateral offset procedures for application in the Asia/Pacific Region

That, as a matter of urgency, the ATS/AIS/SAR/SG develop lateral offset procedures for application in the Asia/Pacific Region, and in co-ordination with other regional planning groups and bodies concerned, develop global offset procedures.

Search and Rescue Matters

Analysis of SAR Capability of ICAO States in the ASIA/PAC Region

2.1.164 The meeting reviewed the table titled Analysis of SAR Capability of ICAO States in the Asia/Pacific Region and noted that it had been updated to include additional information submitted by States.

Provision of SAR and SAR Agreements

2.1.165 The meeting was advised that the ICAO Office has established a register of SAR agreements between States. The meeting also noted that ICAO has received SAR Agreements based on a multi-lateral basis between Malaysia and Singapore, Philippines, Thailand, Indonesia and Brunei Darussalam. Singapore has also provided details of their SAR Agreements with their neighbouring States namely, Malaysia, Vietnam, Thailand, Philippines and Indonesia. Australia also had a number of bilateral agreements in place with their neighbouring States.

2.1.166 Other States that have established SAR agreements or are in the process of doing so were also encouraged to complete this important task and send this information to ICAO to be included in the register.

2.1.167 The meeting considered matters associated with Search and Rescue Exercises (SAREXs) in the Region and was advised that a number of States had plans in place for SAREX to be conducted during 2001. Some of these SAREXs were to be conducted on a local basis within the State while others are planned to be conducted with participation from States in the Region.

2.1.168 The meeting noted that a number of SAREXs have been conducted successfully in the Region in the past, however, a SAREX had not been held in the Bay of Bengal area for some considerable time. In order to assist in the preparation and organization of the Seminar/SAREX, the meeting considered using the experiences of past events together with the assistance of ICAO expertise to coordinate the programme of activities of this event with the nominated States involved.

2.1.169 When considering the formulation of a Conclusion to address this issue, the meeting noted that seven (7) island States in the Pacific Region had not provided information to complete the SAR Capability Matrix, and that this area should also be considered in the Asia/Pacific SIP being contemplated to assist with Seminar/SAREX in the Region, initially for the Bay of Bengal area.

2.1.170 The meeting was advised that a Regional SAR Conference was held by the US Coastguard in conjunction with the Australian SAR organization (AusSAR) in Cairns, Australia on 13-16 August 2001. The meeting noted that the Regional Conference was very successful. Invitations to the Conference had been sent to approximately 30 countries throughout the Asia/Pacific Region.

2.1.171 The meeting agreed that SAR Seminars and SAREXs are important issues to ensure the continuity of SAR preparedness in the Region. As a consequence, the following Conclusion was formulated:

Conclusion 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.

2.1.172 The meeting noted that Australia had restructured its SAR organization in mid -1997 to combine the two aviation Rescue Co-ordination Centres (RCCs) and the Maritime RCC into a single RCC (AusSAR), which is administratively under the Australian Maritime Safety Authority (AMSA). The objective of establishing a single Australian centre to coordinate aviation and maritime search and rescue was to overcome real and perceived shortcomings in communications, coordination and the national development of the SAR system under the previous arrangements where three Rescue Co-ordination Agencies (RCAs) and two government agencies were involved. It was recognized that contemporary communications systems allowed the activities to be coordinated from the one national centre, and with a concentration of effort, there would be increased levels of efficiency and effectiveness in bringing the resources together.

2.1.173 With regard to SAR training, the meeting noted that ICAO, in partnership with the International Maritime Organization (IMO) has developed an *International Aeronautical and Maritime Search and Rescue Manual* (Doc 9731-AN/958). The first edition of the Manual, dated 1998, gives a comprehensive explanation of search and rescue organization, responsibilities and requirements, and is designed to assist States in meeting their own search and rescue needs and the obligation they accepted under the Convention on International Civil Aviation, the International Convention on Maritime Search and Rescue and the International Convention for the Safety of Life at Sea (SOLAS).

2.1.174 States were encouraged to follow the guidelines contained in Doc 9731-AN/958 so that their SAR services would be a part of a global system.

Inclusion of SIGMET in VOLMET Broadcasts in the Asia/Pacific Region

2.1.175 The meeting recalled that in pursuit of APANPIRG Conclusion 10/3 to add to the Asia/Pacific ANP a requirement for inclusion of SIGMET in VOLMET broadcast for Asia Region, a draft amendment proposal (Serial number APAC 99/9-ATS) was forwarded to concerned States, whose facility and services will be significantly affected by the proposal, for comments before it would be formally circulated.

2.1.176 It was also recalled that some States with very large FIRs indicated difficulty in transmitting SIGMET in addition to other required meteorological information in the limited timeframe of 5 minutes, though the majority of States consulted were in favour of the proposal. Since, noting the problems expected by States, IATA emphasized the needs of full SIGMET information, not partial, in order that pilots are able to make an appropriate decision in a timely manner during flights. It was agreed that IATA would consult with their member airlines to identify a possible solution and advise the Secretariat.

2.1.177 The meeting was informed that a summary of the results of the IATA survey was presented to the ATS/AIS/SAR/SG/11 meeting, but there was not any conclusive result.

2.1.178 Subsequently, IATA suggested that some brief and simple guidance should be developed as to what SIGMET information is critical to the VOLMET and what information in the whole VOLMET broadcast could be condensed and abbreviated. Some examples are:

a) information on position and movement of a tropical storm or depression;

b) volcanic activity; or

c) actual pilot reports of severe clear air turbulence (CAT) (*note: this is not referring to forecast CAT, which is subjective and rarely encountered*).

2.1.179 Since the ATS/AIS/SAR/SG was not considered as the appropriate body to discuss this technical matter in detail, reaffirming the principle to include SIGMET in VOLMET broadcast as mentioned in APANPIRG Conclusion 10/3, the meeting agreed to refer the subject to the CNS/MET/SG. Results of discussion by CNS/MET/SG are addressed under Agenda Item 2.2.

Reforms in Flight Level Assignment, Altimeter Setting Procedures and the Implementation of Status of Radar Control in China

2.1.180 The meeting was provided with the detailed information on the recent developments by the Air Traffic Management Bureau of General Administration of Civil Aviation of China (CAAC) with the aim of enhancing the safety and efficiency of air traffic control services.

2.1.181 One of the significant developments is to implement a new flight level assignment system where the vertical separation minimum is 300 meters below 8400 meters, and 600 meters above 9000 meters. With the reform of the flight level assignment that became effective on 31 July 2001, international traffic can transit from the flight level system of China to the international flight level system as specified in Annex 2 to the ICAO Convention, and vice versa, more safely and efficiently. It also makes the transfer of air traffic control with adjacent States easier and smoother.

2.1.182 The meeting noted that CAAC developed a project management programme for the implementation of radar control service along the air route A461 between Beijing and Guangzhou, and will continue their efforts to provide radar control services on the routes between Beijing and Shanghai, and between Shanghai and Guangzhou which form the busiest airspace.

2.1.183 Furthermore, it was noted that new altimeter setting procedures using QNH were implemented at 30 international airports effective on 9 August 2001.

2.1.184 The meeting recognized with appreciation the significant efforts for improvements made by China.

Update the list of ATS/AIS/SAR Subject/Tasks together with priorities

2.1.185 The meeting reviewed and updated the List of Tasks allocated to the Sub-Group by APANPIRG/11. A copy of this list is contained in Appendix I to the Report on Agenda Item 2.1. The meeting developed the following Decision:

Decision 12/11 – ATS/AIS/SAR Subject/Task List

That, the ATS/AIS/SAR Subject/Task List as contained in Appendix I to the Report on Agenda Item 2.1 be adopted as the current work assignment for the ATS/AIS/SAR Sub-Group replacing the current Subject/Tasks List as assigned by APANPIRG/11.

ASIA/PACIFIC REGION RVSM IMPLEMENTATION PLAN STATUS REPORT

Updated at RVSM/TF/11

FIR/AOR	RVSM Implementation Date	Comments
Anchorage Arctic	24 Feb 2000	RVSM Transition Airspace only
Anchorage Continental	24 Feb 2000	RVSM Transition Airspace only
Anchorage Oceanic	24 Feb 2000	
Auckland Oceanic	24 Feb 2000	
Bali	Not applicable	Subject to Indonesia upper airspace consolidation
Bangkok	21 Feb 2002	
Beijing		
Biak	Not applicable	Subject to Indonesia upper airspace consolidation
Brisbane	24 Feb 2000	Oceanic East of Australia 24 Feb 2000 Remainder of FIR 22 March 2001
Calcutta	27 Nov 2003	
Chennai	27 Nov 2003	
Colombo	27 Nov 2003	
Delhi	27 Nov 2003	
Dhaka	27 Nov 2003	
Guangzhou		
Hanoi	21 Feb 2002	Phased Implementation
Ho Chi Minh	21 Feb 2002	Phased Implementation
Hong Kong	31 Oct 2002	
Honiara	24 Feb 2000	
Jakarta	21 Feb 2002	
Karachi	27 Nov 2003	
Kathmandu		
Kota Kinabalu	21 Feb 2002	
Kuala Lumpur	21 Feb 2002	Phased Implementation – Western part 27 Nov 2003
Kunming		
Lahore	27 Nov 2003	
Lanzhou		
Male		
Manila	21 Feb 2002	
Melbourne	22 Mar 2001	
Mumbai	27 Nov 2003	

FIR/AOR	RVSM Implementation Date	Comments
Nadi	24 Feb 2000	
Naha	24 Feb 2000	Pacific Oceanic (non-exclusive RVSM airspace) Further phased implementation planned
Nauru	24 Feb 2000	
New Zealand (Domestic)	13 July 2000	Non-exclusive
Oakland Oceanic	24 Feb 2000	
Phnom Penh	21 Feb 2002	
Port Moresby	13 Apr 2000	
Pyongyang		
Sanya AOR	31 Oct 2002	
Shanghai		
Shenyang		
Singapore	21 Feb 2002	
Taegu	21 Feb 2002	
Tahiti	24 Feb 2000	Non-exclusive RVSM airspace
Taibei	21 Feb 2002	
Tokyo	24 Feb 2000	Oceanic
Ujung Pandang	21 Feb 2002	
Ulaan Baatar		
Urumqi		
Vientiane	TBD	
Wuhan		
Yangon		

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2nd Survey on Carriage and Operation of ACAS and Pressure-Altitude Reporting Transponders

(AP-ATM0551 dated 17 August 2000)

Pressure-Altitude Reporting Transponders

State/Territory	Effective date (dd/mm/yy)	Applicable airspace	Applicable to			Aeronautical Publication
			aeroplanes engaged in international air transport operations	aeroplanes engaged in international general aviation operations	helicopters engaged in international commercial air transport or international general aviation operations	
Australia	Early 1990's	Controlled airspace inside radar coverage	YES	YES	YES	AIP
Bangladesh						
Bhutan						
Brunei Darussalam	1-Jul-01	Brunei terminal control area	YES	YES	YES	
			* State aircraft as well			
Cambodia	1-Jan-03	All airspace within FIR				
China	31-Dec-00	All airspace within FIR	YES	YES	YES	To be published
Hong Kong,China	1980	Controlled airspace within Hong Kong FIR	YES	YES	YES	AIP Hong Kong GEN 1.5-2
Macau, China	2-Jan-97	Controlled airspace within Macau ATZ	All aircraft flying within Macau ATZ			AIP Macau GEN 1.5-1 dated 2 Jan 1997
Cook Islands						
DPR Korea						
Fiji						
France (French Polynesia)	23-Jan-03	All airspace within FIR	YES	YES (All aircraft in general aviation)	YES	AIP
(New Caledonia)						
India	07-9-99	All airspace within FIRs	YES	YES	YES	Civil Aviation Requirements Section2, Series "R", PART IV
Indonesia						
Japan	10-Oct-75	Airspace defined by Minister of Transportation	YES	YES	YES	AIP dated 1 Oct 1975

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(AP-ATM0551 dated 17 August 2000)

Pressure-Altitude Reporting Transponders

State/Territory	Effective date (dd/mm/yy)	Applicable airspace	Applicable to			Aeronautical Publication
			aeroplanes engaged in international air transport operations	aeroplanes engaged in international general aviation operations	helicopters engaged in international commercial air transport or international general aviation operations	
Kiribati						
Lao PDR						
Malaysia	1-Jan-03	All airspace within FIRs	YES	YES	YES	AIC 6/2000 dated 10 Mar 2000
Maldives	2002	Defined portion	YES	YES	YES	
Marshal Islands						
Micronesia, Federated States of						
Mongolia	1-Jan-02	International routes	YES	NO	NO	To be published in Dec 2001
Myanmar	1-Jan-00	All airspace within FIR	YES	YES	YES	Notice to owner T/41 dated 20 Jan 1999
Nauru						
Nepal	Not specified	Not specified	YES	YES	YES	Flight Operations Requirements, Amendment Number 2 dated 18 Feb 2000
New Zealand	01-4-97	Transponder Mandatory Airspace prescribed in NZ Air Navigation Register				Civil Aviation Rules Part 91
Pakistan	1-Jul-01	All airspace within FIR	YES			AIP
Palau						
Papua New Guinea						
Philippines						
Republic of Korea	30-Nov-94	All airspace within FIR	YES	YES	NO	Aviation Law

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(AP-ATM0551 dated 17 August 2000)

Pressure-Altitude Reporting Transponders

State/Territory	Effective date (dd/mm/yy)	Applicable airspace	Applicable to			Aeronautical Publication
			aeroplanes engaged in international air transport operations	aeroplanes engaged in international general aviation operations	helicopters engaged in international commercial air transport or international general aviation operations	
Samoa	2000	All airspace within FIR	YES	NO	NO	NOTAM will be issued on 30 Sep 2000
Singapore	Jul-81	All airspace within FIR	YES	YES	YES	AIP in 1981
Solomon Islands						
Sri Lanka						
Thailand	26-Feb-99	*All airspace within FIR:all comercial transport aeroplanes and international operation helicopters *Defined portion:all general aviation and helicopters	YES	YES	YES	
Tonga						
U.S.A.		Defined portion	The requirements are based on the location of aircraft operation, not the weight, engine configuration or type of operation of aircraft			FAR, Part 91
Vanuatu	01-1-00	All airspace within FIR	YES	N/A	N/A	
Viet Nam						

2nd Survey on Carriage and Operation of ACAS and Pressure-Altitude Reporting Transponders

(AP-ATM0551 dated 17 August 2000)

Airborne Collision Avoidance System (ACAS)

State/Territory	Effective date (dd/mm/yy)	Required TCAS types	Applicable airspace	Applicable to		Aeronautical Publication
				turbine-engined aeroplanes of a maximum certified take-off mass in excess of 15000kg or authorized to carry more than 30 passengers engaged in international air transport operations	turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5 700kg or authorized to carry more than 19 passengers engaged in international air transport operations	
Australia	01-1-00	Version 6.04 or greater until 1 Jan 2003, thereafter Version 7	All airspace within FIRs	YES	No plan	Civil Aviation Regulation and AIP
Bangladesh	1-Jan-03	Version 7				AIP will be published
Bhutan						
Brunei Darussalam	1-Jul-01	Version 7	Brunei terminal control area	YES		
Cambodia	1-Jan-03	Version 7	All airspace within FIR	YES		AIP will be published
China	31-Dec-00	Version 7	All airspace within FIR	YES	YES (On 31 Dec 2003)	To be published
Hong Kong,China	1-Jan-00	Version 6.04 until 1 Jan 2003	All airspace within FIR	YES		AIP Hong Kong GEN 1.5-2
	1-Jan-03	Version 7	All airspace within FIR	YES	YES (on 1 Jan 2005)	AIC 02/01 dated 1 Feb 2001
Macau, China	1-Jan-00	Version 7	Controlled airspace within Macau ATZ	All fixed wing aircraft registered in Macau greater than 5700 kg or certified for more than 9 passengers seats.		AIC 07/99 dated 1 Dec 1999
Cook Islands						
DPR Korea						

2nd Survey on Carriage and Operation of ACAS and Pressure-Altitude Reporting Transponders

(AP-ATM0551 dated 17 August 2000)

Airborne Collision Avoidance System (ACAS)

State/Territory	Effective date (dd/mm/yy)	Required TCAS types	Applicable airspace	Applicable to		Aeronautical Publication
				turbine-engined aeroplanes of a maximum certified take-off mass in excess of 15000kg or authorized to carry more than 30 passengers engaged in international air transport operations	turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5 700kg or authorized to carry more than 19 passengers engaged in international air transport operations	
Fiji						
France (French Polynesia)	23-Jan-03	Version 7	All airspace within FIR	YES	YES (on 1 Jan 2005)	AIP & AIC 010/00 dated 3 Aug 2000
(New Caledonia)	23-Jan-03	Version 7	All airspace within FIR	YES	YES (on 1 Jan 2005)	AIP & AIC 010/00 dated 3 Aug 2000
India	31-Dec-98	Any Version	All airspace within FIRs	Aeroplane having a maximum certified passenger seating configuration of more than 30 or maximum ***payload capacity of more than 3 tonnes***		
	1-Jan-03	Version 7	All airspace within FIRs	Aeroplane having a maximum certified passenger seating configuration of more than 30 or maximum ***payload capacity of more than 3 tonnes***	YES (on 1 Jan 2005)	Civil Aviation Requuirements, Section2, Series 'I', PART VIII, Revision2 dated 4 Dec 2000
Indonesia						
Japan	4-Jan-01	Version 6.04 or greater *upgrading to Version 7 before 2003 is under consideration	Domestic airspace	YES	YES (on 1 Jan 2005)	AIP dated 4 Jan 1996
Kiribati						
Lao PDR						
Malaysia	1-Jan-03	Version 7	All airspace within FIRs	YES	YES	AIC 6/2000 dated 10 Mar 2000

2nd Survey on Carriage and Operation of ACAS and Pressure-Altitude Reporting Transponders

(AP-ATM0551 dated 17 August 2000)

Airborne Collision Avoidance System (ACAS)

State/Territory	Effective date (dd/mm/yy)	Required TCAS types	Applicable airspace	Applicable to		Aeronautical Publication
				turbine-engined aeroplanes of a maximum certified take-off mass in excess of 15000kg or authorized to carry more than 30 passengers engaged in international air transport operations	turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5 700kg or authorized to carry more than 19 passengers engaged in international air transport operations	
Maldives	Jan-00	Version 7	All airspace within FIR	YES	YES (in Jan 2005)	Published on 14 Sep 1997
Marshal Islands						
Micronesia, Federated States of						
Mongolia	1-Jan-02		International routes	YES	No	To be issued in Dec 2000
Myanmar	1-Jan-03	Version 7	International routes	YES	No	Notice to owner T/42 dated 1 Sep 2000
Nauru						
Nepal	1-Jan-03	Version 7	Not specified	YES	YES (on 1 Jan 2005)	Flight Operations Requirements, Amendment Number 2 dated 18 Feb 2000
New Zealand						Civil Aviation Rules regulating the carriage of ACAS in FIRs will be included in Civil Aviaiton Rules Programme for the fiscal year 2000/2001.
Pakistan	1-Jul-01	Version 6.04 or greater	All airspace within FIR	YES		AIP
Palau						
Papua New Guinea						
Philippines						

2nd Survey on Carriage and Operation of ACAS and Pressure-Altitude Reporting Transponders

(AP-ATM0551 dated 17 August 2000)

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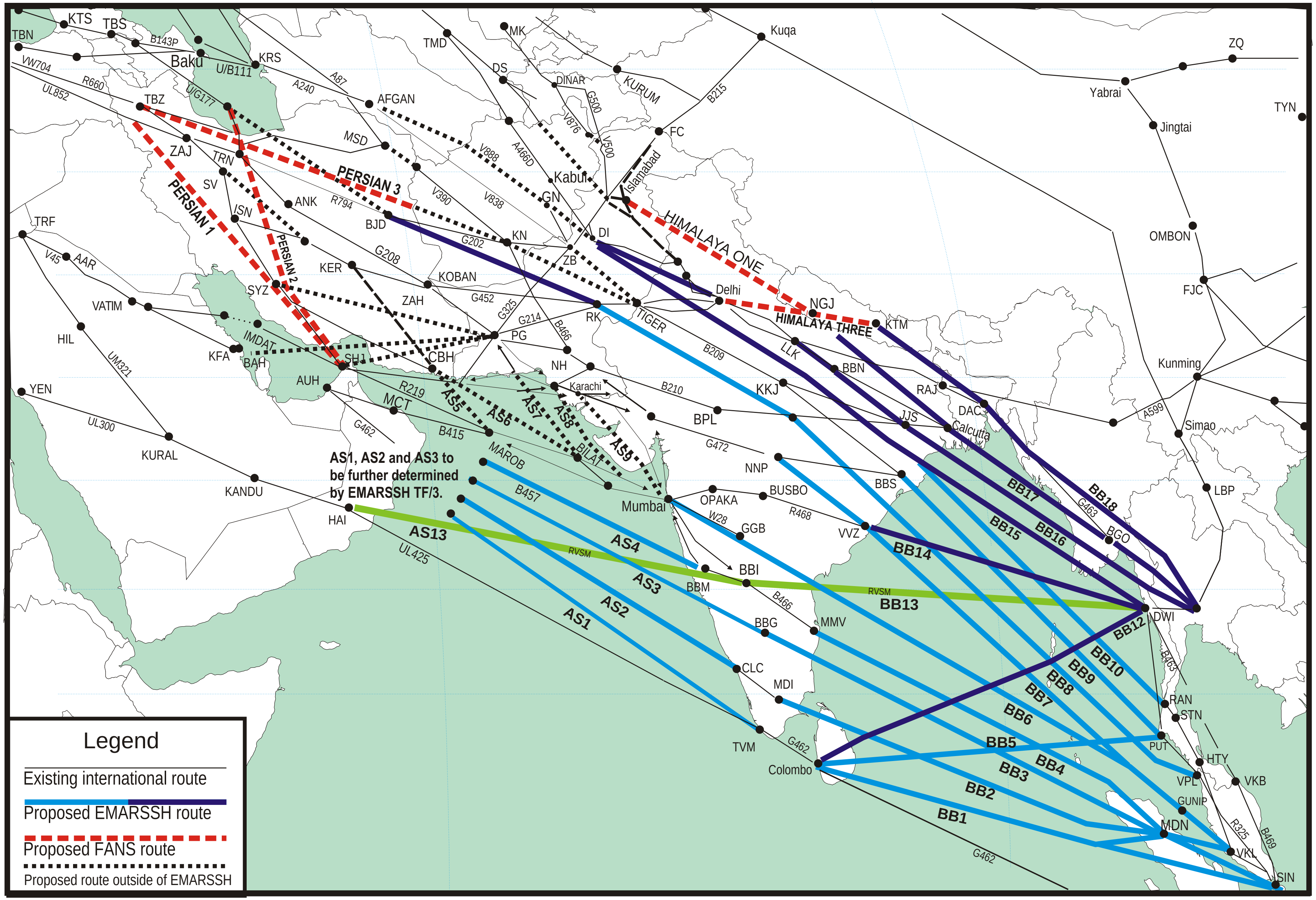
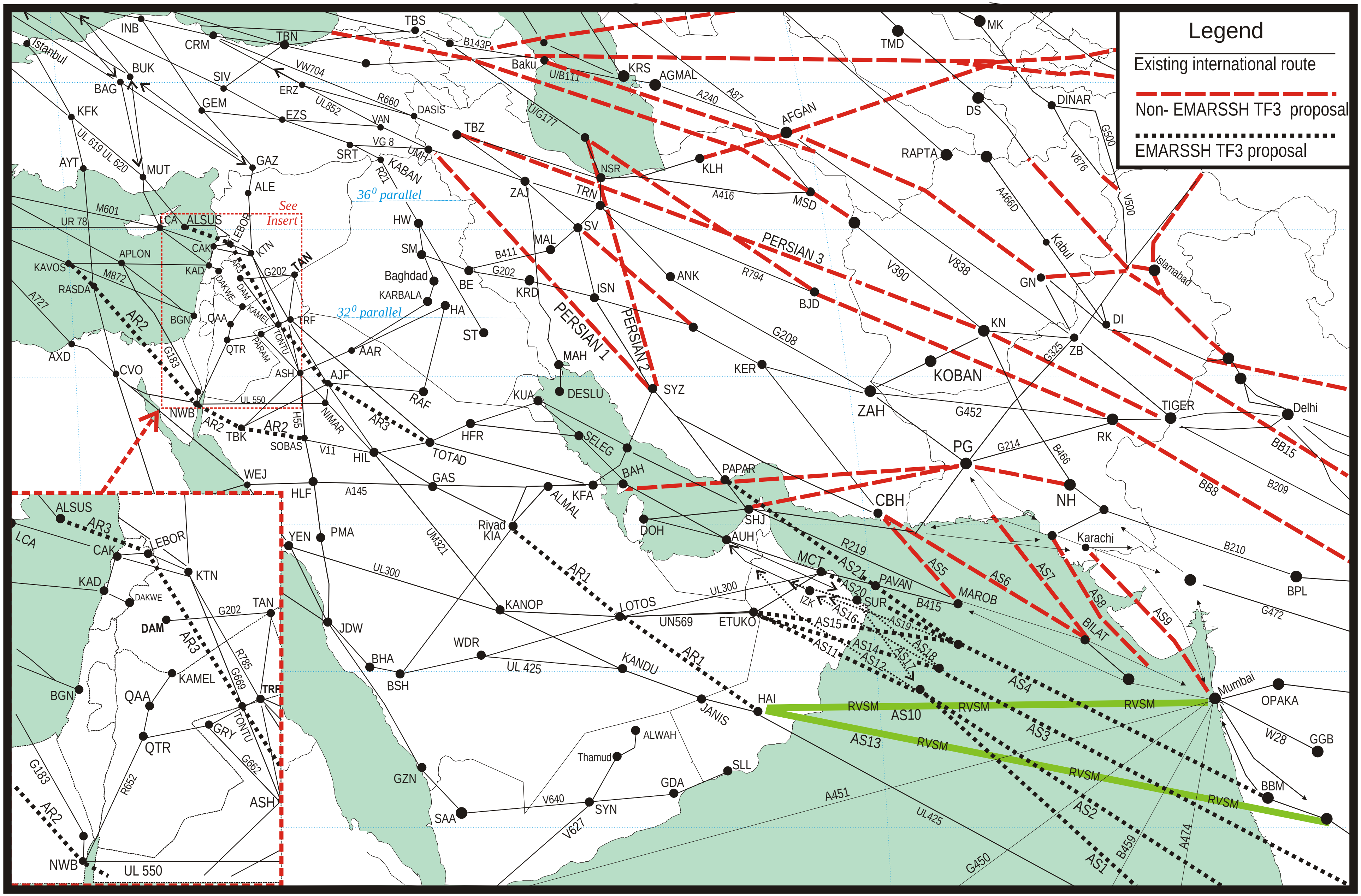
				turbine-engined aeroplanes of a maximum certified take-off mass in excess of 15000kg or authorized to carry more than 30 passengers engaged in international air transport operations	turbine-engined aeroplanes of a maximum certified take-off mass in excess of 5 700kg or authorized to carry more than 19 passengers engaged in international air transport operations	
Republic of Korea	1-Jan-00	Version 6.04 or greater & Version 7 after Jan 2003	All airspace within FIR	YES	N/A	Aviation Law
Samoa	2000	Version 6.04 or greater & Version 7 for new installation after Jan 2002	All airspace within FIR	YES	YES (on 1 Jan 2005)	NOTAM will be issued
Singapore	1-Jan-02	Version 7	All airspace within FIR	YES	YES (on 1 Jan 2005)	AIC will be issued
Solomon Islands						
Sri Lanka						
Thailand	1-Jan-03	Version 7	All airspace within FIR	YES	YES (on 1 Jan 2005)	
Tonga						
U.S.A.	31-Dec-95	Version 6.04 or greater	Within the territorial limit of 12 miles from the US coast	A passenger or combination cargo/passenger (combi) airplane that has a passenger seat configuration, excluding any pilot seat, of more than 10 seats		FAR, Part 121
Vanuatu	1-Jan-00	Version 6.04 or greater	All airspace within FIR	YES	N/A	Australia CAA Act 1998, Sbusection 9 (1)
Viet Nam						

Note: Blank indicates that no information has been provided.



Legend
Existing international route
Proposed EMARSSH route
Proposed FANS route
Proposed route outside of EMARSSH
AS1, AS2 and AS3 to be further determined by EMARSSH TF/3.
PERSIAN 1
PERSIAN 2
PERSIAN 3
HIMALAYA ONE
HIMALAYA THREE
AS1
AS2
AS3
AS4
AS5
AS6
AS7
AS8
AS9
AS13
BB1
BB2
BB3
BB4
BB5
BB6
BB7
BB8
BB9
BB10
BB12
BB13
BB14
BB15
BB16
BB17
BB18
RVSM
Baku
Kabul
Islamabad
Delhi
Karachi
Mumbai
Calcutta
Colombo
Kunming
Kuqa
Yabrai
Jingtai
Simao


Legend
Existing international route
Non- EMARSSH TF3 proposal
EMARSSH TF3 proposal
See Insert
36° parallel
32° parallel
PERSIAN 1
PERSIAN 2
PERSIAN 3
KOBAN
Mumbai
Karachi
Islamabad
Delhi
Kabul
Baghdad
Riyad
RVSM

EMARSSH TASK LIST and SCHEDULE – Asia/Pacific Region

No	Task	Action by	Target Date (not later than)	Date Start	Date Finish	Remarks
1	Produce Draft AIC on intention to introduce RNP10 Airspace	ICAO APAC	20 Apr 2001		7 May 2001	completed
2	Produce Draft AIP SUPP on intention to introduce EMARSSH Routes	EMARRSH Core Team	14 Jul 2001			
3	Nav error monitoring – LOAs	Implementing States, ICAO	30 Apr 2001			
4	Central Monitoring Agency appointed	ICAO (Asia/Pacific Regional	30 Apr 2001			
5	Nav error monitoring procedures	Central Monitoring Agency	30 Apr 2001			
6	Implementation of Navigation Error Monitoring RNP10	Implementing States	30 Apr 2001			
7	AIC Publication	Implementing States	01 Jul 2001			
8	Investigate implementation of special EMARSSH page on ICAO web-site	ICAO APAC	30 Jun 2001			
9	Amend Regional SUPPS	ICAO APAC	28 Sep 2002			
10	RNP10 approval procedures developed	Operators, Users and Implementing States	01 Dec 2001			
11	Completion of Safety Assessment	CMA, Safety Analyst, Implementing States and ICAO	Oct 2001 (Delhi meeting)			

No	Task	Action by	Target Date (not later than)	Date Start	Date Finish	Remarks
12	Arrange Seminar on Provisions of Procedural Separation	ICAO	Apr 2002			
13	AIP Maps and Charts	Implementing States	28 May 2002			
14	AIP SUPPS	Implementing States	28 May 2002			
15	ATC Procedures	Implementing States	28 May 2002			
16	ATC Letters of Agreement	Implementing States	28 May 2002			
17	Staff Training	Implementing States and Operators	28 Nov 2002			
18	RNP10 implementation	Implementing States	28 Nov 2002			

EMARSSH TASK LIST and SCHEDULE – Middle East Region

No	Task	Action by	Target Date (not later than)	Date Start	Date Finish	Remarks
1	Produce Draft AIC on intention to introduce RNP10 Airspace	ICAO APAC	7 May 2001	7 May 2001	7 May 2001	Completed – presented during TF/3 meeting.
2	Produce Draft AIP SUPP on intention to introduce EMARSSH Routes	EMARRSH Core Team	14 Jul 2001			
3	Nav error monitoring – LOAs	Implementing States, ICAO		Completed	completed	Completed with RNP5
4	Central Monitoring Agency appointed	ICAO (MID)		Completed	Completed	UAE is CMA for MID RNP5 (Note Singapore appointed CMA for RNP10)
5	Nav error monitoring procedures	Central Monitoring Agency		Completed	Completed	Completed – associated with RNP5
6	Implementation of Navigation Error Monitoring – RNP5	Implementing States				Phase one – implemented Phase two – Mar 2002
7	AIC Publication	Implementing States			Completed	AIC for RNP5 phase one published AIC for RNP5 phase two pending
8	Investigate implementation of special EMARSSH page on ICAO web-site	ICAO APAC	30 Jun 2001			ICAO APAC to arrange
9	Amend Regional SUPPS	ICAO MID	28 Sep 2002			
10	RNP approval procedures developed	Operators, Users and Implementing States	01 Dec 2001		Completed	RNP5 procedures implemented RNP10 TBD
11	Completion of Safety Assessment	CMA, Safety Analyst, Implementing States and ICAO	Oct 2001 (Delhi meeting)			UAE for MID (ongoing) Australia for APAC (TBD)

No	Task	Action by	Target Date (not later than)	Date Start	Date Finish	Remarks
12	Arrange Seminar on RNP Procedural Separation	ICAO	Jun 2001			
13	AIP Maps and Charts	Implementing States	28 May 2002			
14	AIP SUPPS	Implementing States	28 May 2002			
15	ATC Procedures	Implementing States	28 May 2002			
16	ATC Letters of Agreement	Implementing States	28 May 2002			
17	Staff Training	Implementing States and Operators	28 Nov 2002			States and Operators to determine training schedule and requirements
18	RNP5 implementation RNP10 implementation	Implementing States Implementing States	14 Jun 2001 Mar 2002 28 Nov 2002			Phase one implementation Phase two implementation RNP10 TBD

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GUIDANCE MANUAL FOR AERONAUTICAL INFORMATION SERVICES

in the

ASIA/PACIFIC REGIONS

First Edition - 2001

Authorised by the ATS/AIS/SAR Sub-Group of APANPIRG

INTERNATIONAL CIVIL AVIATION ORGANIZATION

RECORD OF AMENDMENTS

Amendments			
No.	**Date of Issue**	**Date entered**	**Entered by**

States may wish to suggest changes to any of the documents that are associated with this Manual. Suggested changes should be forwarded to the ICAO Asia & Pacific Regional Office, Bangkok, Thailand.

Introduction

Role of the AIS and the Globalizaztion of CNS/ATM

Clearly the role of the AIS is one of the foundation building blocks for the successful transition to a global ATM system. At the core of this building block lies the Quality System that will provide quality and timely aeronautical data and information to the aviation community.

"Annex 15 notes at 3.2 that:

> *Note.- International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization."*

In addition to the requirements described in Annex 15 for Quality Systems, Chapter 9 of the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750-AN/963 makes the following comments:

> "9.4 The role and importance of aeronautical information/data has changed significantly with the implementation of RNAV, RNP and airborne computer-based navigation systems. These systems are all data-dependent, and in that respect aeronautical data have become the crucial and critical components of the system. Consequently, corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation. In this respect, as of 1 January 1998, each Contracting State must take necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each functional stage of the data process. Established quality systems must provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy established requirements for data quality (accuracy, resolution and integrity) and timeliness."

The Guidance Materials that follow in this Manual have been developed to provide assistance to States for the development and implementation of Quality Systems for Aeronautical Information Services in the Asia/Pacific Region.

The Guidance Material will provide key stepping stones to assist States with an understanding of the requirements for a Quality System, and provide a foundation for distributed aeronautical data and information to satisfy the established requirements for timeliness and accuracy in compliance with the requirements of ICAO Annex 15 and other relevant standards.

GUIDANCE MANUAL FOR AERONAUTICAL INFORMATION SERVICES

in the

ASIA/PACIFIC REGIONS

PART 1

AIS QUALITY SYSTEMS

Guidance Material – A Quality System for AIS

Sample Quality Manual

QA Implementation Planning Template

GUIDANCE MATERIAL

A QUALITY SYSTEM

for

AERONAUTICAL INFORMATION SERVICES

August 2000

Guidance Material

A Quality System

for

Aeronautical Information Services

Document Control

Version	Status	Date
1.001	Initial Draft	20 July 2000
1.002	Draft	6 August 2000
1.003	Draft	13 August 2000
1.004	Draft	15 August 2000
1.005	Draft Release for Comment	16 August 2000
1.006	Released for inclusion in Asia/Pacific Guidance Material	21 May 2001

Guidance Material

A Quality System

for

Aeronautical Information Services

Table of Contents

GUIDANCE MATERIAL

A QUALITY SYSTEM

for

AERONAUTICAL INFORMATION SERVICES

Introduction

This Guidance Material has been constructed to provide information for States about the implementation of a quality system for their aeronautical information service, and should be read in conjunction with the appropriate ICAO and International Standards Organisation (ISO) references.

ICAO Annex 15 – Aeronautical Information Services shows the need for States to "…take all necessary measures to introduce a properly organised quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined…." In this context, the function stages relate to the functions of an AIS "to:

- receive and/or originate
- collate or assemble
- edit
- format
- publish/store
- distribute

aeronautical information/data concerning the entire territory of the State as well as areas in which the State is responsible for air traffic services outside its territory."

ICAO notes that the International Organisation for Standardisation (ISO) 9000 series of quality assurance standards provides a basic framework for the development of a quality assurance program.

These International Standards specify the requirements for a quality management system where an organisation needs:

(a) to demonstrate its ability to consistently provide products that meet customer and applicable regulatory requirements, and

(b) to address customer satisfaction through the effective application of the system, including processes for continual improvement and the prevention of non-conformity.

The ICAO references and the International Standards provide clear directions towards the needs and requirements for a Quality System within a State's AIS

to meet customer needs and expectations, and where continuous improvement is a pattern of organisational behaviour.

What is in these Guidelines?

These guidelines contain information about a number and variety of topics designed to assist States with the implementation of a Quality System. The Guidelines have been formulated around the relevant ISO Standards to provide this assistance, and to provide easy-to-read material as a starting point for the development and maintenance of a Quality System for an AIS.

The Guidelines are not intended to replace ISO documentation and should be read in conjunction with the appropriate Standards.

The Way Ahead

In addition to these Guidelines, you will find that there are a number of other sources on information that will be able to provide you with advice about the introduction or enhancement of your Quality System. Some of these sources might be:

- Government Departments
- Standards Associations bodies
- Certification or Registration groups
- Internet web sites
- Industry and professional associations
- Other businesses putting in a Quality Management System

After reading through the Guidelines and deciding what needs to be done to introduce a Quality System, the next important decision is “How are we going to do it?” The answer to this might be extra staff or other resources, or external assistance. In any case you will need to formulate a plan to determine exactly what is required, and what the steps forward are.

In some instances these might be small, carefully planned incremental steps leading to a fully functional Quality System. Depending on your resources, you may wish to implement one or two parts at a time before moving on.

The 9 Steps leading to the implementation of a Quality System are shown in Section xx.

If you decide that the best way forward is to engage a consultant to progress the implementation of your Quality System, an important step will be to clearly establish the outcomes and what will be provided at the end of the project.

An effective Quality System is one that is written and organised around the way your AIS operates. Treat “ready-made” solutions with some degree of caution.

When your AIS staff are involved in the development and implementation of a Quality System, they will develop a sense of “ownership” and provide an easier path to making the Quality System work. Often it is difficult to inspire ownership of a Quality System when it has been developed in isolation.

There is no short cut to the development and documentation of a robust Quality System. It takes time and effort, but at the end is a worthy prize.

Certification and Registration

Certification is generally regarded as the formal recognition by others of your Quality Management System. In some States, certified Quality Management Systems are considered to be registered and the term “registration” is used instead of certification.

Certification or Registration is not a mandatory requirement to implement the ISO 9000 series of Standards, but may be required by some of your customers. A decision to seek Certification or Registration may equally be influenced by regulatory or statutory requirements.

If you choose to have your AIS Certified or Registered, the first step should be to contact Certification or Registration agencies to determine what is offered by these groups and what the likely costs will be for the initial Certification or Registration, and any ongoing costs that might apply to re-assessments of your Quality System. Section yy provides some additional information about the Certification and Registration process.

A Quality System

The Need for a Quality System

The importance of aeronautical data and information to the world’s aviation community cannot be overstated. Aeronautical data and information provides one of the essential elements and the backbone to enable aircraft operations to take place safely and efficiently throughout the world.

ICAO Annex 15 points to the need for a Quality System as being:

“The established quality system shall provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy stated requirements for data quality (accuracy, resolution and integrity) and for data traceability by the use of appropriate procedures in every stage of data production or data modification process. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.”

This means that the worldwide aviation community is looking to the AIS's so that they can have a confidence that they are being provided with accurate data and information that meets the required resolution and retains its integrity throughout its life cycle. While this is the principal reason for having a quality system, a Quality System also provides opportunities for:

- Meeting regulatory requirements;
- Performance, coordination and productivity improvements;
- Increased focus on your business objectives and customer expectations;
- Achievement and maintenance of the quality of your products and services to meet your customers stated or implied needs;
- Increased customer awareness and satisfaction;
- Confidence that your intended quality is being achieved and maintained;
- Being able to demonstrate your organisation's capabilities to customers and potential customers;
- Expanded market opportunities.

By itself, introduction of a Quality System won't lead to automatic improvements in product or service quality, or an improvement in work practices and processes. What it will do however, is provide the tools and guidance for those working in the AIS field to use a defined and systematic approach to their work and business.

What is a Quality System?

A quality management system for an AIS might best be described as the way the organisation carries out its business activities for the provision of aeronautical information services and, relates to:

- an organisational structure; together with the
- documentation
- processes, and
- resources.

necessary for the AIS to achieve its quality objectives and to meet customer's requirements.

A Quality System means that everything must fit together, to form one cohesive and effective system. This means that an organisation with a Quality System will have:

- A Quality Manual that outlines the quality system;
- Procedures for all activities within that system, and
- Planning activities to ensure resources are available for the effective conduct of the quality system.

One of the most important things that must be in place for a Quality System to work is commitment from all of those affected to ensure that the documented procedures, processes and practices are not only in place, but are vigorously applied.

A Quality System will strive for excellence, always looking for ways to do the work better through a program of continuous improvement.

Permissible Exclusions

In some AIS' there may be processes that are not performed, for example Procedures Design work. Part 7, and only in Part 7, of the ISO Standards makes allowances for some aspects to be excluded from a Quality Management System if they are not being carried out. These are known as Permissible Exclusions, and could arise due to the:

- Nature of the product range or services provided by a particular AIS;
- Customer requirements;
- Regulatory requirements.

However, you cannot simply claim a Permissible Exclusion just because you do not want to do it. If you question a requirement in this Part of the ISO Standard, then you should ask yourself:

- What is the idea or principle behind this requirement?
- What kind of problem could be prevented by meeting this requirement?
- Why would meeting the requirement give confidence to the customer?

Within Part 7 of the ISO Standard, the following processes are most likely to be considered for Permissible Exclusions:

- Design and Development

- Identification and Traceability
- Customer property
- Control of measuring and monitoring devices

Importantly, if you decide to proceed with Permissible Exclusions you will need to justify this in the Quality Manual and, if you are seeking Certification or Registration, with these bodies as well.

What is ISO 9000 About?

In very simple terms, the requirements of the ISO International Standards for a Quality System can be summarised as being three straightforward tasks:

- Say what you do;
- Do what you say, and
- Show that you did it.

Say what you do

This task requires an AIS to document how it undertakes its activities.

Do what you say

This task requires an AIS to undertake its activities as recorded in the documented procedures.

Show how you did it

This task requires an AIS to maintain records that prove that it undertakes its activities as documented and has done so for a recognised period of time.

Products

One of the many terms used within the Quality System is “product”. In the context of the International Standards, and the diagrams that follow, a product is defined by the standards as:

Product: Result of activities or a process.

The Standards note that there are four generic product categories:

- Hardware
- Software
- Services
- Processed materials

Products may be combinations of the four generic product categories.

The Process Model

Activities that receive inputs and convert them to outputs can be considered to be a process. In many cases, an output from one process will form the input to the next process, for example data is received from an aerodrome operator, entered into the AIS database, and when combined with other data, is provided as an output for charting or a document.

To function effectively within a quality system, an AIS must identify and manage numerous linked processes. Systematic identification and management of these many processes and the interactions between these processes that are used within an AIS are often referred to as a "process approach".

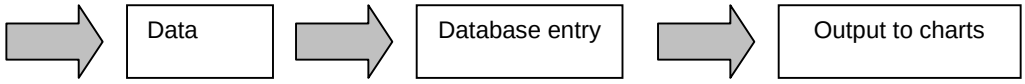


Fig. 1 – A simplistic process

A more sophisticated conceptual process model recognises the role that the customer plays in the definition of requirements as inputs. By monitoring customer satisfaction, or in some cases dissatisfaction, we are able to monitor and evaluate whether or not defined customer requirements have been met.

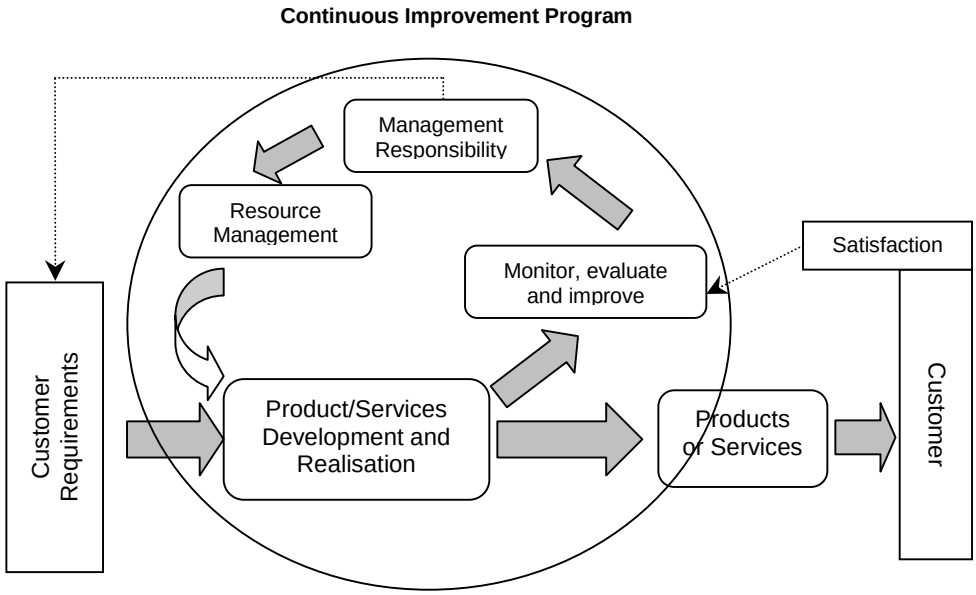


Fig.2 – Conceptual model of the "Process Approach"

Fig. 2 demonstrates that the process approach model and the Quality System starts and finishes with the customer. In the first instance there is the customer requirement on the left hand side of the diagram, on the right hand side there is the degree of customer satisfaction with the product or service

that has been provided as a result of a number of inputs. Customer satisfaction is measurable against the initial requirements and specifications.

Perhaps the most important feature of the model is the need to obtain information about customer satisfaction, this feeds back into the monitoring and evaluation phase, which are in turn a measure of overall performance.

The loop into management responsibility is there to show that management has an important role to review customer feedback to ensure that the appropriate policies, objectives and strategies are in place, along with the necessary resources, to meet the quality challenges.

Resources are a key component of the Quality System. Resources are the equipment, materials and people that make the overall system work. Human resources need to be properly trained and competent to achieve the desired outcomes.

As noted earlier, a Quality System will strive for excellence, always looking for ways to do the work better through a program of continuous improvement. A Quality System will continue to challenge the outputs against the customer requirements and specifications to ensure that customer's expectations are met and exceeded. This is why all of the elements in the Continuous Improvement Program are so important. Outputs must be monitored and evaluated, management must consider the evaluations and apply the planning and resources to achieve the desired outcomes.

General Requirements

The General Requirements for the implementation of a Quality Management System are to:

(a) identify the processes needed for the quality management system;

(b) determine the sequence and interaction of these processes;

(c) determine criteria and methods required to ensure the effective operation and control of these processes;

(d) ensure the availability of information necessary to support the operation and monitoring of these processes;

(e) measure, monitor and analyse these processes, and implement action necessary to achieve planned results and continual improvement.

General Documentation Requirements

Documentation for a Quality Management System must include:

(a) documented procedures (see the section that follows for a description of Documented Procedures); and

(b) documents required by the organisation to ensure the effective operation and control of its processes.

The extent of the Quality Management System is however, dependent on the following, and may be in any form or type of medium:

(a) size and type of the organisation;

(b) complexity and interaction of the processes;

(c) competence of personnel.

Documented Procedures

ISO requirements for a Quality System call for six quality management system procedures to be in place. These are mandatory written procedures that describe how your organisation performs the activities described in each of the six quality management system procedures described below:

1. Control of Documents;

2. Control of Quality Records;

3. Internal Audit;

4. Control of Non-conformity;

5. Corrective Action; and

6. Preventative Action.

Documented Procedures should indicate who does what, where and when they do it, why they do it, and how. It is up to the organisation itself to decide the level of detail that is included in the Documented Procedures. Largely, this will depend on:

(a) methods used;

(b) skills needed;

(c) training;

(d) extent of supervision required.

Documented Procedures should not contain what you would like to happen in the organisation, but rather an accurate description of what really happens.

A robust Quality Management System will involve staff, to the extent that they can contribute, in the writing of Documented Procedures. The earlier and the more staff that are involved will lead to greater staff involvement, understanding and “buy-in” to the procedures and practices.

Management Responsibility

AIS Managers have a number of demonstrable responsibilities within the Quality System. These responsibilities relate to:

(a) Quality policy;

(b) Commitment to quality;

(c) Customer focus;

(d) Planning;

(e) Management Representation;

(f) Management Review

Each of these responsibilities is addressed in further detail below.

A quality system is dependent on all those involved in its provision being quite clear about their responsibilities and authorities. The development and use of accurate position descriptions for all staff in an AIS that address both the responsibilities and authorities of each position can accomplish this.

Quality Policy

The International Standards require management to have a Quality Policy in place that is in writing and is visible to staff. The quality policy forms the an important element for the work of the AIS, and establishes:

- a commitment to quality;
- what the quality objectives or the organisation are; and
- how the objectives relate to customers expectations.

The Quality Policy must address these issues and ensure that it:

- is appropriate for the needs of the organisation;
- includes commitment to meeting requirements and continual improvement;
- provides a framework for establishing and reviewing quality objectives;

- is communicated, understood and implemented throughout the organisation;

- is reviewed for continuing suitability.

A Quality Policy includes AIS's definition of quality and how management and staff will demonstrate their commitment to the policy, and provides an identifiable focus for all staff in their daily activities.

One of the best techniques to develop a Quality Policy is a facilitated meeting of all staff at which individual definitions of "quality" can be consolidated to provide a definition and statement that encapsulates all staff's beliefs and understandings.

Commitment to Quality

AIS Managers must take an active responsibility in the establishment and maintenance of a Quality System. This role includes:

- Definition and implementation of quality policy;

- Communicating the quality policy within the organisation, including the importance of meeting customer, regulatory and legal requirements;

- Setting objectives, strategies and targets derived from the policy;

- Position descriptions that describe the role, responsibilities and authorities for all staff;

- Ensuring that resources are adequate;

- Appointment and support of a management representative; and

- Regular reviews of the effectiveness of the system.

Customer Focus

Meeting customer and regulatory requirements is our primary business. To ensure that these requirements are met, and that customer confidence is maintained, an AIS must have a clear understanding and defined specifications in the form of user requirements. Measurement and analysis of outcomes will be difficult, if not impossible without this specification.

Planning

The step that follows the publication of the Quality Policy is the setting of objectives, strategies and targets that will show how the organisation expects to implement the quality policy. Targets need to be realistic, relate to the

customer's statement of requirements and measurable. The plan must include details of the continual improvement program.

Thorough planning sets the scene for other important aspects of the organisation's operations:

- staff performance measurements;
- budgets;
- overall business performance measurements;
- asset and facility purchases;
- staff competencies and training requirements;
- other resource requirements;
- the continuing improvement program.

In some cases, planning may be conducted as a matter of routine, for example on an annual basis, whereas in others, specific project planning may be required for new or substantially altered products or services.

Planning enables an organisation to exercise control over routine business and changes to ensure that the Quality Management System is effective during the routine activities and after change.

Administration

Responsibility and Authority

A Quality System requires responsibilities and authorities for all staff members to be defined and communicated. This means that everyone in the organisation knows what they are responsible for, what the level of their authority is and what the reporting arrangements are. Responsibilities and authorities can be identified, recorded and communicated through published job descriptions. An organisational chart should supplement job descriptions.

Management Representative

Quality Systems are required to have a Management Representative who looks after the Quality System, and who has the responsibility and authority that includes:

- ensuring that processes for the quality management system are established and maintained
- reporting to senior management on the performance of the quality management system, including needs for improvements; and

- promoting awareness of customer requirements throughout the organisation.

Internal Communications

Internal communications is all about keeping everybody in the team informed about what is going on and to keep abreast of the processes, changes and outcomes. This includes the good news and the bad news.

Effective internal communications will provide the ability to:

- receive information quickly and act on it;
- build trust among the staff;
- identify business opportunities;
- identify opportunities for improvement.

Quality Manual

A Quality Manual is a controlled document that is perhaps the most important part of the Quality System. This is where it begins and includes the details of:

- the scope of the quality management system;
- the documented procedures or a suitable reference;
- a description of the sequence and interaction of the processes included in the quality management system.

The Quality Manual is the “map” for the organisation, and where the following items would be found:

- the quality policy;
- the activities of the business;
- how the documentation works and where people might look to find information about how to do things;
- a definition of any terms having a unique meaning to your business;
- statements of responsibility and authority.

If these items are not specifically included in the Quality Manual, the manual should contain a reference to where they can be found.

AS/NZS ISO 10013 *"Guidelines for developing quality manuals"* provides advice about writing a quality manual.

Control of Documents

All documents required in a quality management system must be controlled. Procedures must be documented to:

- review documents for adequacy and then approve them before use;
- review, update as necessary and re-approve documents;
- identify the current revision status of documents;
- ensure that relevant versions of applicable documents are available at points where they will be used;
- ensure that documents remain legible, readily identifiable and retrievable;
- ensure that documents of external origin are identified and their distribution is controlled;
- identify changes in the document;
- prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.

Documents defined as Quality Records must also be controlled.

Document control is about making sure that the document in use is the "right" document. A controlled document will be the latest approved and applicable version for the work to be done. This is particularly important if staff are to have the information they need to do the job correctly.

The simplest way to control documents is to make them available on the computing network, preferably without any paper copies. A number of computing software packages make document control relatively simple. For example the "save date" can be saved in a footer or header of every page. A statement can be added to the effect that any paper copy is uncontrolled and that it is up to the reader to ensure that the copy being used is the latest version by checking on the network.
There is no limit to the number of documents that can be controlled in a Quality System, but the additional overhead in controlling the document must be balanced against any potential problems caused by using an inaccurate or obsolete version.

Document Master Copy

Each controlled document has one master copy. This is the copy to which all changes are initially made and from which further copies are made and issued as required. The location of the master copy is recorded on the Document Master List.

Document Owner

Each controlled document has an owner. This is the person or persons authorised to review and approve changes requested to the document. The document owner is also recorded on the Document Master List.

Controlled and Uncontrolled Copies

Documents may be issued as controlled or uncontrolled copies. Controlled copies are those issued to particular persons with a record of who has which copy. This record is kept with the document master copy. For controlled copies the document owner is responsible for ensuring that the registered holder of the copy is given an updated copy when the document is modified.

Uncontrolled copies are issued with no record of who has a copy. For uncontrolled copies the document holder is responsible for ensuring that the copy they have is up-to-date.

Control of Quality Records

Records exist in all organisations. Quality Records are required to provide evidence of conformance with requirements and of effective operation of the quality management system. Procedures must be documented for the identification, storage, retrieval, protection, retention time and disposition of quality records.

A Quality Record is a record produced following a procedure in a Quality System document. This record provides a reference when reviewing progress and/or performance, and is often a form.

Each Quality System document must include definitions of the Quality Records to be produced and kept.

Quality records will provide an AIS with information to help manage the business better. This is the part that enables you to “show how you did it”.

In some instances, retention periods will be dictated by legal or regulatory requirements, financial requirements or customer’s specifications. Details about specific retention periods should be recorded in the documented procedures.

Examples of Quality Records include:

- customer orders, specifications and requirements;

- meeting notes (e.g. Management review)
- audit reports;
- non-conformance records (service failure reports, customer complaints);
- corrective action records;
- files on suppliers (e.g. evaluation of suppliers and their performance history);
- process control records;
- inspection and testing reports;
- training records;
- records of goods received and delivered.

Records, indexing and filing can be in any appropriate form; hard copy, or electronic. Storage needs to be appropriate to the circumstances and the medium and should be such that the risk of deterioration, damage or loss is minimised.

The International Standards also call for the organisation to identify and document who has access to the quality records.

To help in deciding what quality records need to be kept, it is useful to consider that all quality records can be considered under three different categories:

(a) What is received before a procedure starts;

(b) What is produced to show intermediary steps have been completed; and

(c) What is produced to show a procedure has been completed.

Quality records are usually produced internally however, they may also be produced outside the AIS, for example a customer's order, or an external auditor's report.

For each quality record identified, the following aspects need to be defined:

(a) What the record is;

(b) Who is responsible for its filing;

(c) How long the record is required to be kept;

(d) Where the record will be kept; and

(e) Who is responsible for the record's disposal.

A tabular layout may be useful to present the information required.

Record	Responsibility	Minimum Retention Period	Location
What the record is	Who is responsible for its filing. Who is responsible for its eventual disposition.	The minimum time the record must be retained for.	Where the record is kept

In some ways, by default, the person deemed responsible for the record's filing is also responsible for and authorised to dispose of the record. In this case, one position can be listed as responsible for the record, and for the filing and disposition.

A minimum period is specified to supply an audit trail for accountability purposes. The audit trail may be required for official inquiries or litigation.

Specification of a minimum retention period allows us to keep records longer if required. Records are often kept on hand for as long as there is space to accommodate them.

In summary, the records management process ensures that all quality records are identified and controlled, in order to provide a ready reference to the effectiveness of our Quality System documents.

The records management process occurs over an extended period and interleaves with other processes, particularly with those for document development and control.

An example of how the records management process might be managed follows in the table below.

Stage	Description	Explanation
1.	The need for a record is identified.	
2.	The record definition is produced and documented.	
3.	The record is produced.	
4.	The record is indexed.	Uniquely identifying individual records assists in filing and retrieval. Records with no un1que identifier can be marked by allocating A specific location for storage. Whatever approach is taken

		should be recorded as part of the record definition.
5.	The record is filed in the location specified in the record definition.	The location should be chosen to ensure that the record is not damaged for the period it is to be retained.
6.	The record is stored for the period specified in the record definition.	Depending on the retention period, it may be necessary to regularly review the storage to ensure that the records are not being damaged.
7.	The record is disposed of.	The person responsible for its storage (as provided for in the record definition) is authorised to dispose of the record.

Management Review

Quality management systems must be reviewed on a regular basis to ensure that they remain appropriate and relevant. Where changes are planned or being implemented, more frequent review periods may be warranted.

To ensure that the entire quality management system is covered, a consistent approach should be followed to ensure that the review addresses:

- the relevance of quality policy and objectives to current needs;
- how the quality management system is working and whether the objectives are being met;
- any quality problems and actions taken;
- any customer complaints;
- quality audit reports (both internal and external);
- areas for improvement/changes needed;
- any outstanding actions from previous reviews;
- training needs;
- equipment, working environment and maintenance.

Resource Management

Provision of Resources

Organisations are required under the International Standards to determine and provide in a timely manner, the resources needed to:

- implement and improve the processes of the quality management system; and
- address customer satisfaction.

In this context, the term resource applies to personnel, facilities and equipment.

Human Resources

Staff who are assigned responsibilities defined in the Quality Management System must be competent on the basis of applicable education, training, skills and experience.

People assigned to carry out quality activities are required to be competent to do them, otherwise a quality product or service is less likely to result. The standards require competence to be based on appropriate or applicable education and training and also on skill and experience that the people possess. There is however, no requirement to have all four, only those applicable to the particular task.

Appropriately qualified and experienced staff in sufficient numbers are pre-requisites for an AIS organisation to provide safe and timely aeronautical information.

The most obvious users of aeronautical information are pilots. Other users of the information represent those engaged in airline operational control and those involved in the provision of Air Traffic Services. The AIS must be technically oriented in the nature of the services being provided. Given the relevance of aeronautical information to global air traffic, it is important to promote the correct level of technical proficiency within the AIS and that the AIS has an appropriate status in the parent civil or military organisation.

This part of the Quality System requires an AIS to have procedures in place for assessing the competence of personnel required by the organisation to check, edit and publish aeronautical information. These procedures should include the levels of training, qualification and experience necessary to achieve expeditious publication of information.

Equally, staff responsible for the collection, collation, checking, coordination and edition information published in the Integrated AIP Package must have a thorough understanding of the content, standards, format and other user requirements related to the material being published.

Ideally, staff responsible for checking, coordinating and editing aeronautical information should have an extensive background as a pilot or within air traffic services, or have received specialist training in AIS.

For example, staff responsible for the operation of the NOTAM office would be:

- conversant with the standard format, codes and abbreviations for NOTAM;
- conversant with the operational requirement for air traffic services, flight operations personnel, flight crews and the services responsible for pre-flight information to be kept informed of operationally significant information that may affect the safety of air navigation;
- competent in the operation of the AFTN.

Training, Awareness and Competency

This part of the standard requires an organisation to:

- determine competency needs for personnel performing activities affecting quality;
- provide training to satisfy those needs;
- evaluate the effectiveness of the training provided;
- ensure that its employees are aware of the relevance and importance of their activities and how they contribute to the achievement of quality objectives;
- maintain appropriate records of education, experience, training and qualifications.

Checking Competence and Training

An AIS needs to regularly review the competence, experience, qualifications, capabilities and abilities of its staff to ensure that any skills and qualifications needed by the AIS are available for the tasks to be completed.

Training is required when deficiencies are noted, or when new employees start work. Any training that is required may be carried out in stages, and may be in the workplace, in-house or at an external location.

The scope of the training and checking is largely a matter for the organisation to determine, but generally, training for AIS would include the following topics:

- Principles of the Aeronautical Information Service
- Organisation of AIS
- Responsibilities and Functions of AIS
    - ICAO Documents
    - AIS Products
    - Responsibilities and Limitations
- The Integrated AIP Package
- Relationships with External Agencies
- Change Management
    - Applicable Policies and Procedures
    - Standard Operating Procedures
    - Quality Processes
    - Coordination Requirements
    - Collation and Processing
    - Data Entry and Verification
    - Data Structures
    - Formats to be used
    - Checking Procedures and Processes
    - File Management
    - Record Keeping
    - Publication and Production
    - Distribution
- AIS Automation

Records should be maintained to show what competences staff possess, and to show what training has been carried out, and the results of that training. Records that demonstrate successful completion (i.e. effectiveness) of a training program and the competence of staff can and should be kept simple.

At their simplest, records may consist of a “sign-off” to confirm that staff can carry out specific processes or follow certain procedures. These records should include a clear statement when a person is deemed to be competent to do the task for which they have been trained.

Facilities and the Work Environment

In addition to adequate numbers of suitably experienced and competent personnel, an AIS also requires appropriate accommodation and adequate facilities to get the work done and so provide quality services.

This part of the ISO Standards call for an AIS to determine, provide and maintain the facilities it needs to achieve product conformity, including:

- Workspace;
- Equipment, hardware and software;
- Supporting services

In simple terms, this means that an AIS needs to identify, provide and maintain adequate space, suitable equipment, tools and systems to enable staff to do their job.

ICAO Document 8126 provides guidance on facilities and equipment for aeronautical information services.

At the most basic level, facilities for an AIS should include:

- Suitable furniture for staff to work comfortably, efficiently and ergonomically;
- Sufficient space between work-stations to avoid disruption to other staff;
- Noisy equipment isolated away from staff or sound-proofed;
- Adequate overhead or specialist lighting to be able to easily read source document;
- A quiet area for proof-reading;
- Suitable computing equipment for word-processing and data capture.

AIS organisations are moving more and more towards automated systems to improve the efficiency, accuracy and cost effectiveness of their businesses. AIS' need to ensure that any systems automation and services are designed with the intent of avoiding incompatibilities, divergences and unnecessary duplication of effort and importantly that there is an overall systems integration management plan in place. Standardisation of procedures, products and services is essential for the successful automation of aeronautical information services.

Product Development and Realisation

Product Realisation

Product realisation is the sequence of processes and sub-processes required achieving the delivery of a product. Planning of the realisation processes must be consistent with the other requirements of the organisation's quality

management system and documented in a form suitable for the organisation's method of operation.

During the planning of the processes to bring a product to fruition, an AIS would consider the following matters:

(a) objectives for the product, project or contract;

(b) the need to establish processes and documentation, and provide resources and facilities specific to the product;

(c) verification and validation activities, and the criteria for acceptability;

(d) the records that are necessary to provide confidence of conformity of the processes and resulting product.

All this planning information should be documented. For regular product and/or service, this planning activity only needs to be carried out at the initial stage and revised when there is a change in process or resources that will affect the delivery of the service or manufacture of the product.

For project work and “one-off items”, you may have to carry out the planning process for each project and item.

Note: Documentation that describes how the processes of the quality management system are applied for a specific product, project or contract may be referred to as a quality plan.

Identification of Customer Requirements

As with any business, an AIS needs to determine its customer requirements. These requirements include:

(a) product requirements specified by the customer, including the requirements for availability, delivery and support;

(b) product requirements not specified by the customer but necessary for intended or specified use;

(c) obligations related to product, including regulatory and legal requirements.

The following definitions have been adopted for this Guidance Material:

Customer The eventual (individual) user of the AIS products or services

Author Area An identifiable group or organisation that has ownership of the information provided by an AIS.

Note: For the purposes of these Guidelines and the ISO requirements, the Author Areas can be considered to be a special type of customer since they have a vital role in determining if the information provided to and by AIS is correct and appropriate.

Who are the customers?

An AIS provides a range of aeronautical information and data for pilots, aircraft operators, air traffic services personnel, flight planning companies and data vendors. Each of these can be considered to be customers of an AIS.

Review of Product Requirements

An AIS with an established Quality System, or in the process of establishing such a system would review the identified customer's requirements, together with any additional requirements that might be necessary.

This review must be conducted prior to the commitment to supply a product to the customer (e.g. submission of a tender, acceptance of a contract or order) and to ensure that:

(a) product requirements are defined;

(b) where the customer provides no documented statement of requirement, the customer requirements are confirmed before acceptance;

(c) contract or order requirements differing from those previously expressed (e.g. in a tender or quotation) are resolved;

(d) the organisation has the ability to meet defined requirements.

The results of the review and subsequent follow up actions must be recorded and form part of the quality records.

When product requirements are changed, the AIS must ensure that any associated documentation; procedures, processes etc are also amended to reflect the changes, and that the staff are kept aware of the changed requirements.

An example of a customer requirement might relate to the supply of aeronautical data or information in a specific electronic format to meet customer needs and specifications.

Customer Communication

Effective communications with our customers are an important part of the work of an AIS. This part of the standard requires the organisation to identify

and put arrangements into place for this communication to take place. The communications plan must include information about:

(a) product information;

(b) enquiries, contracts or order handling, including amendments;

(c) customer feedback, including customer complaints.

Understanding and meeting your customer's requirements.

All parts of the customer's order or contract need to be reviewed to ensure that you can meet your commitments.

The manner in which the customer provides the order may vary in form and may be a:

(a) written order;

(b) verbal agreement; or

(c) telephone order.

Often problems can arise because of a misunderstanding about what was ordered. This makes good communications with your customer an essential part of good business and is essential to resolve any misunderstandings. This might mean that an AIS will make someone specifically responsible for communications with your customers.

Written orders, such as those received by mail or facsimile, provide a permanent record of the order details.

When telephone and direct computer link orders are received, special provisions need to be made to record and confirm the order. Methods of handling these could be as follows:

One approach to telephone orders is to provide a pad (these could even be pre-printed forms) for the order receiver to record the details of the order and read it back to the, customer, asking for confirmation. Alternatively, the details may be faxed or mailed back to the customer.

Where electronic media are involved, two options exist: either save permanently on disk or print out the details.

At the time the order is received you need to determine if there are any design requirements in the order and to see if the commitment to the customer can be met.

The record of the review can be as simple as a notation on the order that it can be fulfilled with the signature of the reviewer and the date. Where a more complex review is called for, how the review is recorded is at your discretion.

Design and/or Development Planning

Many AIS' provide a Procedures Design function. This means that the AIS is required to plan and control design and/or development of the instrument procedures.

Design and/or development planning is required under this part of the Standard to determine:

(a) stages of design and/or development processes;

(b) review, verification and validation activities appropriate to each design and/or development stage;

(c) responsibilities and authorities for design and/or development activities.

Interfaces and internal communications between different groups involved in design and/or development must be managed to ensure effective communication and clarity of responsibilities.

A Disciplined Approach to Design and/or Development

It is important to understand that this part of the ISO Standard is intended to provide controls for the design and/or development process and in no way attempts to restrict the creativity of the designer.

The design controls should generally cover the following to establish:

(a) the design aims, planning how the design is to proceed, and who is to carry out the design;

(b) what is needed to be known for the design to proceed;

(c) the form of the output from the design;

and to:

(d) review, on completion of the design, whether it has achieved what was wanted (flight validation);

(e) modify the design to include changes, which may occur at any stage of the process and for any reason.

Who is going to do what?

You need to plan what is to be done and who is going to do it in relation to the design. Responsibilities for design should be clearly assigned and the methods for the development and updating of the design plans should be established.

Design plans do not have to be complex. They can be as simple as a flowchart, showing the steps to be taken and who is to do them.

As part of the requirements, the AIS should also plan how the design review, verification and validation activities are to be carried out.

Design and/or Development Inputs

Inputs relating to product requirements must be defined and documented, and include:

(a) functional and performance requirements;

(b) applicable regulatory and legal requirements;

(c) applicable information derived from previous similar designs, and

(d) any other requirements essential for design and/or development.

These inputs must be reviewed for adequacy and any incomplete, ambiguous or conflicting requirements resolved.

Have we got it right?

Verification is checking that the results at the end of the design process meet the requirements identified as necessary at the beginning of the design process. For larger projects, the design process is often broken into stages and design verification may be carried out on a stage-by-stage basis.

The design plan should identify the verification method to be used, including who is to carry it out, how it is to be performed and what records are to be kept. There are many ways to verify the design, such as:

(a) performing alternative calculations;

(b) comparing the new design with a similar proven design (if available);

(c) undertaking tests and demonstrations e.g. flight validations;

(d) reviewing the design stage documents before release.

You should determine which are appropriate and effective. Sometimes, regulatory agencies will describe the means required to verify the design.

Customers may need to be involved in the verification process.

Does it work?

Validation is the process of checking that the final product and/or service will be capable of meeting or does meet the customer's needs in use.

This may include marketing trials or operational testing. It is the final stage in the design process and is an important opportunity to prevent serious financial loss by failure to supply acceptable product and/or service. The results of the verification and validation processes can be fed back into each stage of the design process, leading to modifications and improvements or even the next design revision or product and/or service generation.

For many products and/or services, validation is a relatively simple process. An example could be a new design of a visual chart, which could be validated by testing of the prototype, followed by test marketing.

For other types of product and/or service, the validation of the total performance range cannot be achieved until the actual conditions occur.

It is also acceptable for the customer to perform the validation and to provide feedback of the results to the designer. Many software projects are validated in this way.

Control of Design and/or Development Changes

Design and/or development changes must be identified, documented and controlled. This includes evaluation of the effect of the changes on constituent parts and delivered products. The changes shall be verified and validated, as appropriate, and approved before implementation.

The results of the review of changes and subsequent follow up actions must be documented.

Note: See ISO 10007 for guidance.

Controlling Changes

For an AIS, change is a way of life. Changes occurring due to the customer, market, design review, verification or validation activities must be recorded, reviewed and approved. The extent to which the design needs to be to be modified as a result of the changes needs to be considered.

The quality management system has formal requirements for document and change control that must be followed.

Design changes may also require you to reconsider reviewing with your customer what is actually required.

The design change control process may need to be no more complicated than the system described earlier to control other documents. In other situations, the controls may need to be more complex, e.g. those involved in software design may have to be involved in configuration management. Further advice on this aspect is available in ISO 10007, *Quality management –Guidelines for Configuration Management.*

Product Identification and Traceability

An AIS must identify,

(a) the product by suitable means throughout production and service operations when appropriate;

(b) the status of the product with respect to measurement and monitoring requirements; and

(c) record the unique identification of the product, when traceability is a requirement.

Examples of this might be the use of amendment numbering or specific page identification

Keeping track of what you're doing

Identification is knowing what the product and/or service resulting from a particular process is, even an intermediate process. When you need to identify a product and/or service, the methods used and the records to be kept need to be defined. The recording of part numbers, job numbers, bar codes, the name of the person who carried out the service, colour codes or the revision status and version number of a software package being developed are just some examples of identification.

Traceability is knowing where the product and/or service came from, where it is now and in the case of services, what stage it is at. Most businesses, irrespective of size, will have a need in some stage of their operations to keep track of what goes where, what's been done and what still is to be completed. When traceability is a requirement, typical methods used include:

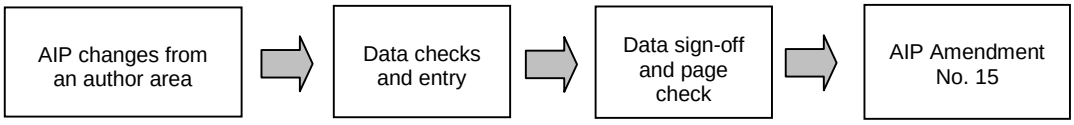
(a) Job card entries.

(b) Data checked and confirmed, data entry complete

(c) Service records, e.g. signing-off a particular work aspect

(d) Tagging

(e) Computer tracking.



When servicing a car, the status of each operation on the service checklist is changed from “to be done” to “done” by ticking off each operation on completion.

In a phone answering service, the status of messages taken is initially 'message received'. On passing the message on to the client, the status changes to 'message delivered'. The phone answering service would have some suitable means of identifying the status.

Some of the above techniques may be also used for identification. You need to be aware that the requirements for traceability may result in additional paperwork and costs, so you have to be aware of the balance between really needing to know and superfluous information.

A example of a checklist.

Action		**Status**	
	Reg No.	**Completed**	**Yet to be done**
Change details registered	WP16/00	✓ (DS)	
Data checked and verified		✓ (DS)	
Data Entry		✓ (CS)	
Entered on Charts		✓ (CH)	
Airspace Handbook			x
AIP Book			x
Document checks complete			x
Chart checks complete			x
Publications to printer			x
Publications to dispatch			x

You need to establish what your internal requirements are and document them.

In AIS, identification and traceability are specified requirements. If the need for a product recall arises, an effective identification and traceability system will make the task a lot easier. An effective identification and traceability system will make it much easier to replace the poor quality service and initiate steps to avoid recurrence such as retraining or a review of process operations.

Records that provide the traceability (including the change requirements) should be retained as part of the Quality Records.

The method(s) you adopt as being most suited to your business should be described (e.g. in your work instructions) so that everybody knows how it works.

Customer Property

An AIS must exercise care with customer property while it is under the organisation's control or being used by the organisation. The organisation must identify, verify, protect and maintain customer property provided for use or incorporation into the product. Occurrence of any customer property that is lost, damaged or otherwise found to be unsuitable for use shall be recorded and reported to the customer.

Note: Customer property may include intellectual property

Looking after what the customer gives you

Occasions may arise where the customer gives you material or equipment to be used in producing the items or delivering the service. Examples could include:

(a) instruments provided by the customer for measurement purposes;

(b) training room provided by the customer;

(c) special hardware of software;

(d) special paper for specific products.

Whilst a documented procedures is not required for this aspect, the organisation is responsible for ensuring that the control of customer property is sufficiently documented to describe how it is identified and cared for. The document could simply reference in-house processes that are in use.

Looking after the Product and/or Service

An AIS must preserve conformity of product with customer requirements during internal processing and final delivery to the intended destination. This includes identification, handling, packaging, storage and protection, and also applies to the constituent parts of a product.

This part of the Standard means that none of these activities are allowed to affect the quality of the product and/or service being provided. It is up to you to determine how you will ensure that this is the case.

Depending on the nature of your business, some or all of the requirements of this part of the Standard may apply. When they do apply the arrangements for handling, storage, packaging, preservation and delivery should be recorded in your process documentation.

There are a number of areas where handling, storage and preservation, packaging and delivery problems can affect the quality of the product and/or service. Some examples are found in the following areas:

Handling: This might be the use of computers and/or a filing system, job-cards, or work-packages to control work in progress.

Storage/Preservation: Use of computer systems to store work in progress, and off-site or other back-up arrangements.

Packaging/Delivery: Use of mailing tubes or electronic transfer of data to deliver charting products to a printer for reproduction.

You will need to examine your own procedures to determine the extent special handling procedures are needed and to document them.

Packaging should be appropriate for the materials. In many cases, little or no packaging will be required. Bulk materials, such as sand, coal, wheat etc are examples where packing consists simply of filling the carrying container. Even for such bulk transport, there needs to be a check that the container is suitable and does not contaminate the product. Large fabricated components may be simply loaded onto a truck and strapped down.

Packaging should be appropriate for the product, the intended transport and end use. You should make sure that where packaging and marking materials are used, that they are compatible with the products being packaged or marked. Marking materials can cause corrosion or otherwise damage products and should be selected with care.

Additionally, you should be aware if any regulations exist regarding packaging. These could require “use-by-dates”, handling instructions or specific information regarding the contents to be displayed on the package.

Examples of this might be the packaging required for chart negatives to be dispatched to the printer. Packaging needs to be robust to ensure that the film is not damaged in transit, and may require some marking to ensure that the contents are not bent or folded.

Stock Control

Most businesses will probably already have a stock control system. During stocktaking it is usually possible to check the condition of products. You need to identify the storage requirements for your products and assign appropriate storage areas. Each product does not necessarily require a separate storage area.

A periodic check of the condition of the product in stock is necessary if it is likely to deteriorate or become contaminated. The frequency is dependent on the nature of the product, with robust types requiring a less frequent check than perishable or fragile products. There may be regulatory and legislative

requirements or the preservation system may be specified in the customer's order.

The protection of the quality of the product after final inspection and test now extends to include delivery to destination. If this is to be subcontracted out then you will have to ensure that appropriate procedures or instructions are given in order that final delivery does not prevent or affect the product and/or service from meeting customer requirements. You may need to carry out a supplier evaluation.

This may involve you in taking responsibility for the transport. In such cases, you would need to be aware of any legislation or regulations that might apply.

Control of measuring and monitoring devices

When necessary, an AIS must identify the measurements to be made and the measuring and monitoring devices required to assure conformity of product to specified requirements.

This part of the standard is only applicable to those AIS' where measuring or testing equipment (including test software) is used to check that what you are providing meets your customer's requirements for example the supply of data electronically to a data vendor, for example the use of cyclic redundancy checks (CRC). If however, for example, your inspection method is visual inspection such as that use for some maps and charts, you may not need to have any measuring equipment or instruments and this part of the Standard does not apply.

Measuring and monitoring devices must be used and controlled to ensure that measurement capability is consistent with the measurement requirements.

When applicable, measuring and monitoring devices must:

(a) be calibrated and adjusted periodically or prior to use, against devices traceable to international or national standards; where no such standards exist, the basis used for calibration must be recorded;

(b) be safeguarded from adjustments that would invalidate the calibration;

(c) be protected from damage and deterioration during handling, maintenance and storage;

(d) have the results of their calibration recorded;

(e) have the validity of previous results re-assessed if they are subsequently found to be out of calibration, and corrective action taken.

Note: See ISO 10012 for additional guidance

Software used for measuring and monitoring of specified requirements must be validated prior to use.

Having confidence in the equipment used to check your work

If use is made of measuring and testing equipment for checking compliance with your customer's requirements, you will need to consider how it is controlled, stored, used and its accuracy maintained at the level needed.

It should be emphasised that the requirement applies only to equipment that can affect quality. If you are using measuring and testing equipment for indication purposes only, it does not necessarily have to be calibrated. The key message here is do not automatically calibrate everything.

Calibration is the process of periodically comparing your equipment against a reference standard to determine how accurate it is and whether or not it is still capable of meeting the accuracy required for the measurements made with it.

“Periodically” can mean on a time basis (monthly, annually) or a usage basis (before each use or after a number of times used).

The reference standard may have been provided with the equipment. For example, a paint thickness meter is normally supplied with a set of thickness standards. In other instances, you may have to have access to a suitable reference standard by buying one or using a supplier.

For a reference standard to have validity, it needs to be traceable back to an appropriate recognised accurate source. This will normally be a national or international standard. There are cases where a national standard does not exist. In these cases, the sources or frame of reference needs to be described.

You also need to take into account just how accurate the measurements need to be. How accurate your equipment needs to be will depend upon how much tolerance is permissible in what you are measuring. A measuring device usually has to be capable of measuring to a much closer tolerance than the tolerance specified for the item being measured. However, there is no point in having measuring devices calibrated to unnecessarily high precision if you do not need that precision for your operations. Allied with these factors is how skilled the personnel need to be to use the equipment.

To make sure the measuring equipment operates effectively and gives reliable results, you need to:

(a) Make sure it is looked after, regularly calibrated and adjusted as needed.

(b) Describe how this will be done so that records are available which show calibration is traceable to national standards.

(c) Make sure it is possible to identify which equipment has been calibrated and that it is suitable for use (e.g. label the equipment).

If equipment is found to be faulty, you need to find out at what stage it went wrong. You need to decide whether you need to do anything about product you have passed using that equipment. The results of any review may indicate that no action is required or that a product recall is required.

Test software needs to be subject to some form of validation to make sure that it can perform the required measurements. One way is to ensure that this software can accurately and reliably identify product with a known set of faults and deficiencies. The details of how the test software is validated should be documented.

Unlike hardware test equipment, test software does not experience 'drift' or ageing, so periodic revalidation may not appear to be necessary. However, software can be subject to unintended errors. Therefore the purpose of revalidating test software is to ensure its continuing ability to perform the required measurements.

Some type of secure write protection should be used, in the same manner as seals are used on hardware calibration adjustments, to minimise inadvertent adjustments.

If you decide to carry out your own calibrations, you will need to have procedures for calibrating each type of equipment you use.

If you decide to use a supplier, some additional points you will need to consider are:

(a) Ideally, the organisation should be endorsed as a calibrating service by a suitable certifying body.

(b) The organisation should issue a certificate of calibration, which states the uncertainty of measurement. (This is another way of stating how accurately the instrument can measure).

(c) The certificate should indicate that the organisation can trace your calibration back to a national or international standard.

You are free to use an organisation that has not been endorsed as described above to carry out your own calibration if this is practical, e.g. original equipment manufacturer or neighbouring company. However, the resulting records must confirm that the reference standards used for calibration are of known accuracy, normally traceable to a national or international standard.

It may be possible, if you have several measuring instruments of a similar type, for the most accurate of these to be calibrated by a supplier then used as the basis for calibration of the others. For example, an accurately calibrated digital thermometer may be suitable as a reference standard for other less accurate temperature measuring equipment.

Calibration is an expensive operation. For an AIS, the costs of calibration can be considerable. You should ensure, therefore, that you know the difference between checking that process control equipment is fit for purpose and calibrating equipment that is required to give confidence in your inspection and test measurements.

You need to make sure that the calibration frequency, and standards of accuracy specified are appropriate to the actual equipment usage and not excessive. Once having determined the initial calibration procedure it does not have to remain fixed forever; it can be adjusted in light of experience.

In addition to calibrating equipment, records need to be kept to show:

(a) when the equipment was last calibrated, who did it, the calibration procedure, the acceptance criteria, what the result was, its acceptability and how this affects the equipment suitability (calibration status); and

(b) when the next calibration is due-the period is dependent on the type of equipment, its usage and how critical the measurements are to the process.

(c) Measuring equipment needs to be suitably stored when not in use, to protect it from damage or deterioration. It should also be suitable for use in the proposed operating environment. These precautions apply even more so to any 'master' measuring equipment or reference standards used for calibration purposes.

Measurement and Monitoring of Products

An AIS must measure and monitor the characteristics of the product to verify that requirements for the product are met, and must be carried out at appropriate stages of the product realisation process.

Evidence of conformity with the acceptance criteria must be documented, and records must indicate the authority responsible for release of product.

Product release and service delivery must not proceed until all the specified activities have been satisfactorily completed, unless otherwise approved by the customer.

Checking Things are Right

This part of the Standards requires that you establish how you intend to check and monitor both your processes and your product and/or service. Frequently

there will be considerable overlap between the two and in many cases the same monitoring processes will be adequate for both purposes.

Some examples of measurement and monitoring include:

(a) measuring dimensions;

(b) proof-reading publications;

(c) matching colours; and

(d) looking at things and deciding if they are what were asked for.

You need to decide what your measurement and monitoring requirements are and how they are to be carried out. People who carry out measurement and monitoring may need to be trained for what they are doing.

You also need to decide and record who has the authority to say a job is finished and the product and/or service can be delivered.

Individuals may check their own work, without secondary checking by another person. Such flexibility is sometimes necessary in an AIS where excessive duplication of effort should be avoided.

Verification, i.e. examining something to see if it meets requirements, is also a measurement and monitoring operation. In some industries, such as publishing industry, visual verification may be the main form of measurement and monitoring carried out.

Somebody has to be responsible for the actual measurement and monitoring. The person does not have to have a staff or managerial status. For example, in a small AIS with only a few employees, it may be necessary for cartographers to inspect their own work before passing it on to the printing and dispatch area. A job card may follow the work, and the operator signs off the work performed on the job card. This works well because the work of the next operator down the line is affected if the incoming work is not correct.

The final approval phase includes not only checking the finished product and/or service, but that all the inspections and tests that ought to have been done, have in fact been done and that if any paperwork is to go with the product and/or service, that it has been prepared and is satisfactory. In other words, if you were the customer, these are all the things you would want to know have happened before you took delivery of the product and/or service.

The measurement and monitoring to be carried out may be listed in a number of ways, such as:

(a) a quality plan;

(b) a sampling plan;

(c) an inspection and test plan;

(d) a procedure;

(e) an instruction;

(f) the customer's order.

There needs to be a consistent method of recording that the measurement and monitoring has been carried out. In an AIS, the supervisor could sign off a checklist to show all the inspections have taken place.

Your quality management system should be capable of identifying the job and include a procedure to recall the job if the item subsequently proves defective.

You need to have a system for keeping the necessary testing and inspection records or have other means of showing that the inspections have taken place.

Your records should indicate whether any failures occurred and the proposed action.

Inspection and test failures are handled by the activities described for non-conforming products.

Inspection and test failures should not be confused with normal processing activities to bring the product and/or service within specification before it is released to the next stage of operations.

A typical example might be a publishing company that measures, adjusts and readjusts colour densities on a chart until the required levels are achieved. Such an iterative approach does not constitute an inspection failure.

However, if the printer signs the system off as meeting specification, and it is subsequently found to be outside specification, this is a non-conformance.

Control of Non-conformity

An AIS must ensure that products that do not conform to requirements are identified and controlled to prevent unintended use or delivery. These activities shall be defined in a documented procedure.

Non-conforming products must be corrected and subject to re-verification after correction to demonstrate conformity.

When non-conforming products are detected after delivery or use has started, the organisation shall take appropriate action regarding the consequences of the nonconformity.

Some customers may require notification of any non-conforming product and/or service and approve what steps should be taken. If this is the case, it will be necessary to notify the customer following detection of the non-conforming product and/or service. You may wish to include the steps you propose taking along with the notification.

Records will need to be kept of any decision made, approval given by the customer, any rework or repair procedure, and the results on the inspection and testing on any rework or repair.

If, for example, a publishing company discovers that it has inadvertently used inks that are beyond their "use by-date" (or shelf life) in the printing of maps and charts. A number of actions might be required to fix the problem:

(a) investigation to find out the extent of the problem;

(b) segregation and quarantine of the remaining ink supply from that consignment;

(c) segregation and quarantine of affected maps and charts awaiting delivery;

(d) recall of those maps and charts likely to be similarly affected, and that could affect safety.

Depending on the potential risks, there may be a need to involve the applicable regulatory authorities and to make the public aware of the problem.

Analysis of data

This part of the Standard requires an AIS to collect and analyse appropriate data to determine the suitability and effectiveness of the quality management system and to identify improvements that can be made. This includes data generated by measuring and monitoring activities and other relevant sources.

In this regard, the AIS must analyse data to provide information on:

(a) customer satisfaction and/or dissatisfaction;

(b) conformance to customer requirements;

(c) characteristics of processes, product and their trends;

(d) suppliers.

Do the measurements reveal any trends?

As a result of your measuring and monitoring activities, you probably will have collected significant amounts of data, which can be analysed to indicate any trends. Any trends that you may find could suggest where there are problems

in your quality management system, which indicates areas where improvement is needed.

You may also find activities that, although effective as they are now performed, could be improved further.

You may find that statistical techniques are useful tools for the analysis process.

The Standard identifies four areas where analysis is to be applied but you can extend data analysis to whatever areas provide you with useful information.

Planning For Continual Improvement

Understandably, an AIS must plan and manage the processes necessary for the continual improvement of the quality management system to facilitate the continual improvement of the quality management system through the use of the quality policy, objectives, audit results, analysis of data, corrective and preventive action and management review.

What improvements do you plan to make?

Continual improvement of the quality management system is now a mandatory requirement. It is important to understand that continual improvement doesn't mean that it occurs without a break or without ceasing. Instead, improvement should be interpreted as a repeated activity to be implemented as each opportunity is identified and there is justification for proceeding.

The standard lists a number of tools and inputs that you can use to both plan and actually implement improvement.

Corrective Action

An AIS must take corrective action to eliminate the cause of non-conformities in order to prevent recurrence. Corrective action must be appropriate to the impact of the problems encountered.

The documented procedure for corrective action must define requirements for:

(a) identifying non-conformities (including customer complaints);

(b) determining the causes of nonconformity;

(c) evaluating the need for actions to ensure that non-conformities do not recur;

(d) determining and implementing the corrective action needed;

(e) recording results of action taken reviewing of corrective action taken.

Preventive Action

An AIS must identify preventive action to eliminate the causes of potential non-conformities to prevent occurrence. Preventive actions taken shall be appropriate to the impact of the potential problems.

The documented procedure for preventive action must define requirements for

(a) identifying potential non-conformities and their causes;

(b) determining and ensuring the implementation of

(c) preventive action needed;

(d) Recording results of action taken;

(e) Reviewing of preventive action taken.

Fixing the Causes of Problems

Both corrective and preventive action can be seen as steps in a quality improvement cycle. The need for corrective action can arise when an internal nonconformity (product and/or service or quality management system) occurs, or from external sources such as a customer complaint or warranty claim, or problems encountered with a supplier.

Corrective action involves finding the cause of the particular problem and then putting in place the necessary actions to prevent the problem recurring.

Preventive action starts with considering and analysing the data from all the incidences of non-conformities, all the customer complaints, all the warranty claims, all the problems with suppliers as well as any other sources of problems to find out if any trend is occurring.

Where this analysis shows that the potential for problems exists, preventive action then involves putting in place the necessary steps to eliminate these potential causes.

The documented procedures for both corrective and preventive actions should define the responsibilities and authorities for these activities.

Fixing the cause of known problems

There is a difference between carrying out corrective action and fixing a non-conformity. Fixing a non-conformity is about making good the problem either by reworking, replacing or any of the other activities described in the guidance material. A corrective action is concerned with finding out why the nonconformity occurred and making sure that the problem does not occur again.

The need for corrective action could be indicated by a number of factors, some of which could be:

(a) customer complaints;

(b) non-conformances;

(c) rework or repairs;

(d) audit reports.

Analysis of the causes may suggest some solutions such as retraining employees or amending a process control practice.

The size of the problem and the associated risks to your business will determine the actions that you need to take.

When corrective action is taken, it should be recorded and followed up within a reasonable period to find out whether it has worked. It may be necessary to change the quality manual, documented procedures, instructions and any other relevant documentation. Changes should be made in accordance with the provisions shown for the Control of documents.

Fixing the cause of potential problems

You should use your records to see if any trends exist which show a potential problem could arise. Typical examples of where information might be found and used for such analysis are from such sources as:

(a) difficulties with suppliers;

(b) in-process problems, rework rates, wastage levels;

(c) final inspection failures;

(d) customer complaints and customer surveys.

Other sources might include market surveys, audit reports and quality records. Where a potential problem is identified, a course of action may need to be developed and put in place to reduce or eliminate the risk of the problem.

If preventive action is found to be necessary, it should be recorded and followed up within a reasonable period to find out whether it has worked. As a result of preventive action, the quality manual, documented procedures, instructions and any other relevant documentation may need to be changed.

Examples of where preventive action may be applied include:

(a) identifying possible situations where product damage may occur and implementing practices to prevent it from happening;

(b) feedback from personnel may indicate a more efficient process; and

(c) re-assessment of suppliers to overcome potential supply problems.

In an AIS, there is little justification in separating management review arrangements from long-term corrective and preventive action. Where there are few personnel and the same people are involved in both activities, an artificial separation may result in duplication of effort. If this approach is taken, it should be included in the quality manual.

Purchasing

Purchasing Control

Controlling provision/production is of little consequence if the raw materials brought into an AIS are unsatisfactory. Complying with the part of the Standard therefore requires:

(a) Documented procedures for ensuring purchased products meet requirements;

(b) The evaluation, selection and reviewing of contractors;

(c) Clear definitions of requirements of contractors; and

(d) Procedures for verifying and allowing customer verification of contractor operation at the contractor's premises.

As with any other business an AIS needs to, and the ISO Standards require that its purchasing processes are controlled to ensure that the purchased product conforms to requirements. The type and extent of control shall be dependent upon the effect on subsequent realisation processes and their output.

Examples of products or services that an AIS might purchase are:

(a) Hardware

(b) Software

(c) Aeronautical data

(d) Cartographic services

The organisation must evaluate and select suppliers based on their ability to supply products in accordance with an AIS' requirements. Criteria for selection and periodic evaluation need to be defined and recorded

Stating Purchasing Requirements

Who do we get it from?

You will need to identify those materials and services that you buy which can affect the quality of your product and/or service. You will then need to select from suppliers who can supply these materials and services, those you intend to use. Remember that sub-contracted services such as design, transport and delivery, calibration services etc. may affect quality and may need to be considered.

Most AIS' usually have a number of reasons why they deal with a particular supplier. You can continue to use existing suppliers when developing your quality management system. The standard simply requires that selection be carried out in a controlled manner.

When you decide why a particular supplier is to be used, you should write down the criteria and basis for the selection. Questions you may wish to ask in selecting suppliers may include one or more of the following:

(a) how reliable are they?

(b) can they supply what you want?

(c) do they have the necessary resources e.g. equipment and personnel?

(d) is the quoted delivery time and price acceptable?

(e) do they have a quality management system?

(f) have you used them before successfully?

(g) have they a good business reputation?

Where a proprietary or brand name product is to be purchased, an obvious source may be a wholesale or retail outlet offering an off-the-shelf or self-selection service. A wide range of products are available from such sources, such as cartographic and stationery resources, hardware and some software supplies.

In these circumstances, the criteria for supplier selection and the associated records may be minimal.

You may wish to consider buying for a trial period, with a review at the end of the period to establish the acceptability of the supplied product and/or service or the supplier.

As well as maintaining records of approved suppliers and basis of approval, you should also regularly monitor the performance of those suppliers to ensure that they still meet the selection criteria. However, as a somewhat small business, you need to be aware that your purchasing power is limited, and threats to remove suppliers from your supplier approval system may be ineffectual. This is particularly true where you are obtaining product and/or service from very large national or international organisations. Your quality manual needs to reflect the real life situation.

The extent to which you monitor supplier's performance depends on how critical the product and/or service being supplied is to the quality of your product and/or service.

For example, the paper quality could be critical in an external business that provides printing services to an AIS. Other businesses might use normal, commercial stationery, which would not need any quality related purchasing controls, but in the case of some AIS products, paper thickness and longevity, colour matching or ink bleeding through can create a number of problems for the delivery of quality products.

The printing business may monitor the performance of its paper suppliers very closely to ensure the quality of its printed product and/or service remains at the expected level.

Purchasing Documentation

Purchasing documents must contain information describing the product to be purchased, including where appropriate:

(a) Requirements for approval or qualification of

- product,
- procedures,
- processes,
- equipment and
- personnel.

(b) Quality management system requirements.

When making a purchase, an AIS must ensure the adequacy of specified requirements contained in the purchasing documents prior to their release.

Stating Purchasing Requirements

What do we need?

In order to get what you need, the purchase instructions should leave no doubt of what it is you want. Instructions are preferably given as a written order. As discussed before, remember that phone instructions are open to misunderstanding by your supplier and you may need to take additional precautions to ensure that your instructions are understood. Irrespective of whether the order is written or verbal, you will need to keep a record of what was ordered so you can confirm you got what you asked for.

This part of the purchasing requirement deals with the details that you should include, as appropriate, in advising your purchase requirements. The extent to which the details listed in Items (a) and (b) apply depends on the extent that the goods and services being ordered affect the main business and the quality of your product and/or service.

it is essential that all relevant details of the items or services wanted are clearly stated at the time of ordering. These may include drawing, catalogue or model numbers and required delivery date and place. In some cases, a catalogue number, or a part number may cover the complete description. While it is essential to fully describe what you want, unnecessary detail can lead to misunderstanding and incorrect delivery.

Verification of purchased products

The organisation must identify and implement the activities necessary for verification of purchased product.

Where the organisation or its customer proposes to perform verification activities at the supplier's premises, for example factory acceptance testing of hardware of software on a Test and Evaluation Platform before introduction onto an operational platform, the organisation must specify the intended verification arrangements e.g. a test plan and method of product release in the purchasing information.

Did you get what you ordered?

Most businesses have some form of incoming measurement and monitoring, even if it is simply an employee checking the delivery docket and signing it to confirm that goods were delivered. A further check is that goods are what was ordered and have been received in good order. However, you need to decide whether the goods and services you receive should be inspected, by whom and how.

When a supplier has a quality management system in place, it may be possible to reduce the extent of measurement and monitoring.

The extent of measurement and monitoring also depends on the nature of the goods being received; e.g. the inspection of office supplies may be simply a verification that the quantity ordered was delivered. The delivery docket, signed by the employee, may be all the documentation required.

If you order goods or services, or both, from a supplier, and wish to inspect the goods or services, or both, at the supplier's premises, the arrangements for such an inspection need to be agreed and included in your order. Some examples of this requirement are:

(a) Factory acceptance testing of software of hardware before taking delivery;

(b) monitoring employees being trained at a training organisation.

If your customer wants to visit your supplier's premises to check the product and/or service, this needs to be stated in both the customer's order to you and in your order to the supplier.

Whether or not the customer actually does this, you are still responsible for ensuring that all the products and/or services obtained from suppliers meet the requirement of the customer's order.

Production and Service Operations

Operations Control

The organisation must control production and service operations through the:

(a) availability of information that specifies the characteristics of the products;

(b) availability of work instructions when necessary;

(c) use and maintenance of suitable equipment for production and service operations.

(d) availability and use of measuring and monitoring devices;

(e) implementation of monitoring activities;

(f) implementation of defined processes for release, delivery and applicable post-delivery activities.

Controlling what you do

Perhaps a more easily understood title for this part of the standard might be Process Management. Remember that this applies equally to services as well as "hardware" type products.

How your processes, which are necessary to produce the required product and/or service, interact with each other and the order in which they occur has to planned and then put into practice.

Note that a documented procedure is not required, but may prove beneficial to an AIS for staff to understand all of the processes and relationships.

You need to understand how each of these processes impacts on the final product and/or service and to ensure that appropriate controls are in place to be able to meet whatever customer requirements have been specified. In many companies, the control is exercised through internal orders, drawings, production schedules, service specifications, operator instructions, etc.

You need clearly understandable work specifications or work instructions when they are necessary to ensure the product and/or service conforms to the specified or customer requirements. One of the key issues here is that it is not necessary to write a document with all the details that a competent operator would be expected to know.

For example, there should be no need to describe to a trained cartographer how to operate CAD equipment. If the cartographer cannot operate the equipment, the answer is not written instructions but training. However, the procedure might refer to ICAO standards for depictions or routine file maintenance and record keeping.

When product quality is dependent on avoiding any deterioration of the condition of process equipment, you need to establish arrangements for maintenance of that equipment, e.g. plotters or printers may only continue to produce quality output if there is periodic maintenance of ink cartridges or toner.

Control of operations will require you to ensure your equipment is fit for purpose and that there are no problems due to the work area.

Many of the requirements for equipment control and working environment may be specified by your customer or by regulation such as Occupational Health and Safety and will need to be reflected in your own process controls.

Process controls should also include how the process condition or the product itself is to be monitored, e.g. the printer may monitor the colour values of the charts or the operation of the printing equipment. To assist there may be proof charts or photographs available to indicate the required colours for the charting output and the folding required. Another example might be the use of data integrity checks to ensure that the output is that required.

Many goods and services are sold with a commitment to provide post delivery maintenance and support e.g. hardware and software as part of the overall contract. Remember that commitments made as part of a warranty also form part of the contract and this part is relevant.

In dealing with post delivery activities, your process will need to address the following aspects:

(a) general provisions of a servicing programme;

(b) planning the servicing activities;

(c) personnel needed and any training requirements;

(d) spare parts management;

(e) preparation of servicing instructions;

(f) records of servicing activities.

When providing servicing, it is important to remember that any product and/or service non-conformances should be fed into the corrective action system so that the reason for the failure can be identified. Remember, if warranty repairs were required, the product did not perform as intended and this is a form of non-conformance.

As always, records that show what you did to measure how your process was under control should be kept.

Contract Review

All agreements with the customer base must first be defined as requirements and then controlled to ensure that:

(a) All requirements are adequately defined;

(b) Any differences between the end product and the requirements are resolved; and

(c) The terms of the agreement can be met.

To ensure this occurs; the following steps are necessary:

(a) A documented procedure for reviewing and approving agreements;

(b) A documented process for managing changes to agreements; and

(c) The keeping of records of the agreements and their review and/or approval.

Customer Satisfaction

The Standards require an AIS to monitor information on customer satisfaction and/or dissatisfaction as one of the measurements of the performance of the quality management system. The methodologies for obtaining and using this information must be determined.

How satisfied are your customers?

This is an important new aspect to the 2000 version of ISO 9001. You are required to monitor your performance as a supplier to your customers. More specifically, you are required to monitor information on satisfaction or dissatisfaction. To do this you will need to find out how satisfied your customers are.

More that one type of customer

Firstly it is important to remember that you may have more than one type of customer. For example, if you are a map or chart manufacturer, you may sell to wholesalers who then sell to retailers who then sell to the general public. In this case you have three types of customer and they all have different requirements. You may be satisfying one group and upsetting another. For your product and/or service to sell successfully you will need to satisfy them all.

Satisfaction and dissatisfaction

Another important point is to understand that satisfaction is not the opposite of dissatisfaction. Your customers are entitled to be satisfied and may take good quality of products and/or services for granted. On the other hand, if they are dissatisfied, they may react quite badly or strongly. So satisfaction may produce a neutral response whereas dissatisfaction may produce a strong negative response. There is a third possibility, which is a strong *positive* response. This is sometimes referred to as 'delight', something beyond the normal level of satisfaction.

Monitoring satisfaction

There are many ways of finding out what your customers think of you. Amongst the most widely used are:

(a) telephone calls made periodically or after delivery of product and/or service;

(b) questionnaires and surveys,

(c) using a market research company;

(d) focus groups.

All of these have merits and disadvantages. For a small AIS organisation, it recommended that you start with simple methods such as calling your customers. You may gain a useful insight by calling someone who is senior to the one that you normally deal with. Such a person is likely to know how you perform and is likely to tell you, good or bad.

Surveys and questionnaires are being extensively used. For example, how many do you receive in a year? You may get some good ideas from the ones sent to you. You can give your customers the option of giving their name or staying anonymous. You may get more negative responses from anonymous people, because some people do not like being the bearer of bad news. If they can hide their identity they may tell you something they would not otherwise do. Remember criticism is vital information, which will help grow your business.

Questionnaires and surveys have their disadvantages because they are time consuming. If you use a questionnaire, keep it simple. Choose your questions very carefully. Ensure that they are clear. Why not test it out on a trusted friend before you send it out?

If you really want to know what your customers think, it is probably best left to the professional market research companies. Their independence enables them to gather an objective perspective of you performance and your customers' satisfaction.

Customer focus groups are a powerful tool for finding out the reasons behind the measure of satisfaction. A group of customers is brought together in a small meeting where they discuss the merits of your product and/or service. This needs facilitation, which is best left to a professional.

Satisfaction as a measure of your system performance

The new version of the Standard makes it clear, that you are to use customer satisfaction as a measure of the performance of your quality management system.

At its simplest, this could be the percentage of dissatisfied, satisfied and delighted customers. In reality it tends to be more complicated than that!

One customer may be both satisfied and dissatisfied. He or she may be satisfied with the product and/or service but dissatisfied with your delivery performance, for example. So you need to think it through and come up with a practical measure. Perhaps you could ask your customers to rate your performance on a scale from 1 to 10. Or perhaps it would be worthwhile measuring several aspects of your business, for example, appearance, delivery performance, packaging, functionality, and value for money.

CAA's must conduct periodic internal audits to determine whether the quality management system:

(a) conforms to the requirements of the International Standard;

(b) has been effectively implemented and maintained.

CAA's must plan the audit program taking into consideration the status and importance of the activities and areas to be audited as well as the results of previous audits. The audit scope, frequency and methodologies must be defined. Audits must be conducted by personnel other than those who performed the activity being audited.

A documented procedure must include the responsibilities and requirements for conducting audits, ensuring their independence, recording results and reporting to management.

AIS Management must take timely corrective action on deficiencies found during the audit.

Follow-up actions shall include the verification of implementation of corrective action and the reporting of verification results.

Note: See ISO 10011 for guidance.

Are you doing what you said you would do and does it work?

Audits are about getting information, in a planned way, from a variety of sources and comparing it all to confirm that things are being done properly. The steps of gathering this information should include:

(a) reading the documented procedures;

(b) reading relevant process control documents;

(c) observing processes being carried out;

(d) talking to the people carrying out the processes; and

(e) looking at the records.

All these need to tell the same story; i.e. that you are doing things right, the way you said you would.

For a well organised and run AIS, where familiarity with the day-to-day activities is the norm, a properly conducted audit can be beneficial. You should use audits to stand back and look at your business objectively to confirm that the quality management system is helping you do what you want to do and what you need to do.

You need to find some form of evidence, documented or otherwise, which can confirm that the quality management system is performing in the way it was intended. It is not sufficient to simply do an overview and conclude without

any proper basis or supporting evidence that the quality management system is operating satisfactorily. This requirement is reinforced to require you to develop some means for measuring how the quality management system is performing.

Seeking out areas for improvement is now particularly important as it is this information that is required to be added to the data to be analysed.

The information from internal audits should also be used as part of your management review. The better your audit, the more useful your management review will be.

When an internal quality audit shows up non-conformances and inconsistencies, you need to develop the necessary corrective actions and then put them in place.

These may be as simple as:

(a) writing or revising a documented procedure or a process control document;

(b) redesigning a form to incorporate more information; and

(c) arranging for employee retraining.

Audits should be scheduled to cover all the quality-related activities you undertake and all the requirements of the standard. In deciding how to manage the audit schedule and how often any particular aspect should be audited, the following factors may be considered:

(a) Are there any complex procedures or processes that would justify individual audits?

(b) Are there any aspects or areas that have a history of problems?

(c) Does your 'hands-on' approach indicate a need for less frequent audits?

A report or summary of each audit should be made out, listing the findings and what action if any is to be taken. The record need not necessarily be complex. For example a simple entry in a daybook may be sufficient. If the previous audit recommended or required action to be taken, the current audit should check how effective the change was and this should be recorded.

There is a requirement in the Standards that “audits shall be conducted by personnel other than those who performed the activity being audited”. For example, it is acceptable for the office personnel to audit the production/service activities and vice-versa. This can provide benefits in developing an understanding of each other's problems.

In a small AIS where there may be only one or two people in the entire management structure, this requirement may not be achievable. It is suggested that in such cases, the manager, carrying out the duties of an auditor tries to step back from direct involvement in the business operations and be very objective about the audit.

Another approach would be to seek the cooperation of another work area and each provides the internal quality audit facility for the other. This may prove attractive if there are good relations between the two businesses.

Effective use of internal quality audits is an area that you may use to minimize the ongoing costs of certification/ registration. If the auditor from the certification/registration body can see that internal quality audits are being used to effectively monitor and control the quality management system, the auditor does not need to spend as much time verifying the quality management system operation. Again it must be emphasized that what the auditor will be seeking is objective evidence with respect to internal quality audits.

Steps towards Implementation a Quality System

There are many ways an organisation can go about implementing a quality management system. This part of the Guidance Material is intended to provide an example of implementation into an AIS.

Note: This example is intended as guidance only and should not be regarded as the only method of implementation, nor necessarily the best or only method of implementation.

The approach in this example consists of three stages:

(a) Considering what happens in an AIS;

(b) Implementing a quality management system;

(c) Improving the quality management system.

(a) Considering what happens in an AIS	Step 1	Consider the business of an AIS, i.e. the different flows of work through the organisation and list them.
	Step 2	With this list in mind, decide if there are any "permissible exclusions" (refer to Standards Guidelines for details) that apply to the AIS. Remember that any exclusions will need to be justified in the Quality Manual.
(b) Implementing a Quality Management System	Step 3	Get people involved in writing down what their jobs cover.
	Step 4	Collate this in sequences relevant to the list of main business activities collected in Step 1.
	Step 5	Identify where the standards and this list of your main business activities link together.
	Step 6	Apply the standard and the quality management system.
	Step 7	Keep the quality management system simple and functional, i.e. relevant to the business operations.
(c) *Improving the Quality Management System*	Step 8	Consider the feedback of information from the quality management system to lead to improvements in ideas and activities
	Step 9	Monitor and measure the changes so that everybody is aware of the gains made by the system.

Now that you have determined that you would like to analyse the business and would like to work in a more efficient manner, where do you start?

The stages and their associated steps have been outlined above, the next section provides an amplification of the details.

Step 1	**Consider what your main business activities are and list them.** Those elements described in Annex 15 form the main business activities of an AIS. • receive and/or originate • collate or assemble • edit • format • publish/store • distribute Aeronautical information/data
Step 2	**With this list of main business activities, determine if any of the activities require you to do design work**. Design means taking raw ideas or concepts and either though design drawing, computer design or academic thought process developing a product and/or service design or project plan to suit the needs of your customer. Generally for an AIS, design work will manifest itself through the design of instrument procedures. If you determine that you don't design, and the products and/or services are done against tried and previously developed standards or specifications, you may be able to claim a "permissible exclusion". To achieve the next step, you need to keep the list of main business activities firmly in mind. It may help at this stage to produce these activities in the form of a flow chart to assist in the development of a quality management system. The purpose of setting activities out in this way is to: • identify the different components of the AIS and decide if they all fit together, or if changes are required to make the whole process work better; and • identify where and if the elements of the standard are covered.

Step 3	**GET PEOPLE INVOLVED BY WRITING DOWN WHAT THEIR JOBS COVER** Now is the time to get everyone concerned involved in writing down how they carry out the parts of the AIS activities they are responsible for, stating: • who is responsible for performing and checking activities; • where the activity takes place; • when it will happen; and • what happens, that is, how the activity is performed. *Some important points you will need to think about are:* (a) As the job is being carried out by a specialist, you will only need to reference the type of person and the qualifications. (b) If, the work is done by non-specialist staff, or there are specific in-house requirements, more detail may be required. (c) The sequence of the activities may still need to be defined, for example: • How a job is initiated. • How does the work get started? • Who monitors the progress? • How is the work processed and inspected? • Who decides when the work is finished? • How is delivery made? • What follow up action is needed and who does it? • What records are kept and who keeps them? If your organisation already has its details written down as operating or work instructions, your job is already half done. Don't rewrite what is already documented, make a note of the name and title of the document so it can be controlled and if necessary referenced in other quality management system documentation at a later date. (d) Most important ... Keep written documentation Simple!

Step 4	**COLLATE THIS IN SEQUENCES RELEVANT TO THE LIST OF BUSINESS ACTIVITIES (STEP 1)** Once everyone has written down (or collected previously written) work instructions relevant to their part of the activity or particular job responsibilities, you as manager should take time out with someone else from the business to look at: • What has been written; • Satisfy yourself that it all fits together; and • Deal with any gaps or inconsistencies. By appointing someone to assist you, you have basically appointed a management representative or if you are doing most of this yourself as manager, you have assumed the role of management representative. You have now addressed one of the first requirements of the standard. By collating all these documents, you now have a procedures manual (which is another requirement of the standard). You should adopt a consistent style for these documents which you and your people are comfortable with. This may provide an opportunity to review and improve the procedures themselves.
Step 5	**IDENTIFY WHERE THE STANDARDS AND THIS LIST OF YOUR BUSINESS ACTIVITIES LINK TOGETHER** You or your management representative need to go through the documents you have written with a copy of the standard beside you and determine if you have met: • the requirements of the standard; and • your process control requirements. If you identify an area of the standard you have not addressed you will need to consider how you will cover that particular requirement. You may need to add some detail to one of the existing procedures to ensure the requirement is met. It may require some additional documentation, but be careful, make sure it is relevant to the work of the AIS. You may have to use external documents in your business activities. Some examples are dealers' manuals, maintenance manuals and installation manuals. It is not necessary to rewrite these to include them in your quality management system. All that is needed is to make an appropriate reference to the process control document in your manual.

Step 6	**APPLY THE STANDARD AND THE QUALITY MANAGEMENT SYSTEM** If you continue to involve others in your organisation, they are more likely to grow with the quality management system and have input. The quality management system will then reflect reality rather than become irrelevant paperwork. The following points should be noted: • Do not create unnecessary paperwork, forms, and the like. Look at what is currently done and write your procedures to show how the job is done, not how you wish it was done or should be done. • Only create a form if it is going to capture a critical activity or is going to help someone. A signature on or an extension to an existing form may suffice. • Remember, keep a record when: ➢ a problem arises; ➢ a good suggestion is raised; or ➢ a customer or employee expresses a need for action. • To implement the quality management system, everybody needs to be have access to the documentation that relates to their activities. They need to be given some insight into how the quality management system works and why, for example, document control ensures that they have the latest copies of information relevant to their jobs and can rely on making decisions based on up-to-date information. • Everybody needs to be trained to understand how to keep the quality management system up-to-date themselves, if changes take place in areas they are responsible for. Everybody needs to know how to make changes to the quality management system as well as noting problems and putting forward ideas for improvement. Remember that you need to approve any changes before they are put in place.

Step 7	**KEEP THE QUALITY MANAGEMENT SYSTEM SIMPLE, FUNCTIONAL AND RELEVANT TO THE BUSINESS OPERATIONS** The following points are worth noting: • The purpose of implementing a quality management system is to ensure that the business activities of the AIS are operating in a controlled manner and the people responsible for the various activities know and understand their roles and responsibilities. • Quality management system documentation should be a ready reference point to identify how, when, where and sometimes why a job should be done, or an activity managed. For that reason, the wording should be simple and in the language used in the workplace on a daily basis. • Documentation should be in a format that is easily used in the organisation. For example: ➢ if computers are available, it may be easier to have a computerised system, rather than a paper system; ➢ where there may be language or other differences in the workforce, it may be necessary to use pictures or several translations of the documents. • Documentation should reflect what is currently happening in the business. During the audit process, questions will be asked and objective evidence sought, to show that personnel are using and understanding the quality management system. The objective evidence is provided by the documentation.

IMPROVING THE QUALITY MANAGEMENT SYSTEM

An effective quality management system uses feedback loops to improve how you go about doing things, which in turn should lead to an improvement in product and/or service quality.

Step 8	**CONSIDER THE FEEDBACK OF INFORMATION FROM THE QUALITY MANAGEMENT SYSTEM TO LEAD TO IMPROVEMENT IN IDEAS AND ACTIVITIES** By noting areas of concern from corrective action activities (Step 6), you will gather data, or note trends that you can look at and consider for improvement. Improvements may be simple and easily achieved in the initial stages but may become more challenging once the obvious opportunities for improvement have been taken. It is worthwhile persevering with a systematic approach to quality improvement, since the benefits can be considerable. Normally, improvements are adopted over a period of time as money and resources become available. A realistic approach and steady progress will build confidence and maintain enthusiasm.
Step 9	**MONITOR AND MEASURE THE CHANGES SO YOU KNOW WHAT YOU HAVE GAINED** It is important to remember to measure your progress. One-way of doing this is to monitor mistakes and their cost. This gives you the opportunity to identify areas where cost savings may be made. Noting how long or how many resources are spent on an activity or service delivery may also obtain measurements. This should always be recorded on any activity that has been chosen for improvement, prior to commencement and compared again at the end, even though the activity may be small and simple.

CONCLUSION **Remember:** small steady changes leading to improvements, well thought through and effective, are going to have long term advantages.

These nine steps can help you take advantage of the quality management system approach and allow it to contribute to the growth of your business.

What does Certification and Registration Mean

Starting Out

Certification/registration of quality management system is not mandatory but the following provides a brief outline for those wishing to follow this path.

Before the actual certification/registration can take place, it is essential to have all aspects of the quality management system in place and running for several months. You can then see the quality management system in operation and have the opportunity to improve it. Any improvements you can achieve at this stage can simplify the certification/ registration process. This can save you time and money.

Certification/registration bodies do not operate on the principle of "what is going to happen". They want to see what has happened. You will need sufficient records to demonstrate that your quality management system has become established and effective.

Who does the certification/ registration?

There are two types of certification/registration; one is carried out by your customer(s) and the other by an independent party. The outline below is based on that typically adopted by independent third party certification/ registration bodies.

Brief Outline

The process generally takes the form of the following steps: You make a formal application to the certification/registration body. The application normally includes a description of your business activities, the product and/or service range, and any other information requested. The certification/ registration body may ask for a questionnaire to be filled out.

Next, the certification/registration body will review your quality manual. What it will be looking for is how well the quality manual describes what you say happens against what the standard says should happen.

When there are deficiencies, the certification/registration body will indicate where the problems are. Amendments to the quality manual will usually overcome most problems, but you may also have to develop additional procedures.

A further review of any changes is carried out and is often combined with one of the subsequent stages. The certification/registration body may then hold a pre-assessment check or go straight to the certification/registration audit.

In the certification/registration audit, the auditor (and there may be more than one) will use the quality manual and any procedures as a guide to how your business operates. The auditor's operative words will be 'Show me'. The

auditor will be looking for records, documents, or other objective evidence to see that you are doing what your quality manual/procedures say you do.

Where inconsistencies (nonconformities) are found, the auditor's actions depend on how serious these are. For major nonconformities, the certification/registration could be withheld pending rectification. For minor nonconformities, a qualified certification/registration might be issued, pending rectification by the next compliance audit.

Once certification/registration is granted, the certification/ registration body will carry out compliance audits of the quality management system over the period for which the certification/ registration is valid. These audits are not as comprehensive, in that the full quality management system is not necessarily assessed at each compliance audit.

If nonconformities are found during a compliance audit and not rectified within specified times, certification/registration may be withdrawn. Minor non-conformances will be required to be rectified by the next compliance audit, which under these circumstances may seem to come round very quickly.

Terms and Definitions

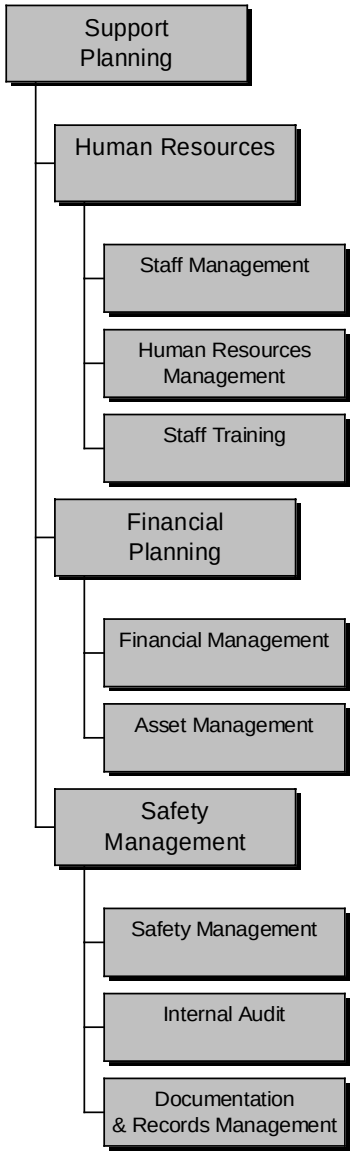
Bibliography

ISO 9000

HB66(Int) 2000

AS/NZS ISO 9001:1994 – Quality Systems. Model for quality assurance in design, development, production, installation and servicing.

Support Planning



(State)

Aeronautical Information Service

Quality Management System

Quality Manual

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WARNING

CONTROLLED COPY No:

If the number is:

RED Then this is a Controlled copy

BLACK Then this is NOT a Controlled copy

<Insert the name of the AIS Unit>

Quality System Manual

CONTROLLED COPY NUMBER

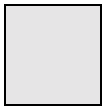

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Table of Contents

Introduction

This Quality Manual relates to the operation of <insert the AIS Unit> and provides guidance on the policies and procedures applicable for the provision of an aeronautical information service by the State of <insert State name>.

The policies and procedures within this manual have been implemented to ensure that the requirements for a quality system for the AIS of <insert State> are documented and so ensure compliance with the requirements of ICAO Annex 15 and other relevant standards.

The <insert> AIS Unit forms part of <insert the organisational arrangements eg Air Traffic Services Division> within the <insert parent body eg Civil Aviation Administration of …>

This AIS Unit is located at:

<insert address>

Tel:	<insert contact number>
Fax:	<Insert contact number>
Email:	<insert contact details>
AFTN:	<Insert contact details>
Web Site:	<Insert contact details eg www.>

The contents of this Manual are reviewed on an as required basis, but not less than annually. <Insert who is responsible for coordinating changes to the Manual eg the Administration Manager, Aeronautical Information Service> is responsible for coordinating requests for changes and amendments to the Manual.

The approving officer and issuing authority for this Manual and subsequent amendments is <insert title or position of authority>.

<Insert who is responsible for the Manual eg the Administration Manager, Aeronautical Information Service> is responsible for the maintenance and distribution of this Manual.

Issuing Authority:

Signed: _____ Name: _____

Date: _____

Scope and Field of Application

The Scope of this Manual is to define <insert the scope of the Manual>

The provision of an AIS for the State of < state name >.

Note: *If this manual only covers part of the AIS, eg: NOTAM, this needs to be specified.*

Document the Scope, including the:

(a) boundaries within which the AIS operates

(b) deliverables of the AIS eg product range

(c) exclusions (see below)

(d) related work areas and interdependencies with other areas

(e) constraints – ensure that any constraints in terms of time, money or other factors are clearly identified

(f) assumptions – specify any assumptions that have been necessary when describing the scope

Exclusions

<List any exclusions to the Standards or other areas that are not covered by this Manual. This is to ensure that there is no ambiguity about what is within the Scope of the AIS and what is outside>

References and Associated Documents

List applicable State Civil Aviation documents, regulations, orders and rules.

- ICAO Doc. 8126 Aeronautical Information Services Manual
- ICAO Doc. 8697 Aeronautical Charts Manual
- DOC 8400/3 ICAO Abbreviations and Codes
- DOC 8585 Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services
- DOC 8643 Aircraft Type Designators
- ICAO Annex 4 Aeronautical Charts
- ICAO Annex 5 Units of Measurement
- ICAO Annex 15 Aeronautical Information Services
- <insert other relevant documents eg Business Plans etc>

Document Control Information

Document Control Sheet

This document is a controlled document and is identified as such when the controlled copy number is shown in <insert colour, usually red>. All other copies are uncontrolled.

The Manager Aeronautical Information Service <insert if someone else is responsible>:

- maintains a distribution list and the master control copy of the AIS Quality Manual;
- is responsible for keeping a register of controlled copies; and
- ensures that each copyholder verifies receipt of all controlled documents and subsequent amendments.

Uncontrolled copies may be issued with no record of who has the copy. For uncontrolled copies the document holder is responsible for ensuring that the copy they have is up-to-date.

The control information for this manual is detailed in the table below:

Title:	AIS Quality Manual
Owner:	<insert>
Location of master copy:	Aeronautical Information Service
Date last updated:	<insert date>
Holders of controlled copies:	A register of holders of controlled copies is shown on <insert page> of this manual.

Controlled Copies of This Document

Copy No:	Holder
1. 2. 3. 4. 5. 6. 7. 8.	<**insert as appropriate**>

This manual must be made available to all AIS staff. It may also be advantageous to distribute the manual to those organisations that make substantial contributions to the AIP. eg: ATS, Various methods of distribution can be considered, eg paper and electronic formats

Amendments and Amendment List Record Sheet

Change Summary

Changes made to this document are summarised in the following table.

Date	Pages	Description
<insert>	All	Initial Draft

Amendments

Amendments to this manual must be by page replacement, addition, and deletion or by complete re-issue.

Staff carrying out an amendment to this Manual must complete the Amendment Record sheet below.

Amendment Number	Amendment Date	Amended by	Date

Check List of Effective Pages

	Page Number	Date		Page Number	Date

Quality Policies

The following statement should clearly and simply state principle policy or policies relevant to the provision of AIS.

<insert the parent organisation name> mission is to provide a safe, efficient and effective air traffic system. <insert the organisation name> recognises that high quality aeronautical information services are essential to achieving this mission.

The <insert name> AIS Unit is committed to providing high quality aeronautical information services to meet the needs and requirements of its customers and to seek continuous improvement in the provision of those services through a quality framework.

Quality will be an integral part of all AIS activities.

The quality framework will be based on the ISO 9000 series of International Standards and will draw as appropriate, on ICAO Standards and requirements and other International and <insert the name of the State> Standards.

AIS will be provided in a manner consistent with the standards and recommended practices contained in the applicable ICAO Annexes, in particular Annexes 4 and 15.

A statement similar to the following can be used in circumstances where the AIS provider also has commercial objectives:

The AIS will be provided in a manner that is consistent with the commercial objectives of both the < name of government department or agency responsible for the provision of AIS > and customers.

The following statement should be included in all cases.

The policies and procedures detailed in this manual are binding on all AIS staff.

Quality Objectives

These objectives should reflect the principles of the Quality policy.

The Quality Objectives of <insert> State are (eg):

(a) To provide quality information and data services to meet the demands and requirements of our internal and external customers

(b) To ensure that products are constructed, produced and distributed in such a way as to enable users to operate safely and efficiently

(c) To ensure the quality and timely promulgation of products for which AIS is responsible

(d) To ensure that products comply with applicable standards and regulations.

(e) To ensure as far as practicable that the information published is accurate and up to date.

(f) To provide the end user with value-added, defect-free products, that are timely and competitively priced

(g) To institute a program of continuous learning within the AIS

(h) To foster an environment where quality is the accepted way of doing business

(i) To foster the participation of our staff in the work and decision making processes of the AIS

(j) To pursue commercial business opportunities within the areas of expertise of the AIS

Communicating the Quality Policy and Quality Objectives

Each staff member in the <insert> AIS has access to this Manual and consequently to the Quality Policy and Quality Objectives.

The <insert who is responsible eg Manager, AIS and/or Management Representative> is/are responsible for making staff aware of the Quality Policy and Quality Objective, for the implementation of quality practices to achieve these Objectives, and to monitor their application.

Staff members are kept informed of these matters through staff meetings, performance agreements, appraisals and competency checks.

Organisation

Provide here a summary of how the AIS is organised, where it is located, how it is staffed and the relationship of the AIS to other departments of the Civil Aviation administration.

DOC 8126, Chapter 2 provides guidance on the establishment of a sound organisational base and management structures. An organisation chart such as the example shown in Fig 1. Below is a useful way of showing the how the AIS is organised and its relationship to other departments and workareas

Organisational Arrangements - <Insert> AIS

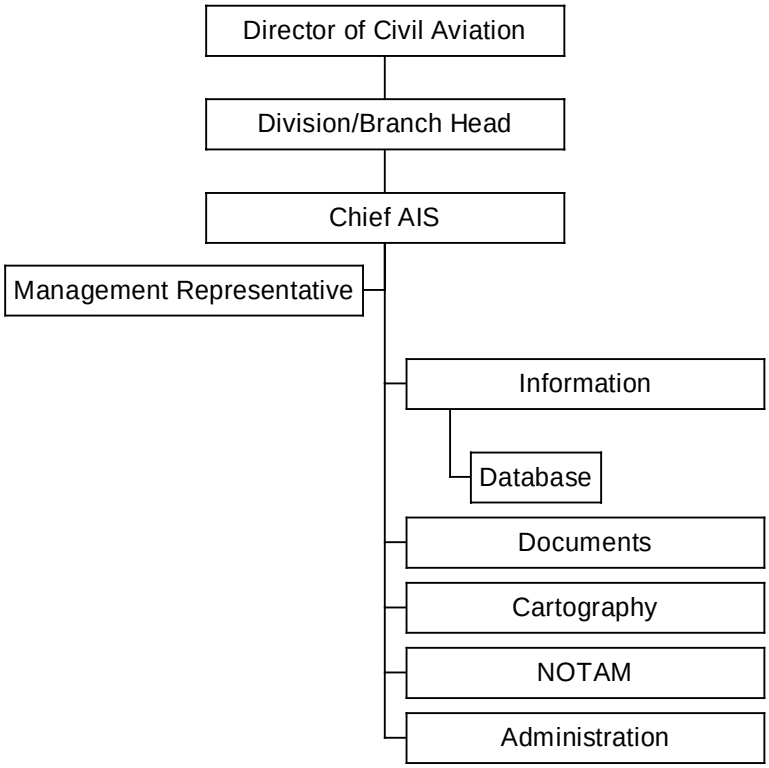


Fig. 1

Management Representative

It is important to identify one person who has overall responsibility for the implementation and monitoring of the quality policies and procedures described in this manual.

Responsibility and authority for all quality processes and functions described in this manual and associated aspects of the AIS are held by the < specify title or position of manager with overall responsibility for the AIS quality system >.

< specify title or position of manager with overall responsibility for the AIS quality system > has the responsibility and authority for:

(a) ensuring that processes for the quality management system are established and maintained

(b) reporting to senior management on the performance of the quality management system, including improvements

(c) promoting awareness of customer requirements throughout the organisation

As shown in the above organisation chart, it may be useful to structure the AIS as function teams, where each team of one or more staff could be responsible for certain aspects of the AIS. These could include an Information Team, Cartographic Team, Publishing Team, NOTAM Team and an Administration Team. Suggestions on the responsibilities of each of these are shown below.

Information Team

The Information Team includes a Coordinator and < number > assistants. This team has primary responsibility for the collection and verification of information for publication in the AIP, and for database entry.

Documents Team

The Documents Team includes a Coordinator and < number > assistants. This team has primary responsibility for the processing of changes provided by the Information and Cartographic Teams to create AIP amendments and other document changes for printing and distribution.

Cartography Team

The Cartographic Team includes a Coordinator and < number > assistants. This team has primary responsibility for the processing of amendments to charts.

NOTAM Team

The NOTAM Team includes a Coordinator and < number > NOTAM Officers. This team has primary responsibility for operation of the International NOTAM Office and the provision of Pre-flight Information.

Administration Team

The Administration Team includes a Coordinator and < number > assistants. This team provides administration support to the AIS.

Responsibility and Authority

Position Descriptions

The responsibilities and authorities of each staff member are detailed in individual Position Descriptions, copies of which are held by each staff member and on file <insert the file name and reference>

Position Descriptions are important - they should clearly specify the responsibilities of each individual staff member.

Position Descriptions should be held on file and not included within this manual. This enables changes in staff to be made without the need to amend this manual. A suggested position description for an AIS team member is shown in Appendix 1.

Written contracts are held by both the AIS and various Sub-contractors for the provision of those services listed below. These contracts detail the responsibilities and authorities relevant to the services provided.

Sub-Contractor	Service Provided	Location of Contract
<insert details>	<insert details>	<insert details>

Document Control

Note: *These procedures relate to the amendment and control of this and any other manuals that document the policies, processes and procedures for the Quality System. The Document Control measures in place in the AIS should be specified in this part. Parts of the text shown below may be suitable for inclusion in this quality manual.*

Document control procedures are developed for all documents that are part of the Quality System to ensure that:

(a) pertinent issues of appropriate documents only are available at all locations where operations essential to the effective functioning of the quality system are performed

(b) obsolete documents are promptly removed from all points of issue or use

(c) documents are regularly reviewed for applicability

(d) all documents clearly show traceability to source

All documentation that is part of the Quality System should be reviewed in conjunction with Management. When the procedures or standards detailed in this manual are derived from other references (such as ICAO Annexes), amendments to such references should be reviewed upon receipt, and where necessary, the relevant procedures or standards amended to reflect the requirements of such references.

All amendments to Quality System documents must be brought to the attention of the appropriate staff.

Controlled Documents (Example text)

A controlled document is a document for which the release, status, storage, distribution, revision and disposal are managed according to documented procedures. The documents in a quality system, and any other important reference, must be controlled to keep them accurate and up-to-date.

Example:

- AIS Quality Manual
- Standard Operating Procedures – AIS Charting
- <insert other examples as appropriate>

Controlled and Uncontrolled Copies

A controlled document is an individually numbered document assigned to a specific registered copyholder. Controlled copies are identified by the <insert the colour eg red> colouring of the controlled copy number on the front page.

All controlled documents must have a copy number entered in red ink in the space provided on the cover sheet by the officer responsible for issue of the document.

Roles and Responsibilities

A full description of procedures relating to the control of Documents is shown in Section <insert> of this Manual. The responsibilities shown below only address the responsibilities of persons holding controlled and uncontrolled copies of this document.

Holders of Controlled Copies

Holders of controlled copies are responsible for ensuring the copy is current before it is used and for disposing of the controlled copy once it is superseded.

Holders of Uncontrolled Copies

Holders of uncontrolled copies are responsible for ensuring the copy is current before it is used and for disposing of the uncontrolled copy once it is superseded.

Document Identification (Example text)

All controlled documents must show the following identification elements:

(a) title

(b) effective date

(c) page number

This is to be achieved by using appropriate titles on drawings and headers and footers on documents.

Where a document consists of several pages and is permanently bound, only the front page needs to show the full identification of the document. All other pages should be identified by document title and page number.

Document Format (Example text)

Overview

Amendments to this document must conform to the formats described in this part.

Element	Style
Page size	<insert eg A4>
Font	<insert eg Arial 12 pt>
Margins	<insert>
Etc	<insert>

Text Conventions

The word “must” is to be standard in the “shall/must” situation and means that conformance with the procedure or instruction is compulsory.

The term “should” implies that all users are encouraged to conform to the applicable procedure.

Abbreviations must be avoided when not in common usage, or when the document’s intended recipients are not specialists familiar with the terms.

If an abbreviation is not in common use, the first instance must be shown in full with the abbreviations in brackets, eg Office of Legal Counsel (OoLC). Thereafter the abbreviation may be used exclusively.

When in doubt, the word or term must be spelt in full throughout the document.

Layout

Change bars must be shown to indicate any additions or deletions or alterations to text.

A bold **“D”** must be shown next to the change-bar to highlight areas of text that have been deleted.

Paragraph numbering is not required.

Footers must contain:

(a) Document title
(b) Issue date
(c) Authorisation
(d) Page numbers

Document Amendment (Example text)

For convenience, and to coordinate with changes in both reference documents and products, where possible, amendments should be issued to become effective on the ICAO determined AIRAC dates.

Amendments to documents should be indicated < detail how amendments are identified >. Changes to charts and diagrams should be indicated by a note along the inside margin.

Hand amendments to hard copy documents should only be used for minor typographical amendments. Amendments to policies, procedures and associated forms should only be by the issue of replacement documents, pages or forms. All hand amendments should be initialled and the authority indicated.

Documents should be reissued after a practical number of changes have been implemented.

Document Issue

The <insert the person responsible for the issuance of controlled documents eg Administration Coordinator> maintains a master document list which records:

(a) document title, file reference (both software and hard copies)

(b) the author

(c) the authorities for all documents

(d) the version

(e) documents received by recall

(f) follow up action

(g) distribution lists and copy numbers

(h) receipt of document

The <insert the person responsible eg Administration Coordinator > is responsible for ensuring that all documents issued are signed as authorised copies. The <insert the person responsible> should record the details of the received documents and arrange distribution as per the distribution list and recall of the obsolete documents.

All amendments to documents must include a Record of Receipt. The Record of Receipt is to be completed by the recipient and returned to the Administration Coordinator along with obsolete documents.

If, within 10 working days of document distribution, the obsolete documents are not received, reminder notices should be despatched.

One copy of all document versions must be archived to show the amendment traceability. All archived documents should be annotated as “Cancelled”. All other obsolete copies should be destroyed.

External Documents

A range of external documents is held by the AIS for reference purposes. These include legislation standards, recommended practices and AIP documents from other states.

If information from an external document is used in the preparation of a new product, the document must be checked to ensure the status and currency of information.

A register of ICAO documents is be maintained by the <insert the person responsible eg Administration Coordinator>.

AIS Responsibilities

This section should clearly define the responsibilities of the AIS with respect to the collection, publication and promulgation information. In particular, it is recommended that a clear understanding exists between information originators and the AIS as to where the responsibility for the accuracy of source data vs editorial accuracy lie.

Collection of Information

AIS receive aeronautical data and information for publication in the AIP and NOTAM from, but not limited to the following organisations that provide services in support of the air navigation system:

(a) aerodrome operators

(b) telecommunication service organisations

(c) Air Traffic Service organisations

(d) air navigation service organisations

(e) meteorological organisations

(f) other AIS organisations

(g) Customs, Immigrations, Conservation and Health Authorities

(h) defence organisations

(i) other government departments and ministries

(j) other States

Information for inclusion in the AIP or NOTAM is sent direct to the AIS. This material is authenticated as described in “Authorisation of Original Material”.

Data and Information from other States

Aeronautical data and information is received from other States:

Information	State	Source
<insert>	<insert>	<insert eg AIP, NOTAM, bi-lateral agreement etc>

Editorial Responsibilities

<insert> AIS has the following editorial responsibilities:

(a) ensuring that the data and information collected is published in the appropriate format, in accordance with the applicable standards and distributed according to the operational significance of the information.

(b) ensuring that the information received is accurately promulgated

(c) ensuring that aerodromes published in the AIP are shown on the applicable aeronautical charts

(d) ensuring the preparation, accuracy and distribution of all aeronautical charts

(e) monitoring the data and information to ensure that it is reviewed by the originating organisation on a regular basis

(f) ensuring the timely provision of aeronautical information to the aeronautical information services of other states. This should normally be by the provision of the AIP and NOTAM, except where other arrangements are documented (by letter of agreement).

The responsibilities of the AIS for ensuring the accuracy of information relates to ensuring conformance with applicable standards and that information provided is "reasonable" when compared with other available information. The responsibility for the accuracy, completeness and timeliness of original data and information rests with the originator. Those responsible for ensuring accuracy and conformity within AIS are shown in the section "Production of the Integrated AIP Package".

Original Material Identification and Traceability

All original material must be able to be identified and traced to source. A good way of doing this is to have a register and allocate each item of original material a unique number from the register. This register number can be used on every record associated with that item. A sample register is shown below.

Original Material

Original and source material for publication and associated drawings, drafts and proofs are <insert the method of identification eg held on file> as follows:

Record	Location	Responsibility	Minimum Retention Period
<Insert eg proposed amendments to (doc)>	<insert eg held on specifically numbered amendment No. file>	<insert who is responsible for creating and filing the record>	<insert the minimum retention period>

Authorisation of Original Information

Original data and information received is checked for proper authorisation against <insert the method eg the Originator Database, or if received on Company Letterhead paper etc>.

To ensure the authenticity of information presented for publication, particularly from external originators, the AIS should maintains a register of details for all authorised originators on the Originator Database. This register should include the following details for each originating organisation:

- *organisation name*
- *contact details*
- *the date that the above details were last reviewed and updated*
- *the expiry date for current information which should be on the first anniversary of the receipt of the most recent details*

The names and signatures of all persons responsible for the authorisation of amendments on behalf of each organisation should be held on file.

Originators should be requested to review details at least annually.

An alternative is to have data and information coming into the AIS on Company Letterhead paper where this is possible.

Database Amendments

Procedures should be established and included in the Manual to ensure that amendments are actioned in the database. As with published information, amendments to database information should be subject to procedures that ensure amendments to the database are authorised and processed. A sample checklist is shown below.

Step	Action	Responsibility
1.	Change details registered	<insert>
2.	Change authorised	<insert>
3.	Data checked and verified	<insert>
4.	Data entry	<insert>
5.	Entered on <insert eg charts>	<insert>

AIP Production Schedule

To efficiently manage the AIP amendment process, it is recommended that a production schedule be developed and promulgated to all organisations originating material for the AIP or involved in production. This schedule should be based on the AIRAC dates as listed in DOC 8126. For each effective date, critical dates within the publishing and distribution process should be established. These need to take into account factors such as and the time to complete publishing processes, the time required to print, postage or delivery times and ICAO recommendation of 28 or 56 days prior notification. An example of a AIP Production Schedule can be found in Appendix 2.

The <insert State> Integrated AIP Package is produced in accordance with the AIP Production Schedule which is published on a <insert cycle eg 12 months>. An example of a Publication Schedule is shown in Appendix <insert>.

Scheduling and Coordination of Amendments

There should be a procedure in place to ensure that amendments to the AIP are scheduled and coordinated. This could be achieved by convening regular meetings of major originating organisations with AIS staff. Significant improvements can be introduced into the AIP publishing process with thorough forward planning.

Originating organisations should be encouraged to provide the AIS with an indication of AIP publishing requirements as far in advance as possible, taking user needs into consideration eg how many amendments are required per year and are they economically viable.

The <insert State> AIS convenes regular meetings with the following originators of amendments to the AIP:

< list originators >

At these meetings, originators will be invited to submit the following details on proposed amendments including:

(a) Effective date of amendment

(b) Scope of amendment

(c) Affected AIP documents

(d) Charting requirements

(e) Consequential impact on other information

The purpose of these meetings is to schedule and coordinate requests for amendments to the AIP. Agendas and minutes are kept by <insert>for all meetings.

Format and Standards

Standards as specified in the following ICAO Annexes and documents are applied by AIS:

(a) Annex 15

(b) DOC 8126

(c) Annex 4

(d) DOC

(e) < list other Annexes and documents that are used as references >

Note: *Where a State includes within the AIP information for which no ICAO Standard or Recommended Practice is available or where there are a number of differences to the ICAO Standards and Recommended Practices, the standards that are being applied need to be documented. This can either as part of this manual or as a separate "Standards or Style Manual". If a "Standards or Style Manual" is used, this should be reflected in the hierarchy of documents.*

Coordination of AIP Amendments, NOTAM and Other Bulletins

NOTAM are monitored by the Information Team to ensure any permanent changes that are initiated by NOTAM are identified, and if not already initiated by the originator, follow-up action for an AIP amendment occurs. This could be addressed by the procedure shown below.

NOTAM originated by <insert eg to these the domestic and international NOTAM, information bulletins from third party providers such as Jeppesen are reviewed daily by <insert who is responsible>. Those relating to published AIP information are checked to determine whether the information promulgated will be of a permanent or long-term nature and if so, whether an amendment to the AIP has been initiated by the originator.

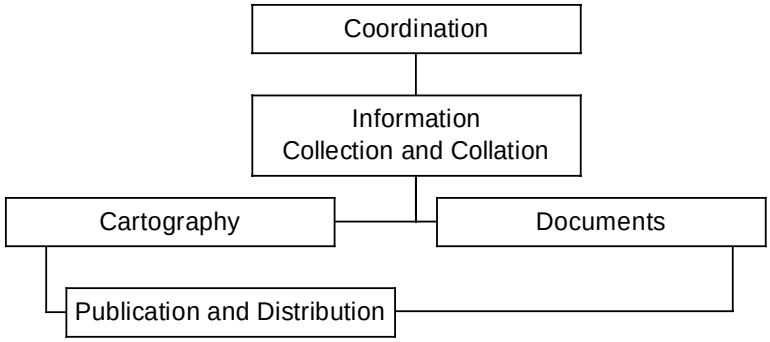
If no permanent amendment has been initiated by the originator, the <insert> will contact the originator and advise of the action required.

Responsibility for initiation of a formal change to the Integrated AIP Package is the responsibility of the NOTAM originator, or other designated person when required.

Production of the Integrated AIP Package

To more effectively manage the AIP publishing process, it could be useful to break the process into a number of phases. These phases could be defined by the primary work undertaken during each, or by the functional team that is responsible for carrying out the work. A suggested workflow is shown below.

Typical Workflow



Collection and Collation of Aeronautical Information

During the coordination phase, all requests for amendment are reviewed as follows to determine:

Step	Action	Responsibility
1.	Requested effective date	<insert>
2.	AIP documents affected	<insert>
3.	Cartographic and publishing resources required	<insert>
4.	Conformance of submitted material with required standards	<insert>
5.	Amendment requests are correctly authorised and all necessary coordination has been completed	<insert>
6.	The amendment is complete	<insert>
7.	The requested amendment corresponds to other known information. For instance, a request to increase a runway length should be compared to currently published runway information	<insert>
8.	All consequential amendment action required is understood and identified	<insert>

Amendment Process

Step	Timing	Responsibility	Description
1.	Continuous	Author areas	Prepare proposed amendments/additions and submit them to AIS
2.	Approximately 1 month before printing date	<insert>	Review and collate all proposed amendments/additions and submit them to <insert>
3.	On receipt of amendments	<insert>	Review the submitted amendments for suitability, accuracy and completeness Make appropriate records Mark unsuitable amendments as “Non Conforming” as per the procedures described in <insert>
4.	After records have been made	<insert>	Amend the AIP
5.	During the amendment process	<insert>	Check all the amendments made against the hard copies to ensure that the changes you have just made are correct.
6.	2 weeks before printing date	<insert>	Check the final proof and sign it as being approved for publication.
7.	1 week before printing date	<insert>	Prepare the final proof for publication.
8.	Before printing date	<insert>	Dispatch for publication

The introduction of any new material is normally not permitted once Step 6 has been reached and is not permitted once the hard copy has been printed. Any amendments received after this must be placed in the amendment file by <insert> ready for the next amendment package.

Records

The following table describes the records kept of this process.

Record	Location	Responsibility	Minimum Retention Period
Hard copy of all amendments	<insert>	<insert>	Archive (or as determined by State legislation)

Record	Location	Responsibility	Minimum Retention Period
Signed off final proof	<insert>	<insert>	Archive (or as determined by State legislation)
Historical record of amendments made	<insert>	<insert>	Indefinitely on file.
Dispatch details	<insert>	<insert>	Until the amendment is printed.

Printing and Distribution

Procedures should specify the manner in which material is prepared and delivered for printing and the distribution of the AIP.

This phase should include sufficient time to ensure AIP amendments are available to end users as specified by Annex 15 (eg: minimum 28 days)

Inspection and Checks

A good quality system requires that there are checks at appropriate stages of processes and that there are records of these checks being completed.

Step	Action	Responsibility
1.	Complete the Proof-Read Chart form by listing all affected pages connected with the particular amendment issue	<insert>
2.	Proof read the hard copy together with at least 1 (preferably 2) representative(s) from <insert>	<insert>
3.	Correct any anomalies at the conclusion of the proof read	<insert>
4.	Print a final proof and stamp this ready for approval. ***Note:*** *Purpose built rubber stamps are held by <insert>*	<insert>
5.	Approve for publication	<insert>
6.	Update the Collation Schedule with all the information required by the publisher <insert>	<insert>
7.	Dispatch for publication to arrive by the print date defined in planning schedule	<insert>
8.	Printers first proof checked prior to distribution	<insert>
9.	Distribution	<insert>
10.	Publisher returns <insert the number> of amended copies of the Integrated AIP Package to <insert>	<insert>
11.	Amend the master copies of the Integrated AIP Package on receipt	<insert>

Checklist for Products

Product	Produced by	Checked By	Authorised for Publication by
<insert>	<insert>	<insert>	<insert>

Control of Non-Conforming Product

There should be a procedure for dealing with data and information that does not conform to the required standards. This could be done by having a method of identifying such information – eg: stamped "Non Conforming". The purpose of this is to ensure that such information cannot inadvertently be used in the published AIP.

Data or information presented to AIS for publication in the Integrated AIP Package that does not conform to the specified requirements for a particular AIP product must be marked as Non Conforming by <insert who is responsible for the marking and how the material is marked eg stamped, hand endorsed>.

<Insert> is responsible for advising the originator that the material submitted does not conform.

Step	Action	Responsibility
1.	Record non conformities	<insert>
2.	Determine the causes of non conformity	<insert>
3.	Determine actions required to prevent re-occurrences of non conformities	<insert>
4.	Advise originator	<insert>
5.	Implement corrective action	<insert>
6.	Filing records created after corrective action taken	<insert>

Correction of Errors in Published Information

If an error is determined to be hazardous or have the potential to be hazardous, remedial action appropriate to the operational significance of the error will be initiated by <insert who is responsible>. The operational significance of the error should be determined in consultation with the originator.

Appropriate action may include:

(a) issue of NOTAM. If a NOTAM is issued, the error should be scheduled for correction in the next scheduled amendment. If the next scheduled amendment will not be within 90 days, the information should be published by AIP Supplement at the next available issue.

(b) issue of AIP Supplement. Errors should only be corrected by AIP Supplement when the page or chart is not scheduled for reissue at the next AIP amendment

(c) issue of an AIP amendment at next available amendment

(d) correct at next scheduled issue of page or chart

To ensure continuous quality improvement, procedures need to be in place to record and analyse errors and implement both corrective action and preventative action.

For the purposes of recording and analysis, an error is defined as follows:

(a) any instance where information is incorrectly or inaccurately published

(b) any instance where the accuracy, structure or format of published information does not conform with required standards

Attention should be given to whether or not an occurrence has actually created or had the potential to create a hazard. In the event that it can not be determined whether an error could or could not have been hazardous, the error should be recorded. For instance, there is probably little to gain from recording and analysing minor typographical errors.

Error Tracking Process

This instruction describes the procedures to be used when an error is detected in a component of the Integrated Aeronautical Information Publication (AIP) package. An example of an Error Tracking Form (ETF) is shown in Appendix 3; and example of an Error Tracking Register is shown in Appendix 4.

Step	Action	Responsibility
1.	Confirm the error and raise an ETF	<insert>
2.	Register the ETF	<insert>
3.	Analyse the safety aspects associated with the error and determine if NOTAM or other action is appropriate	<insert>
4.	Initiate corrective action as a NOTAM or AIP SUP and process through the NOTAM officer/NOF	<insert>
5.	Attach a copy of the NOTAM request/Draft AIP SUP to this form	<insert>
6.	Analyse the cause of the error	<insert>
7.	Discuss the error with the officer responsible	<insert>
8.	Determine remedial action;	<insert>
9.	Brief AIS Manager as necessary	<insert>
10.	Initiate change action when required	
11.	Amend or establish procedures as required to strengthen processes	<insert>
12.	Sign-off the ETF when completed	<insert>
13.	Forward the completed form to <insert> for filing	<insert>

Error Analysis

To assist with the analysis of errors, it could be useful to establish a system of categorising errors as shown below.

The following guidelines are used to determine the categorisation of errors:

Critical

Any instance where the published information directly compromises the safety of air navigation:

(a) where the published information could compromise aircraft clearance from terrain. eg: incorrect instrument approach minima

(b) where there is an error in navigational or route information. eg: incorrect track

(c) any error in the depiction or publication of airspace information. eg: incorrect vertical limits

Major

Any instance where the published information intended for communications or air navigation purposes is missing, ambiguous or difficult to interpret. eg: incorrect ATS frequency.

Minor

Any instance of typographical, grammatical, printing or formatting deficiencies which do not directly cause operational difficulties, but do not meet expected standards such as:

(a) any “typographical” error, where the information published is correct in context and content but could contain spelling or grammatical errors

(b) errors where there are no operational impacts

Preventative Action

Good error analysis should identify where necessary the preventative action required to ensure the error does not re-occur.

Step	Action	Responsibility
1.	Collate information relating to non conformities, error tracking forms and customer complaints/suggestions	<insert>
2.	Determine causes of non conformity	<insert>
3.	Determine what action is necessary to prevent non conformities re-occurring	<insert>
4.	Determine and implement corrective action	<insert>
5.	Record and file results of action taken	<insert>

Change Procedures

Staff are encouraged to suggest changes that will improve the quality system.

To facilitate this process, suggestions should be made in the following format:

AIS Quality System - Staff Suggestion		
No.	**To:** <Insert who the suggestions are directed to eg Manager AIS>	**From:**
Details:		
Action taken:	Originator Advised:	Date:

Each suggestion is recorded with an individual number, details entered of the action taken and advice to the originator.

Step	Action	Responsibility
1.	Register the suggestion	<insert>
2.	Determine course of action to be taken	<insert>
3.	Advice provided to the originator	<insert>
4.	Record filed	<insert>

Security and Records

Records are required for data and information provided to AIS. The following table describes the record management procedures for the <insert> AIS Unit. The purpose of these is to enable traceability of all published information, including the origin, date of receipt and check procedures.

A minimum retention period for records should be specified. This could be different for records associated with NOTAM and AIP.

There should be details of security procedures for the protection of information and data. These could include computer log-on and identification procedures.

Description of Record	Location where the record is held	Responsibility for filing	Retention Period
<insert>	<insert>	<insert>	<insert>

Contract Review

All contracts between AIS and suppliers, clients or consumers should be reviewed before final contract signature and on a regular basis after signature.

A review clause should be written into all contracts to allow for this provision. The aim of the review is to ensure that:

(a) the contract requirements are clear and unambiguous
(b) every requirement that is different from that tendered is resolved
(c) the supplier has the capability to meet the requirements of the contract
(d) written minutes of all contract review meetings should be recorded with resolution of
(e) all points actioned at the meeting being clearly indicated.
(f) Agreement that the review has taken place and is acceptable should be by contract signature and/or the exchange of letters.

<Insert> is responsible for reviewing contracts held by AIS.

Purchasing

General

The < position/title > is responsible for ensuring that all purchased products conforms to the specified requirements.

Assessment of Sub-Contractors

All Sub-contractors who could provide products or services that can directly affect product quality are evaluated and approved by the < position/title >.

Approval of Sub-contractors is based on, but not limited to evaluation of the following criteria:

(a) previous Sub-contractor history

(b) Sub-contractor certification to approved Quality Standards

The type and extent of the evaluation depends on the nature of the goods or services to be provided and the degree of previous experience with the Sub-contractor.

All agreements with Sub-contractors should allow for the audit of Sub-contractor management systems by AIS (or their designated representative).

If the AIS does not have the resources and skills to carry out Sub-contractor audits, arrangements should be made with a suitably qualified organisation to carry out these audits.

Sub-contractor history should be established by maintaining a history of quality performance.

Sub-contractors who regularly fail to achieve required quality performance criteria should not be used the AIS.

Purchasing Authority

Specify here which staff members have authority for purchasing. These should also be included in individual position descriptions.

Product or Service	Authority for Purchase
<insert>	<insert position or title>

All orders should specify or include the following where appropriate:

(a) the title of the product or service

(b) relevant associated drawings

(c) means of identification

(d) inspection instructions

(e) approval requirements

(f) Quality Standard to be applied

Where the services or products are ordered under the terms of a service contract, only those specifications not detailed in the service contract need to be included in the order. Where the services or products are ordered under the terms of a service contract, the service contract should specify the purchasing documents to be used. A Sub-contractor supplied purchasing document could be used.

Where the Sub-contractor does not supply purchasing documentation, an AIS Order should be used.

Copies of purchasing documentation should be retained.

Internal Quality Audits

Audit Policy

Audits of the activities used by <insert> AIS will be carried out from time-to-time to confirm that the procedures and processes used comply with quality system requirements.

Scope of Quality Audits

Audits of the AIS will cover the quality system being used, processes and products.

Responsibility

<insert> is responsible for ensuring that quality audits of the AIS are carried out in accordance with the procedures shown below

Audit Process

The following steps will constitute the audit process. The Lead Auditor is responsible for ensuring all the steps take place:

(a) advice to the AIS Manager of the proposed audit, including the audit program

(b) development of audit checklist

(c) entry meeting

(d) verbal debrief to AIS Manager and other staff (where appropriate) on audit findings

(e) completion of the audit proper

(f) compilation of the audit report and any corrective actions

(g) obtaining the AIS Manager's signature as having accepted report, agreeing to corrective actions and establishment of appropriate close-out dates

(h) dispatch of reports and corrective actions to the appropriate senior personnel.

Audit Records

One copy of the audit report, including comments and information from follow up meetings will be filed for <insert the period>.

Note: *In a small AIS, there could be insufficient staff available to provide internal audit capability. In this case, arrangements could be made with other suitably qualified staff within the Civil Aviation administration, with another organisation or with a neighbouring State.*

Management Reviews

Regular Management Reviews are important to provide the opportunity to assess the overall effectiveness of the Quality System. To assist with this, it is helpful if someone independent of the AIS is facilitates the Management Review. This could be a representative from the Quality Assurance department or similar.

Management Review

Management Review meetings will be convened and chaired by < position or title > and usually involve < names of attendees >. An agenda and minutes will be prepared and kept for all such meetings. These meetings will be held at six monthly intervals.

Overview – Training

The competencies required for each position are detailed in the relevant Position Descriptions. From these competencies, and initial and regular assessments of performance, training requirements for individual staff are identified.

Newly Appointed Staff

The training requirements for newly appointed staff are identified in consultation with the staff member and implemented as a Training Plan. The Training Plan will identify all relevant items for which training is required, a time-frame for the completion of each item (either due date or period) and when appropriate, any required achievement level.

As training items are completed, completion is recorded on the Training Plan.

Current Staff

Details of training programs for on-going training to keep current with practices applicable to the position and to ensure all incumbents are trained to the specifications, are developed and maintained by the Manager AIS in consultation with individual staff members.

This is carried out as part of the annual Performance Assessment with any identified training requirements recorded in the Personal Development Plan. Details of the completion of training for all staff (newly appointed and current) is made in the staff members file.

Competency

This section should describe the procedures used to ensure that staff employed in the AIS have the skills and knowledge appropriate to their responsibilities.

Position	Qualifications and/or Core Competencies

Newly Appointed Staff

New appointees to any position are required to demonstrate experience and competency appropriate to the position being filled. Initially, this will be determined through the recruiting process.

(a) A training plan for all newly appointed staff is shown at <insert the reference>.

The performance of newly appointed staff members will be reviewed within 3 months of appointment. This requirement will normally be met by reviewing the results of day-to-day work and the completion of Training Plan items.

If at the completion of all Training Plan items, or the completion of the first 3 months of employment (whichever is the latter), the staff member has demonstrated an appropriate level of competency, they will be considered to be current staff and from that time, be required to meet the competency requirements for current staff.

Current Staff

To remain competent, staff are required to carry out their specified responsibilities at least once every three months. Because of the on-going and regular nature of their work, staff will normally satisfy this requirement through their day-to-day work.

Where a current staff member is absent for a period exceeding 3 months, their performance will be reviewed during the month of recommencement of work, or until such time as they have demonstrated an appropriate level of competency. The performance attributes to be reviewed will depend upon the position held, the length of their absence and the nature of work currently in progress. These should be determined by mutual agreement with the staff member concerned.

Competency Records

Details of competency reviews are held on individual staff member's files.

Sub-Contractor Competency

Where processes relating to the production are subcontracted, the Sub-contractor should have demonstrable competence appropriate to the work being undertaken. This is usually measured through historical performance.

It is recommended that a file be maintained to record Sub-contractor performance, and in particular, any problems and corrective and preventative actions that could result.

Sub-contractors should be required to demonstrate adequate and ongoing competency in the services provided. This should be assessed by the results of the services or products provided by the Sub-contractor concerned and by regular audits of the Sub-contractor.

Performance Assessments

As well as staff training, it is recommended that a program be put in place to regularly review the performance of individual staff. This would normally be annually. For new staff, a performance review at the completion of training could be appropriate. This performance review could provide the opportunity to agree on any further training required.

Annual Performance Assessments are completed for all staff. Performance reviews should include:

(a) The establishment of performance objectives for the next period (year)

(b) A review of the staff members performance against objectives for the review period

(c) Identification and agreement of any training required.

Details of Performance Agreements and Performance Appraisals are held on individual staff member's files.

General Definitions

The following definitions are provided for guidance. These could nee to be amended to suit specific State policies etc.

Quality	The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.
Quality Management	That aspect of the overall management function that determines and implements the Quality policy.
Quality Assurance	All those planned and systematic actions necessary to provide adequate confidence that a product or service should satisfy given requirements for quality.
Quality Control	The operational techniques and activities that are used to fulfil requirements for quality.
Quality System	The organisational structure, responsibilities, procedures, processes and resources for implementing Quality Management.
Document	Any manual or page thereof used to implement the Quality System. *Note: This should not be confused with the AIP documents, which could be products of this quality system. Where an AIP document is referred to within this manual, it should be specified by name.*
Originator	Any organisation that provides data or information for publishing in the AIP either as an amendment, Supplement or as a NOTAM.
Sub-Contractor	Any organisation or person contracted to provide products or services directly related to the production processes of this Quality System.

Technical Definitions

The following list is provided for guidance and may need to be amended to suit the needs of the individual state and knowledge of staff employed by the AIS.

The following technical abbreviations and terms are used within this manual.

AFTN	Aeronautical Fixed Telecommunications Network.
AIC	Aeronautical Information Circular Notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.
AIP	Aeronautical Information Publication
AIRAC	An acronym (aeronautical information regulation and control) for advance notification of information based on common effective dates which are established by ICAO.
AIS	Aeronautical Information Service
ATS	Air Traffic Services
ERC	Enroute Chart
FIR	Flight Information Region
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
NOTAM	A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to staff concerned with flight operations. NOTAM are distributed on a telecommunications network.
Time System	Specify the time system/s applicable within the FIRs covered by this manual. The day begins at 0001 hours and ending at 2400 hours using the 24-hour clock. Date and time is expressed as a six-figure group of day, hour and minute; eg, 4 April 1993, 1635 UTC is expressed as 041635.

Appendix 1 - Example Position Description

Job Title:	Aeronautical Charts Officer
Level:	Airways Operations Officer
Location:	
Reports To:	Operations Manager, Aeronautical Information Service
Subordinates:	Nil

Primary Job Purpose

The primary purpose of this position is to collect, coordinate, validate, and prepare amendment to a range of aeronautical charts in accordance with the specifications described in ICAO Annexes 4 and 15.

Key Responsibilities or Duties:

(a) Collecting, coordinating and validating proposals for amendments to a range of aeronautical charts

(b) Preparing and making changes to aeronautical charts

(c) Detailed checking of interim chart plots and proofs

(d) Checking “first rushes” from the print run

(e) Assist with the cross-checking of chart amendment data with that contained in other aeronautical documentation

(f) Maintaining quality records relating to amendments, including an audit trail of amendment data, source documents, plot, proofs and correction data for each chart

(g) Assist with the development of new or revised charting products to meet specified needs

(h) Maintain Standard Operating Procedures and Checklists

Key Relationships and Interactions

The occupant of this position is required to develop and maintain close working and business relationships with originators or amendment proposals, data custodians and other staff in the AIS.

Qualifications and Experience

(a) Hold or have held and ATS Licence or have other relevant aviation experience

(b) Possess and demonstrate a good working knowledge of the AIP, Civil Aviation Regulations, Civil Aviation Orders and Civil Aviation Advisory Publications

(c) Demonstrate a good working knowledge of ICAO documentation, particularly Standards and Recommended Practices relating to the provision of charting products

Appendix 2 – Example Time Line Planning Chart

AIS Production Schedules - April 2001 to November 2002

AERONAUTICAL INFORMATION PUBLICATION (AIP)	
	Start Date
AIP A/L 31	
AIS Cut-off	**16-May-01**
Printing	15-Jun-01
Distribution	29-Jun-01
28 Days AIRAC Notice	13-Jul-01
Effective Date	**9-Aug-01**
AIP A/L 32	
AIS Cut-off	**29-Aug-01**
Printing	27-Sep-01
Distribution	12-Oct-01
28 Days AIRAC Notice	2-Nov-01
Effective Date	**29-Nov-01**
AIP A/L 33	
AIS Cut-off	**21-Jan-02**
Printing	19-Feb-02
Distribution	5-Mar-02
28 Days AIRAC Notice	20-Mar-02
Effective Date	**18-Apr-02**
AIP A/L 34	
AIS Cut-off	**15-May-02**
Printing	14-Jun-02
Distribution	28-Jun-02
28 Days AIRAC Notice	12-Jul-02
Effective Date	**8-Aug-02**
AIP A/L 35	
AIS Cut-off	**28-Aug-02**
Printing	26-Sep-02
Distribution	11-Oct-02
28 Days AIRAC Notice	1-Nov-02
Effective Date	**28-Nov-02**

Appendix 3 – Example Error Tracking Form (ETF)

No.000/01

This form is to be completed for each NOTAM or AIP SUPP issued to correct errors in AIP package.

Description of error:	
Affected documents(s):	
Notified by:	
Cause & analysis:	
Corrective action taken:	
Comments:	

Notes for completion:

The <insert the position responsible> will:

(a) Confirm the error; raise, number and register an error tracking form;
(b) Analyse the safety aspects associated with the error and determine if NOTAM or other action is appropriate;
(c) Initiate a NOTAM/AIP SUPP correction action, and process through NOTAM officer/NOF; *(attach a copy of the NOTAM request to this tracking form)*
(d) Analyse the cause of the error;
(e) Discuss the error with the officer responsible for the document;
(f) Determine remedial action;
(g) Brief Manager, AIS as necessary;
(h) Initiate required change action required;
(i) Amend or establish procedures as required to strengthen processes
(j) Sign-off this form as completed;
(k) File the completed form.

The <insert> officer will assist the <insert from above the position responsible> to determine appropriate action, analyse the cause of the error and propose changes to procedures. Tasks involved may include:

(a) Establishing the audit trail for the data;
(b) Analysing the safety aspects associated with the error and determine if NOTAM or other action is appropriate;
(c) Investigating the cause of the error;
(d) Proposing changes to Standard Operating Procedures.

Appendix 4 – Example Error Tracking Form Register

AIS Register of Error Tracking Forms (ETF) - 2001

Reg. No	Description of Error	Document(s) Affected	Corrective Action taken	Date
001/01				
002/01				
003/01				
004/01				
005/01				
006/01				
007/01				
008/01				
009/01				
010/01				
011/01				
012/01				
013/01				
014/01				
015/01				
016/01				

QA IMPLEMENTATION PLANNING TEMPLATE

(*Version 1.1)*

CONTENTS

Introduction

This document presents an outline of issues that should be considered in the preparation of a plan to implement a Quality Assurance system within an AIS unit, the aim being to register for compliance against the ISO 9002 standard.

Document Structure:

Content	Purpose
Overview of the planning approach	Provides an initial checklist of principal issues to be addressed in chronological order
Implementation Plan Checklists	Checklist of items consistent with the generic project plan
Implementation Plan Proposal template	A template of a high level proposal to initiate a project to implement QA within an AIS department.
Useful Tools	Example forms providing support to appropriate elements of the implementation plan. e.g. process analysis form
Sample Quality System Elements	Example document contents

How to use this document

1. By following the document in sequential order the essential elements of the implementation process will be addressed.

2. The approach overview serves two purposes:-

1) provides a breakdown of the main tasks
2) can be used as a primary checklist

3. For the preparation phase, a template has been provided to create a high level proposal that, can be used to initiate the programme (by submitting to senior management for commitment to the project)

4. The template is followed by a series of checklists that are consistent with the generic project plan provided in the USEFUL TOOLS section. These checklists identify the tasks to be undertaken during the implementation programme and can be useful in monitoring project progress.

5. The generic project plan is one of the Useful Tools and is available as an electronic MS Project file for the user to adapt according to local requirements.

6. The final section contains a number of example documents from Quality Management Systems. Again these items can be modified by the user by using the accompanying electronic files.

ELECTRONIC VERSION OF THIS DOCUMENT

This document is also provided in electronic form on the accompanying diskette.

File name: **Planning Outline for QA Implementation.doc**

File name: **Generic AIS QA Project.mpp**

Hidden Text

The text highlighted in blue italics within the electronic document is "hidden" text. **Be aware that the visibility of the hidden text will be dependent on the TOOLS menu default setting in the configuration of MS WORD on the machine being used to read the file.**

There are 2 options :-

1. To see hidden text on the screen use the following MS WORD menu selection:-

TOOLS
OPTIONS
VIEW
tick the appropriate box

2. To include hidden text in the printed document:- use the following MS WORD menu selection:-

TOOLS
OPTIONS
PRINT
tick the appropriate box

Guidance and further explanatory comments have been added to many of the points in the planning document. These comments have been formatted as "hidden text " so that the document can be printed as a template of checklists without the explanatory material, if necessary.

Document navigation

External links within the document provide additional functionality in accessing the supporting project plan file which the user can tailor to the requirement. These links and other internal navigation links are identified by ***red italics*** and have also been formatted as hidden text.

NOTE: In order to preserve embedded external links within this document when copying the "Planning outline for QA implementation" file to another directory, ensure that the following files are also copied to the same location:-

Generic AIS QA Project.mpp ..... Project plan Gantt chart requires **MS PROJECT 98.**

Inventory State Procedures.doc

Approach OVERVIEW

INITIAL PLANNING CHECKLIST			
PHASE		**Check Item**	**Sections**
PREPARATION	Establish project team, target dates and resources		0
	Produce a high level proposal for management support.		0
	Management decision to implement ISO 9002		
PLANNING	Review current processes and evaluate against requirement of standard		0
	From the assessment develop a plan and schedule for development and implementation for each of the elements of the quality system.		
DESIGN	High level design followed by the development and documentation of the unit processes.		0
TEST	Deployment of processes with associated training and briefing sessions		0
	Preliminary audit programme to validate effectiveness of the quality system against the Standard		0
REGISTRATION	Operation and fine tuning of the quality system and registration assessment.		0
POST REGISTRATION	Once the quality system is implemented and operational, continue to identify and establish suitable aspects within the working quality system that can be used as measures to monitor the system performance and assist with identifying improvement.		

The shaded area above refers to those phases described on the accompanying generic project plan Gantt chart. *Generic AIS QA Project.mpp*

PREPARATION

A basic plan is needed which provides a first appraisal of the current organisation requirement, resources available and other resources needed.

Use the following checklist to research information and then complete the proposal template in section 0.

Item	PROGRAMME INITIATION	Check Item
1	**Management Support.** *Who? It is recommended that the highest level of support be looked for.*	
2	**Internal resources and budget.** *The introduction of a quality system should not create new employment posts to be filled but may increase work responsibilities. Support for external consultancy will however be needed and budgetary provision required.*	
3	**External support / effort needed?** *Recommended in order to assist with correct interpretation and to ensure the internal team is kept on track for compliance. Consider the initial quality and internal auditor training.*	
4	**Target date to be met for registration** *Defines a timescale for planning purposes, provides goals in the form of milestones for the project team and can also assist in continuing interest and support from senior management*	
5	**Scope** **1. Activity** *Complexities of seeking registration with some operations may not be apparent until analysis of the full requirement is made.* **2. Location** *In deciding the scope of the implementation, consideration must be given to those aspects of the operation that are not confined to the one location.*	
6	**Project Leader and team** *Careful consideration needs to be given to the responsibility for coordination of the implementation. Define skills required including motivation for the programme and ability for good communication and relationship with all levels. Note that the project team assigned at this stage need not imply a fixed decision on responsibilities within the quality system. These roles have yet to be defined e.g. the quality management representative at this stage may not necessarily continue with the role once the QS has been implemented.*	
7	**Resources** *Estimates of the time required by existing personnel should be made before estimating effort and costs of external support.*	
8	**Contact with registration organisations** *It is not necessary at this stage to make a formal agreement regarding registration however information re costs and schedules for the registration assessment is needed for planning purposes.*	
9	**Complete and submit QA Implementation Proposal** *Ref: Template 0*	
10	**Programme launch**	

PLANNING - QA REQUIREMENT PHASE

Determine department organisation structure, roles and responsibilities

	MANAGEMENT ORGANISATION STRUCTURE 4.1	
Item		Check Item
1	**Prepare organisational perspective** *Although the quality system may only be confined to one unit or department of a larger organisation, the relationship of the unit to the whole is of benefit to understanding certain processes and identifying responsibilities which may lie outside of the unit.*	
2	**Unit structure** *Specific working / business groups probably already exist but need to be clearly defined in their roles and responsibilities. Identify inputs and outputs. Note that areas of responsibility may be more clearly defined by considering* ***what is not*** *the responsibility of a group in a particular functional area.*	
3	**Personnel responsibilities** *Allocation of individual responsibilities in a working group including the value of all levels communicating non conformances and or potential improvements*	

Determine documentation requirements and control processes

Ref: Documentation planning tool 0

	QUALITY SYSTEM DOCUMENTATION 4.2	
Item		Check Item
1	**Quality Policy**	
2	**Management Organisation**	
3	**Quality Manual** *Decide on D.M.S.*	
4	**Training Records** *Quality training and skills training as relevant to the department services*	
5	**Forms.** *Complaint forms, check sheets, corrective actions*	
6	**Document control process** *Ref: Example 0*	

Identify Procedures

(*Requires preparation and assessment of the current operation to measure compliance of existing methods*)

	IDENTIFY PROCEDURES 4.9	
Item		**Check Item**
1	**Process mapping** *Project team understanding. Identify current practices in each functional area and map their relationships;- (a) with each other, (b) to other organisational units and (c) to the Standard. It is useful to use flowcharts to demonstrate relationships.*	
2	**Gap assessment** *Perform a comparative analysis to understand how current practice differs from the requirements to meet the Standard or to improve practice.*	
3	**Procedures list** *From analysis list those procedures needed to meet requirements of the Standard and operation .Ref Example form 0* *For a model production process refer to SDP procedures. A list is given in .* *Ref Inventory State Procedures.doc - Toc483045353*	
4	**Compare proposed procedures with training requirements** *Check for duplication of procedures with existing training instructions which cover the same function.*	
5	**Prepare procedure development plan** *Identify those procedures on the list to be derived and documented from existing records and those that need to be developed as new.*	

Example Process form 0

System awareness programme

	QUALITY AWARENESS TRAINING 4.18	
Item		Check Item
1	**Generating quality awareness** *Whole department briefing on basic quality. Consideration should be given to the size of the group. It may be advisable to conduct separate courses.*	
2	**System deployment briefing** *Once the quality system has been designed and documented it needs to be explained to the working units. This is best effected in small groups concentrating on those aspects relevant to their functional area.*	
3	**Reviews and repeats** *Consider the need to repeat the briefings at appropriate times to reinforce or clarify aspects of the deployment of the Quality System. Opportunity can also be given to present reviews of the system that have taken place.*	

DESIGN PHASE

Develop procedures

	PROCESS PROCEDURE DEVELOPMENT 4.9	
Item		Check Item
1	**Procedure structure** *Consistency is needed in the approach to detailing each procedure.* *Example structure 0*	
2	**Amend existing procedures** *Modify existing procedures according to analysis in 0*	
3	**Develop new procedures** *Documented procedures needed were identified in the gap assessment in 0.*	
4	**Identify quality measures** *Establish suitable aspects within the working quality system that can be used as measures to monitor the system performance and assist with identifying improvement. E.g. response times to information requests.*	

Training Plan

	TRAINING PLAN 4.18	
Item		Check Item
1	**Develop procedures for identifying training** *Evaluate experience of staff e.g. such as for prerequisite qualification for specialised tasks.* *Identify the individual training needs of staff at defined intervals e.g. by job appraisal or performance reviews.*	
2	**Develop procedures for providing training** *Consider internal or external training as appropriate to fulfill current job requirements* *Consider training or briefings required for suppliers.*	
3	**Develop procedures for keeping training records** *Establish and maintain training plans and records.*	
4	**Create a training record form or template**	
5	**Establish a training plan for each job profile**	
6	**Quality training plan** *Ref: Elements identified in 0*	

Internal auditing

INTERNAL AUDITS 4.17		
Item		Check Item
1	**Develop procedures**	
2	**Selection of internal auditors** *Consider working relationship in order to ensure cooperation.*	
3	**Internal auditor training**	
4	**Create documentation** *Checklist, non conformity report templates, audit history*	
5	**Internal audit plan** *Consider the timing and frequency of internal audits. In the initial stages higher frequency may be necessary in order to fine tune the system and to provide on the job training for the internal auditors. Take into account the timing of external registration audits .*	
6	**Establish reviews** *At management and work group level.* *Ref: Example Management review agenda 0*	

Corrective and preventive action

CORRECTIVE and PREVENTIVE ACTION 4.14		
Item		Check Item
1	**Develop procedures** *1.Integrate with non conformance reports and management review results* *2.Analyse reports, determining action required and implementing corrective action.* *3.Verification of effective action by internal audit.*	
2	**Create forms required** *e.g. change request for corrective and preventive actions or changes to the Quality System.*	
3	**Create log to monitor status of actions** *Note status of non conformances and appropriate actions is an agenda item on the management review. .*	

Document control

CONTROL OF QUALITY RECORDS 4.16		
Item		Check Item
1	**Develop procedures** *Issues of formatting, review, approval, implementation, and change processes* *Ref: Example document management requirements 0*	
2	**Create document change request form** *Establish consistency through use of agreed style for documents.*	
3	**Establish controlled documents master list.** *List all documents within the Quality System including quality records*	
4	**Document control awareness** *Monitor effective document control through the internal audit process.* *Educate and inform users through briefing sessions or information updates*	

TEST PHASE

QS DEPLOYMENT and VALIDATION		
Item		Check Item
1	**Brief staff and inform of start date**	
2	**Issue and implement procedures**	
3	**Conduct internal audits to plan**	
4	**Establish corrective and preventative action reporting**	
5	**Develop service level agreements** *Provides a method of defining and controlling relationships between internal organisations.* *Ref: Example criteria 0*	
6	**Conduct internal audit of management system**	
7	**Registration ISO audit process**	

REGISTRATION PHASE

ISO AUDIT PROCESS		
Item		Check Item
1	**Operate and fine tune the declared management system.**	
2	**Pre-assessment**	
3	**Corrective action arising from pre assessment**	
4	**Registration ISO assessment**	
5	**Post assessment corrective action plan**	

PROPOSAL TEMPLATE

return 0

The proposal template will allow the creation of a documented proposal which can be used for submission to management to secure support, define policy, assign responsibility and allocate resources.

PROJECT PROPOSAL

QUALITY ASSURANCE IMPLEMENTATION

State Administration:

Document reference: .

Date:

CONTENTS

1 INTRODUCTION

The inclusion of the following requirements for Quality Assurance systems in ICAO Annex 15 (Aeronautical Information Services), Edition 10, and the establishment of an associated CIP Objective, has identified the requirement for the implementation of ISO 9000 Quality Assurance (QA) activities in the National Aeronautical Information Services.

> 3.1.7 An aeronautical information service shall receive and/or originate, collate or assemble, edit, format, publish/store and distribute aeronautical information/data concerning the entire territory of the State.....
>
> 3.2 Quality System
>
> 3.2.1 As of 1 January 1998, each Contracting State shall take all necessary measures to introduce a properly organized quality system containing procedures, process and resources necessary to implement quality management at each function stage of the aeronautical information service. In addition, States shall ensure that established procedures exist in order that aeronautical data at any moment is traceable to its origin so as to allow any data anomalies or errors, detected during the production/maintenance phases or in their operational use, to be corrected.
>
> *Note--- International Organisation for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme is to be formulated by each State and in most cases are unique to the State organization.*
>
> 3.2.2 The established quality system shall provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy stated requirements for data quality (accuracy, resolution and integrity) and for data traceability by the use of appropriate procedures in every stage of data production or data modification process. .....

2 OBJECTIVE

In order to meet the AIS CIP Objective which calls for States to achieve registration to the ISO 9000 series of QA Standards by 2003 the following proposal outlines the plan to implement a quality management system within the *enter State name* AIS and complete the registration to ISO 9002 by the stated target date. ISO 9002 has been identified as the ISO standard most appropriate for AIS.

3 SCOPE

The programme described will implement Quality Assurance for the following AIS activities within the administration:-

1) e.g. AIP production
2) *e.g. NOTAM operations*

The implementation will extend to the operation of these activities at .. *name the location /s.....*
In deciding the scope of the implementation consideration must be given to those aspects of the operation that are not confined to the one location e.g. briefing offices.

4 BENEFITS

The implementation and operation of quality measures in the form of a quality management system will bring improvements in efficiency and reliability with subsequent enhancements to productivity, safety and service levels.

5 PROGRAMME DESCRIPTION

The programme tasks can be broken down into four principal phases:-

1) Planning - QA requirement in the specified AIS areas.
2) Design of the quality system.
3) Deployment and test of the quality system.
4) Final adjustment and audit for ISO registration.

5.1 Planning - QA requirement

The objective of this phase is to establish for each of the operational AIS processes being involved :-

(a) the associated roles and responsibilities;
(b) the necessary procedures to effect the processes identified;
(c) the necessary documentation.

A key feature of this phase will be the gap assessment to identify where there is a need to develop and extend procedures to meet the requirements of the ISO 9002 standard. It will also be necessary to initiate an awareness programme in order to gain support for the initiative at all levels.

5.2 Design

In this phase it is necessary to identify where new procedures are required and ensure consistency with existing ones. To develop training plans, system audit planning and establish the management review process. Key to this phase will be the documenting and creation of the necessary forms to fulfil the quality record requirement.

5.3 Deployment

As the quality system develops the procedures need to be issued and the system implemented such that the process can be tested and checked for correct function. Discrepancies will be dealt with through the corrective action and follow-up action procedures, the aim being to validate the system in preparation for the formal, external audit process necessary for registration.

5.4 Registration

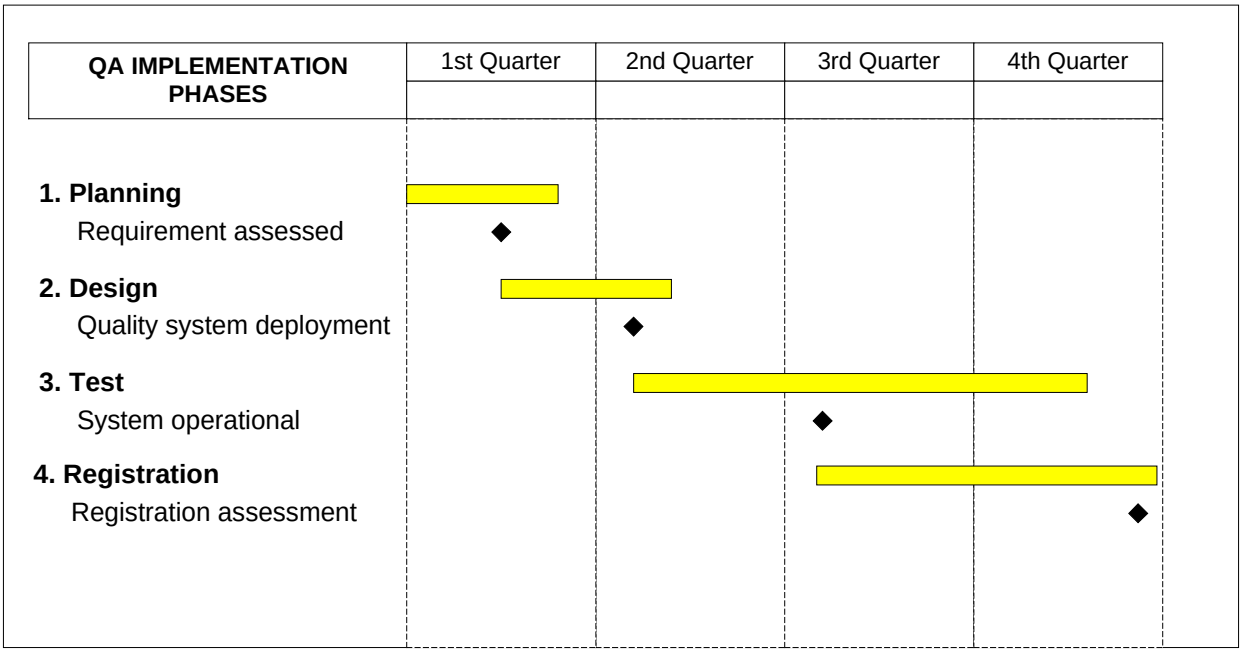
The final phase represents the on-going working quality system which will be operated for a period before the registration assessment. This provides an opportunity for the fine tuning of quality system elements. Note that the timescale for this phase extends beyond the assessment date in order to accommodate any corrective action issues that may arise from the registration audit.

Target date to be met for registration
Defines a timescale for planning purposes, provides goals in the form of milestones for the project team and can also assist in continuing interest and support from senior management

6 PROJECT PLAN

The following is a high level schedule of the programme showing a proposed total implementation timescale of *enter proposed time* months.

Note that the plan below can be substituted by the detailed MS project plan provided with the implementation template This plan has used a 12 month timescale. This will need to be adjusted according to the local plan. Generic AIS QA Project.mpp



Note: Gantt chart normalised to 12 months

7 PROJECT TEAM

The following personnel are proposed to comprise the implementation project team. An assessment of effort required is included.

PROJECT TEAM			
Name	**Role**	**Skills / department represented**	**Estimated effort required**
	QA Project leader		
	QA committee		
	QA committee		

Careful consideration needs to be given to the responsibility for coordination of the implementation. Define skills required including motivation for the programme and ability for good communication and relationship with all levels. Note that the project team assigned at this stage need not imply a fixed decision on responsibilities within the quality system. These roles have yet to be defined e.g. the quality management representative at this stage may not necessarily continue with the role once the QS has been implemented.

8 RESOURCES

The introduction of a quality system should not create new employment posts but is expected to increase work responsibilities, particularly during the development of the system. The following is an estimate of the effort required for the specified tasks, the majority of which can be provided internally for the development of the necessary documentation.

The cost of external support has to be considered against the saving in internal effort by correctly interpreting the requirement in the earlier stages of the programme, and providing assistance with the assessment of the quality system once operating prior to registration audit. Budget allocation will need to be considered for support from external consultancy.

Note: Check with National agencies to see if subsidised support is available.

Internal :

Ref: The planning matrix 0 gives a more detailed breakdown for assessing time required for documentation development.

INTERNAL EFFORT	
Task	**Estimated effort (man days)**
Process analysis	
Procedures development	
Documentation control	
QA training	
Internal auditor training	

2. External

Some external support is recommended in order to assist with correct interpretation and ensure the internal team is kept on track for compliance. Consider also initial quality and internal auditor training.

EXTERNAL EFFORT		
Task	**Estimated effort (man days)**	**Cost**
Interpretation of requirement against standard ISO 9002		
QA awareness training		
Internal Auditor training		
Pre registration audit		

OTHER SUPPORT COSTS		
Item	**Purpose**	**Cost**
e.g. software	*document control*	
ISO Registration fee	Professional registration organisation	

9 DELIVERABLES

The project objective is to establish a quality system that meets the requirements of the ISO 9002 standard. The following are considered to be essential elements of this process.

- ❑ Quality policy
- ❑ Documented procedures
- ❑ Training plan
- ❑ Audit plan
- ❑ Management review plan
- ❑ ISO 9002 registration

10 REFERENCES

1. Annex 15 to the Convention on International Civil Aviation (section 3.2 Quality System)
2. An Introduction to ISO 9000 Quality Management Systems for Aeronautical information Systems (QA Workshop IANS - 1999)

USEFUL TOOLS

Planning Matrix

return 0

Estimate the times involved for each of the phases in preparing the following documentation :-

Document Type	Analysis	Definition of Process	Implementation	Review	Total *(days)*
Quality Policy					
Quality Manual					
Procedures					
Instructions					
Document Templates					
Checklists					
Forms					

Process Documentation planning Requirements.

Example of a planning table to establish the type of documentation required to support key elements of the quality system.

return: 0

Process	Document Name	Document Type	Author
Planning audits	Planning an Internal audit Annual audit schedule	Procedure Form	
Conducting audits	Conducting an internal audit Audit checklist Audit trail Non conformity report	Procedure Checklist Form Form	
Management Review	Meeting agenda Meeting minutes Action list	Form	

Example Process Description Form

Unit :	
Developer Name:	*Who has developed and documented the process and is responsible for any changes.*
Date :	

PROCESS:	
Application Area:	*Is the activity performed unit wide or concerns a specific section?*

Process description
What activities are performed and in which order

Name:
Who performs the process

Forms
Forms support the process and provided the quality records.

Work instructions
Associated with the process for providing specific detail.

Process inputs *What are the inputs to the process, information, materials etc?*	**Process entry criteria** *When does the process begin?*
Process outputs *What are the outputs - information, products etc?*	**Process exit criteria** *When is the process considered complete?*

Procedures List

return 0

Procedure name / identifier	ISO 9002 : 1994 Reference		Check Item
	Contract review	4.3	
	Document and Data Control	4.5	
	Purchasing	4.6	
	Customer supplied product	4.7	
	Identification and traceability	4.8	
	Process Control	4.9	
	Inspection and Testing	4.10	
	Inspection and Test Status	4.12	
	Control of Non conforming product	4.13	
	Corrective and preventive action	4.14	
	Handling, storage, packing and delivery	4.15	
	Control of quality records	4.16	
	Internal quality audits	4.17	
	Training	4.18	
	Servicing	4.19	
	Statistical techniques	4.20	

Note: This form will be updated on introduction of ISO 9001:2000

Service Level Agreements **return 0**

Requirement

A service level agreement is typically needed where processes span two or more internal organisations or where the absence of such a defined operational interface may adversely affect the quality of the product or service provided.

Criteria guideline

An agreement that defines the following aspects of the interface

Organisational relationship	Include the charters of both customer and supplier.
Scope	Reference services to be provided by the supplier in the agreement. If there are service areas that fall outside the agreement these should be identified within the scope.
Responsibilities	Both customer and supplier personnel responsible for the review and approval of the agreement.
Point of contact	Clearly identified point of contact from each member of the agreement.
Expectations	Detail and list service and product expectations e.g. ▪ timeliness of service ▪ quality of deliverables
Process	Reference to those procedures and work instructions relevant to the relationship defined in the agreement.
Constraints	Define any constraints on the members of the agreement that may affect the performance.
Deliverables	Clearly defined deliverables between members of the agreement, including any necessary approval controls or assessment criteria.
Special cases / complaints	Suitable procedures should be in place to address issues that fall outside of the agreed specification of the relationship.
Performance monitor	Reviews conducted by supplier and customer - type and frequency to be agreed.
Charges	

SAMPLE QUALITY SYSTEM ELEMENTS

The following pages provide guidance on specific elements identified in the implementation plan template that will assist the user in defining or developing those aspects relevant to the users operation.

Document management system requirements

return 0
return 0

The document management system must be able to provide the following feature capabilities. Those identified with an asterisk indicate that this is an essential requirement. All others, while not essential, are considered beneficial / desirable.

- ❑ *Unique identification of all documentation / data.
- ❑ *Issue and version status of the document / data.
- ❑ Source / origin, author / owner of the document / data.
- ❑ *Impact Assessment source / responsibility (where applicable).
- ❑ *Number of copies held.
- ❑ *Distribution – location / holder of each document / data copy held.
- ❑ *Identification of any extracted data & where held / located.
- ❑ *Recording the processing of Change Request and the updating of procedures.
- ❑ *Recording the processing of Problem reporting and the closure / progress of corrective actions.
- ❑ Ability to highlight (flag) overdue actions.
- ❑ Tracking of customer feedback / satisfaction performance reporting.
- ❑ Provision of routine trend analysis reports.
- ❑ Management of the management system audit plan.
- ❑ Management Reviews – action progressing and closure of actions.

Procedure structure

return 0

The Procedures contained within the documented management system, should be as consistent as possible. A suggested outline of the procedure structure content is provided below:

Process / procedure title*;*
This being the subject / topic covered by the procedure.

Procedure 'Owner';
This being the individual or function with responsibility for the process.

Objective;
This should briefly describe what the process / procedure is trying to achieve.

Scope;
The scope should define what is applicable and the limitation (if any of the procedure).

Responsibilities;
This section should briefly define the responsibilities of the key functions involved in the procedure.

Introduction;
Optional. A procedure may benefit from a brief introduction, but this is not essential.

Contents List;
Optional. This being a list of contents of the document .

Process Overview;
This section should provide a high level end to end overview of the key activities / steps contained within the process lifecycle.

Detailed Process;
This section should define the detail of the process activities, to the extent that the absence of these could be potentially detrimental to the completion of the activity being performed.
It should identify; the key activities /steps within the process, the requirements that must be met, responsibility for achieving these and supporting guidance notes, to the degree necessary to ensure that the activity can be performed.

Document control elements;
This information supports the identification of the procedure including the document number, issue number, approval and amendment records.

Related Documents;
This section should list should list the related documents, forms, etc., referred to within the content of the procedure and which are necessary to complete the process being described by the procedure.

Definitions;
Technical terms, abbreviations and acronyms used in the document.

Appendices;
These would typically contain supporting information necessary to complete the process.

Note: References to departments, sections, functions etc., should be used wherever possible and the use of personal names and telephone numbers within the content of the procedure should be avoided. Should the latter change it will require an amendment update to the procedure.

Typical management system review agenda

return 0

The management system review should consider, but not be limited only to the following topics:

- ❑ Outstanding actions from previous review meetings;
- ❑ Overall service/product delivery performance and customer feedback;
- ❑ Management system audit observations.
- ❑ Follow-up closure/escalation action of any outstanding observations.
- ❑ Outstanding non-conformance's i.e. Problem Reports, Change Request etc.;
- ❑ Performance to Service Level / Interface Agreements – both internal and external.
- ❑ Adequacy of support Contracts with suppliers / contractors (where applicable);
- ❑ Regulatory and Statutory issues, *(i.e. issues / changes impacting on the Administration, e.g. ICAO).*
- ❑ Staff Training and skills development – *(with respect to the training plan);*
- ❑ Resources.
- ❑ Proposed business process improvement activities.

GUIDANCE MANUAL FOR AERONAUTICAL INFORMATION SERVICES

in the

ASIA/PACIFIC REGIONS

PART 2

SELECTION AND TRAINING GUIDELINES

for the

AIS

GUIDELINES

SELECTION AND TRAINING

for the

AERONAUTICAL INFORMATION SERVICE

Table of Contents

Selection and Training Guidelines

Introduction

This part of the Guidance Manual for Aeronautical Information Services (AIS) in the Asia/Pacific Regions has been developed to provide States with guidance material for the selection and training of staff in the AIS.

The guidance material is not intended to be prescriptive and may be used as a guide when States are developing their own individual selection and training material.

Selection Principles

Recruitment and selection of staff for the AIS should be made based on merit and relative efficiency, the requirements of the position, in fair and open competition to ensure that the best qualified applicant gets the job.

In assessing the relative efficiency of candidates consideration should be given to the abilities, qualifications, experience, standard of work performance and personal qualities of each applicant, to the extent that those matters are relevant to the efficient performance or potential to efficiently perform the duties.

The First Step

A number of documents must be in place before the Selection Process can commence to clearly identify the work to be done. Normally these would consist of:

- Position Description;
- Duty Statement; and the
- Selection Criteria against which applicants will be assessed.

The Position Description and the Duty Statement set the scene about what the position is required to do, what the reporting arrangements are, and how the position fits in with the other work areas.

The Selection Criteria is the part that sets out how the applicants will be measured for the job of work to be done.

The Selection Process

A Selection Committee will usually be established with a minimum of two people to determine the most suitable applicant.

When necessary, a shortlist of applicants most suitable for further consideration may be made by the committee based on claims against the selection criteria and/or on referee comment.

When there is only one applicant for the position the applicant may be recommended for direct promotion or employment without the establishment of a Selection Committee.

The Selection Committee should decide the procedures to be followed and the sources of information to be used in assessing applicants against the selection criteria. Sources of information may include:

- Application
- Interview
- Referee Reports
- Work Samples and/or
- Performance tests

The Selection Committee is responsible to ensure that the field of applicants is of sufficient calibre for assessment to proceed. The procedures that the Selection Committee follows will enable a thorough investigation of the claims and merits of the applicants to be assessed against the selection criteria.

The selection report will provide an accurate account of the Committee's assessment of applicants and enough information for the decision-maker to make a decision. The report will be used as the basis for counselling unsuccessful employees and for review requests arising from the selection decision.

An appropriate delegate will usually formally approve the Selection Committee's recommendation.

All unsuccessful applicants interviewed for the job should be notified in writing of the outcome and should be given the opportunity to obtain verbal feedback on their performance if they so desire. Applicants not listed for interview should be advised accordingly.

Training and Training Courses

Following a selection process, AIS training is separated into a number of distinct stages.

Stage 1 deals with "core skills" and the focus is on the new entrant becoming familiar with the purpose, role and responsibilities of an AIS.

Stages 2 and 4 are assessments that follow the Core Training and On-the-Job Training.

The third stage covers topics related to on-the-job training.

The fifth stage covers more advanced training and is applicable to staff who have been working in the AIS for more than a few months.

The training process is depicted in the following table.

Stage	Description
	New Entrant Selection
1.	Core Training
2.	Training Assessment
3.	Area assignment - Task specific on-the-job training
4.	Performance Assessment
5.	Career Development

A flow chart showing the various stages in the Selection and Training Process is shown in Appendix 1.

Base entry-level positions in some AIS may be as cartographic and / or Air Traffic Services Operations Officers, who may be responsible for matters such as NOTAM, documents, static aeronautical data and information, or operational aspects of aeronautical charts. It is unlikely that an applicant will present with a complete range of these technical skills. The normal process is therefore to advertise for, and select an applicant with the skill set most needed at the time.

Stage 1 - Core Training

New entrants will be placed in an appropriate work area, and assigned to an experienced staff member who will supervise and guide the new entrant through the more formal generic training.

This initial training requires the student to research basic reference documents and then undergo an assessment to confirm that the required levels of knowledge have been acquired.

The assessment is designed to ensure that the student has strong understanding of the role, functions, products and structure of AIS.

A demonstrated level of competency in an assessment of “AIS Core Knowledge” will enable the new entrant to commence working with non-continuous supervision.
Each AIS should specify a time period within which the Core Training will be completed as part of the overall training plan.

AIS Core Knowledge

A list of AIS Core Knowledge and the associated reference documents is shown in the following table.

Topic	Reference Document
Legislation and legal charter	National legislation, DOC 8126, Annex 15
Responsibilities, status, functions, scope, and purpose of an AIS	DOC 8126, DOC 7192, Annex 15, AIP
Quality systems	Annex 15, Annex 11, ISO 9000 series
Origin of aeronautical information and collection of information	DOC 8126, AIP
AIS organisation	Internal Organisation Chart, DOC 8126, AIP
AIS relationships with internal and external stakeholders, clients and author areas	AIS Quality Manual, AIS Business Plan
AIRAC	DOC 8126, Annex 15, AIP
AIP/AIP SUP/AIC	DOC 8126, Annex 15, AIP
NOTAM	DOC 8126, Annex 15, AIP
Codes	DOC 8126, 7910, 8585, 8400, 7383, 8643, Annex 15,AIP.
WAC and aeronautical charts	DOC 8697,Annex 15, Annex 4, AIP
The integrated AIP	DOC 8126, AIP
Integrated Automated AIS Systems	DOC 8126
Windows NT (or other operating system) - file management and file transfer	Users Manual
Word processing	Users Manual
Database	Users Manual
Spreadsheet	Users Manual

Stage 3 - Task Specific Training

On-the-job training supports new entrant training Stage 2 and any training provided to staff moving to a new work group.

A more experienced officer from within the work group provides on-the-job training. This training is informal and seeks to assist the new member to adjust and become familiar with standard operating procedures, work processes, job norms and data structures as they relate to a particular job function within AIS.

An exception to this practice is for those staff members who, in the course of their duties, will issue NOTAM. When required, new entrants may undertake NOTAM office specific training at an International or other NOTAM office.

The topics listed below represent some of the subject matter that will be covered in on-the-job training. Not all topics need to be covered for each new entrant.

On-the Job Training Topics

- ICAO documents
- AIS Products
- Change Management
- Standard Operating Procedures
- Quality Processes
- Checking procedures
- Branch Policies & Procedures
- Network configuration of DTP
- File Management within DTP
- File Management within CAD
- Record Keeping
- AIP Data Structures
- Relationships with external agencies
- Responsibilities and limitations
- NOTAM Management and Policies
- Codes Management and Policies
- Publication and production
- Distribution

Assessment of this phase of training is continuous and forms part of the performance appraisal process.

Training and Competency

Training

The competencies required for each position are detailed in the relevant Position Descriptions held for each of the functional areas of the AIS. From these competencies, and initial and regular assessments of performance, training requirements for individual staff are identified.

Newly Appointed Staff

The training requirements for newly appointed staff are identified in consultation with the staff member and implemented as a Training Plan. The Training Plan will identify all relevant items for which training is required, a time-frame for the completion of each item (either due date or period) and when appropriate, any required achievement level.

As training items are completed, completion is recorded on the Training Plan. A copy of a sample checklist is shown at Appendix 2.

Current Staff

Training programs should be developed by the Manager, AIS for on-going training to keep staff current with practices applicable to the position and to ensure all incumbents are trained to meet the requirements shown in the Position Description and Duty Statement.

This may be carried out as part of the annual Performance Assessment with any identified training requirements recorded in the Personal Development Plan. Details of the completion of training for all staff; both newly appointed and current, should be made in the staff members file.

Competency

Newly Appointed Staff

New appointees to any position are required to demonstrate experience and competency appropriate to the position being filled. Initially, this will be determined through the recruiting process.

The performance of newly appointed staff members should be reviewed within 3 months of appointment. This requirement will normally be met by reviewing the results of day-to-day work and the completion of Training Plan items and mentor reports.

If at the completion of all Training Plan items, or the completion of the first 3 months of employment (whichever is the latter), the staff member has demonstrated an appropriate level of competency, they will be considered to be current staff. From that time, they will be required to meet the competency requirements for current staff.

Current Staff

To remain competent, staff members should carry out their specified responsibilities at least once every three months or other suitable interval, depending on the nature of the work being performed. Because of the on-going and regular nature of their work, staff will normally satisfy this requirement through their day-to-day work.

Where a current staff member is absent for a period exceeding 3 months, their performance should be reviewed during the month of recommencement of work, or until such time as they have demonstrated an appropriate level of competency. The performance attributes to be reviewed will depend upon the position held, the length of their absence and the nature of work currently in progress. These should be determined by mutual agreement with the staff member concerned.

Competency Records

Details of competency reviews should be held on individual staff member's files.

Performance Assessments

Regular Performance Assessments should be completed for all staff. Performance reviews should include:

(a) The establishment of performance objectives for the next period (year)

(b) A review of the staff members performance against objectives for the review period

(c) Identification and agreement of any training required.

Details of Performance Agreements and Performance Appraisals should be held on individual staff member's files.

A sample Performance Appraisal form is shown at Appendix 5.

Stage 5 - Career Development

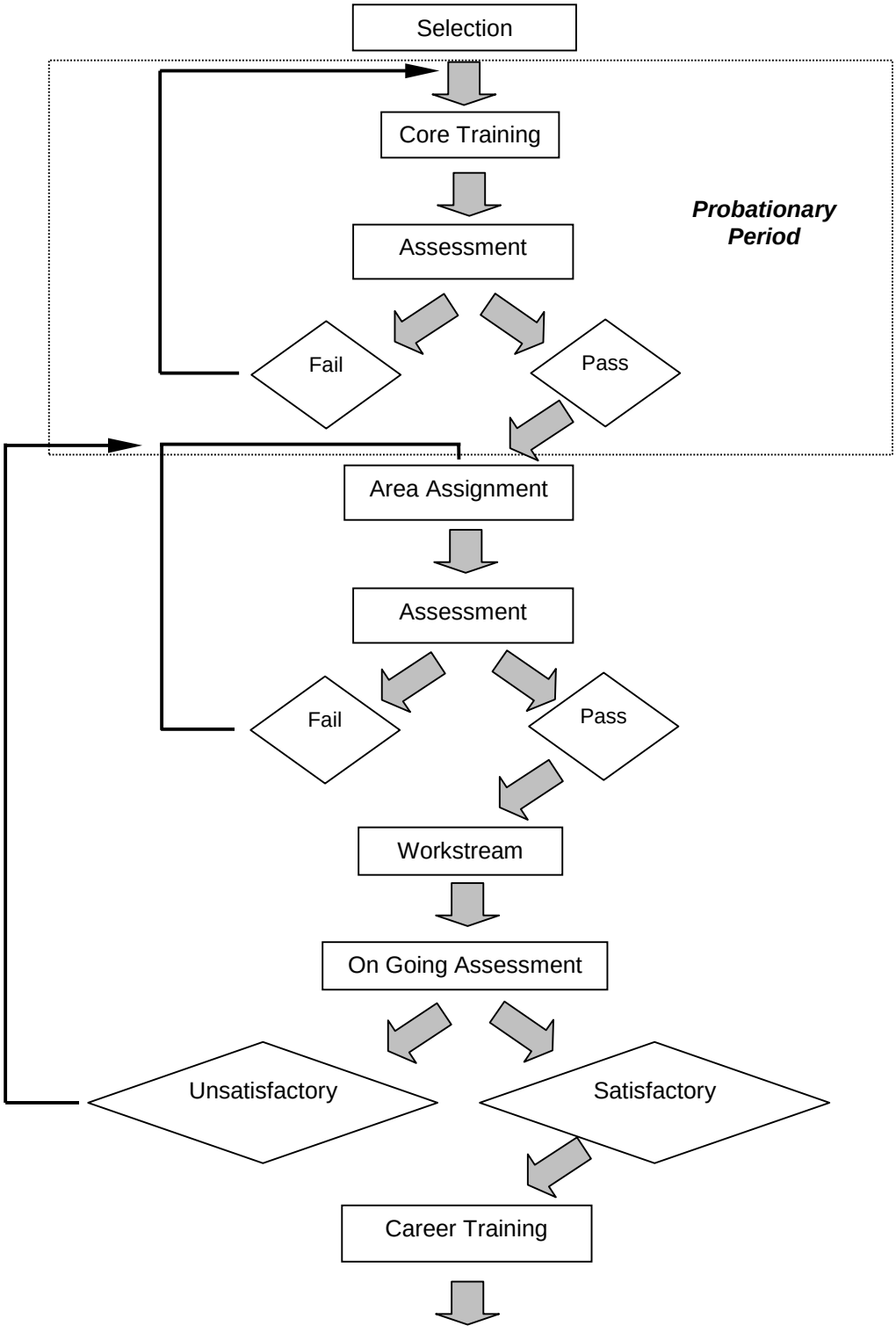
There is no specific course designed for this segment of AIS training.

Computer hardware and software applications training is provided as needs are identified.

This policy is followed throughout the career of an AIS staff member, in terms of providing refresher and advanced applications training. Such courses are not limited to computer applications. By necessity, they include training in both general and quality management techniques and philosophies.

These courses may sourced from firms' external to the parent organisation on an as required basis. Staff should be encouraged and supported in their endeavours to obtain skill enhancements in their own time. This may include acquisition of tertiary or technical skills.

Appendix 1 - Sample Selection and Training Program



Appendix 2 - Sample Training Checklists

Computer Operation Checklist

Topics	Competent (Yes)	Date	On the Job Training Instructor Initials	Individual Undertaking Training's Initials
Log On/Password				
Read Message				
Print Message				
Refile Message				
Create Message				
Answer sender/all				

Fault Reporting Checklist

Topics	Competent (Yes)	Date	On the Job Training Instructor Initials	Individual Undertaking Training's Initials
Fault Reporting – Team Leader on duty				
Fault Reporting - Outside Team Leader hours				

Local Arrangements Checklist

Topics	Competent (Yes)	Date	On the Job Training Instructor Initials	Individual Undertaking Training's Initials
Temporary Local Instructions(TLI) record				
Workstation Information Book				
Database Change Procedures				
Personal Recency Record				
Military Flight Information Service				
Airspace and Location Geography				
Military Prohibited, Restricted and Danger Airspace Groups				
Location for International Issue of NOTAM				

Disaster, Contingency and Evacuation Checklist

Topics	Competent (Yes)	Date	On the Job Training Instructor Initials	Individual Undertaking Training's Initials
Warning Message				
Evacuation Message				
Evacuation Actions				
Assembly area				
Disaster Recovery Plans Plan Documentation & Checklists				
Disaster Recovery Plans Actions				

Appendix 3 - Competency Areas : Sample Grading Criteria

Introduction

This covers the Competency Areas, and offers suggested guidelines for grading performance when using the “Assessment Debrief Form”.

Competency Areas have been divided into separate areas as shown below.

- Pre-flight Briefing and Flight Plan Acceptance
- Flight Plan Processing and Message Handling
- Phraseologies and Communications
- Equipment Handling
- Airspace/Geographical Knowledge
- Documents and Local Procedures
- Coordination
- Workload Management

Competency Areas : Sample Grading Criteria

Competency Area	Grading Criteria
Pre-flight Briefing and Flight Plan Acceptance	The officer must demonstrate a thorough understanding of all-briefing material and flight planning requirements. The officer must obtain a clear understanding of the pilot’s requirements, correctly handle data errors and omissions and demonstrate awareness of technical elaboration responsibilities.
Grading	1 Lack of basic knowledge and understanding of pre-flight briefing and flight plan acceptance responsibilities results in unsatisfactory performance. 3 Demonstrated sufficient knowledge and understanding of pre-flight briefing and flight plan acceptance. 5 Demonstrated a complete knowledge and understanding of all aspects of pre-flight briefing and flight plan acceptance.

Competency Area	Grading Criteria
Flight Plan Processing and Message Handling	The officer must process all flight plans and messages quickly and without error, using correct procedures, message addressing and endorsement of processed messages. The officer must demonstrate correct use of PDAIs, military addressing and ZP procedures.
Grading	1 Fails to correctly process flight plans and messages without assistance and guidance. 3 Demonstrates satisfactory ability to process flight plans and messages. 5 Flight plans and messages processed quickly and correctly at all times using correct procedures, addressing and endorsements.

Competency Area	Grading Criteria
Phraseology & Communication	The officer must use standard phrases as applicable and be able to efficiently use non-standard phrases in unusual situations with no ambiguity. The officer must be able to use clear and correct speech without long pauses, inappropriate inflections or emphasis, or clipped transmissions.
Grading	1 Poor or incorrect use of standard phraseology, resulting in indistinct and hesitant delivery. Unable to adlib without being ambiguous. 3 Standard phraseology used effectively. A basic ability was demonstrated with non-standard phraseology. Delivery was usually clear and concise. 5 Use of standard phraseology was automatic and non-standard phraseology was effectively used, resulting in clear, unambiguous delivery at all times.

Competency Area	Grading Criteria
Equipment Handling	The officer must be able to competently manipulate the equipment applicable to the operating position. The officer must be able to use backup systems in the event of equipment failure and carry out correct fault reporting procedures.
Grading	1 Unable to use essential equipment effectively. 3 Demonstrated ability to use essential equipment effectively. 5 Sound understanding and demonstrated optimum use of all equipment at all times.

Competency Area	Grading Criteria
Airspace and Geographical Knowledge	The officer must be able to demonstrate a complete knowledge of the various classes of airspace, prohibited, restricted and danger areas, and areas of responsibility. The officer must be able to demonstrate a geographical knowledge applicable to the operating position.
Grading	1 Lack of knowledge does not allow effective performance of functions. 3 Sufficient knowledge to perform job functions satisfactorily. 5 Demonstrates a thorough knowledge of all aspects of airspace layout and requirements and geographical knowledge

Competency Area	Grading Criteria
Documents and Local Procedures	The officer must demonstrate a thorough knowledge of and compliance with all briefing documents, maps and charts, and local instructions and procedures.
Grading	1 Inadequate knowledge of or fails to comply with requirements of documents and local procedures. 3 Adequate knowledge and

Competency Area	Grading Criteria
	sufficient compliance with requirements of documents and local procedures. 5 Demonstrated a thorough knowledge of and full compliance with requirements of all briefing documents and local procedures

Competency Area	Grading Criteria
Coordination	The officer must perform applicable coordination functions correctly in a timely manner. The officer must be able to communicate effectively with other units and agencies.
Grading	1 Coordination not completed in appropriate time, resulting in poor communications with other units and agencies. 3 Correct coordination completed in sufficient time. 5 Demonstrated complete, effective and timely coordination at all times with other units and agencies.

Competency Area	Grading Criteria
Workload management	The officer must demonstrate the application of a logical work plan, based on current workload, so that tasks are prioritised and completed with sufficient speed and accuracy.
Grading	1 Unable to prioritise tasks effectively to cope with normal workload. Makes frequent errors. Work rate was too slow and little ability to adjust to increasing work rate was evident. 3 Ability to process information correctly with sufficient priority, speed and accuracy to cope with average workload demands. 5 Able to prioritise tasks, maintain accuracy and adjust work rate to cope with all workload demands with ease and confidence.

Appendix 4 - Sample Trainee Assessment Debrief Form

Week:

Trainee :	Instructor / Training Officer :	Position :	Date :

Pre-flight Briefing and Flight Plan Acceptance

1 2 3 4 5

Understanding of briefing material
Understanding of Flight planning requirements (Domestic/International)
Clear understanding of pilots requirements
Aware of technical elaboration responsibilities
Correctly handles data errors and omissions
Application of standard briefings

Flight Plan Processing and Message Handling

1 2 3 4 5

Correct endorsement of processed messages
Correct message addressing
Standard flight plans
Uses correct procedures
Timely and accurate message distribution
Efficient use of PDAIs
Military addressing
ZP procedures

Phraseologies and Communications

1 2 3 4 5

Uses standard phraseologies
Clear concise delivery
Adjusts briefing style to suit recipient
Confident delivery, adlibs as required

Equipment Handling

1 2 3 4 5

Briefing system Phone/PABX Fax
Fault reporting Frequency management

Airspace / Geographical Knowledge

1 2 3 4 5

Classes of airspace
Areas of responsibility
Prohibited, Restricted and Danger areas
Locations

Documents and Local Procedures

1 2 3 4 5

Knowledge of briefing documents
Maps and Charts
Local instructions
Disaster recovery

Coordination

1 2 3 4 5

Coordination
Off normal situations
Handover/takeover
Keeps Supervisor informed
Other agencies

Workload Management

1 2 3 4 5

Prioritises tasks
Speed and accuracy
Keep Supervisor informed

Teamwork

Co-operation & teamwork

Customer Service

Public relations Politeness Enthusiasm

Trainee Comments

Training Officer Comments

Areas identified as requiring more work

Action plan for remedial training

Trainee's Signature & Date Training Officer's Signature & Date

This signifies agreement with the remedial program by both parties

Training Evaluation Feedback Form

Instructions for using this form:

- This form is to be filled out:

– at the end of each week of training

***For Weekly Assessments*:**

- A grading of 3 – 5 shall be considered as satisfactory.
- A grading of 1 or 2 shall be considered as unsatisfactory and a remedial action plan shall be implemented.

***For Milestone Assessments*:**

- A grading of 3 – 5 shall be considered a pass
- During a Rating assessment, a non-pass grading (i.e.: 1 or 2) shall indicate that a formal remedial plan may be required (subject to managerial approval). After the remedial action and following a second assessment, failure may result in recommendation for termination.

Appendix 5 - Sample Performance Appraisal Form

EMPLOYEE NAME:	**POSITION TITLE:**
BRANCH:	**LOCATION:**
POSITION REPORTS TO:	**DATE OF APPOINTMENT:**

APPRAISAL PERIOD: **FROM:** ..... **TO:** .....

INSTRUCTIONS

Performance is to be formally assessed at least once per year with a review of performance occurring at least halfway through the assessment period.

Performance should be evaluated against both annual objectives set by agreement between the staff member and manager/supervisor at the beginning of the assessment period and/or the Key Result Areas contained in the staff member's job description.

The staff member and manager/supervisor should separately complete their own assessment of performance, training and development requirements prior to the interview.

Once the appraisal comments are completed and the appraisal formally reviewed, a copy of the completed form should be forwarded for filing in the staff member's personal file.

Only two copies of the completed form are to be made. One is held by the staff member and the other on the staff member's personal file. Access is on a strict need-to-know basis. Forms are to be destroyed TWO years after the date of appraisal.

PERFORMANCE RATINGS

1.	Outstanding	Performance objectives consistently met at outstanding level.
2.	Superior	Performance objectives consistently met, frequently exceeds competent level.
3.	Satisfactory	Fully competent and performance objectives met to acceptable level.
4.	Adequate	For performance which does not always meet the required standards. *Persons promoted to the level within the last six months and who may be regarded as novices in the role should be rated at this level.*
5.	Unsatisfactory	Performance regularly falls below minimum acceptable level. Performance objectives frequently not met. Persons should be participating in discipline counselling process.

PERFORMANCE APPRAISAL

PERFORMANCE RESULTS

These are the objectives and/or key result areas which are agreed at the beginning of the assessment period. These are to be transferred from the individual performance agreement worksheet which should be attached to this document.

OBJECTIVES/KEY RESULT AREAS 1.	COMMENTS/PERFORMANCE INDICATOR	**RATING**
2.		
3.		
4.		
5.		
6.		

PERSONAL ATTRIBUTES

These are factors which need to be considered for individual performance and/or career development reasons - transfer development action to Page 3.

1) List those characteristics which will enhance the appraisee's successes
2) List those characteristics which require further development or strengthening

DEVELOPMENT ASSESSMENT

NAME *……* ***LOCATION*** *……*

TRAINING AND DEVELOPMENT

PERSONAL DEVELOPMENT What training or development activities have been undertaken during the year? (Nominate specific programs or activities.)	
CAREER ASPIRATIONS AND PLANNING Please identify position(s) that you would see as career goal(s) and how soon you would see yourself reaching this goal.	
TRAINING NEEDS What training and development do you believe is required for you in the next 12 months?	

ORGANISATION IMPROVEMENT

1) What changes or improvements do you see or suggest in your work area or responsibilities over the next three years?	
2) How will this affect your job and/or those of your subordinates?	
3) What action would you recommend or what steps are you taking to facilitate these changes?	

AGREED TRAINING AND DEVELOPMENT OBJECTIVES FOR (period)

As a result of discussion, detail the development objectives agreed.

TYPE	TYPE/LOCATION	DATE	PRIORITY

PERFORMANCE SUMMARY

OVERALL PERFORMANCE RATING:

1	2	3	4	5

Refer to detailed definitions of Performance Ratings on page 1.

SUPERVISOR/MANAGER COMMENTS

Comments must be related to the evaluation of performance and interview discussion.

MANAGER/SUPERVISOR Name ..... Title .....

Signature ..... Date .....

EMPLOYEE COMMENTS

EMPLOYEE Name ..... Title .....

Signature ..... Date .....

REVIEWER COMMENTS

REVIEWER Name ..... Title .....

Signature ..... Date .....

GUIDANCE MANUAL FOR AERONAUTICAL INFORMATION SERVICES

in the

ASIA/PACIFIC REGIONS

PART 3

COMMON OPERATING PROCEDURES FOR AUTOMATED AIS SYSTEMS

This Part is being updated

GUIDANCE MANUAL FOR AERONAUTICAL INFORMATION SERVICES

in the

ASIA/PACIFIC REGIONS

PART 4

USE OF THE INTERNET FOR INFORMATION TRANSFER

This part has yet to be developed

STATUS OF WGS-84 IMPLEMENTATION

EXPLANATION OF THE TABLE

Column

1 Name of the State, territory or aerodrome for which WGS-84 coordinates are required with the designation of the aerodrome use:

RS	-	international scheduled air transport, regular use
RNS	-	international non-scheduled air transport, regular use
RG	-	international general aviation, regular use
AS	-	international scheduled air transport, alternate use

2 Runway designation numbers

3 Type of each of the runways to be provided. The types of runways, as defined in Annex 14, Volume I, Chapter 1, are:

NINST	-	non-instrument runway;
NPA	-	non-precision approach runway;
PA1	-	precision approach runway, Category I;
PA2	-	precision approach runway, Category II;
PA3	-	precision approach runway, Category III.

4 Requirement for the WGS-84 coordinates for FIR, indicated by the expected date of implementation or an "X" if already implemented.

5 Requirement for the WGS-84 coordinates for Enroute points, indicated by the expected date of implementation or an "X" if already implemented.

6 Requirement for the WGS-84 coordinates for the Terminal Area, indicated by the expected date of implementation or an "X" if already implemented.

7 Requirement for the WGS-84 coordinates for the Approach points, indicated by the expected date of implementation or an "X" if already implemented.

8 Requirement for the WGS-84 coordinates for runways, indicated by the expected date of implementation or an "X" if already implemented.

9 Requirement for the WGS-84 coordinates for Aerodrome/Heliport points (e.g. aerodrome/heliport reference point, taxiway, parking position, etc.), indicated by the expected date of implementation or an "X" if already implemented.

10 Requirement for geoid undulation indicated by the expected date of implementation or an "X" if already implemented.

11 Requirement for the WGS-84 Quality System, indicated by the expected date of implementation or an "X" if already implemented.

12 Requirement for publication of WGS-84 coordinates in the AIP indicated by the expected date of publication or an "X" if already published.

13 Remarks

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
AUSTRALIA			X	X						X	X	
YPAD ADELAIDE/												
Adelaide	05	NPA			X	X	X	X				
RS	23	PA1				X	X	X				
	12	NPA				X	X	X				
	30	NPA				X	X	X				
YBBN BRISBANE/					X			X				
Brisbane	1	PA1				X	X					
RS	19	PA1				X	X					
	14	NPA				X	X					
	32	NPA				X	X					
YBCS CAIRNS/					X			X				
Cairns	12	NPA				X	X					
RS	30	NPA				X	X					
	15	PA1				X	X					
	33	NPA				X	X					
YPDN DARWIN/					X			X				
Darwin	11	NPA				X	X					
RS	29	PA1				X	X					
	18	NINST				X	X					
	36	NPA				X	X					
YMML MELBOURNE/					X			X				
Melbourne	09	NPA				X	X					
RS	27	PA1				X	X					
	16	PA1				X	X					
	34	NPA				X	X					
YPPH PERTH/					X			X				
Perth Intl	03	NPA				X	X					
RS	21	PA1				X	X					
	06	NPA				X	X					
	24	PA1				X	X					
	11	NPA				X	X					
	29	NPA				X	X					
YSSY SIDNEY/					X			X				
Kingsford Smith Intl	07	PA1				X	X					
RS	25	NPA				X	X					
	16L	PA1				X	X					
	34R	PA1				X	X					
	16R	PA1				X	X					
	34L	PA1				X	X					
YMAV AVALON/					X			X				
Avalon	18	PA1				X	X					
AS	36	NPA				X	X					
YBRM BROOME/					X			X				
Broome	10	NPA				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
RS	28	NPA				X	X					
YSCB CANBERRA/					X			X				
Canberra	12	NPA				X	X					
AS	30	NPA				X	X					
	17	NPA				X	X					
	35	PA1				X	X					
YSCH COFFS HARBOUR/					X			X				
Coffs Harbour	03	NPA				X	X					
AS	21	NPA				X	X					
	10	NPA				X	X					
	28	NPA				X	X					
YBCG COOLANGATTA/					X			X				
Coolangatta	14	NPA				X	X					
AS	32	NPA				X	X					
	17	NPA				X	X					
	35	NPA				X	X					
YMHB HOBART/					X			X				
Hobart	12	PA1				X	X					
RS	30	NPA				X	X					
					X			X				
Learmonth	18	NPA				X	X					
AS	36	NPA				X	X					
YLHI LORD HOWE ISLAND/					X			X				
Lord Howe Island	10	NPA				X	X					
RS	28	NPA				X	X					
YPPD PORT HEDLAND					X			X				
Port Hedland	14	NPA				X	X					
AS	32	NPA				X	X					
	18	NPA				X	X					
	36	NPA				X	X					
YBTL TOWNSVILLE/					X			X				
Townsville	01	PA1				X	X					
AS	19	NPA				X	X					
	07	NPA				X	X					
	25	NPA				X	X					
YBAS ALICE SPRINGS/					X			X				
Alice Springs	06	NPA				X	X					
AS	24	NPA				X	X					
	12	PA1				X	X					
	30	NPA				X	X					
	17	NPA				X	X					
	35	NPA				X	X					
YSDU DUBBO/					X			X				
Dubbo	05	NPA				X	X					
AS	23	NPA				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
	11	NPA				X	X					
	29	NPA				X	X					
YPKG KALGOOLIE/					X			X				
Kalgoorlie	11	NPA				X	X					
AS	29	NPA				X	X					
	18	NPA				X	X					
	36	NPA				X	X					
YMLT LAUNCETON/					X			X				
Launceston	14L	ninst				X	X					
AS	32R	ninst				X	X					
	14R	NPA				X	X					
	32L	PA1				X	X					
	18	ninst				X	X					
	36	ninst				X	X					
YBRK ROCKHAMPTON/					X			X				
Rockhampton	04	NPA				X	X					
AS	22	NPA				X	X					
	15	NPA				X	X					
	33	NPA				X	X					
YPTN TINDAL/					X			X				
Katherine	14	NPA				X	X					
AS	32	NPA				X	X					
YHID HORN ISLAND/					X			X				
Horn Island	08	NPA				X	X					
RGS	26	NPA				X	X					
	14	NPA				X	X					
	32	NPA				X	X					
YSNF NORFOLK ISLAND/					X			X				NZZO FIR
Norfolk Island	04	PA1				X	X					
RS	22	NPA				X	X					
	11	PA1				X	X					
	29	PA1				X	X					
YPXM CHRISTMAS ISLAND/					X			X				
Christmas Island	18	NPA				X	X					
RS	36	NPA				X	X					
YPCC KEELING/					X			X				
Cocos Island Intl	15	NPA				X	X					
RS	33	NPA				X	X					
BANGLADESH			X	X						X	X	
VGZR DHAKA/					X			X				
Zia Int'l	14	PAI				X	X		*			* Not yet decided
RS	32	NPA				X	X					
VGEG CHITTAGONG/					X			X				
M.A. Hannan Intl	05	NPA				X			*			* Not yet decided
RS	23	PA1				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
VGSY SYLHET/					X			X				
Osmani Intl	11	PA1				X	X		*			* Not yet decided
RS	29	NPA				X	X					
BHUTAN												
BRUNEI DARUSSALAM												WBFC FIR
WBSB BRUNEI/					X			X			X	
Brunei Intl	03	PA1				X	X					
	21	PA1				X	X					
CAMBODIA												
CHINA			X	X								Sanya AOR only
HONG KONG, China			X	X						X	X	
VHHH HONG KONG/					X			X	X			
Hong Kong Intl	07L	PA2				X	X		X			
RS	07R	PA2				X	X		X			
	25L	PA2				X	X		X			
	25R	PA3				X	X		X			
MACAO, China												VHHK FIR
VMMC MACAU/					X			X			X	
Macau Intl	16	NPA				X	X		X			
	34	PA2				X	X		X			
COOK ISLANDS												
DPR KOREA												
FIJI			X	X						X	X	
NFFN NADI/					X			X				
Nadi Intl	02	PA1				X	X		X			
RS	20	PA1				X	X		X			
	09	NINST				X	X		X			
	27	NINST				X	X		X			
NFSU SUVA/					X			X				

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
Nausori Intl	10	NPA				X	X		X			
RS	28	NPA				X	X		X			
FRENCH POLYNESIA (FRANCE)			2003	2003						2003	2003	
NTAA TAHITI/								X				
Faaa	04	PA1				2003	X		X			
RS	22	NPA				2003	X	X	X			
NTTB BORA BORA/												
Moto-Mute	11	NPA				2003	X	2003	X			
	29	NPA				2003	X	2003	X			
NTTR RAIATEA												
Utoroa	07	NPA				2003	X	2003				
	25	NPA				2003	X	2003				
NTTG RANGIGORA												
Rangigora	09	NPA				2003	X	2003				
AS	27	NPA				2003	X	2003				
NEW CALEDONIA (FRANCE)			X	X						2001	X	NFFF FIR
NWWW Noumea/					X			X				
La Tontouta	11	PA1				X	X		X			
RS	29	NINST				X	X		X			
WALLIS ISLANDS (FRANCE)												NFFF FIR
NLWW Wallis/												
Hihifo										2001	X	
RS	08	NPA				X	X					
	26	NPA				X	X					
INDIA			X	X							X	
VIDP DELHI/					X			X				
Indian Gandhi Intl	09	NPA				X	X					
RS	27	PA1				X	X					
	10	PA1				X	X					
	28	PA2				X	X					
VABB MUMBAI/					X			X				
ChhatrapatiShivaji Intl	09	PA1				X	X					
RS	27	PA1				X	X					
	14	PA1				X	X					
	32	NPA				X	X					
VOMM CHENNAI/					X			X				
Madras	07	PA1				X	X					
RS	25	NPA				X	X					
	12	NPA				X	X					
	30	NPA				X	X					
VECC KOLKATA/					X			X				
Netaji Subash	19L	PA1				X	X					
Chandra Bose Intl	01R	PA1				X	X					
RS	19R	NPA				X	X					
	01L	PA2				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
VAAH AHMEDABAD/					X			X				
Sardar VallabhBhai	05	NPA				X	X					
Patel Intl	23	PA1				X	X					
RS												
VIAR AMRITSAR/					X			X				
Amritsar	16	NPA				X	X					
RS	34	PA1				X	X					
VOBG BANGALORE/					X			X				
Bangalore	09	NPA				X	X					
RS	27	PA1				X	X					
VOCI COCHIN/					X			X				
Cochin Intl	09	NPA				X	X					
RS	27	PA1				X	X					
VAGO GOA/					X							
Goa	08	NPA				X	X					
RS	26	NPA				X	X					
VEGT GUWAHATI/					X			X				
Lokapriya Gopinath	02	PA1				X	X					
Bardoloi Intl	20	NPA				X	X					
RS												
VOHY HYDERABAD/					X			X				
Rajiv Gandhi Intl	09	NPA				X	X					
RS	27	PA1				X	X					
VOTV TRIVANDRUM/					X			X				
Thiruvananthapuram	14	NPA				X	X					
Intl	32	PA1				X	X					
RS												
	Note: Transformation into WGS-84 has been done by mathematical means using MADRAN software developed by NIMA (National Imaginary and Mapping Agency), USA											
INDONESIA			2002	X					X	2001		
WAPP AMBON/					2002			X				
Pattimura	04	NPA				X	X					
RNS	22	PA1				X	X					
WRLL BALIKPAPAN/					2002			X				
Sepinggan	07	NPA				X	X					
RS	25	PA1				X	X					
WRBB BANJARMASIN/					2002			X				
Syamsudin Noor	10	PA1				X	X					
AS	28	NPA				X	X					
WIKB BATAM/					2002			X				
Hang Nadim	04	PA1				X	X					
RS	22	NPA				X	X					
WABB BIAK/					2002			X				
Frans Kaisiepo	11	PA1					X					
RS	29	NPA					X					
WRRR DENPASAR/					2002			X				

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
Ngurah Rai	09	NPA				X	X					
RS	27	PA1				X	X					
WIII JAKARTA/					2002			X				
HalimPerdanakusuma	06	NPA					X					
RNS	24	PA1					X					
WIIH JAKARTA/					2002			X				
Soekarno-Hatta	07L	PA1				X	X					
RS	25L	PA1				X	X					
	07R	PA1				X	X					
	25R	PA1				X	X					
WAJJ JAYAPURA/					2002			X				
Sentani	12	NPA				X	X					
RS	30	PA1				X	X					
WRKK KUPANG/					2002			X				
El Tari	07	NPA					X					
RS	25	PA1					X					
WAAA MAKASSAR/					2002			X				
Hasanuddin	13	PA1				X	X					
RNS	31	NPA				X	X					
WAMM MANADO/					2002			X				
Sam Ratulangi	18	PA1				X	X					
RS	36	NPA				X	X					
WIMM MEDAN/					2002			X				
Polonia	05	PA1				X	X					
RS	23	NPA				X	X					
WAKK MERAUKE/					2002			X				
Mopah	16	NPA				X	X					
RNS	34	NINST				X	X					
WIMG PADANG/					2002			X				
Tabing	16	NINST				X	X					
RS	34	NINST				X	X					
WIPP PALEMBANG/					2002			X				
SM Badaruddin II	11	NPA				X	X					
RNS	29	PA1				X	X					
WIBB PEKANBARU/					2002			X				
SultanSyarifKasim II	18	NPA				X	X					
RNS	34	PA1				X	X					
WIOO PONTIANAK/					2002			X				
Supadio	15	PA1				X	X					
RS	33	NPA				X	X					
WRSJ SURABAYA/					2002			X				
Juanda	10	PA1				X	X					
RS	28	NPA				X	X					
WIKN TANJUNG PINANG/					2002			X				
Kiang	04	NPA				X	X					

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STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
RNS	22	NINST				X	X					
WRLR TARAKAN/					2002			X				
Juwata	06	NPA				X	X					
RS	24	NINST				X	X					
WABP TIMIKA/					2002			X				
Tembaga Pura	12	NPA					X					
RS	30	NPA					X					
WIJJ YOGYAKARTA/					2002			X				
Adi Sucipto	09	NPA					X					
RNS	27						X					
	* The WGS-84 was implemented in almost all International Airport in Indonesia including the NPA with overlay ** The Ground Undulation (Diference between Mean Sea Leval and Elipsoit) will be started in the Year 2002											
JAPAN			2002	X							2002	
RJFF FUKUOKA/					2002			X				
Fukuoka												
RS	16	PA1				X	X					
	34	NPA				X	X					
RJCH HAKODATE/					2002			X				
Hakodate												
RS	12	PA1				X	X					
	30	NPA				X	X					
RJFK KAGOSHIMA/					2002			X				
Kagoshima												
RS	16	NPA				X	X					
	34	PA1				X	X					
RJBB OSAKA/					2002			X				
Kansai Intl												
RS	06	PA2				X	X					
	24	NPA				X	X					
RJFT KUMAMOTO/					2002			X				
Kumamoto												
RS	07	PA3				X	X					
	25	NPA				X	X					
RJFU NAGASAKI/					2002			X				
Nagasaki												
RS	14	NPA				X	X					
	32	PA1				X	X					
	18	NPA				X	X					
	36	NPA				X	X					
RJNN NAGOYA/					2002			X				
Nagoya												
RS	16	NPA				X	X					
	34	PA1				X	X					
ROAH NAHA/					2002			X				
Naha												
RS	18	NPA				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
	36	PA1				X	X					
RJCC SAPPORO					2002			X				
New Chitose												
RS	01L	PA1				X	X					
	19R	NPA				X	X					
	01R	PA1				X	X					
	19L	NPA				X	X					
RJAA TOKYO/					2002			X				
New Tokyo Intl	16	PA3				X	X					
RS	34	NPA				X	X					
RJSN NIIGATA					2002			X				
Niigata												
RS	04	NPA				X	X					
	22	NPA				X	X					
	10	NPA				X	X					
	28	PA1				X	X					
RJOO OSAKE-/					2002			X				
Osaka Intl												
RS	14R	NPA				X	X					
	32L	PA1				X	X					
	14L	NPA				X	X					
	32R	NPA				X	X					
RJSS SENDAI/					2002			X				
Sendai												
RS	09	NPA				X	X					
	27	PA1				X	X					
	12	NPA				X	X					
	30	NPA				X	X					
RJTT TOKYO/					2002			X				
Tokyo Intl												
RS	16L	NPA				X	X					
	34R	PA2				X	X					
	16R	NPA				X	X					
	34L	PA1				X	X					
	04	NPA				X	X					
	22	PA1				X	X					
KIRIBATI												NFFF FIR
LAO PDR												

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
MALAYSIA			X	X							X	
WMKA ALOR SETAR/					X			X				
Sultan Abdul Halim	04	NPA					X					
RS	22	NINST					X					
WMKB BUTTERWORTH/					X			X				
Butterworth	18	NPA					X					
RS	36	NPA					X					
WMKC KOTA BHARU/					X			X				
Sultan Ismail Petra	10	NPA					X					
RS	28	NPA					X					
WMKD KUANTAN/					X			X				
Kuantan	18	NPA					X					
RS	36	PA1					X					
WMKE KERTEH/					X			X				
Kerteh	16	NPA					X					
RS	34	NPA					X					
WMKF KUALA LUMPUR/					X			X				
Simpang	04	NINST					X					
RS	22	NINST					X					
WMKI IPOH/					X			X				
Sultan Azlan Shah	04	PA1					X					
RS	22	NINST					X					
WMKJ JOHOR BAHRU/					X			X				
Sultan Ismail	16	PA1					X					
RS	34	NPA					X					
WMKK KUALA LUMPUR/					X			X				
Sepang Intl	14R	PA1				X	X					
RS	32L	PA1				X	X					
	14L	PA1				X	X					
	32R	PA1				X	X					
WMKL LANGKAWI/					X			X				
Langkawi Intl	03	PA1					X					
RS	21						X					
WMKM MALACCA/					X			X				
Malacca	03	NPA					X					
RS	21	NPA					X					
WMKN KUALA TERENGGANU/					X			X				
Sultan Mahmud Shah	04	NPA					X					
RS	22	NPA					X					
WMKP PENANG/					X			X				
Penang Intl	04	PA1					X					
RS	22	NPA					X					
WMSA KUALA LUMPUR/					X			X				
SultanAbdulAzizShah	15	PA1					X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
RS	33	PA1					X					
WMBT PULAU TIOMAN/								X				
Pulau Tioman	02						X					
RS	20	NINST					X					
WMPA PULAU PANGKOR/								X				
Pulau Pangkor	04						X					
RS	22	NINST					X					
WMAP KLUANG/								X				
Kluang	05	NINST										
RS	23	NINST										
WBGB BINTULU/					X			X				
Bintulu	12	NPA					X					
RS	30	NINST					X					
WBGG KUCHING/					X			X				
Kuching Intl	07	NPA					X					
RS	25	PA1					X					
WBGR MIRI/					X			X				
Miri	02	PA1					X					
RS	20	NPA					X					
WBGS SIBU/					X			X				
Sibu	13	PA1					X					
RS	31	NPA					X					
WBKD LAHAD DATU/					X			X				
Lahad Datu	11	NINST					X					
RS	29	NPA					X					
WBKK KOTA KINABALU/					X			X				
Kota Kinabalu Intl	02	PA1					X					
RS	20	NPA					X					
WBKL LABUAN/					X			X				
Labuan	14	NPA					X					
RS	32	NPA					X					
WBKS SANDAKAN/					X			X				
Sandakan	08	PA1					X					
RS	26	NPA					X					
WBKW TAWAU/					X			X				
Tawau	17	NINST					X					
RS	35	NPA					X					
MALDIVES			X	X						X		
VRMM MALE/					X			X				
Male Intl	18	PA1				X	X		X			
RS	36	NPA					X					
MARSHALL IS.												KZOK FIR

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
MICRONESIA, FS												KZOK FIR
MONGOLIA			X	X						2002	X	
ZMUB ULAN BATOR/					X			X				
Byant-Ukkaa	14	NPA				X	X					
	32	NPA				X	X					
RS												
MYANMAR												
NAURU												
NEPAL				X						X	X	
VNKT KATHMANDU					X			X				
Tribhuvan Intl	02	NPA				X	X					
RS	20	NINST					X					
NEW ZEALAND			X	X						X	X	
NZAA AUCKLAND/					X			X				
Auckland Intl	05	PA1				X	X		X			
RS	23	PA1			X	X	X		X			
NZWN WELLINGTON/					X			X				
Wellington	16	PA1				X	X		X			
RS	34	PA1				X	X		X			
ZCH CHRISTCHURCH/					X			X				
Christchurch	02	PA1				X	X		X			
RS	20	PA1				X	X		X			
NZNS NELSON/					X			X				
Nelson	02	NPA				X	X		X			
RS	20	NPA				X	X		X			
NZDN DUNEDIN/					X			X				
Dunedin	03	PA1				X	X		X			
RS	21	PA1				X	X		X			
NAPM PALMERSTON/					X			X				
Palmerston North	07	NPA				X	X		X			
RNS	25	NPA				X	X		X			
NZHN HAMILTON/					X			X				

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
Hamilton	18	NPA				X	X		X			
RNS	36	NPA				X	X		X			
NZQN QUEENSTOWN/					X			X				
Queenstown	05	NPA				X	X		X			
RNS	23	NPA				X	X		X			
NZWP WHENUAPAI/					X			X				
Whenuapai (Mil)	03	PA1				X	X		X			
RNS	21	PA1				X	X		X			
NZOH OHAKEA					X			X				
Ohakea (Mil)	09	PA1				X	X		X			
AS	27	PA1				X	X		X			
NIUE ISLAND (New Zealand)												NZZO FIR
NIUE ALOF/												
Niue Intl												
RS												
PAKISTAN			X	X						X	X	
OPFA FAISALABAD/					X			X				
Faisalabad	03	PA1				X	X		X			
RS	21	NPA										
OPGD GWADAR/					X			X				
Gwadar	06	NINST				X	X		X			
RS	24	NPA										
OPRN ISLAMABAD/					X			X				
Chaklala	12	NINST				X	X		X			
RS	30	PA1										
OPKC KARACHI/					X			X				
Quaid-e-Azam Intl	07	NINST				X	X		X			
RS	25	PA1										
OPLA LAHORE/					X			X				
Lahore	18	NPA				X	X		X			
RS	36	PA2										
OPMT MULTAN/					X			X				
Multan	18	NPA				X	X		X			
RS	36	PA1										
OPNH NAWABSHAH/					X			X				
Nawabshah	02	NPA				X	X		X			
AS	20	NPA										
OPPS PESHAWAR/					X			X				
Peshawar	17	NPA				X	X		X			
RS	35	NPA										
OPTU TURBAT/					X			X				
Turbat	08	NPA				X	X		X			
RS	26	NPA										
PALAU												KZOK FIR

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
PAPUA NEW GUINEA												
	Note: All Navaids coordinates using WGS-84 datum FLT SUP COM 2-1 to 2-7											
PHILIPPINES			08/2001	08/2001							08/2001	
RPLL MANILA/					08/2001						08/2001	ATO-NIMA survey
Ninoy Aquino Intl	06	PA1					08/2001	08/2001				
RS	24	PA1					08/2001	08/2001				
	13	NINST					08/2001	08/2001				
	31	NINST					08/2001	08/2001				
RPLB SUBIC BAY/					08/2001						08/2001	ATO-NIMA survey
Subic Bay Intl	07R	NPA					08/2001	08/2001				
RS	25L	(S Cat1)					08/2001	08/2001				
	07L	NINST					08/2001	08/2001				
	25R	NINST					08/2001	08/2001				
RPMD DAVAO/					08/2001						08/2001	Old survey (ATO-NIMA
Francisco Bangol Intl	05	NPA					08/2001	08/2001				survey on-going)
AS	23	NPA					08/2001	08/2001				
RPLI LAOAG/					08/2001						08/2001	Old survey (ATO-NIMA
Laoag Intl	05	NPA					08/2001	08/2001				survey on-going)
AS	23	NPA					08/2001	08/2001				
RPVM LAPU-LAPU/					08/2001						08/2001	ATO-NIMA survey
Mactan Cebu Intl	04	PA1					08/2001	08/2001				
RS	22	PA1					08/2001	08/2001				
RPLC PAMPANGA/					08/2001						08/2001	ATO-NIMA survey
Clark Intl	02R	PA1					08/2001	08/2001				
RS	20L	PA1					08/2001	08/2001				
	02L	NINST					08/2001	08/2001				
	20R	NINST					08/2001	08/2001				
RPMZ ZAMBOANGA/					08/2001						08/2001	Old survey (ATO-NIMA
Zamboanga Intl	09	PA1					08/2001	08/2001				survey on-going)
AS	27	PA1					08/2001	08/2001				
REP OF KOREA			X	X						X	X	
RKSI INCHEON/					X			X				
Incheon Intl	15R	PA3				X	X		X			
RS	15L	PA3				X	X		X			
	33R	PA3				X	X		X			
	33L	PA3				X	X		X			
RKSS GIMPO/					X			X				
Gimpo Intl	14R	PA2				X	X		X			
RS	32L	NPA				X	X		X			
	14L	PA1				X	X		X			
	32R	PA1				X	X		X			
RKPK BUSAN/					X			X				

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
Gimhae Intl	18L	NPA				X	X		X			
RS	36R	PA1				X	X		X			
	18R	NPA				X	X		X			
	36L	PA1				X	X		X			
RKPC JEJU/					X			X				
Jeju Intl	6	PA1				X	X		X			
RS	24	PA1				X	X		X			
	31	NINST				X	X		X			
	13	NINST				X	X		X			
RKTU CHEONG/					X			X				
Cheongju	06L	PA1				X	X		X			
RNS/AS	24R	PA1				X	X		X			
	06R	NINST				X	X		X			
	24L	NINST				X	X		X			
RKJJ GWANGJU/					X			X				
Gwangju	4	PA1				X	X		X			
RNS/AS	22	NPA				X	X		X			
RKTN DAEGU/					X			X				
Daegu	31	PA1				X	X		X			
RNS/AS	13	NPA				X	X		X			
RKNN GANGNEUNG/					X			X				
Gangneung	26	NPA				X	X		X			
RNS/AS	8	NINST				X	X		X			
RKTH POHANG/					X			X				
Pohang	10	NPA				X	X		X			
AS	28	NPA				X	X		X			
RKTY YECHEON/					X			X				
Yecheon	28	PA1				X	X		X			
AS	10	NPA				X	X		X			
SAMOA											X	NFFF FIR
NSFA FALEOLO/					X			X				
Faleolo Intl	08	PA1				X	X			X	X	
RS	26	NPA				X	X			X	X	
NSFI FAGALII/												
Fagalii	10											
RG	28	NINST										
NSMA MAOTA/												
Maota	08											
RG	26	NINST										
NSAU ASAU/												
Asau	08											
RG	26	NINST										
SINGAPORE			X	X						X	X	
WSSS SINGAPORE/					X			X				
Changi Intl	02L	PA2				X	X		X			

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
RS	20R	PA1				X	X		X			
	02R	PA1				X	X		X			
	20L	PA2				X	X		X			
WSSL SINGAPORE/					X			X			X	
Seletar	03	NINST					X		X			
RG	21	NINST					X		X			
WSAP SINGAPORE/					X			X			X	
Paya Lebar	02	NPA				X	X					
AS	20	NPA				X	X					
SOLOMON ISLANDS												
SRI LANKA			X	X							X	
COLOMBO/												
Bandaranaike Intl	22	PA1			X	X	X			X	X	AIP Supplement
RNS	04	PA1				X					X	
THAILAND			2001	2001							2002	
VTSE CHUMPHON/					2001			X				
Chumphon												
RG	06	NPA					X		X			
	24	NPA					X		X			
VTPH PRACHUAP KHIRI KHAN/								X				
Hua Hin												
RG	16	NPA					X		X			
	34	NINST					X		X			
VTUK KHON KAEN/								X				
Khon Kaen	03	NPA					X		X			
RNS	21	NPA					X		X			
VTSG KRABI/								X				
RNS	14	NPA					X		X			
	32	NPA					X		X			
VTUQ NAKHON RATCHASIMA/								X				
Nakhon Ratchasima												
RG	06	NPA					X		X			
	24	NPA					X		X			
VTCN NAN/								X				
Nan												
RNS	02	NPA					X		X			
	20	NPA					X		X			
VTSC NARATHIWAT/								X				
Narathiwat												
RG	02	PA1					X		X			
	20	NPA					X		X			

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
VTSK PATTANI/								X				
Pattani												
RG	08	NPA					X		X			
	26						X		X			
VTPP PHITSANULOK/								X				
Phitsanulok	14	NPA					X		X			
RS	32	PA1					X		X			
VTSR RANONG/								X				
Ranong												
RG	02	PA1					X		X			
	20						X		X			
VTSB SURAT THANI/								X				
Surat Thani	04	NPA					X		X			
RNS	22	PA1					X		X			
VTST TRANG/								X				
Trang												
RG	08	NPA					X		X			
	26						X		X			
VTUU UBON RATCHATHANI/								X				
Ubon Ratchathani	05	NPA					X		X			
RS	23	PA1					X		X			
VTUD UDONTHANI/								X				
Udon Thani												
RNS	12	NPA					X		X			
	30	PA1					X		X			
VTSM SURATHANI/					X			X				
Samui												
RS	17	NPA				X	X		X		X	
	35	NPA				X	X					
VTPO SUKHOTHAI/					X			X				
Sukhothai												
RS	18	NPA				X	X		X		X	
	36	NPA				X	X					
VTCC CHIANG MAI/												
Chiang Mai Intl	18	NPA			2001	X	X	X				
RS	36	PA1										
VTSS SONG KHLA/												
Hat Yai Intl	08	NPA			2001	X	X	X				
RS	26	PA1										
VTSP PHUKET/	09	NPA			2001	X	X	X				
Phuket												
RS	27	PA1										
VTCT CHIANG RAI/												
Chiangrai Intl	03	PA1			2001	X	X	X				
RS	21	NPA										

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
VTBU RAYONG/												
Ban U-Taphao	18	PA1			2001	X	X	X				
AS	36	NPA										
VTBD BANGKOK/					2001			X				
Bangkok Intl	03R	NPA				X	X					
RS	03L	PA1				X	X					
	21R	NPA					X		X			
	21L	PA1					X		X			
TONGA			X	X						X	X	NFFF FIR
NFTF FUA'AMOTU/					X			X				
Fua'amotu Intl	11	NPA				X	X		X			
RS	29	NPA				X	X		X			
	17	NINST				X	X		X			
	35	NINST				X	X		X			
TUVALU												NZZO FIR
UNITED STATES			X	X						X	X	
PANC ANCHORAGE/					X			X				
Anchorage Intl	14	NPA										
RS	32	NINST				X	X		X			
	6L	PA1				X	X		X			
	24R	NINST				X	X		X			
	6R	PA3				X	X		X			
	24L	NINST					X		X			
PAED ANCHORAGE/					X			X				
Elmendorf AFB	5	PA1				X	X		X	X	X	
AS	23	NINST										
	15	NINST										
	33	NINST										
PACD COLD BAY/					X			X				
Coldbay	14	NPA				X	X		X			
AS	32	NPA										
	26	NINST										
KPAE EVERETT/					X			X				
Paine Field	34L	NPA				X	X		X			
AS	16R	PA2										
	11	NINST										
	29	NINST										
	34R	NINST										
	16L	NINST										
PAEI FAIRBANKS/					X			X				
Eielson AFB	13	PA1				X	X		X			
AS	31	PA1				X	X		X			
PAFA FAIRBANKS/					X			X				
Fairbanks Intl	19R	PA1				X	X		X			
RS	01L	PA3				X	X		X			

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
	19L	NINST										
	01R	NINST										
KFAT FRESNO/					X			X				
Yosemite Intl	29R	PA3				X	X		X			
AS	11L	NPA										
	29L	NINST										
	11R	NINST										
PHTO HILO/					X			X				
General Lyman Field	03	NINST				X	X		X			
AS	21	NINST										
	26	PA1				X	X		X			
	08	NINST										
PHNA HONOLULU/												
Barbers Point	04R	NPA										No WGS-84
AS	22L	NINST										data available
PHNL HONOLULU/					X			X				
Honolulu Intl	8L	PA1				X	X		X			
INTL	26R	NINST										
RS	04L	NINST										
	22R	NINST										
	04R	PA1										
	22L	NINST										
	26L	PA1				X	X		X			
	8R	NINST										
PHOG KAHULUI/												
Kahului	32	NINST			X			X				
AS	02	PA1				X	X		X			
	20	NPA				X	X		X			
KLAX LOS ANGELES/					X			X				
Los Angeles Intl	06L	PA1				X	X		X			
RS	24R	PA3				X	X		X			
	6R	PA1				X	X		X			
	24L	PA1				X	X		X			
	07L	PA1				X	X		X			
	25R	PA1				X	X		X			
	07R	PA1				X	X		X			
	25L	PA3				X	X		X			
KOAK OAKLAND/					X			X				
Oakland Metropolitan	11	PA1				X	X		X			
AS	29	PA3										
	09R	NPA										
	27L	NPA										
	09L	NPA										
	27R	NPA										
KONT ONTARIO/					X			X				

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
Ontario Intl	26R	PA1				X	X		X			
AS	08L	PA1				X	X		X			
	26L	PA3				X	X		X			
	08R	NPA				X	X		X			
KPMD PALMDALE/					X			X				
Palmdale	22	NPA										
AS	25	PA1				X	X		X			
	07	NPA				X	X		X			
KPDX PORTLAND/					X			X				
Portland Intl	03	NINST				X	X		X			
AS	21	NPA				X	X		X			
	10R	PA3				X	X		X			
	28L	NPA				X	X		X			
	10L	PA2				X	X		X			
	28R	NPA				X	X		X			
KSMF SACRAMENTO/					X			X				
Metropolitan	16R	PA3				X	X		X			
AS	34L	PA1				X	X		X			
	16L	PA1				X	X		X			
	34R	NPA				X	X		X			
	16L	NPA				X	X		X			
KSFO SANFRANCISCO/					X			X	X			
San Francisco Intl	10L	NINST										
RS	28R	PA3				X	X		X			
	10R	NINST					X					
	28L	PA1				X	X		X			
	01L	NINST					X					
	19R	NINST					X					
	01R	NINST					X					
	19L	PA1				X	X					
KSJC SAN JOSE/					X				X			
San Jose Intl	12R	PA1				X	X	X				
RS	30L											
	12L	NPA										
	30R											
	29	NINST										
KBFI SEATTLE/					X			X				
Tacoma Intl	13R	PA1				X	X		X			
RS	31L	PA1				X	X		X			
	13L	NINST				X	X		X			
	31R	NINST										
KGEG SPOKANE/					X			X			X	
Spokane Intl	25	NPA				X	X		X		X	
AS	07	NINST				X	X					
	21	PA2				X	X					

STATUS OF WGS-84 IMPLEMENTATION

STATE, TERRITORY OR AERODROME FOR WHICH WGS-84 IS REQUIRED			WGS-84 IMPLEMENTATION									REMARKS
CITY/AERODROME	RWY No	RWY TYPE	FIR	ENR	TMA/ CTA/ CTZ	APP	RWY	AD/HEL	GUND	QUALITY SYSTEM	AIP	
1	2	3	4	5	6	7	8	9	10	11	12	13
	03	PA3				X	X					
KSCK STOCKTON/												
Metropolitan	11L	PA1			X	X	X	X	X			
AS	29R	NINST										
AMERICAN SAMOA (United States)												NFFF FIR
NSTU PAGO PAGO/												
Pago Pago Intl												
RS												
GUAM ISLAND (United States)												KZOK FIR
PGUM GUAM/												
Agana												
RS												
PGUA GUAM ISLAND/												
Andersen												
AS												
JOHNSTON ISLAND (United States)												KZOK FIR
PJON JOHNSTON ISLAND/												
Johnston Atoll												
RS												
NORTHERN MARIANA ISLANDS (United States)												KZOK FIR
PGSN SAIPAN/												
Saipan Intl												
RS												
VANUATU												NFFF FIR
VIET NAM			X	X							X	
VVNB HANOI/					X							
Noi Bai Intl	11	PA1				X	X		X			
RS	29	NPA				X	X		X			
VVDN DANANG/					X							
Da Nang Intl	17L	NPA				X	X		X			
RS	35R	PA1				X	X		X			
	35L	NPA				X	X		X			
	17R	NPA				X	X		X			
VVTS HO CHI MINH/					X							
Tan Son Nhat Intl	07R	NPA				X	X		X			
RS	07L	NPA				X	X		X			
	25R	PA1				X	X		X			
	25L	NPA				X	X		X			

AGENDA ITEM 2.2: CNS/MET MATTERS

2.2 **CNS/MET Matters**

2.2.1 The meeting reviewed the report of the Fifth Meeting of the CNS/MET Sub-Group of APANPIRG which was held in Bangkok from 16 to 20 July 2001. The content of the report of the Sub-Group was noted with appreciation and the following actions were taken on the Conclusions and Decisions formulated by the Sub-Group.

2.2.2 The meeting noted with satisfaction actions taken on all the Decisions and Conclusions of the APANPIRG /11 in the CNS/MET fields.

AFTN Improvements

2.2.3 The meeting noted the implementation status of AFTN plan. The main highlights of the AFTN improvements during 2000 and early 2001 were as follows:

- Hong Kong/Ho-Chi-Minh circuit was upgraded from dual 75 baud to 300 bauds on 1 April 2000;
- Nadi/Noumea circuit was upgraded from 75 baud to 2400 bps since July 2000;
- Beijing/Seoul 9600 bps circuit with X.25 communication protocol was implemented using VSAT on 20 February 2001;
- Beijng/Khabarovsk 2400 bps circuit was established using VSAT since 13 February 2001;
- Hong Kong/Guangzhou circuit was upgraded from 1200 bps to 2400 bps on 9 May 2001;
- Singapore/Ho Chi Minh AFTN circuit was upgraded from 75 baud to 300 baud on 15 June 2001.

2.2.4 The meeting noted the status of upgrading capacity of AFTN circuits specified in the Table CNS 1A - AFTN Plan of the ASIA/PAC FASID.

AFTN Circuits Performance

2.2.5 On the basis of the review of AFTN circuit loading statistics, the meeting identified the need to closely monitor loading and to upgrade capacity of the following circuits. Accordingly, the meeting endorsed the following conclusion:

Conclusion 12/12 - Need to monitor AFTN circuit performance

That, States concerned closely monitor performance of the following AFTN circuits and coordinate upgrading the circuits capacity, in accordance with the AFTN plan.

1. Manila/Singapore
2. *Nadi/Apia Faleolo
3. Mumbai/Colombo
4. Christchurch/Papeete
5. Mumbai/Nairobi
6. Hong Kong/Manila
7. Kuala Lumpur/Chennai
8. Colombo/Singapore
9. Tokyo/Singapore
10. Colombo/Male

*the Apia Faleolo/Nadi AFTN circuit will be rerouted by Apia Faleolo/USA upon approval of the amendment proposal to ASIA/PAC ANP.

ATN Transition Planning

2.2.6 It was noted that an ATN Seminar was held in conjunction with the Third meeting of the ATN Transition Task Force in March 2001. The Seminar covered a wide range of issues in ATN implementation with a view to develop understanding of various technical, planning and implementation aspects. The Seminar was well received by all participants who had expressed the views that such Seminars should be organized in the future.

ATN Technical and Planning Documents

2.2.7 The meeting noted that the technical and planning documents were developed by the ATN Transition Task Force to provide guidance to States in the implementation of the ground-to-ground element of the ATN. The meeting endorsed following conclusion:

Conclusion 12/13– Regional ATN Planning Documents

That, the ASIA/PAC ATN ATS Message Handling System Plan, ATN Addressing Plan, ATN Network Service Access Point (NSAP) Address Registration Form and ATN Routing Architecture Plan be adopted and circulated to States in the ASIA/PAC and adjacent regions.

ATN Transition Plan

2.2.8 The meeting noted that the ATN Transition Plan was developed which outlines the requirements for those trunk circuits that will support main data flow of traffic in the ASIA/PAC region. The plan also provides target dates for implementation of Boundary Intermediate System (BIS) and Backbone Boundary Intermediate Systems (BBIS) which will need to occur to ensure a smooth transition to ATN in the ASIA/PAC region.

2.2.9 In view of the above, the meeting adopted the following conclusion and agreed to include the Table CNS-1B ATN Router Plan in Part IV of the CNS FASID.

Conclusion 12/14 – ATN Transition Plan

That, the ASIA/PAC ATN Transition Plan provided in Appendix A to the report on Agenda Item 2.2 be adopted and the ASIA/PAC ATN Router Plan contained in Table CNS-1B be included in PART IV-CNS of ASIA/PAC FASID.

2.2.10 It was expected that the Tables CNS-1C- AMHS Routing Plan and Table CNS-1D-AIDC Routing Plan would be completed for inclusion in the CNS Part of the FASID in 2002.

2.2.11 The meeting noted that the Interface Control Documents (ICD) for AMHS would also be finalized for review in 2002. The meeting noted that AMHS trials were conducted and further trials were planned in United States, Japan, Hong Kong China, and Republic of Korea with an objective of implementation commencing 2002.

2.2.12 The meeting reviewed the Tasks List of the ATN Transition Task Force and adopted the following decision.

Decision 12/15– Amendment of the Subject/Tasks List of the ATN Transition Task Force

That, the updated Subject/Tasks List of the ATN Transition Task Force provided in Appendix B to the report on Agenda Item 2.2 be adopted.

GPS Modernization

2.2.13 The meeting noted information on the GPS modernization. One of the main GPS modernization efforts is the addition of two new civil navigation signals in addition to the existing civilian service broadcast at 1575.42 MHz (L1). The first of these new signals will be a Coarse/Acquisition (C/A) code located at 1227.60 MHz (L2) that will be added to the remaining 12 Block IIR satellites and available for general use in non safety-critical applications. This capability will also be added to all future Block IIF satellites. Current timelines have the first scheduled launch of a Block IIR satellite with L2 occurring in 2003.

2.2.14 Block IIF satellites will also broadcast an additional civil signal located at 1176.45 MHz called L5 to support civil safety of life operations. The first scheduled launch of the enhanced Block IIF satellites with L5 onboard is currently scheduled for 2005. This new L5 signal falls in a band that is protected worldwide for aeronautical radionavigation, and therefore this band will be protected for safety-of-life aviation applications. L5 will provide significant benefits above and beyond the capabilities of the current GPS constellation, even after the planned second civil frequency (L2) becomes available. Benefits include more precise navigation worldwide, increased availability of precision navigation operations in certain areas of the world, and interference mitigation.

Wide Area Augmentation System (WAAS)

2.2.15 It was noted that in August 2000, the FAA announced that the WAAS Signal in Space was available for aviation users to increase situational awareness during VFR flight, as well as for non-aviation users for recreational, maritime, agricultural, surveying, and other applications requiring precise positioning and time. WAAS has been broadcasting continuously 24-7 since then, and current schedules have the initial operating capability (Lateral Navigation/Vertical Navigation – LNAV/VNAV) for WAAS in December 2003.

Local Area Augmentation System (LAAS)

2.2.16 It was noted that the current LAAS development schedules show the availability of an initial Category I public use LAAS system by 2003 and a Category III public use LAAS system by late 2006. If these operational development activities prove successful, it is the intent of the FAA to purchase up to 160 LAAS installations (Category I and III) for operational use in the U.S. National Airspace System (NAS). Full LAAS deployment is scheduled to be complete by 2010.

Galileo and EGNOS

2.2.17 The meeting noted that the goal of Galileo is to provide worldwide navigation services in terms of positioning, velocity and time. Galileo will provide different service levels according to users' needs, up to a guaranteed and certified service for safety critical applications. It also provides full interoperability and optimum co-operation with present and future GNSS systems. The Final Operational Capability (FOC) of Galileo will be available by 2008. It was stated by the member from France that Galileo will provide ICAO Category I landing capability world-wide without augmentations. The meeting was also informed that the EGNOS programme is about to enter the deployment and verification phases. EGNOS system prototype is operational and CAT 1 accuracy is reached. EGNOS will provide service for Europe by the end of 2003 and extension outside Europe (Test-bed and Services) are being explored.

MTSAT Satellite-based Augmentation System (MSAS) Status

2.2.18 It was noted that the new MTSAT-1 will be launched in early 2003. MTSAT-2 will be launched in the middle of 2004. Following the total system integration test of MTSAT and certification work of MSAS, which will commence its first phase of operation by a single MTSAT in

Japanese fiscal year 2004. The second phase of operation by two MTSAT is scheduled for commissioning in Japanese fiscal year 2006.

2.2.19 The MSAS has been designed to meet the ICAO GNSS SARPS and is interoperable with the U.S. WAAS and European EGNOS. MTSAT is not a specific system for a specific State. JCAB offer the MTSAT system to the Asia/Pacific States as an aviation infrastructure, the MTSAT would be made available to the Asia/Pacific States on a non-profit basis in support of implementation of CNS/ATM systems.

GNS Measurement Campaign

2.2.20 The meeting noted progress with the implementation of the Regional GPS measurement campaign being undertaken in accordance with Conclusion 11/20 of APANPIRG. It is expected that the measurement to determine the normal and peak excursion of GPS performance will be carried out two or three times during the period September and October 2001.

China Air-Route Satellite Navigation Initial Monitoring System (CARSNIMS)

2.2.21 The meeting noted that monitoring of the GPS integrity, reliability, accuracy and continuity was carried out by China. It was noted that China has planned to develop and deploy the CARSNIMS network system during the period 2003 to 2005.

2.2.22 The data collected will be analysed and used to determine the selection of a system to provide integrity information to ACCs and aircraft. The first consideration will be to support high altitude international routes and secondly non-precision approach at medium and small airports in China.

Status of GNSS Implementation in Australia

2.2.23 It was noted that Australia is continuing deployment of non-precision approaches. It was also noted that Australia under the AusAid Program - Balus, is supporting the introduction of GNSS based operations in Papua New Guinea. Some 16 GPS non-precision approaches have been designed and the draft orders, regulations and procedures have been produced. Basic training and endorsement of CAA pilot staff has also been done. PNG has also commissioned a GNSS use study by the U.S. Department of Transportation, Volpe Centre, the results are expected by the end of July 2001.

Ground-based Regional Augmentation System

2.2.24 It was also noted that the Draft SARPs for the Ground-based Regional Augmentation System.(GRAS) have been circulated to the GNSSP for consideration prior to the combined meeting of Working Groups A and B in Rio De Janeiro during October 2001. The development has moved to the engineering design phase until June 2002. A Business Case will be developed and a decision on the implementation of an operational GRAS is expected in mid 2003. It was also informed that the European Commission released a request for tender to evaluate the interoperability of GRAS and the new Galileo satellite navigation system.

Research and Development

2.2.25 The meeting noted that the Australian GNSS Co-ordination Committee (AGCC) has called for tenders to research GNSS in agriculture and to research radio frequency interference. The Civil Aviation Safety Authority is also conducting research into the use of the TSO C146 receivers outside the service area of an SBAS. These receivers do not require the reception of a wide area signal but do have Fault Detection and Exclusion (FDE) as well as take advantage of SA being turned off.

Strategies for Precision Approach and GNSS Implementation

2.2.26 The meeting reviewed the Strategies for the Provision of Precision Approach and Landing Guidance Systems and Implementation of GNSS Navigation Capability and updated.

2.2.27 The meeting reviewed both strategies based in the light of current information presented to the meeting. During the review clarification was sought on paragraph b) of the Strategy for Precision Approach and Landing Guidance System whether currently available SBAS can support PA Category I approach. It was clarified that, although SBAS architecture provides for PA CAT I, the currently available service (WAAS) is yet to support PA Category I. Consequently, in the ASIA/PAC region GBAS would be required to support PA CAT I operations. In order to clarify this issue, para b) of the strategy was amended as shown in the Appendix C. It was noted that States, in particular, smaller States, considered the strategies as a useful guidance for planning and implementation of the GNSS based non-precision approaches and precision approaches in the region. With the above amendments the meeting adopted the following conclusions:

Conclusion 12/16 - Strategy for the Provision of Precision Approach and Landing Guidance System

That, the Strategy for the Provision of the Precision Approach and Landing Guidance System provided in Appendix C to the report on Agenda Item 2.2 be adopted.

Conclusion 12/17 - Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC Region

That, the Strategy for the Implementation of GNSS in the ASIA/PAC Region provided in Appendix D to the report on Agenda Item 2.2 be adopted.

Regional GNSS Implementation Workshop

2.2.28 It was noted that the Regional GNSS Implementation Workshop was held in Bangkok 8 to 11 May 2001. The Workshop was held in accordance with APANPIRG Conclusion 11/23. The Workshop had developed a Checklist with a view to assist States in the implementation of GNSS. The meeting reviewed the Checklist for the introduction of the GNSS based operations as provided in the Appendix E. The Checklist was considered as a tool to facilitate implementation of GNSS based operations and agreed to circulate it to State to serve as a guidance material. In view of the foregoing, the meeting adopted the following conclusion:

Conclusion 12/18 – Checklist for GNSS Implementation

That, the Checklist for introduction of GNSS based operations contained in Appendix E to the report on Agenda Item 2.2 be circulated to States in the ASIA/PAC region to serve as a guidance material.

Automatic Dependent Surveillance (ADS) developments

2.2.29 It was noted that the provision of surveillance information utilizing automatic dependent surveillance is now common in the region through the use of ADS-C functionality of FANS 1/A equipped aircraft. Developments taken place in the broadcast version of ADS (ADS-B) was noted with interest.

ADS-B in Australia

2.2.30 Airservices Australia has initiated a project to conduct an operational trial of ADS-B in a region near Bundaburg Queensland. The project will install a single ADS-B ground station, equip a number of aircraft with ADS-B avionics, and modify an operational air traffic management system to process and display ADS-B tracks.

The objectives of the trial were:

- To provide and demonstrate operational benefits to airline and airspace users in the selected area
- To provide first hand operational experience of ADS-B in the Australian environment including the development of procedures and training.
- To provide cost-benefit information and practical information before widescale deployment of ADS-B for radar like surveillance within Australia is considered.

2.2.31 Australia considered that ADS-B technology opens the possibility of cost effective ATC surveillance in areas of Australia where radars cannot be justified. Potentially surveillance could be provided over the whole continent as it is today for VHF voice communication. Safety and commercial benefits will result when compared with today's procedural control.

2.2.32 The pilot system will be fully integrated into The Australian Advanced Air Traffic System (TAAATS). ADS-B tracks will be presented to controllers on the same screen as radar and flight plan tracks. Airservices has the objective of using ADS-B tracks to separate aircraft.

2.2.33 The system will include coupling of ADS-B tracks with flight plans, short-term conflict alert, minimum safe altitude warning and danger area infringement warning.

ADS-C/ADS-B in Mongolia

2.2.34 Mongolia made a visual presentation of their CNS and MET systems supported by VSAT. The ADS is seen as having great potential for Mongolia as it has no civil radars but a modern ATC system and supporting infrastructure. The current ATM automation system (AutoTrac 2100) is capable of integrating ADS information. It was informed that Mongolia is organizing demonstration of ADS-C and ADS-B from 25 to 26 September 2001. The demonstration will consist of a system utilizing VDL Mode 4 datalink.

2.2.35 The meeting considered the information in the papers presented by Australia and Mongolia. The meeting considered possible use of ADS-B in place of conventional primary and secondary radar infrastructure as a cost effective means. It was recognized that there would be obvious cost advantages if the surveillance requirements can be satisfied by ADS information.

U.S./FAA Safe Flight 21 Program Status

2.2.36 It was noted that the U.S. Safe Flight 21 is a cooperative government/industry effort to evaluate enhanced capabilities for free flight based on evolving Communications, Navigation and Surveillance (CNS) technologies. Safe Flight 21 is currently demonstrating the in-cockpit display of traffic, weather and terrain information for pilots, and providing improved information for controllers. The new technologies on which this program is based include: the Global Positioning System (GPS), Automatic Dependent Surveillance – Broadcast (ADS-B), Flight Information Services – Broadcast (FIS-B), Traffic Information Services – Broadcast (TIS-B), and their integration with enhanced pilot and controller information displays. Safe Flight 21 will evaluate the safety, service and procedure improvements that these technologies could make possible.

2.2.37 Successful Safe Flight 21 demonstrations, coupled with supporting analyses in the areas of business case, safety and risk will be used to determine if these applications should be made operational.

Preparation for World Radiocommunication Conference 2003 (WRC-2003)

2.2.38 The meeting noted the ICAO Position on the WRC 2003 Agenda Items of interest to civil aviation. The International Telecommunication Union (ITU) is expected to convene a World Radiocommunication Conference (WRC-2003) from 9 June to 4 July 2003 in Geneva, Switzerland.

2.2.39 The meeting noted that the agenda for the WRC-2003 included a number of items of a technical nature with implications for aviation such as: review of the footnotes to the Table of Frequency Allocations**,** Harmful interference in the aeronautical HF bands, Protection of DME and radar systems operating in the 960 - 1 300 MHz**,** Protection of radar systems operation in the band 2 700 - 2900 MHz and the use of the band 5 091 - 5 150 MHz by the Aeronautical Radionavigation Service (ARNS).

2.2.40 It is likely that it will be possible to maintain the priority that the Radio Regulations currently give to the use of the band 5 091 – 5 150 MHz by MLS, only on the condition that aviation spectrum requirements for the band are identified in the ICAO review. If the priority is not maintained, this could, in practice, be equivalent to an irreversible loss of the band for aeronautical use, as it would enable other users to establish themselves in the band and thereby develop "first-come, first serve" rights to the detriment of future aviation use. It was noted that in order to enable ICAO to complete the study and submit result to ITU, a State Letter was issued by the Regional Office in this regard requesting States in the ASIA/PAC region to advise prospective spectrum requirements for ARNS including MLS and other potential aeronautical application and systems which can be accommodated in the band 5 091–5 150 MHz.

Regional Preparatory Group Meeting for WRC-2003 and Aeronautical Mobile Communication Panel (AMCP) Working Group F Meeting

2.2.41 In order to facilitate better understanding of the ICAO Position for WRC 2003 and to provide opportunity to States in the ASIA/PAC region to be thoroughly familiar all aspects of Aeronautical Frequency Protection and Management it is planned to hold a Regional Preparatory Group Meeting for WRC-2003 in Bangkok from 15 to 16 November 2001 followed by the AMCP WG-F Meeting from 19-27 November 2001 in Bangkok.

Action item 37/12 of DGCA Meeting

2.2.42 It was also noted that the 37th Conference of the Directors General of Civil Aviation, Asia and Pacific Regions in its Action Item 37/12 had strongly urged States to support ICAO Position for WRC 2003.

Designation of contact person

2.2.43 The meeting was advised that in accordance with Conclusion 11/24 of APANPIRG States were requested to notify the Regional Office detail of designated focal point or contact person in each Administration responsible for preparation for WRC-2003 in order to make a concerted effort at the APT Conference Preparatory Group (APG) meetings as well as at WRC 2003 to support ICAO Position. The meeting noted that only 14 States had provided the names of the designated contact person. The meeting agreed that the need to designate a contact person and to arrange their attendance at the Regional Preparatory Group meeting for WRC2003 to he held in Bangkok from 15 to 16 November 2001 should be brought to the attention of the 38th ASIA/PAC DGCA Conference to seek support for ICAO Position and for attendance by the contact person at the meetings. It was also agreed that the Regional Office would present a paper at the DGCA Conference in this regard.

2.2.44 The meeting noted that the ICAO position was presented at the APT Conference Preparatory Group (APG 2003-1 and APG 2003-2) Meetings held in September 2000 and June 2001. The Sub-Group stressed the need for aviation representatives to attend future APG meetings to safeguard aviation interests.

2.2.45 The meeting also recognized the need for designated or contact persons to attend the Regional Preparatory Group Meeting WRC-2003 and AMCP WG-F meeting in November 2001 in order to be able to effectively participate in the discussions at the national level while developing national position for APT and WRC-2003 meetings.

Preliminary Australian view

2.2.46 Australia's preliminary views on various agenda items of WRC - 2003 were noted. It was cautioned that the agenda items 1.4, 1.5 and 1.6 of WRC-2003 in the 5 GHz band need special attention and should be carefully considered in order to protect the ARNS band for aviation use. Participation of the aviation representatives at the national and regional levels to protect aviation interest was also emphasized.

Airlines concern

2.2.47 IATA emphasized the need for a concerted effort by States in protecting aviation interest. It was also emphasized that States should not concede to the telecommunication regulators the use of 5 GHz band even if there is no requirement for MLS. Since the band 5 091 –5 150 MHz is allocated to ARNS it could be made available for other emerging ARNS applications such prevention of runway incursion and for other potential usages.

2.2.48 In view of the above the meeting formulated the following conclusion:

Conclusion 12/19 – Protection of Aeronautical Frequency Spectrum

That States:

a) assign high priority to the aeronautical spectrum management;
b) participate in the development of States' position for WRCs at the national level to ensure support to ICAO position;

c) ensure, to the extent possible that, aviation representatives are included in States delegation to the Asia-Pacific Telecommunity (APT) Conference Preparatory Group meetings and at WRCs; and

d) ensure participation of designated focal point or contact person at the Regional Preparatory Group Meeting for WRC-2003 to be held from 15 to 16 November 2001 followed by the AMCP WG-F Meeting to be held from 19-27 November 2001 in Bangkok and attendance at APTAPG Meetings and WRC 2003.

Ultra-Wideband Technology

2.2.49 The meeting noted that Ultra-wide band (UWB) is an evolving technology that is low-powered and uses very narrow pulses or impulses that generate a very wide bandwidth, greater than 25% of the center frequency. Applications of UWB systems include imaging (e.g., through-the-wall and ground penetrating) and communications devices (e.g., a local area network) with applications for consumers, businesses, and government. The impact of UWB systems on aeronautical systems is not well understood at this time. The Global Navigation Satellite System (GNSS) is one of the systems at risk.

2.2.50 ICAO has submitted an ITU-R study draft question regarding UWB technology to Study Group 1. The draft question calls for the ITU to study the characteristics of UWB technology and assess the impact it may have on civil aviation.

2.2.51 States should be aware of this new technology and take appropriate action within their countries to ensure that aviation safety is not jeopardized if UWB is implemented.

2.2.52 The meeting also noted the need for States to carefully evaluate the potential for UWB systems to detrimentally effect GNSS.

VHF Interference

2.2.53 The United States informed the meeting that the critical air traffic control communications operated around 134.000 MHz has experienced several cases of interference caused by unauthorized use of “high power cordless telephones”. It was suggested to be brought to attention of AMCP Working Group F for discussions on the methods of mitigating them. States were encouraged to inform ICAO of such radio frequency interference. The national radio regulatory authorities should also be informed of this new source of radio frequency interference and its potential impact on the aviation safety.

Consideration of training needs for engineering/technical staff

2.2.54 The safety and integrity of airways systems depend on competency of engineers and technical staff that implement and maintain the systems.

2.2.55 Documentation on the training and competency requirements of engineers and technical staff engaged in the implementation and maintenance of systems supporting CNS and ATM is not available. Some provisions are contained in Doc 8071 the “Manual on the Testing of Radio Navigation Aids”.

2.2.56 It was noted that the Asia Pacific Economic Cooperation (APEC) has established an engineer register to facilitate the mutual recognition of engineering competency between member economies. The initial economies participating in the program were Australia, Canada, Hong Kong China, Japan, Korea, Malaysia and New Zealand. Each Economy has developed competency standards comparable to the APEC model.

2.2.57 It was informed that Airservices Australia has implemented standards and practices for the assessment and recording of competencies of personnel authorised to remove, restore to services, to work on live equipment and to certify the technical performance of its systems.

2.2.58 It was noted that standardised training packages are offered through the ICAO TRAINAIR Programme. The scheme offers standard training packages for engineering staff involved in the implementation of CNS/ATM systems. The programme is seen as the method of achieving initial competency.

2.2.59 International recognition of competency and experience was seen to be of value with international integration and connectivity of systems increasing. An example quoted was the certification and maintenance of a reference station, which forms part of a regional GNSS augmentation system. Interest was also expressed in the practices for periodic reviews of competency to ensure that staff remained at the appropriate level of skill and received refresher training as appropriate. The training and competency of non-licensed personnel other than engineering and technical staff was also considered. An example discussed was the position of Procedure Designer (PANS-OPS). The meeting considered that enhanced guidance material would be of benefit to States

to enable the implementation of State based programmes which could be benchmarked against similar programmes in other contracting States of ICAO.

Trial Weather Data Exchange Under The New CNS/ATM Systems

2.2.60 The meeting noted the information presented by Hong Kong, China on the results of quality of weather data received from automatic aircraft data down-linked in ADS/CPDLC trials conducted in 2000. The trials with B747 aircraft were conducted by the Hong Kong Civil Aviation Department (CAD) during a one-month period from 7 September to 6 October 2000. During this period, participating aircraft were requested to transmit routine air-reports of available meteorological parameters using ADS and CPDLC to the CAD following ICAO Standards and Recommended Practices. ADS and CPDLC messages with weather reports were passed by CAD to the Hong Kong Observatory (HKO) for evaluation of quality of these weather reports.

2.2.61 Overall, the evaluation results show that a majority of the ADS/CPDLC temperature and wind reports were of good quality and meteorologically consistent with the conditions of the atmosphere prevailing at the time of observation. Introduction of ADS/CPDLC weather reports into day-to-day operations would provide additional weather information to supplement data sparse areas such as the South China Sea. This in turn is expected to improve the accuracy of the numerical weather prediction model analysis and hence the weather forecasts of the HKO and other weather centres in the world.

Progress in implementation of the ISCS and SADIS

2.2.62 Under this item the meeting examined the current status of implementation of the International Satellite Communication System (ISCS/2) provided by the United States of America and the Satellite Distribution System for information relating to air navigation (SADIS) provided by the United Kingdom as integral part of the ICAO aeronautical fixed service (AFS). The information concerning implementation of the ISCS/2 and SADIS as provided by States, WAFCs, available with the Secretariat and updated during the CNS/MET SG/5 meeting was summarized as presented in Appendix F to the Report on Agenda Item 2.2. The meeting noted that the use of the ISCS/2 and SADIS broadcasts in the ASIA/PAC Regions had continued to grow and further expansion is expected. It was agreed that FASID Table MET 7 of the ASIA/PAC ANP be amended accordingly.

2.2.63 The meeting noted the comprehensive information regarding plans of the United States to enhance and improve the telecommunication service of the ISCS. The current system will be upgraded and the upgrade will require some interface equipment replacement at Contracting State sites to be provided by the United States at no cost to the users. It was also noted that the United States had entered into agreement with GST, Incorporated to maintain and repair existing workstations on a cost reimbursable basis. In the future, it is intended that each workstation owner should be responsible for replacing their workstation. The meeting noted that actions to be taken by the States concerned and assistance offered by the United States had been discussed in details by the CNS/MET SG/5.

SWH chart for new WAFS area “M” added to ISCS broadcast

2.2.64 The meeting noted that, as a follow up of the APANPIRG Conclusion 11/27, the United States had agreed to provide the additional SWH chart by the WAFC Washington with the same coverage, scale and map projection as the chart that was produced by RAFC Tokyo, and WAFC London had agreed to provide back up should it be necessary. The meeting was advised that WAFC Washington began production of the chart and distribution over ISCS on 9 July 2001. The new area of coverage would be labelled “M”.

2.2.65 It was agreed that requirements for the new WAFS area of coverage "M" be reflected in the ASIA/PAC ANP. In order to give effect to the foregoing proposal, the meeting formulated the following conclusion.

Conclusion 12/20 – Requirement for a new WAFS area of coverage "M"

That,

a) The ASIA/PAC ANP be amended to include under the WAFS a new area of coverage "M" (FASID Chart MET 7) as shown in Appendix G to the Report on Agenda Item 2.2; and

b) FASID Tables MET 5 and MET 6, as developed by APANPIRG/11, be amended to include requirement for SWH prepared by the WAFC Washington for the new WAFC area of coverage "M" as given in Appendices H and I to the Report on Agenda Item 2.2.

Note: FASID Chart M should be a mercator projection, with coordinates 100°E and 70°N; 110°W and 70°N; 110°W and 10°S; 100°E and 10°S.

SADIS strategic assessment tables

2.2.66 The meeting reviewed the SADIS strategic assessment tables, as drafted by the CNS/MET SG/5, and agreed with entries regarding the current and projected data volumes for 2001-2005. The following conclusion was formulated by the meeting.

Conclusion 12/21 – SADIS strategic assessment tables

That, the ASIA/PAC SADIS strategic assessment tables, as given in Appendix J to the Report on Agenda Item 2.2, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.

Transition to the final phase of WAFS

2.2.67 The meeting noted that the ASIA/PAC WAFS Transition Plan and Procedures is being successfully implemented. As a follow up of APANPIRG Conclusions 11/29, 11/30 and 11/31, the transfer of responsibilities for production of SWH charts from the ASIA/PAC RAFCs to WAFCs London and Washington had been implemented, and RAFCs New Delhi, Melbourne, Tokyo and Wellington had ceased operations.

2.2.68 The meeting noted the results of a survey undertaken by the WAFS Transition Task Force during period September to November 2000 to assess a capability of the ASIA/PAC States and Territories to obtain and process GRIB forecasts, as produced by the WAFCs London and Washington, into Wind/Temp charts on an operational basis. It was concluded that assistance is required to be provided and training to be arranged to ensure that States have the ability to convert GRIB messages into graphical products, especially on an operational basis.

2.2.69 The meeting agreed that the SADIS Provider State be invited to arrange training in the ASIA/PAC Regions in co-ordination with ICAO and WMO and with assistance of other States as necessary. In this context, the meeting formulated the following conclusion.

Conclusion 12/22 – GRIB Training Workshop

That, the SADIS Provider State be invited to arrange for a GRIB training workshop, in co-ordination with ICAO, WMO and other States as necessary, in the ASIA/PAC Regions in 2002.

2.2.70 The meeting also noted the results of the survey undertaken by the WAFS Transition Task Force on the assessment of the operational effectiveness of WAFS. It was noted that responses indicated general agreement that WAFS is providing substantial benefits in the aviation industry. However, a number of improvement opportunities were also identified by the CNS/MET SG/5.

2.2.71 As a follow up of the survey, the meeting considered a proposal developed by the CNS/MET SG for extension of the WAFS Area of Coverage "E" 5 degrees to the north to cover the northern part of Japan. Taking into consideration ability of the WAFC London to produce SIGWX chart covering the northern part of Japan, agreement by the WAFC Washington to provide back up service and support by observer from IATA at the SG meeting, the requirement for extension of the WAFS Area of Coverage "E" to the north up to 45°N was formulated in the following conclusion.

Conclusion 12/23 – WAFS Area of Coverage "E"

That, ICAO be invited to consider extending the WAFS area of coverage "E" to the north up to 45°N to cover northern part of Japan.

2.2.72 A number of important issues, such as issuance/transmission time of SIGWX, production alerts, global content of the WAFS products and back-up procedures, as considered by the CNS/MET SG, was noted by the meeting.

ASIA/PAC WAFS Transition Plan and Procedures

2.2.73 The meeting reviewed the ASIA/PAC Transition Plan and Procedures as drafted by the CNS/MET SG/5. It was noted that the Plan had been amended taking into consideration the transfer of responsibilities from RAFCs to WAFCs London and Washington and closure of the RAFCs in the ASIA/PAC Regions. Some changes were also made regarding the timetable for achieving the final phase of WAFS, including editorial changes to the document. The meeting adopted the Plan and formulated the following conclusion.

Conclusion 12/24 – Amended ASIA/PAC WAFS Transition Plan and Procedures

That, the ASIA/PAC WAFS Transition Plan and Procedures be amended as shown in Appendix K to the Report on Agenda Item 2.2 to reflect considerable progress in transition to the final phase of WAFS in the regions.

Future Work Programme for the WAFS Transition Task Force

2.2.74 The meeting noted appreciation expressed by the CNS/MET SG/5 to the WAFS Transition Task Force for the work done and the requirements for the Task Force to continue its work until the final phase of the WAFS is implemented in the ASIA/PAC Regions. The future work programme for the Task Force, as presented in Appendix L to the Report on Agenda Item 2.2, was noted by the meeting.

The SADIS Cost Recovery Administrative Group

2.2.75 The meeting noted the information provided by the Secretariat regarding establishment of the SADIS Cost Recovery Administrative Group (SCRAG), its terms of reference, composition and working arrangements of the group. It was also noted that, following consultation with the Chairman of APANPIRG, China had been nominated to represent the Region as a member of the SCRAG, and Thailand had been nominated as an alternate member of the group. The meeting noted some results of the SCRAG/1 held in June 2001.

Exchange of OPMET information

2.2.76 Under this item, the meeting first took note of implementation of the ROBEX Scheme. It was advised that a number of amendments to the ROBEX Scheme arising from changes in operational requirements for OPMET data exchanges had been coordinated with the States concerned and implemented.

2.2.77 The meeting noted that, as a follow up of Amendment 72 to Annex 3 adopted by the Council, the inclusion of the code name METAR/SPECI and TAF become compulsory with every message effective 1 November 2001. It was also noted that the decision regarding inclusion of the code names was due to the implementation of data link where METARs and TAFs are extracted individually from data banks and where it is essential that every message be identified with its code name. Moreover, the code name has to be part of every report and forecast including those which are in bulletins. The meeting agreed that States should be encouraged to implement the new procedures.

2.2.78 It was noted that the ROBEX OPMET data banks, namely Bangkok, Brisbane, Nadi, Singapore and Tokyo Data Banks have been implemented. The facilities of the data banks are operational and accessed by a large number of users. The meeting agreed that any changes required to be made to the Interface Control Document (ICD) – OPMET Data Bank Access Procedure, Second Edition – 1998, should be provided to the Secretariat in due course.

2.2.79 The meeting emphasized a need for actions to be taken by States to facilitate distribution of the ASIA/PAC OPMET information to the WAFCs London and Washington for uplink to the satellite broadcasts as recommended by APANPIRG/10. It was also agreed that efforts should be made by States to ensure that all available OPMET information, as listed in Annex 1 to the SADIS User Guide, be forwarded to the London Centre for uplink to the satellite broadcast.

Follow up of the SADISOPSG/6 Meeting

2.2.80 It was advised that the sixth meeting of the SADISOPSG was held in Paris, from 28 May to 1 June 2001. The executive summary of the SADISOPSG/6 report was reviewed and it was noted that some issues discussed by the SADISOPSG/6 are required to be considered by the meeting.

2.2.81 In particular, it was noted that the SADISOPSG/6 had adopted EUR OPMET update procedures. Since these procedures had proved to be efficient, the meeting agreed with a proposal by the CNS/MET SG/5 that similar procedures be developed and introduced in the ASIA/PAC Regions. In this context, the following conclusion was formulated by the meeting.

Conclusion 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.

2.2.82 Another item considered by the meeting, as a follow up of the SADISOPSG/6, was issue relating to inclusion of tropical cyclone advisories, with the data designator “FK”, in SADIS. It was emphasized that the issuance of tropical advisories is a safety issue and of utmost importance to international aviation. In this context, the meeting agreed that the ASIA/PAC tropical cyclone advisory centres (TCACs) should issue the advisories using the “FK” as a data designator on a regular

basis to ensure the routing of these bulletins to aviation users and to London Centre for uplink to the SADIS broadcast. The following conclusion was formulated by the meeting.

Conclusion 12/26 – Tropical cyclone advisories with the data designator "FK"

That, the TCACs Honolulu, Miami, New Delhi, Darwin, Nadi and Tokyo, designated to provide the service in the ASIA/PAC Regions, issue the advisories using the data designator "FK" and ensure the routing of these bulletins to aviation users and London Centre for uplink to the SADIS broadcast.

Note: Requirement for Honolulu TCAC in the ASIA/PAC Regions is covered by Conclusion 12/33 formulated by the meeting.

2.2.83 Having adopted the above conclusion, the meeting noted that at the CNS/MET SG/5 the expert from the United States had fully supported the new arrangements, however, commented that it is against telecommunications policy of the US National Weather Service to use the data designator "FK" and the United States will continue issuance of the advisory with the designator "WT" for some time.

2.2.84 In view of the introduction of the SADIS mandatory cost recovery scheme in 2001, the meeting supported opinion of the SADISOPSG/6 that it would not be appropriate for States not participating in the cost recovery and hence not receiving the SADIS broadcast to be members of the SADISOPSG. In this regard, the meeting agreed that the composition of the SADISOPSG should be reviewed and formulated the following conclusion.

Conclusion 12/27 – Composition of the SADISOPSG

That, the composition of the SADISOPSG be reviewed to replace the members representing States not participating in the cost recovery and hence not receiving the SADIS broadcast.

Proposal for amendment of the Regional Supplementary Procedures, ICAO Doc. 7030/4

2.2.85 The meeting reviewed the proposal for amendment of the Regional Supplementary Procedures, ICAO Doc 7030/4, MID/ASIA and PAC, Part 3 – Meteorology – Aircraft Observations and Reports, as drafted by the CNS/MET SG/5. The meeting was advised that the proposal is in line with plans to implement in the MID/ASIA and PAC Regions the provisions of Annex 3 concerning automated air reporting of meteorological information as required by the introduction of VHF and satellite air-ground data link communications. The meeting agreed with the proposal and formulated the following conclusion.

Conclusion 12/28 – Proposal for amendment of ICAO SUPPS, Doc 7030/4

That, Regional Supplementary Procedures, ICAO Doc 7030/4, MID/ASIA and PAC, Part 3 – Meteorology – Aircraft Observations and Reports, be amended as shown in Appendix M to the Report on Agenda Item 2.2.

Sub-regional issues

2.2.86 The meeting noted that the CNS/MET SG/5 had considered some sub-regional issues relating to OPMET data exchange, and in particular, MET support to the revised contingency arrangements in the South China Sea.

2.2.87 The meeting also noted the information regarding designation of Gia Lam MWO (VVVVYMYX) be responsible for providing the service over Hanoi FIR and Ho Chi Minh FIR effective 1 July 2001. It was agreed that FASID Table MET 1B of the ASIA/PAC ANP be amended to delete requirements for Hanoi and Ho Chi Minh MWOs and to include requirement for Gia Lam MWO against Viet Nam. It was also agreed that consequential amendments are to be made in FASID Table MET 2A and Table MET 3 Part I and Part II, renamed as FASID Tables 2B, 3A and 3B accordingly. In order to reflect the said changes in the ASIA/PAC ANP the following conclusion was formulated by the meeting.

Conclusion 12/29 – Gia Lam Meteorological Watch Office (MWO)

That,

a) FASID Table MET 1B of the ASIA/PAC ANP be amended to delete requirement for Hanoi and Ho Chi Minh MWOs and to add requirements for Gia Lam MWO; and

b) Consequential amendments be made to FASID Table MET 2A, renamed as FASID Table MET 2B, FASID Table MET 3, Part I and Part II, renamed as FASID Tables 3A and 3B, accordingly.

Inclusion of SIGMET in VOLMET

2.2.88 The meeting noted consideration given by the CNS/MET SG/5 to the inclusion of SIGMET in VOLMET broadcast as requested by the ATS/AIS/SAR Sub-group.

2.2.89 The meeting discussed the COM aspects to assist in the resolution of the problem. The ideal solution would be to identify additional frequencies for VOLMET broadcast form ITU Radio Regulation Appendix S27. It was however, not considered practical to pursue this option, as it would take a considerable period of time to secure suitable frequencies. This option was not found suitable to satisfy the immediate requirement.

2.2.90 In view of the foregoing, as a near term solution, consideration may be given for the use of currently available D-VOLMET through ACARS data link pending availability of ICAO standard telecommunication system. Where feasible, the use of voice channel of existing NDB may also be considered.

2.2.91 As to the proposal by IATA to condense and abbreviate SIGMET, it was noted that this would contradict the provision of Annex 3 which particularly specifies that content and format of reports, forecasts and SIGMET information included in VOLMET broadcasts should be consistent with the provisions of Chapter 4, 6, and 7 of the Annex as applicable to bulletins disseminated beyond the aerodrome of origin.

2.2.92 It was also noted that with regard to the proposal by IATA to include in VOLMET broadcast only those SIGMETs valuable to the operating crew, the CNS/MET SG/5 felt that, since

issuance of SIGMET is considered as a safety issue, selection of SIGMETs to be included in VOLMET broadcast is not acceptable.

Status of implementation of international airways volcano watch

2.2.93 The meeting reviewed the status of implementation of the international airways volcano watch (IAVW) in the ASIA/PAC Regions. It was noted that the volcanic ash advisory centres (VAACs), namely Anchorage, Darwin, Tokyo, Washington and Wellington, designated to provide the advisory service in the ASIA/PAC Regions, have been implemented. It was also noted that various formal and informal arrangements between the VAACs and volcanological and civil aviation authorities are working satisfactorily in most cases. A number of operating plans have been implemented.

2.2.94 It was noted that the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds, Doc 9691 – AN/954, First Edition – 2001, had been published by ICAO and circulated to States. The meeting was also advised that the Handbook on the International Airways Volcano Watch – Operational Procedures and Contact List, Doc 9766 – AN/968, First Edition – 2000, had been published by ICAO and circulated to States. The Handbook is accessible on the ICAO Web site at http://www.icao.int and it has been amended recently. States are requested to verify the information and to advise any changes to the ICAO Regional Office.

2.2.95 As to the practical operations of IAVW, the meeting felt that, in order to ensure that the information available on volcanic activity reaches the ACC, MWO and VAAC in a timely manner, provision should be made in ICAO documentations regarding requirement for VAACs to operate on a 24hrs basis. In this context, the meeting formulated the following conclusion:

Conclusion 12/30 – Operation of the VAACs

That, ICAO consider the proposal to amend Annex 3, and the Handbook on the IAVW – Operational Procedures and Contact List, Doc 9766 accordingly, that each VAAC should operate on a 24 hour basis.

The VAAC areas of responsibility

2.2.96 The meeting reviewed FASID Table MET 3, Part II of the ASIA/PAC ANP and considered the relevant changes to be made, as proposed by the CNS/MET SG/5, to reflect the extension of the VAAC areas of responsibility. An opportunity was also taken to amend the list of MWOs to which advisory information should be sent by the VAACs. The meeting also took note of the proposal by the CNS/MET SG/5 to rename the FASID MET Tables of the ASIA/PAC ANP. In this context, the meeting agreed to amend the FASID Table MET 3, Part II, renamed as FASID Table MET 3B, and formulated the following conclusion

Conclusion 12/31 – Volcanic ash advisory centre

That, FASID Table MET 3, Part II of the ASIA/PAC ANP, renamed as FASID Table MET 3B, be amended as shown in Appendix N to the Report on Agenda Item 2.2.

2.2.97 It was also agreed that the Plan be amended to include new FASID Chart MET 3 showing the amended areas of responsibility of the designated VAACs in all ICAO air navigation regions.

Development of volcanic ash advisory in graphical format

2.2.98 The meeting noted concern expressed by the CNS/MET SG/5 that the VAACs are developing the graphical advisories in a different formats. It was agreed that this should be done under guidance to be provided by ICAO regarding both the standard format to be followed as well as the procedures for dissemination of the graphical advisories. It was felt that a similar guidance is required to be developed by ICAO with respect to SIGMETs for volcanic ash in graphical format. The meeting noted clarification provided by the Secretariat at the CNS/MET SG/5 on the subject with reference to Annex 3 which specifies the graphical format to be followed by VAACs in issuance of the advisory. However, the meeting felt that further study is required for improvement of the format and formulated the following conclusion.

Conclusion 12/32 – Volcanic Ash Advisory and SIGMET in graphical format

That, ICAO give consideration to further improvement of the format in which the graphical advisory should be issued by VAACs and development of proposals for the format of a graphical SIGMET for volcanic ash, including the necessary guidance regarding procedures for dissemination of information.

Test for routing of NOTAMs for volcanic activity/ASHTAM from NOFs to the SADIS uplink station and VAACs

2.2.99 The meeting was provided with some information regarding a world-wide test to distribute NOTAMs for volcanic activities/ASHTAM to the SADIS uplink station and VAACs in order to improve the IAVW operational procedures. It was noted that the test had been carried out on 10 and 11 July 2001. From the ASIA/PAC Regions, Australia (Darwin VAAC), Japan (Tokyo VAAC, Tokyo NOF) and the Philippines (Manila NOF) participated in the test. It was also noted that the test with participation of Jakarta NOF is proposed to be carried out in September 2001.

Review the CNS part of the ASIA/PAC Basic ANP and FASID

2.2.100 In the list of Key Priorities in CNS/ATM Implementation the need to incorporate CNS/ATM material in the Basic ANP and FASID has been identified. The meting noted that the CNS/MET Sub-Group had established a Working Group to review Regional Procedures given in introductory text to Part IV –CNS of the Basic ANP and FASID and develop a proposal to include CNS/ATM materials in the Plan in accordance with the Key Priorities in CNS/ATM Implementation.

Amendment to the MET part of the ASIA/PAC Basic ANP and FASID

2.2.101 The meeting considered the information presented to the CNS/MET SG/5 by expert from the United States regarding establishment of Honolulu TCAC. It was noted that the United States had transferred part of the area of responsibility for the portion of the Oakland FIR from 140° W to 180° W from the Miami TCAC to Honolulu TCAC. It was proposed that FASID Table MET 3, Part I of the ASIA/PAC ANP, renamed as FASID Table MET 3A, should be amended to reflect the formal designation of the Honolulu TCAC. The meeting agreed to formulate the following conclusion.

Conclusion 12/33 – Honolulu tropical cyclone advisory centre

That, FASID Table MET 3, Part I of the ASIA/PAC ANP, renamed as FASID Table MET 3A, be amended, as shown in Appendix O to the Report on Agenda Item 2.2, to reflect designation of the TCAC

Honolulu with the area of responsibility covering portion of the Central Pacific from 140°W to 180°W.

2.2.102 Having formulated the above conclusion, the meeting agreed that the ASIA/PAC ANP be amended to include new FASID Chart MET 2 showing the amended areas of responsibility of the designated TCACs in all ICAO air navigation regions. Taking into consideration the proposal made in paragraph 2.2.97 on the inclusion of new FASID Chart MET 3 showing the amended areas of responsibility of the VAACs, the meeting formulated the following conclusion.

Conclusion 12/34 – New FASID Charts MET 2 and MET 3

That, the ASIA/PAC ANP be amended to include the new FASID Chart MET 2 and FASID Chart MET 3, as given in Appendices P and Q to the Report on Agenda Item 2.2, showing the areas of responsibility of TCACs and VAACs respectively.

2.2.103 Having summarized the recent developments relating to the regional MET air navigation facilities and services, the proposals developed by the meeting, as well as the amended provisions of Annex 3, it was agreed that the ASIA/PAC ANP should be amended accordingly. The meeting considered a proposal, as drafted by the CNS/MET SG/5, with respect to amendments to be made to the regional procedures given in the introductory text to Part VI – Meteorology of the ASIA/PAC Basic ANP and FASID and agreed to formulate the following conclusion.

Conclusion 12/35 – ASIA/PAC Basic ANP and FASID, Part VI – Meteorology

That, the regional procedures given in the introductory text to Part VI – Meteorology of the ASIA/PAC Basic ANP and FASID be amended as shown in Appendices R and S to the Report on Agenda Item 2.2.

Chapter 8 – Meteorology of the ASIA/PAC CNS/ATM Plan

2.2.104 The meeting reviewed the draft Chapter 8 – Meteorology of the ASIA/PAC Regional Plan for the new CNS/ATM Systems as developed by the CNS/MET SG/5 with assistance of the MET WG on the CNS/ATM Plan. It was agreed that the Regional CNS/ATM Plan should be amended to include Chapter 8 – Meteorology. The meeting formulated the following conclusion.

Conclusion 12/36 – Chapter 8 – Meteorology of the ASIA/PAC CNS/ATM Plan

That, the ASIA/PAC Regional Plan for the new CNS/ATM Systems be amended to include Chapter 8 – Meteorology as given in Appendix T to the Report on Agenda Item 2.2.

2.2.105 The meeting agreed with the views expressed by the CNS/MET SG/5 that the regional plan for the implementation of meteorological services and facilities for the CNS/ATM systems should be further developed. It was agreed that the planning of the meteorological systems at the regional level would involve the following steps :

- Ascertain meteorological requirements of ATM and airspace users
- Develop cost effective solutions to meet the requirements
- Identify the necessary infrastructure and harmonization measures
- Formulate implementation strategy

2.2.106 It was also agreed that more detailed developments on the regional requirements should be examined, discussed and consolidated, and in particular, ATM requirements for MET information should be identified.

2.2.107 It was noted that the CNS/MET SG/5 had expressed its appreciation to the MET WG on the CNS/ATM Plan for the work done. The Sub-group also agreed that the MET WG had completed its task and be dissolved.

2.2.108 The meeting noted that, in order to further develop the Chapter 8 – Meteorology of the Regional CNS/ATM Plan, the CNS/MET SG/5 had established a METATM Task Force on the CNS/ATM Plan consisting of experts from Australia, Hong Kong, China, Japan, the United States and IATA. The expert from Australia will act as a Chairman of the Task Force. The Terms of Reference of the METATM Task Force on the CNS/ATM Plan, as given in Appendix U to the Report on Agenda Item 2.2, were noted by the meeting. It was also noted that the first results of its consideration would be reported by the Task Force to the CNS/MET SG/6.

Subject /Tasks List of the CNS/MET Sub -Group

2.2.109 The meeting reviewed the updated Subject/Tasks List of CNS/MET Sub-Group and noted proposed changes. It was noted that of the 38 Tasks, 26 Tasks were completed. In view of the foregoing the meeting adopted the following decision:

Decision 12/37 - Amendments to the Subject/Tasks List of the CNS/MET Sub-Group

That, the updated Subject/Tasks List of the CNS/MET Sub-Group presented in Appendix V to the report on Agenda Item 2.2 be adopted.

ASIA/PAC REGION ATN TRANSITION PLAN

Table of Contents

Executive Summary

This document provides technical guidance on the transition from the ground infrastructure support of the Aeronautical Fixed Telecommunication Network (AFTN) services to the Aeronautical Telecommunication Network (ATN) for the Asia Pacific Region.

The Asia/Pacific ATN Ground Transition Plan outlines the requirements to increase bandwidth and upgrade protocols for those trunks that will support the main data flow of traffic through the Asia Pacific Region. The plan also provides target dates in which these trunks and implementation of BBISs and BISs will need to occur to ensure a smooth transition of the ATN within the region.

This transition plan also takes into consideration the air to ground aspects and presents the transition activities required for the Asia Pacific Region.

1. INTRODUCTION

This document presents a plan on the ATN ground transition activities applicable to the Asia Pacific region. The document provides information on the ground infrastructure required to support the ATN and to take into consideration the ATN air-to-ground requirements of the region.

1.1 OBJECTIVES

The objective of this document is to provide guidance and information on the transition activities that will need to occur for the Asia Pacific region to migrate from the AFTN to the ATN.

The document also takes into account the air-ground aspects as promoted by the ATN Routing Architecture Plan.

1.2 SCOPE

The scope of the document includes:

- A brief description of the existing ground infrastructure based on AFTN;
- The types of ATN applications that will be used over the ground infrastructure;
- The types of trunks that will need to be upgraded to cater for ATN traffic; and
- A proposed implementation schedule on how the ATN should be transitioned within the region.

1.3 REFERENCES

Reference 1 Manual of Technical Provisions for the ATN (Doc 9705-AN/956) Second Edition 1999.

Reference 2 ATN Routing Architecture Plan for the Asia Pacific Region

Reference 3 ICAO Location Indicators – Document 7910

Reference 4 ICAO Asia/Pacific CNS Facilities and Services Implementation Document (FASID)

2. EXISTING GROUND INFRASTRUCTURE

The existing AFTN is mainly made up of low speed circuit links operating at 600 bps to 9600 bps using X.25 or asynchronous protocols. There are also a number of low speed circuits operating at 50 baud using telegraph technology. Currently there are over 90 International AFTN circuits that operate within the Region and between neighboring regions. Further details for each AFTN circuit within the Asia Pacific Region is documented in the ICAO Asia Pacific CNS Facilities and Services Implementation Document (FASID).

When reviewing the current AFTN topology, the majority of AFTN circuit links will not be suitable to be used for the ATN without some form of upgrade. These upgrades will need to be in

the form of high-speed links (bandwidth capacity) and the use of modern protocols such as X.25 that is compatible with the ATN lower layers.

It can also be assumed that due to different planning activities by States, that not all States within the region will be migrating to the ATN at the same time. Therefore there will be a need to maintain existing AFTN circuit links to operate in parallel with any new implementation of high-speed links to meet ATN requirements.

It may also be possible for some States that operate private subnetworks using protocols such as X.25 that they could be in a position to carry transit ATN traffic between States that have implemented ATN without being forced to implement ATN in their own country straight away. This would allow the progression of the ATN to continue within the Region without being restricted or having to operate expensive links as a temporary measure while waiting for other States to start their implementation programs.

3. ATN END SYSTEM APPLICATIONS

There are currently six end system applications identified in the Manual of Technical Provisions for the ATN Table 3-1 lists these applications and provides a brief summary of their functions.

Table 3-1 ATN Applications

Application	Function
Context Management (CM)	An ATN application that provides a logon service allowing initial aircraft introduction into the ATN and a directory of all other data link applications on the aircraft.
Automatic Dependent Surveillance (ADS)	An ATN application that provides data from the aircraft to the ATS unit(s) for surveillance purposes.
Controller Pilot Data Link Communication (CPDLC)	An ATN application that provides a means of ATC data communication between controlling, receiving or downstream ATS units and the aircraft, using air-ground and ground-ground subnetworks.
Flight Information Service (FIS)	An ATN application that provides to aircraft information and advice useful for the safe and efficient conduct of flight.
ATS Message Handling Service (ATSMHS)	The set of computing and communication resources implemented by ATS organizations to provide the ATS message service.

Application	Function
ATS Inter-facility Data Communication (AIDC)	An ATN application dedicated to exchanges between ATS units of ATC information in support of flight notification, flight coordination, transfer of control, transfer of communication, transfer of surveillance data and transfer of general data.

4. ATN TRAFFIC

4.1 GROUND-GROUND TRAFFIC

With the introduction of AMHS as the replacement for AFTN, a number of AFTN circuit links between centres will need to be upgraded to cater for the increase in traffic load generated by AMHS overheads. Table 4-1 shows a comparison of different size messages transmitted over both an AFTN service and an AMHS service using X.25. From the results shown in Table 4-1 there is an increase in message size of 93% due to overheads generated by AMHS for a typical message of about 250 bytes. As the message size increases the amount of overheads generated becomes less significant to the size of the body of the message. In transitioning from AFTN to AMHS, States will have to anticipate this increase in bandwidth to accommodate AMHS traffic so as to maintain current or better performance of traffic delivery.

It is also important to note that there will also be an increase in other forms of data traffic due to implementation of other ATN applications such as the ATS Inter-facility Data Communication (AIDC) application. AIDC will generally be used by Flight Data Processors (FDP) to communicate between each other, which are normally established in each Fight Information Region (FIR). It can therefore be expected that data generated by this application will increase bandwidth requirements on those links that are required to pass this information between FIRs.

States will need to ensure that not only are the links that are established between States are capable of transferring data in a timely manner but also for those links that provide an alternate path for the applications to use in times of disruption to the primary links.

Table 4-1 Comparison of X.25 Message Sizes Using AFTN and AMHS (Results courtesy of the INCA[1] Project.)

Data Set #	Set # 1	Set # 2	Set # 3	Set # 4
Size of user message (A)	42	255	7480	13
AFTN				
Size of complete message including overheads **(B)**	98	311	7845	N/A
Size of total data transported - user data **= (B) - (A)**	56	56	365	N/A
Ratio of user message / total message size (%) **= (A)/(B) %**	42.86%	81.99%	95.35%	N/A
AMHS				
Size of complete message including overheads and delivery report **(C)**	4231	4448	12783	4271
Size of total data transported - user data **= (C) - (A)**	4189	4193	5303	4258
Ratio of user message / total message size (%) **= (A)/(C) %**	0.99%	5.73%	58.52%	0.30%
AMHS vs. AFTN				
Ratio of total AFTN / total AMHS (%) **= (B) / (C) %**	2.32%	6.99%	61.37%	N/A
Ratio of total AMHS / total AFTN **= (C) / (B)**	43.17	14.30	1.63	N/A

4.2 AIR-GROUND TRAFFIC

With the implementation of the air-ground applications it is important to ensure that transit response times are kept to a minimum level so as not to affect the overall response time that it takes for traffic such as ADS reports and CPDLC messages to be delivered to their final destination. This again reflects the need to ensure that critical ground links within the Region are capable of handling this information efficiently.

Another important factor with air-ground traffic is the generation of routing information that is caused by aircraft that will move between various ATN routing domains. To maintain this information in a defined area requires a minimum number of backbone routers to be implemented which protects the majority of all other ATN routers from being flooded with routing information. This information is further explained in Section 5.

5. ATN ROUTING ARCHITECTURE

[1] INCA (Investigation of Networked CNS/ATM Applications) project was a joint Airservices Australia and Airsys ATM Pty Ltd ATN research and development program, which investigated the AMHS during 1999/2000.

The ATN infrastructure can be divided into two main areas to support both the air-ground and ground-ground applications that will operate over the ATN.

For air-ground support the ATN needs to support an ATN Routing Backbone network so that routing information about where an aircraft is can be maintained by this backbone. As aircraft move through various coverage media and FIR boundaries the ATN Routing Backbone will be notified of the changing routing data for each mobile aircraft in the region. The type of ATN Routing Backbone architecture for the Asia Pacific Region is document in the Asia Pacific ATN Routing Architecture Plan and is summarized in Figure 5-1 of this document.

It is anticipated that the trunks used for the ATN Routing Backbone will also be used to carry ground-ground application data such as the AMHS. This of course depends upon the routing policies set up between each router, which determine which links are to be used for the different classes of traffic that can be expected to transverse the network. Figure 5-1 shows the proposed ATN Routing Backbone for the Asia Pacific Region. The ATN Router Backbone tries to use existing trunks that have already been established between the nominated States who will operate the backbone that is currently used for the AFTN. Virtually these trunks will need to be upgraded to cater for the increase in traffic load that will be handled by the ATN. Further details about these trunks are documented in Section 6.

To improve the resilience and redundancy aspects of the ATN routing backbone, it is proposed that additional trunks be incorporated to ensure minimal disruption to the air-ground applications. This effectively ensures that the Asia Pacific Region can function on its own without support from other regions relaying information on behalf of a failed router or trunk service within the Asia Pacific Region. These additional trunks have been shown as dashed lines in Figure 5-1. Also shown are the inter-regional connections between the Asia Pacific Region and its neighboring Regions. Additional inter-regional connections are also proposed and are further documented in Section 6.

It is important to also note that costs will increase due to implementing higher bandwidth links. Therefore the region should review its requirements in having to use point to point circuits every where when a number of strategically placed links may suffice with alternate dial up on demand capabilities being deployed between key sites. This may help to offset the costs and still provide for an efficient ground-ground network for the ATN.

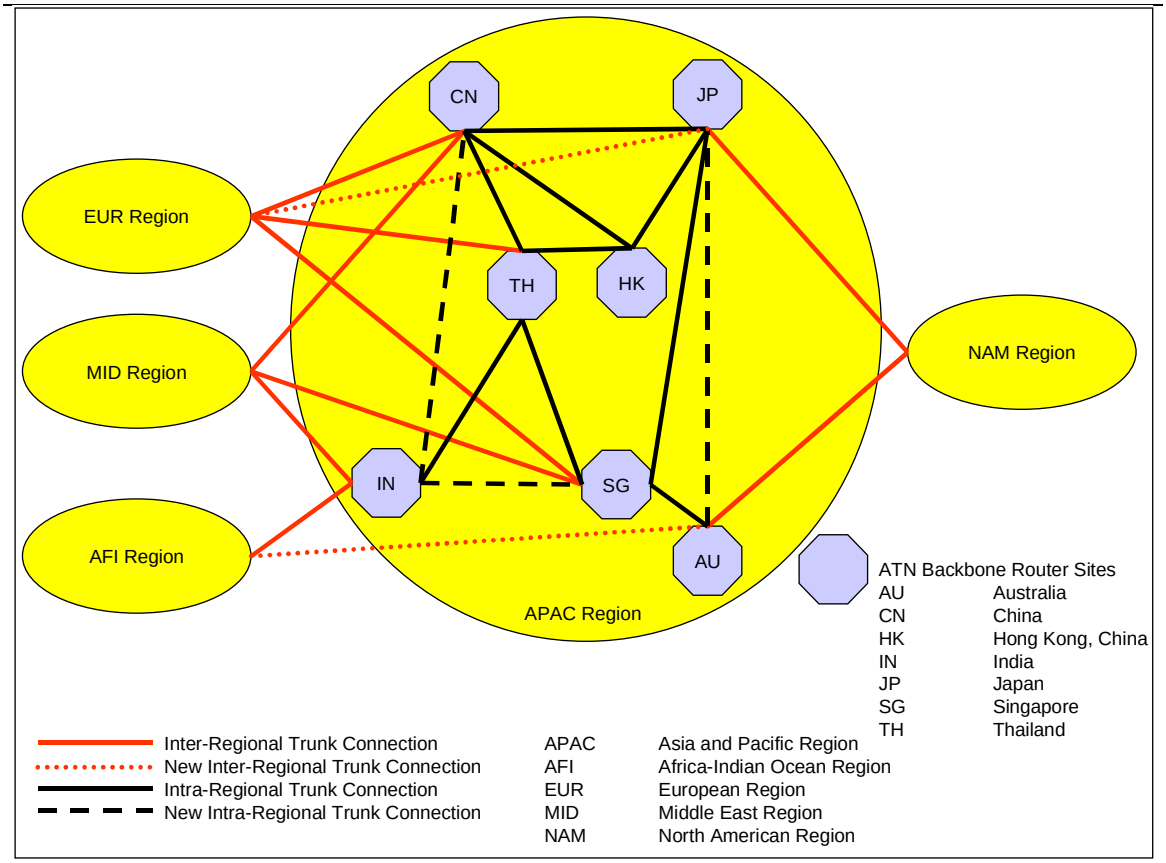


Figure 5-1 Proposed Routing Backbone Architecture

6. ATN BACKBONE TRUNKS

Table 6-1 provides a list of existing or proposed upgrade AFTN circuits that have been selected for the transition to the ATN routing backbone. Also provided in the table are proposed additional new trunks that should be considered to provide the necessary redundancy and backup services for the ATN for the region.

As part of the transition from AFTN to the ATN, the existing link capacity, especially those using X.25, must be able to handle both AFTN and ATN for those States who do not intent to migrate to AMHS straight away. It is assumed that States that have been nominated to provide the ATN backbone routing environment will do so in a timely manner so as to allow those States who are ready to start their implementation programs can do so without too much restriction within the region. Where a nominated State cannot provide the ATN backbone then an alternative arrangement should be put in place for another State, who is willing to provide the service, can do so.

An additional backbone site will need to be identified to provide proper redundancy for the South Pacific. At present if a failure occurs in Australia then such States as Fiji, New Zealand and other South Pacific States will be isolated from the network. If either Fiji or New Zealand becomes a backbone site with a connection to the United States will alleviate this problem. Under the current AFTN topology Fiji currently has a connection to the United States.

Table 6-1 ATN Circuit Upgrade and Backbone BIS Implementation

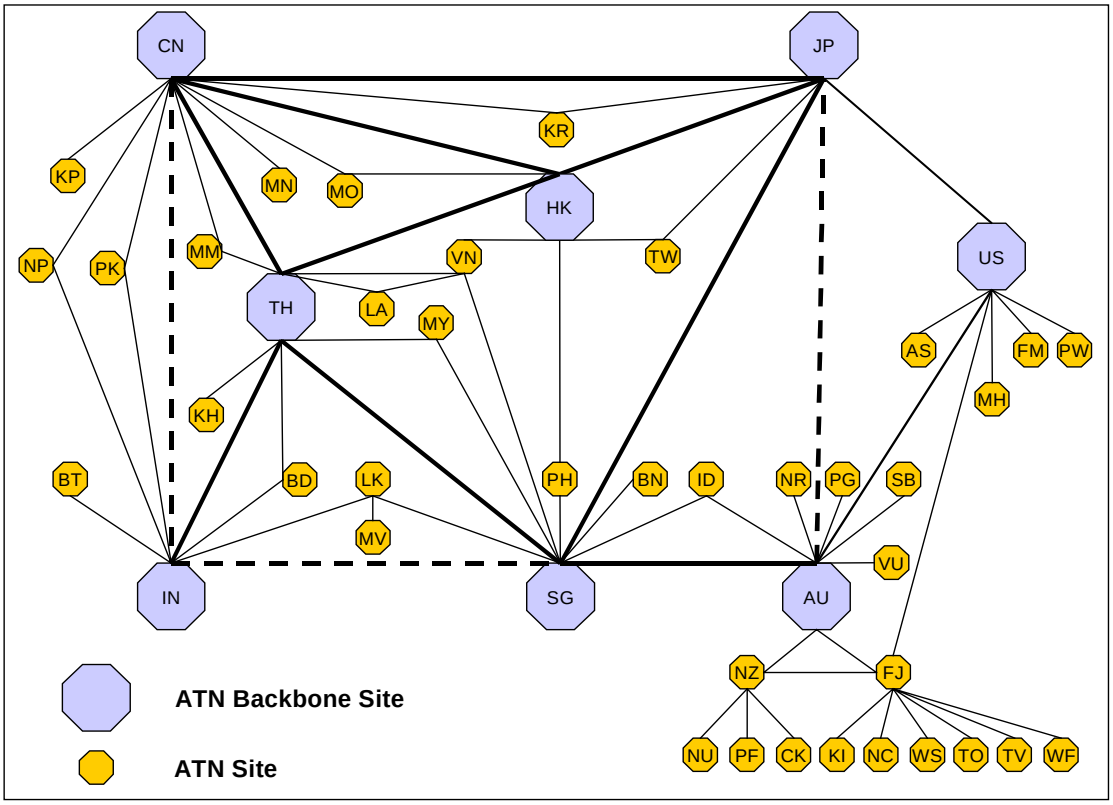
Nominated State	ATN Backbone Connection		Target Date Of Implementation		Trunk Type	Comment
	Speed	Protocol	Circuit	BBIS		
Australia				2003		
Japan	64000bps	X.25	2003		Intra-Regional	New circuit
Singapore	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
South Africa	19200bps	X.25	2003		Inter-Regional	New circuit
United States	64000bps	X.25	2003		Inter-Regional	Upgrade of circuit
China				2005		
Japan	64000bps	X.25	2005		Intra-Regional	Upgrade of circuit
Hong Kong, China	64000bps	X.25	2005		Intra-Regional	Upgrade of circuit
India	64000bps	X.25	2005		Intra-Regional	New circuit
Russian Federation	19200bps	X.25	2005		Inter-Regional	Upgrade of circuit
Thailand	64000bps	X.25	2002		Intra-Regional	New circuit
Hong Kong, China				2003		
China	64000bps	X.25	2005		Intra-Regional	Upgrade of circuit
Japan	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
Thailand	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
India				2005		
China	64000bps	X.25	2005		Intra-Regional	New circuit
Kenya-Nairobi	19200bps	X.25	2005		Inter-Regional	Upgrade of circuit
Oman-Muscat	19200bps	X.25	2005		Inter-Regional	Upgrade of circuit
Singapore	64000bps	X.25	2005		Intra-Regional	New circuit
Thailand	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit

Nominated State	ATN Backbone Connection		Target Date Of Implementation		Trunk Type	Comment
	Speed	Protocol	Circuit	BBIS		
Japan				2002		
Australia	64000bps	X.25	2003		Intra-Regional	New circuit
China	64000bps	X.25	2005		Intra-Regional	Upgrade of circuit
Hong Kong, China	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
Europe	64000bps	X.25	2005		Inter-Regional	New circuit – Interim Service
Singapore	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
Russia Federation	19200bps	X.25	2005		Inter-Regional	New circuit – Interim Service
United States	64000bps	X.25	2003		Inter-Regional	Upgrade planned.
Singapore				2005		
Australia	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
Bahrain	19200bps	X.25	2005		Inter-Regional	Upgrade of circuit
England-London	64000bps	X.25	2005		Inter-Regional	Upgrade of circuit
Japan	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
India	64000bps	X.25	2005		Intra-Regional	New circuit
Thailand	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
Thailand				2002		
China	64000bps	X.25	2002		Intra-Regional	New circuit
Hong Kong, China	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit
India	64000bps	X.25	2005		Intra-Regional	Upgrade of circuit
Italy-Rome	64000bps	X.25	2005		Inter-Regional	Upgrade of circuit
Singapore	64000bps	X.25	2003		Intra-Regional	Upgrade of circuit

7. INTERCONNECTION OF ATN ROUTERS

This section describes the interconnection requirements for all other States ATN routers for the Asia Pacific Region. Figure 7-1 shows a pictorial view of the international interconnection between various Asia Pacific countries. Further information has been provided for in Table CNS 1B – ATN Router Plan of the FASID, which lists all international connections between countries and their proposed bandwidth requirements and implementation dates.

It is proposed that all existing AFTN circuits are upgraded as soon as practicable to use X.25 or other modern protocols that are compatible with the ATN Lower Layers. In doing so, these links would be sized to cater for both AFTN and ATN. This would allow the region to set-up a subnetwork that could support current operational requirements for AFTN and to allow trials and operation services of the ATN to be implemented at minimal cost to the region.



Country	ISO Code	Country	ISO Code
American Samoa	AS	Mongolia	MN
Australia	AU	Myanmar	MM
Bangladesh	BD	Nauru	NR
Bhutan	BT	Nepal	NP
Brunei Darussalam	BN	New Caledonia	NC
Cambodia	KH	New Zealand	NZ
China	CN	Niue	NU
Cook Islands	CK	Pakistan	PK
Fiji	FJ	Palau	PW
French Polynesia	PF	Papua New Guinea	PG
Hong Kong China	HK	Philippines	PH
India	IN	Samoa	WS
Indonesia	ID	Singapore	SG
Japan	JP	Solomon Islands	SB
Kiribati	KI	Sri Lanka	LK
Korea, Democratic People's Republic of	KP	Taibei	TW
Korea, Republic of	KR	Thailand	TH
Lao	LA	Tonga	TO
Macau China	MO	Tuvalu	TV
Malaysia	MY	United States	US
Maldive Islands	MV	Vanuatu	VU
Marshall Islands	MH	Viet Nam	VN
Micronesia, Federated States of	FM	Wallis and Futuna Islands	WF

Figure 7-1 Asia/Pacific ATN Router Interconnection

8. TRANSITION ACTIVITIES

It is recommended that there will be three phases in the implementation of the ATN infrastructure.

- Phase 1, Upgrade of existing subnetwork infrastructure to support the Backbone BISs (BBISs);
- Phase 2, Implementation of the ATN Regional BBISs; and
- Phase 3, Implementation of supporting ATN BISs.

8.1 PHASE 1

This phase consists of upgrading existing AFTN circuits where possible that will support the introduction of the ATN Backbone BISs. Table 6-1 identifies those circuits that will need to be upgraded in both bandwidth and protocols.

In regards to bandwidth requirements, Table 6-1 proposes a preferred speed that will be required when full ATN is implemented. However, lower speeds may be introduced in the initial implementation phases between some locations by bilateral arrangements between States. States will be expected to monitor the performance of these links and increase bandwidth requirements as traffic load increases.

Where new circuits have been identified these will only need to be introduced on a case by case basis as BBISs are implemented.

In respect to the upgrade of protocols, it is recommend that X.25 will be the preferred protocol to be used for the ATN between States in the first instance. However as other more efficient Wide Area Network protocols are implemented in ATN routers such as Frame Relay and Asynchronous Transfer Mode (ATM) it is expected that these protocols will be implemented on a bilateral arrangement between States.

8.2 PHASE 2

Phase 2 consists of implementing the Backbone BISs (BBISs) that will support the Asia Pacific Region. The BBISs are important to the success of the ATN implementation program for the region and will need to be reviewed regularly to determine if contingency arrangements should be put in place where nominated States fail to provide the infrastructure in a timely manner.

Table 6-1 provides target dates in which these facilities should be provided.

Note: Implementation of Inter-Regional BBIS connections between Asia Pacific neighboring regions will also need to be determined and encouraged during this phase.

8.3 PHASE 3

Phase 3 is the implementation of all other BISs that will connect to the Backbone BISs.

Further information including initial target dates for the upgrade of the subnetwork links and protocols and implementation of the BISs for each State can be found in the table CNS 1B – ATN Router Plan of the FASID. Refinement of the target dates will continue to be updated as States start to develop their implementation programs and can provide feedback to the ICAO ASIA/PAC Regional Office.

ANNEX A TO APPENDIX A

ATN INTER/INTRA REGIONAL CONNECTIONS

Table -1 Asia Pacific BIS Routing Interconnections

Backbone State	ATN Interconnection		Target Date Of Implementation		Connection Type	Comment
	Speed	Protocol	Circuit	BIS		
Australia				2003		
Fiji	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Kiribati	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
New Caledonia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Samoa	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Tonga	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Tuvalu	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Wallis Island	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Indonesia	9600bps	X.25	2005	2005	Intra-Regional	
Nauru	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
New Zealand	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Cook Islands	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Fiji	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
French Polynesia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Niue	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Papua New Guinea	9600bps	X.25	2005	2005	Intra-Regional	
Solomon Islands	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit required
Vanuatu	9600bps	X.25	2005	2005	Intra-Regional	New circuit required

Backbone State	ATN Interconnection		Target Date Of Implementation		Connection Type	Comment
	Speed	Protocol	Circuit	BIS		
China				2005		
DPR of Korea	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Macau China	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Mongolia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Myanmar	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Nepal	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Republic of Korea	9600bps	X.25	2005	2005	Intra-Regional	New circuit
Hong Kong, China				2003		
Taibei	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Macau, China	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Philippines	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Viet Nam	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
India				2005		
Bangladesh	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Bhutan	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Nepal	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Pakistan	9600bps	X.25	2005	2005	Intra-Regional	
Sri Lanka	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Maldives	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Japan				2002		
Republic of Korea	9600bps	X.25	2005	2005		
Taibei	9600bps	X.25	2005	2005		Upgrade of circuit
Singapore				2005		
Brunei	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Indonesia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Malaysia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Philippines	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Sri Lanka	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Viet Nam	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit

Backbone State	**ATN Interconnection**		**Target Date Of Implementation**		**Connection Type**	**Comment**
	Speed	**Protocol**	**Circuit**	**BIS**		
United States				2003		
American Samoa	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Marshall Islands	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Micronesia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Palau	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Thailand				2002		
Bangladesh	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Cambodia	9600bps	X.25	2002	2002	Intra-Regional	Upgrade of circuit
Laos	9600bps	X.25	2002	2002	Intra-Regional	Upgrade of circuit
Viet Nam	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Malaysia	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Myanmar	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit
Viet Nam	9600bps	X.25	2005	2005	Intra-Regional	Upgrade of circuit

Note: Speed requirements are an indication only and may vary between sites to meet different performance requirements for the type of ATN services and applications that are operating over each link.

TABLE CNS 1B – ATN ROUTER PLAN

Explanation of the Table

Column	
1	Administration – the name of the Administration, State or Organization responsible for management of the router
2	Location of Router
3	Type of Router: BBIS - Backbone Boundary Intermediate System BIS - Boundary Intermediate System
4	Type of Interconnection: Inter – Regional Intra – Regional Inter – Domain
5	Interconnection, Connection to router of: name of the city or location of the correspondent router
6	Link Speed – Speed requirements of the interconnecting link
7	Link Protocol – Protocol requirements for the interconnecting link
8	Target Date of Implementation – date of implementation of the router services
9	Remarks

Table CNS 1B – ATN ROUTER PLAN

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
American Samoa	Pago Pago	BIS	Inter-Domain	United States	9600bps	X.25	2005	
Australia	Brisbane	BBIS	Intra-Regional	Japan	64000bps	X.25	2003	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2003	
		BBIS	Inter-Regional	South Africa	19200bps	X.25	2003	
		BBIS	Inter-Regional	United States	64000bps	X.25	2003	
		BIS	Inter-Domain	Fiji	9600bps	X.25	2005	May need to be upgraded to BBIS
		BIS	Inter-Domain	Indonesia	9600bps	X.25	2005	
		BIS	Inter-Domain	Nauru	9600bps	X.25	2005	
		BIS	Inter-Domain	New Zealand	9600bps	X.25	2005	
		BIS	Inter-Domain	Papua New Guinea	9600bps	X.25	2005	
		BIS	Inter-Domain	Solomon Islands	9600bps	X.25	2005	
		BIS	Inter-Domain	Vanuatu	9600bps	X.25	2005	
Bangladesh	Dhaka	BIS	Inter-Domain	India	9600bps	X.25	2005	
		BIS	Inter-Domain	Thailand	9600bps	X.25	2005	
Bhutan	Paro	BIS	Inter-Domain	India	9600bps	X.25	2005	
Brunei Darussalam	Brunei	BIS	Inter-Domain	Malaysia	9600bps	X.25	2005	
	Brunei	BIS	Inter-Domain	Singapore	9600bps	X.25	2005	

Annex B to Appendix A - 3

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Cambodia	Phnom Penh	BIS	Inter-Domain	Thailand	9600bps	X.25	2002	
China	Beijing	BBIS	Intra-Regional	Japan	64000bps	X.25	2005	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2005	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	
		BBIS	Inter-Regional	Russian Federation	19200bps	X.25	2005	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2002	
		BIS	Inter-Domain	DPR Korea	9600bps	X.25	2005	
		BIS	Inter-Domain	Macau, China	9600bps	X.25	2005	
		BIS	Inter-Domain	Mongolia	9600bps	X.25	2005	
		BIS	Inter-Domain	Myanmar	9600bps	X.25	2005	
		BIS	Inter-Domain	Nepal	9600bps	X.25	2005	
		BIS	Inter-Domain	Pakistan	9600bps	X.25	2005	
		BIS	Inter-Domain	Republic of Korea	9600bps	X.25	2005	
Hong Kong, China	Hong Kong	BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2003	
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2003	
		BIS	Inter-Domain	Macau, China	9600bps	X.25	2005	
		BIS	Inter-Domain	Philippines	9600bps	X.25	2005	
		BIS	Inter-Domain	Taibei	9600bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Inter-Domain	Viet Nam	9600bps	X.25	2005	
Macau, China	Macau	BIS	Inter-Domain	China	9600bps	X.25	2005	
		BIS	Inter-Domain	Hong Kong, China	9600bps	X.25	2005	
Cook Island	Rarotonga	BIS	Inter-Domain	New Zealand	9600bps	X.25	2005	
DPR Korea	Pyongyang	BIS	Inter-Domain	China	9600bps	X.25	2005	
Fiji	Nadi	BIS	Inter-Domain	Australia	9600bps	X.25	2005	May need to be upgraded to BBIS
		BIS	Inter-Domain	Kiribati	9600bps	X.25	2005	
		BIS	Inter-Domain	New Caledonia	9600bps	X.25	2005	
		BIS	Inter-Domain	Samoa	9600bps	X.25	2005	
		BIS	Inter-Domain	Tonga	9600bps	X.25	2005	
		BIS	Inter-Domain	Tuvalu	9600bps	X.25	2005	
		BIS	Inter-Domain	United States	9600bps	X.25	2005	May need to be upgraded to BBIS
		BIS	Inter-Domain	Wallis Is	9600bps	X.25	2005	
French Polynesia	Papeete	BIS	Inter-Domain	New Zealand	9600bps	X.25	2005	
India	Mumbai	BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Inter-Regional	Kenya, Nairobi	19200bps	X.25	2005	
		BBIS	Inter-Regional	Oman-Muscat	19200bps	X.25	2005	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BBIS	Intra-Regional	Thailand	64000bps	X.25	2003	
		BIS	Inter-Domain	Bangladesh	9600bps	X.25	2005	
		BIS	Inter-Domain	Bhutan	9600bps	X.25	2005	
		BIS	Inter-Domain	Nepal	9600bps	X.25	2005	
		BIS	Inter-Domain	Pakistan	9600bps	X.25	2005	
		BIS	Inter-Domain	Sri Lanka	9600bps	X.25	2005	
Indonesia	Jakarta	BIS	Inter-Domain	Australia	9600bps	X.25	2005	
		BIS	Inter-Domain	Singapore	9600bps	X.25	2005	
Japan	Tokyo	BBIS	Intra-Regional	Australia	64000bps	X.25	2003	Proposed new service
		BBIS	Intra-Regional	China	64000bps	X.25	2005	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2003	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2003	
		BBIS	Inter-Regional	United States	64000bps	X.25	2003	
		BIS	Inter-Domain	Europe	64000bps	X.25	2005	May need to be BBIS for the short term.
		BIS	Inter-Domain	Russia Federation	64000bps	X.25	2005	May need to be BBIS for the short term.
		BIS	Inter-Domain	Republic of Korea	9600bps	X.25	2005	
		BIS	Inter-Domain	Taibei	9600bps	X.25	2005	
Kiribati	Tarawa	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
Lao PDR	Vientiane	BIS	Inter-Domain	Thailand	9600bps	X.25	2002	
		BIS	Inter-Domain	Viet Nam	9600bps	X.25	2005	
Malaysia	Kuala Lumpur	BIS	Inter-Domain	Brunei	9600bps	X.25	2005	
		BIS	Inter Domain	Singapore	9600bps	X.25	2005	
		BIS	Inter-Domain	Thailand	9600bps	X.25	2005	
Maldives	Male	BIS	Inter-Domain	Sri Lanka	9600bps	X.25	2005	
Marshal Island	Majuro	BIS	Inter-Domain	United States	9600bps	X.25	2005	
Micronesia Federated State of	CHUUK	BIS	Inter-Domain	United States	9600bps	X.25	2005	
	Kosrae	BIS	Inter-Domain	United States	9600bps	X.25	2005	
	Ponapei	BIS	Inter-Domain	United States	9600bps	X.25	2005	
	Yap	BIS	Inter-Domain	United States	9600bps	X.25	2005	
Mongolia	Ulaanbaatar	BIS	Inter-Domain	China	9600bps	X.25	2005	
Myanmar	Yangon	BIS	Inter-Domain	China	9600bps	X.25	2005	
		BIS	Inter-Domain	Thailand	9600bps	X.25	2005	
Nauru	Nauru	BIS	Inter-Domain	Australia	9600bps	X.25	2005	
Nepal	Kathmandu	BIS	Inter-Domain	China	9600bps	X.25	2005	
		BIS	Inter-Domain	India	9600bps	X.25	2005	
New Caledonia	Noumea	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	
New Zealand	Christchurch	BIS	Inter-Domain	Australia	9600bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Inter-Domain	Cook Is	9600bps	X.25	2005	
		BIS	Inter-Domain	Fiji	9600bps	X.25	2005	
		BIS	Inter-Domain	French Polynesia	9600bps	X.25	2005	
		BIS	Inter-Domain	Niue	9600bps	X.25	2005	
Niue Is	Niue	BIS	Inter-Domain	New Zealand	9600bps	X.25	2005	
Pakistan	Karachi	BIS	Inter-Domain	China	9600bps	X.25	2005	
		BIS	Inter-Domain	India	9600bps	X.25	2005	
Palau	Koror	BIS	Inter-Domain	United States	9600bps	X.25	2005	
Papua New Guinea	Port Moresby	BIS	Inter-Domain	Australia	9600bps	X.25	2005	
Philippines	Manila	BIS	Inter-Domain	Hong Kong, China	9600bps	X.25	2005	
		BIS	Inter-Domain	Singapore	9600bps	X.25	2005	
Republic of Korea	Seoul	BIS	Inter-Domain	China	9600bps	X.25	2005	
		BIS	Inter-Domain	Japan	9600bps	X.25	2005	
Samoa	Apia	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	
Singapore	Singapore	BBIS	Intra-Regional	Australia	64000bps	X.25	2003	
		BBIS	Inter-Regional	Bahrain	19200bps	X.25	2005	
		BBIS	Inter-Regional	England, London	19200bps	X.25	2005	
		BBIS	Intra-Regional	Japan	64000bps	X.25	2003	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BBIS	Intra-Regional	Thailand	6400bps	X.25	2003	
		BIS	Inter-Domain	Brunei	9600bps	X.25	2005	
		BIS	Inter-Domain	Indonesia	9600bps	X.25	2005	
		BIS	Inter-Domain	Malaysia	9600bps	X.25	2005	
		BIS	Inter-Domain	Philippines	9600bps	X.25	2005	
		BIS	Inter-Domain	Sri Lanka	9600bps	X.25	2005	
		BIS	Inter-Domain	Viet Nam	9600bps	X.25	2005	
Solomon Is	Honiara	BIS	Inter-Domain	Australia	9600bps	X.25	2005	
Sri Lanka	Colombo	BIS	Inter-Domain	India	9600bps	X.25	2005	
		BIS	Inter-Domain	Maldives	9600bps	X.25	2005	
		BIS	Inter-Domain	Singapore	9600bps	X.25	2005	
Thailand	Bangkok	BBIS	Inter-Regional	Italy	19200bps	X.25	2005	
		BBIS	Intra-Regional	China	64000bps	X.25	2002	
		BBIS	Intra-Regional	Hong Kong, China	64000bps	X.25	2003	
		BBIS	Intra-Regional	India	64000bps	X.25	2005	
		BBIS	Intra-Regional	Singapore	64000bps	X.25	2003	
		BIS	Inter-Domain	Bangladesh	9600bps	X.25	2005	
		BIS	Inter-Domain	Cambodia	9600bps	X.25	2002	
		BIS	Inter-Domain	Lao PDR	9600bps	X.25	2002	

Administration	Location of Router	Type of Router	Type of Interconnection	Interconnection, Connected to router of:	Link Speed	Link Protocol	Target date of Implementation	Remarks
1	2	3	4	5	6	7	8	9
		BIS	Inter-Domain	Malaysia	9600bps	X.25	2005	
		BIS	Inter-Domain	Myanmar	9600bps	X.25	2005	
		BIS	Inter-Domain	Viet Nam	9600bps	X.25	2005	
Tonga	Tongatapu	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	
Tuvalu	Funafuti	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	
United States	Oakland	BBIS	Inter-Regional	Australia	64000bps	X.25	2003	
		BBIS	Inter-Regional	Japan	64000bps	X.25	2003	
		BIS	Inter-Domain	American Samoa	9600bps	X.25	2005	
		BIS	Inter-Domain	Marshal Islands	9600bps	X.25	2005	
		BIS	Inter-Domain	Micronesia	9600bps	X.25	2005	
		BIS	Inter-Domain	Palau	9600bps	X.25	2005	
Vanuatu	Port Vila	BIS	Inter-Domain	Australia	9600bps	X.25	2005	
Viet Nam	Ho-Chi-Minh	BIS	Inter-Domain	Hong Kong, China	9600bps	X.25	2005	
		BIS	Inter-Domain	Lao PDR	9600bps	X.25	2005	
		BIS	Inter-Domain	Singapore	9600bps	X.25	2005	
		BIS	Inter-Domain	Thailand	9600bps	X.25	2002	
Wallis Is.	Wallis	BIS	Inter-Domain	Fiji	9600bps	X.25	2005	

Subject/Tasks of the ATN Transition Task Force

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1	RAN/3 C 10/12 C 10/11d	Subject: ATN Transition Guidance Material Task: Develop Regional ATN Transition Guidance Material.		1) Development of detailed guidance material.	Completed
2	RAN/3 C 10/11d	Subject: ATN Transition Plan Task: Develop an ATN Transition Plan to provide seamless transition to ATN.	A	1) Develop Ground Transition Plan taking into account Air-to-Ground aspects. 2) Develop a set of planning documents covering: i) ATN Regional Routing Architecture ii) ATN Naming and Addressing Conventions, and iii) Documentation of the Assigned ATN Names and Addresses.	Completed
3		Subject: ATN major elements. Task: Provide performance and functional requirements of ATN.	A	1) Develop ATN Technical Documents. - Security - Performance - System Management	2003
4	RAN/3 C 10/11b	Subject: AFTN related issues Task: Review operation of AFTN.	B	1) Evaluate and review the effect of increases or decreases in capacity and network changes, on circuit loading. 2) Plan network changes for support of OPMET and AIS databases, automated VOLMET broadcast.	On-going 2003
5		Subject: Planning and implementation information in ANP. Task: Develop G/G part of the CNS FASID.	A	Development of detail description for the existing tables and Charts for the G/G part of the CNS FASID. 1) Table CNS 1B – ATN Router Plan 2) Table CNS 1C – ATS MHS 3) Table CNS 1D – AIDC Routing Plan	 Completed 2002 2002

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
6		Subject: ATN Documentation Task: Development of ATN Routing Documentations and ICDs.	A	Development of ATN Documents: 1) A Router ICD 2) A Routing Policy (IDRP) 3) Directory of Service 4) An AMHS ICD 5) An AIDC ICD	 2002 2002 2002 2002 2005

STRATEGY FOR THE PROVISION OF PRECISION APPROACH AND LANDING GUIDANCE SYSTEMS

Considering:

a) that, in the ASIA/PAC Region, ILS is capable of meeting the majority of requirements for precision approach and landing;

b) that, requirements for provision of terrestrial-based navigation facilities non-precision and precision approach and landing have been implemented in most cases;

c) that, the availability of a proven and standardized MLS to meet all weather operations requirements;

d) the availability of initial ICAO GNSS SARPs and guidance material;

e) feasibility of GBAS systems to support category II and III operations in 2006;

f) the development and deployment of multimode receivers;

g) the definition of Required Navigation Performance for approach, landing and departure operations;

h) the knowledge that GNSS without augmentation can support non-precision approaches and the augmented GNSS based systems will be available to support Category I operations from the year 2003;

i) the need to maintain aircraft interoperability both within the region and between the ASIA/PAC region and other ICAO regions and to provide flexibility for future aircraft equipage.

The strategy for ASIA/PAC Region in the provision of precision approach and landing guidance is:

a) ILS be retained as an ICAO standard system for as long as it is operationally acceptable and economically beneficial;

b) Implement GNSS, with GBAS to support Category I operations where appropriate;

c) Conduct studies for the implementation of GNSS ground based augmentation systems and GNSS avionics equipment for Category II and III operations;

d) Introduce the applicable Required Navigation Performance (RNP) for approach, landing and departure operations in accordance with ICAO provisions.

e) Conduct necessary on-going education and training for operational personnel in using GNSS to ensure safe operations.

f) Implement MLS where operational requirements cannot be satisfied by implementation of ILS or GNSS.

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 Standards and Recommended Practices (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 applied 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 and ground-based systems;

9) Human, environmental and economic factors will affect the implementation of GNSS.

The general strategy for the implementation of GNSS in the Asia/Pacific Region is detailed below. This strategy is based on the regional navigation requirements of:

(a) RNP10 for en-route in remote/oceanic areas;
(b) RNP4 for en-route and terminal phases of flight;
(c) NPA/APV for approaches and departures; and
(d) Precision approaches at selected airports.

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) Implementation shall be in full compliance with ICAO Standards and Recommended Practices and PANS;

4) Introduce the use of GNSS as primary means of navigation in remote/oceanic areas;

5) Introduce the use of GNSS as a supplementary means of en-route navigation and non-precision approach;

6) Any external augmentation system deemed necessary for the implementation of GNSS for a particular flight phase in an area under consideration (SBAS/GBAS including ground based regional augmentation system) should be implemented in full compliance with ICAO SARPs;

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 with the exception of State aircraft;

9) States undertake a co-coordinated R & D programme on GNSS implementation and operation;

10) ICAO and States should undertake education and training to provide necessary knowledge in GNSS theory and operational application, and

11) 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 , 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;

ASIA/PAC Checklist for Introduction of GNSS based operations

No.	Items to check	Reference	Remarks
1.	Establish GNSS Implementation Team (GIT); Establish a GNSS Office and designation of program/project officers –normally from regulator/service provider -Funding -Staffing The Terms of Reference of GIT is provided in the Annex 1 to this Checklist.	ICAO Circular 267-AN/159 for GIT composition as mentioned in 6.10.2 Section of the Circular; Refers to draft appendix 1 to the GNSS manual for a sample TOR of the GIT.	GIT possible members include: -CAA; -Operations; -ATS; -Airworthiness; -Industry; -Airlines; -General Aviation; -Defense; -Maintenance provider; -Pilot training.
2.	State Plan – define and confirm State operational requirements and Regulation changes: - En-route, NPA/APV - PA at selected airports - Produce Orders, AIC, AIP SUPS, MATS amendments etc.	FAA Advisory Circular (AC) 90-94A, Guidelines for Operators using GPS equipment for IFR En Route and Terminal Operations and for NPA in the U.S. National Airspace System; FAA Order 7100.10A-Air Traffic Satellite Navigation Plan.	Draft and publish - Advisory Circulars - AIC - Aeronautical Information Circular; - AIP supplements.
3.	Define Operations and ATS requirements - Determine Operation Use Policy; - Separation Standard application; - Establish ATC GNSS Use Procedures;		
4.	Basic constellation augmentation requirements Determine Augmentation Policy.	SARPs for augmentation systems	ABAS; GRAS SBAS; GBAS.
5.	WGS-84 -Ensure WGS-84 compliant; -WGS-84 survey and publications; -Ensure database vendors provide WGS-84 data.	ICAO World Geodetic System-1984 (WGS-84) Manual Doc9674-AN/946	
6.	En route Domestic/Oceanic & Remote Standards - Define and publish borders between standards - Education on standards and differences		
7.	NPAs - Locations selection - Obstacle survey and database - Airfield status - Use NPA Procedure Design Criteria PANS/OPS; - Publish GNSS Arrival Procedures - Environmental considerations	Chapter 33 and its appendix of PANS/OPS Doc8168 Vol-II, for basic GNSS receivers	Instrument Approach Procedure
8.	Airport standard: - Upgrade to instrument runway; - Obstacle Limit Surface (OLS); - Maintenance of OLS; - Suitability for straight in approach; - Windsock and supporting requirements; - Altimeter setting availability; - Lighting.	Annex 14	

9.	Determine and Implement Receiver Standard - Equipment installation Policy –Supplemental Type Certificate or equivalent; - Conduct Airworthiness Training and approvals; - Establish rule for GPS for terrestrial navigation aid substitution; - Changes to equipment carriage requirements - Limitation of TSO C129 receivers	Rx Design Standard (Selection) TSO-C129; TSO-C145; TSO-C146 (Stand alone).	TSO C129 (FD Limitation): Alternate solution + Barometric aiding;
10.	Operation approval: -Primary means -Supplemental means	Regional strategies for implementation of GNSS air navigation capability and the provision of precision approach and landing guidance systems	GPS as a primary means of Navigation in Oceanic/remote Operations; -N8110-60; -AC20-138.
11.	Flight Inspection and validation; - Topography and obstacle assessment; - Flight Inspection; - Selection of suitable aircraft for inspection; - Transit times/low/slow flying capability; - Fuel reserves/Communications requirements; - Proper avionics	DRAFT Volume 2 Chapters 1 and 2 of DOC 8071.	
12.	Crew training and approval -Pilot Endorsement - Aircraft equipment endorsement - Validation training - GNSS training and approval - Operation familiarization	Australian GPS Non Precision Approaches Instructor Pack-GPSIP CASA; and GPSIP2 CASA	
13.	Licensing: Pilot instrument rating requirements; -En route use; - NPAs.		
14.	GNSS signal monitoring and recording facilities in place.	State that approves GNSS-based operations should ensure that GNSS data relevant to these operations are recorded. The requirement is specified in the Amendment 76 to Annex 10 Vol. II. This recording may be done by non-aviation agencies such as Geodetic Survey Organization.	For use in accident and incident investigations and may also support periodic confirmation that accuracy, integrity, continuity and availability are maintained.
15.	Establish procedures for ensuring database consistency: - Approach Publication; - Implementation; - Operational Testing; - Training; - Flight Operations Inspectors; - Air Traffic Controllers; - Airworthiness; - Pilots and check pilots		Data Cards – to be integrated in Receivers. Responsibility for the correct data made by Jeppesen , Alternately can be got through Internet.
16.	Operational Training: - Procedure design - Air traffic controller	8168 Vol II Chapter 3	

17.	NOTAMs - For GPS, use Status message from USA - RAIM Prediction System (RPS) (if applicable)	RAIM Prediction Service (Australia Airservices website)	(Convert Message into operational NOTAMs for meeting the requirement)
18.	GNSS Incident or Anomaly Report	GPS Outage Query Form provided on the website: www.navcen.uscg.gov/gps	
19.	Post Implementation Review - Procedures compliance; - Revision of Documentation; - Incorporation of AIP Supplements into AIP; - Maintenance of approach Obstacle Limit Surfaces, Airfield status; - Conventional Navigation Aid Policy; - Consolidation Policy – navigation aid withdrawal.		

ANNEX 1 TO THE GNSS CHECKLIST

GNSS IMPLEMENTATION TEAM TERMS OF REFERENCE

1.0 INTRODUCTION

This document sets out the Terms of Reference for the Global Navigation Satellite System (GNSS) Implementation Team, which includes members from regulatory and service provider organizations, and user representatives. It defines the roles of participants with respect to the implementation of GNSS operations.

A common goal of the regulator and service provider is to ensure that aircraft operators receive the benefits of GNSS technology in a timely and effective fashion while maintaining high standards of safety. The GNSS Implementation Team will support this goal by fostering a cooperative approach to developing the standards, systems, procedures and the terms and conditions of regulatory approvals that respond to the needs of the aviation community.

Regulating GNSS and providing GNSS related services require that various branches in the regulatory and service provider organizations allocate resources to specific tasks. A key goal of the GNSS Implementaion Team is to identify resource requirements to allow managers to plan effectively. The GNSS related roles of branches and divisions in the two organizations are described in section 2.

Material developed by ICAO, including SARPs, Guidance Material and Manuals, form the basis for the actions taken by the GNSS Implementation Team. In the early stages, research sponsored by the Team will add to the body of knowledge needed to develop ICAO documentation. As GNSS evolves, the Team will be able to reply to a large extent on this documentation.

2.0 ROLES

2.1 Service Provider

2.1.1 Satellite Navigation Program Office (SNPO)

a) act as the focal point for the development of satellite navigation technology for aviation purposes;
b) complete trials and studies to prove GNSS concepts and test performance against safety standards;
c) coordinate efforts internationally to avoid duplication of effort;
d) provide guidance to the Member of the ICAO GNSS Panel, to ensure that international standards reflect national requirements, and participate in Panel working groups, as appropriate;
e) coordinate the delivery of service based on satellite navigation technology to aircraft operators;
f) develop performance requirements for GNSS augmentation systems, and specify augmentation system architecture to meet operational requirements;
g) field and test prototype augmentation systems to minimize risk with operational systems;
h) work with aircraft operators, aviation systems manufacturers, the academic community and users in other disciplines to ensure that augmentation systems meet requirements effectively and efficiently;

i) maintain knowledge of aircraft, pilot and operator certification standards and work with certification staff to ensure approvals are consistent with GNSS performance;
j) determine the economic viability of implementing augmentation systems, and develop appropriate strategies for fielding these systems and decommissioning traditional navigation aids;
k) develop the necessary documents to obtain funding for operational augmentation systems;
l) promote the use of satellite navigation technology, and assist aircraft operators to make informed decisions on equipage, through publications, presentations, other media and direct contact;
m) encourage the safe use of GNSS by contributing to safety awareness programs;
n) maintain detailed knowledge of satellite navigation avionics standards and performance, including pilot interface characteristics;
o) recommend satellite navigation procedure design features to exploit the strengths of the technology while minimizing pilot workload and the possibility of pilot error;
p) coordinate the development of survey standards to meet the accuracy requirements of satellite navigation approach procedures;
q) participate in the development of GNSS equipment standards;

2.1.2 National Flight Inspection Organization

a) complete flight trials and system performance studies to support GNSS implementation;
b) monitor GNSS performance;
c) complete necessary flight inspections for non-precision and precision approaches

2.1.3 Aeronautical Information Services

a) develop approach and other GNSS procedures;
b) complete in-flight checks of GNSS procedures to assess flyability and obstacles;
c) coordinate airspace-related GNSS issues with ATS;
d) verify GNSS instrument procedures submitted by designers;
e) develop depiction standards for GNSS instrument procedures;
f) develop standards for and control input to databases containing GNSS procedure coordinates, including participation in international standards bodies;
g) provide aeronautical information on GNSS procedures to database suppliers and chart producers;
i) incorporate GNSS information in the NOTAM system;

2.1.4 Planning and International/Government Liaison

a) incorporate GNSS material provided by SNPO in national and international planning documents;
b) incorporate the level of service criteria and planned decommissioning of traditional navigation aids into national and international planning documents;

2.1.5 Operational Requirements and Level of Service

a) develop detailed operational requirements for decommissioning traditional navigation aids, based on strategy developed by the SNPO;
b) complete aeronautical studies associated with decommissioning traditional navigation aids;

2.1.6 Engineering

a) develop technical specifications for augmentation systems;
b) procure and field GNSS augmentations, including related communications systems;
c) perform life cycle management of augmentation systems;
d) develop hardware and software to support GNSS flight inspections, trials and studies;
e) complete studies and investigations on the frequency interference aspects of GNSS performance;
f) provide spectrum management to protect GNSS frequencies
g) participate in the ICAO GNSS Panel to contribute to the development of international standards, recommended practices and guidance material;

2.1.7 Air Traffic Services

a) develop procedures to support GNSS operations;
b) provide air traffic services to support satellite navigation operations;
c) participate in the development of GNSS instrument procedures and in the development of the strategy and plans for decommissioning traditional navigation aids;

2.1.8 System Safety

a) monitor the introduction of satellite navigation technology to identify potential hazards;

2.2 Regulator

2.2.1 ANS & Airspace

a) Monitor the service provider's research and development of GNSS technology, and consider the service provider's recommendations for operational approvals based on this technology;
b) Assist with development activities to maintain knowledge of technology and operational applications;
c) Develop GNSS instrument procedure design standards;
d) Oversee the certification of GNSS augmentation systems and related airspace procedures, and monitor compliance;
e) Introduce airspace procedures appropriate to the capabilities of satellite navigation technology;
f) Approve survey standards;
g) Approve database integrity standards and monitor for compliance;
h) Evaluate aeronautical studies completed by the service provider to assess the impact of decommissioning traditional aids;
i) Publish GNSS information, provided by the SNPO and other GNSS Implementation Team members,in various publications;
j) Conduct ongoing safety oversight of the service provider's Safety Management Program with respect to the introduction of satellite navigation technology;

2.2.2 Aircraft Certification

a) develop national standards and guidance material for the certification of GNSS equipment and its installation and certification in nationally-registered aircraft. Where necessary the development of standards and guidance may be accomplished as a joint effort with other Airworthiness Authorities to minimize duplication of effort and maximize harmonization;
b) certify or oversee the certification, as applicable, of GNSS avionics equipment designed and manufactured nationally as well as the installation of all GNSS equipment installed in nationally registered aircraft;

c) participate in the development of GNSS avionics standards via bodies such as RTCA;

2.2.3 Commercial and Business Aviation

a) develop crew training and certification standards for the use of GNSS avionics by commercial and business aircraft operators;
b) approve the operational use of GNSS technology by commercial and business aircraft operators;

2.2.4 General Aviation

a) develop flight instructor guidelines & flight test standards for the use of GNSS avionics by general aviation aircraft operators;
b) in the course of Instrument Flight Tests and Commercial Pilot - Aeroplane Flight Tests, assess the ability of general aviation pilots to use GNSS avionics;

2.2.5 Aerodrome Safety

a) develop standards for the physical characteristics and obstacle limitation requirements at aerodromes as they affect GNSS instrument approach operations;
b) assess the application of GNSS to Advanced Surface Movement Guidance and Control Systems (ASMGCS) at airports, and develop standards as appropriate, to support the “gate to gate” air traffic management concept;

2.3 Aircraft Services

a) provide suitably-equipped aircraft and simulators to support GNSS trials and studies;
b) provide suitably-equipped aircraft and simulators to regulatory personnel to support their requirement for currency with GNSS operations;

2.4 System Safety

a) monitor the introduction of GNSS technology to identify potential hazards;

2.5 User Representatives

a) a wide cross section of users can provide strategic guidance and detailed recommendations on GNSS implementation;
b) specific users can participate in working groups assessing issues of significance to them.

IMPLEMENTATION OF THE ISCS/2 AND SADIS IN THE ASIA/PAC REGIONS

International Satellite Communication System (ISCS/2)

State/Territory	WAFS User	Location of VSAT	Access Approved	Equipment Installed	Equipment Operational
American Samoa (United States)		Information received from the US NWS, Honolulu via a dedicated circuit			
Australia	Bureau of Meteorology	Melbourne	X	X	X
China	China Meteorological Administration (CMA) Civil Aviation Administration Civil Aviation Administration Hong Kong Observatory Chinese Aeronautical Meteorology Association	National MET Centre, Beijing Beijing Intl. Airport Shanghai Intl. Airport Hong Kong Intl. Airport Taibei	X X X X X	 X X X	 X X X
Cook I	Meteorological Service				
Fiji	Meteorological Service	Nadi Intl. Airport	X	~~Being installed~~ X	X
French Polynesia (France)	Meteo France	Information received from France via satellite	X		
~~Guam (United States)~~				~~X~~	
Indonesia	Meteorological and Geophisical Agency	Soekarno - Hatta International Airport	X	X	X
Japan	Japan Meteorological Agency	Kokusai Denshin Denwa Co.,	X	X	X
Kiribati					
Mongolia	Civil Aviation Authority	Ulaanbaatar	X		
Nauru					
New Caledonia (France)	Meteo France		X	X	X
New Zealand	MET Service of New Zealand, Ltd	Auckland Wellington	X X	back up only X	 X
Niue					
Papua New Guinea	Meteorological Department	Port Moresby Intl. Airport	X	X	X
Philippines	Department of Meteorology	Manila	X	X	X

International Satellite Communication System (ISCS/2)

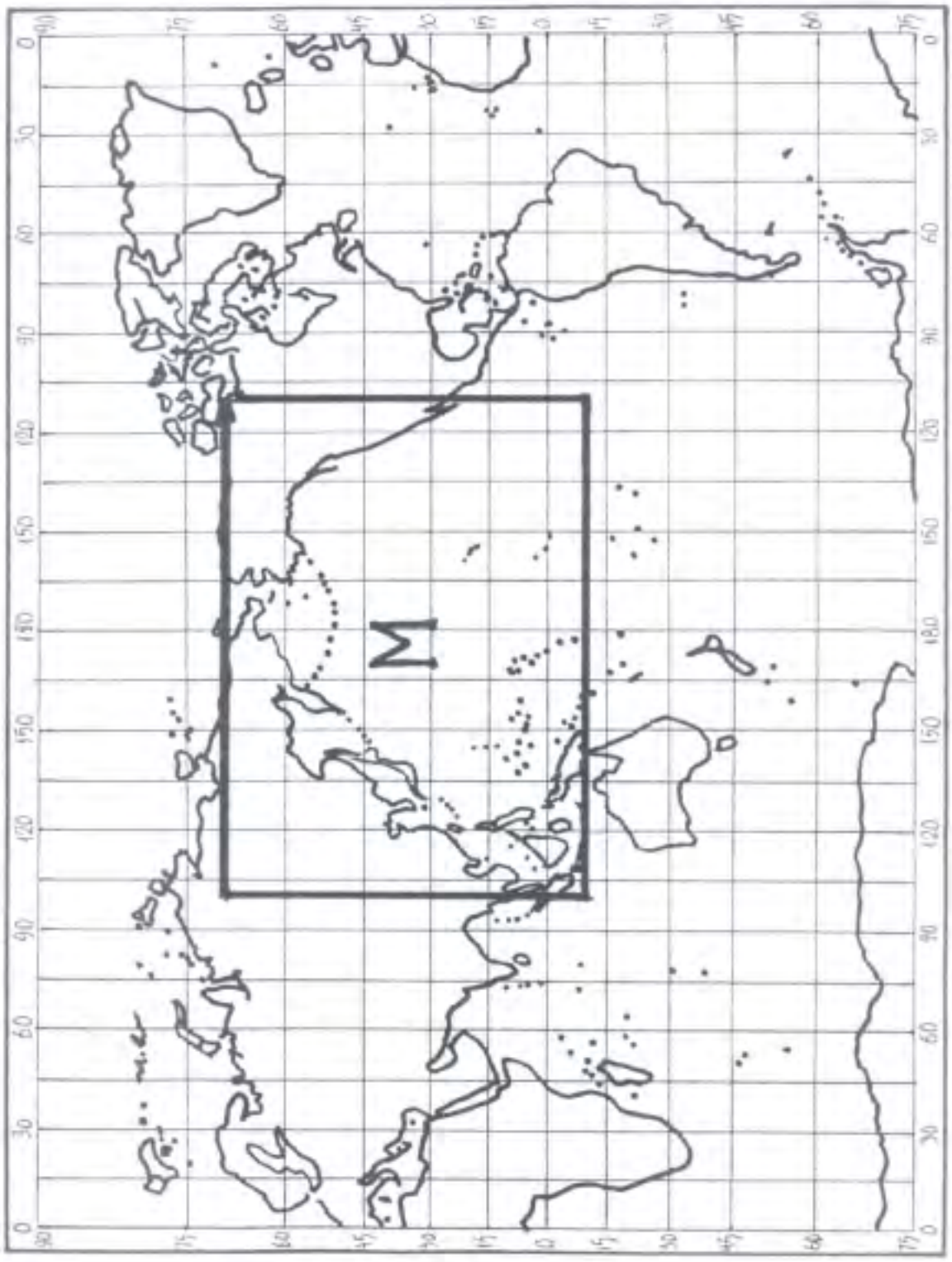
State/Territory	WAFS User	Location of VSAT	Access Approved	Equipment Installed	Equipment Operational
Republic of Korea	Meteorological Services	Seoul Intl. Airport	X	X	X
Samoa					
Singapore	Singapore MET Service	Singapore/Changi Intl. Airport	X	X	X
Thailand	Meteorological Department	Bangkok Intl. Airport	X		
Tonga					
Tuvalu					
Vanuatu	Meteorological Service	Port Vila	X		
Viet Nam	Meteorological Service	Hanoi City	X	X	X
United States	National Weather Service	Guam Hawaii	X X	X	X
Wallis I. (France)	Meteo France	Wallis	X	X	X

Satellite Distribution System (SADIS)

State/Territory	WAFS User	Location of VSAT	Access Approved	Equipment Installed	Equipment Operational
Australia	Bureau of Meteorology	Perth	X	X	
Bangladesh	Department of Meteorology	Dhaka	X	X	X
Brunei	Department of Civil Aviation	Brunei Intl. Airport	X	X	X
China	China Meteorological Administration (CMA)	National MET Centre, Beijing	X		
	Civil Aviation Administration	Beijing Intl. Airport	X	X	X
	Civil Aviation Administration	Guangzhou Intl. Airport	X	X	X
	Hong Kong Observatory	Hong Kong Observatory	X	X	X
	Chinese Aeronautical Meteorology Association	Taibei	X		
	Civil Aviation Administration	Macau Intl. Airport	X	X	X
DPR of Korea	General Administration of Civil Aviation	Pyongyang Intl. Airport	X	X	X
India	Meteorological Department	New Delhi	X	X	X
Indonesia	Meteorological and Geophysical Agency	Headquarters	X	X	
Lao PDR	Department of Meteorology	Vientiane, Wattay	X	X	X
Malaysia	Department of Meteorology	Kuala Lumpur Intl. Airport	X	X	X
Maldives	Department of Meteorology	Male Intl. Airport	X	X	X
Mongolia	Civil Aviation Authority	Ulaanbaatar Intl. Airport	X	X	X
Nepal	Department of Meteorology	Kathmandu Intl. Airport	X	X	X
Pakistan	Meteorological Department	Karachi Intl. Airport	X	X	X
Republic of Korea	Korea Meteorological Administration	Incheon Intl. Airport	X		
Singapore	Meteorological Service	Singapore/Changi Intl. Airport	X	X	X
Sri Lanka	Department of Meteorology	Colombo	X	X	X
Thailand	Thai Meteorological Department	Bangkok Intl. Airport	X	X	X
Vietnam	Civil Aviation Administration	Gialam Airport, Hanoi	X	X	X
	Civil Aviation Administration	Tan-Son-Nhat Intl. Airport, Ho Chi Minh	X	X	

WAFS MAXIMUM AREA OF COVERAGE – MERCATOR PROJECTION

FASID CHART MET 7



ASIA/PAC ANP

FASID TABLE MET 5 – REQUIREMENTS FOR WAFS PRODUCTS

EXPLANATION OF THE TABLE

PRODUCT REQUIRED

W/T Chart	=	Wind and temperature chart
SWM	=	Medium level significant weather chart (FL 100 - 240)
SWH	=	High level significant weather chart (FL 250 - 630)

CHART COVERAGE REQUIRED

D, E, F, G, H, I, J, K, M = Maximum area of coverage required (see Charts MET ~~2~~ 4, ~~3~~ 5, 6 and ~~4~~ 7 attached to Table MET 6)

FASID TABLE MET 5 - REQUIREMENTS FOR WAFS PRODUCTS

PRODUCT REQUIRED	AREAS REQUIRED
W/T CHART > FL 390	D, E, F, G, I, J
A @ A @ FL 390	D, E, F, G, I, J
A @ A @ FL 340	D, E, F, G, I, J
A @ A @ FL 300	D, E, F, G, I, J
A @ A @ FL 240	D, E, F, G, I, J
A @ A @ FL 180	D, E, F, G, I, J
A @ A @ FL 100	D, E, F, G, I, J
A @ A @ FL 50	D, E, F, G, I, J
SWM (FL 100 - 450)	D
SWH CHART (FL 250 - 630)	D, E, F, G, I, J, K, M
GRIB data	GLOBAL
Amendment to SIGWX forecasts in abbreviated plain language	D, E, F, G, I, J, K

ASIA/PAC ANP

FASID TABLE MET 6 – RESPONSIBILITIES OF THE WORLD AREA FORECAST CENTRES

EXPLANATION OF THE TABLE

Column

1 Name of the world area forecast centre (WAFC).

2 Area of responsibility for the preparation of significant weather (SIGWX) forecasts by the WAFC in Column 1.

3 Area of coverage of the SIGWX charts prepared or relayed by the WAFC in Column 1.

4 Area of coverage of the upper-wind and temperature charts prepared by the WAFC in Column 1.

5 Area of coverage of the GRIB data prepared by the WAFC in Column 1.

FASID TABLE MET 6 B RESPONSIBILITIES OF THE WORLD AREA FORECAST CENTRES

WAFC	SIGWX		Upper wind and temperature	
	Area of responsibility	Areas of coverage of SIGWX	Areas of charts coverage	GRIB data
London	global[1]	D, ASIA SOUTH MEDIUM[2], E, G, K	D, E, G	global
Washington	global[1]	F, I, J, M	F, I	global

Note : All SIGWX charts are for FL250 – 630, except for ASIA SOUTH

[1] For back-up purposes

[2] Special medium level chart (FL100-450)

SADIS STRATEGIC ASSESSMENT TABLES
CURRENT AND PROJECTED OPMET DATA VOLUMES 2001-2005

TABLE 1

ICAO REGION: ASIA

MAIN ROUTING(S): AFTN, Two-Way, Direct Line (GTS) **(E.G CAPSIN AND AFTN/GTS/SADIS TWO-WAY)**

	Current 2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005
ALPHNUMERIC OPMET DATA					
Number of FC bulletins **issued per day**	**52**	**55**	**60**	**60**	**60**
Average number of stations per FC bulletin	**6**	**6**	**6**	**6**	**6**
Number of FT bulletins **issued per day ****	**252**	**300**	**300**	**300**	**300**
Average number of stations per FT bulletin	**6**	**6**	**6**	**6**	**6**
Number of SA bulletins **issued per day**	**1257**	**1300**	**1350**	**1400**	**1450**
Average number of stations per SA bulletin	**6**	**6**	**6**	**6**	**6**
Number of SP bulletins **issued per day**	**1**	**25**	**50**	**50**	**50**
Number of SIGMET bulletins **issued per day**	**60**	**100**	**125**	**125**	**125**
(WS<WV and WC) for relevant FIRS					
OTHER OPMET DATA					
Number of other bulletins issued per day					
(please specify header(s))					
Average number of stations per bulletin					
TOTALS					
Total number of OPMET bulletins per day	1622	1780	1885	1935	1985
Average size of OPMET bulletin (bytes)	0.30	0.35	0.35	0.35	0.35
TOTAL ESTIMATED OPMET DATA VOLUME PER DAY (BYTES)	487K	623K	660K	677K	695K

CURRENT AND PROJECTED T4 FACSIMILE CHART VOLUMES 2001-2005

TABLE 2

ICAO REGION: ASIA
MAIN ROUTING(S):GTS

(E.G CAPSIN AND AFTN/GTS/SADIS TWO-WAY)

T4 FACSIMILE CHART INVENTORY	2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005
Head number/Chart name					
Time of issue of chart (UTC)	**No Requirement**	**No Requirement**	**No Requirement**	**No Requirement**	**No Requirement**
Average size of chart (bytes)					
Chart type (e.g. wind/temp/SIGWX)					
Chart level (FL range or medium/high level)					
Validity time of chart VT (UTC)					
High number/Chart name					
Time of issue of chart (UTC)					
Average size of chart (bytes)					
Chart ape (e.g. wind/temp/SIGWX)					
Chart level (FL range or medium/high level)					
Validity time of chart VT (UTC)					
TOTALS					
Total number of T4 charts issued per day					
Average size of each chart (bytes)					
TOTAL ESTIMATED T4 CHART DATA VOLUME PER DAY (BYTES)					

(Levels: medium FL 1000-250, high>FL250)
(*1 octet = 8 byte = 1 character)

CURRENT AND PROJECTED BUFR DATA VOLUMES 2001 - 2005

TABLE 3

ICAO REGION: ASIA
MAIN ROUTING(S): Two-Way, GTS **(E.G CAPSIN AND AFTN/GTS/SADIS TWO-WAY)**

BUFR SIGWX MESSAGES	2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005
				One sites	**One site**
WMO Header					
Time(s) of issue of data (UTC)	**No Requirement**	**No Requirements**	**No Requirements**	**0700, 1300, 1900, 0100**	**0700, 1300, 1900, 0100**
Average size of message (bytes)				**15K**	**15K**
Data level (e.g. FL range or low/medium/high level)				**SWL/SWM***	**SWL/SWM***
Validity time(s) of data VT (UTC)				**1200, 1800, 0000, 0600**	**1200, 1800, 0000, 0600**
WMO Header					
Time(s) of issue of data (UTC)				**0700, 1300, 1900, 0100**	**0700, 1300, 1900, 0100**
Average size of message (bytes)				**15K**	**15K**
Data level (e.g. FL range or low/medium/high level)				**SWL/SWM***	**SWL/SWM***
Validity time(s) of data VT (UTC)				**1200, 1800, 0000, 0600**	**1200, 1800, 0000, 0600**
WMO Header					
Time(s) of issue of data (UTC)				**0700, 1300, 1900, 0100**	**0700, 1300, 1900, 0100**
Average size of message (bytes)				**15K**	**15K**
Data level (e.g. FL range or low/medium/high level)				**SWL/SWM***	**SWL/SWM***
Validity time(s) of data VT (UTC)				**1200,1800,0000, 0600**	**1200,1800,0000, 0600**
TOTALS					
Total number of BUFR messages per day				12	12
Average size of messages (bytes*)				15K	15K
TOTAL ESTIMATED VOLUME OF BUFR MESSAGES PER DAY (BYTES)				180K	180K

(*1 octet = 8 byte = 1 character) (low level <FL 100, medium level: FL100 – 250, high level. FL 250)

CURRENT AND PROJECTED AIS DATA VOLUMES 2001 – 2005
(Subject to statement of an operational requirement)

TABLE 4

ICAO REGION: ASIA
MAIN ROUTING(S): Two-Way, AFTN **(E.G CAPSIN AND AFTN/GTS/SADIS TWO-WAY)**

AIS **(Subject to statement of an operational requirement)**	2001	Projected 2002	Projected 2003	Projected 2004	Projected 2005
ALPHANUMERIC AIS DATA (e.g. NOTAMs)			From Two-Way site		
Bulletin type:	**No requirement**	**No requirement**	**No requirement**	**No requirement**	**No Requirement**
Number of bulletins issued per day					
Average size of each bulletin (byte*)					
Bulletin type:					
Number of bulletins issued per day					
Average size of each bulletin (byte*)					
CHART AIS DATA (e.g. AIP CHARTS)					
Header number/Chart type (e.g. AIP)					
Time(S) of issue of chart (UTC)					
Average size of chart (bytes*)					
Validity time of chart VT(UTC)					
Header number/Chart type (e.g. AIP)					
Time(S) of issue of chart (UTC)					
Average size of chart (bytes*)					
Validity time of chart VT(UTC)					
TOTALS					
Total number of AIS bulletins per day					
Average size of AIS bulletin (bytes)					
Total number of AIS charts issued per day					
Average size of AIS chart (bytes)					
TOTAL ESTIMATED VOLUME OF AIS DATA PER DAY (bytes)					

***1 octet = 8 byte = 1 character)**

SADIS STRATEGIC ASSESSMENT TABLES

ASIA/PAC WAFS Transition Plan and Procedures

3rd 4th Edition - July 2006 1

ASIA/PAC WAFS Transition Plan and Procedures

4th Edition - July 2001

Introduction

1. The ~~ICAO~~ Asia/Pacific WAFS Transition Plan and Procedures has been revised to take account of progress already made and in recognition of the impact of the final phase of WAFS.

The Final Phase of WAFS

2. This plan is based on the understanding that the Final Phase of WAFS, as it will apply to the Asia/Pacific Regions involves:

a. Production and dissemination by the WAFCs of global forecast winds, temperatures, tropopause height, tropopause temperature and humidity in GRIB format. The wind and temperature forecasts are now operational. **Note**: Humidity and forecast information for FL140 is expected to be introduced in November 2001 in response to user requirements, especially for ETOPS operations.

b The transfer of responsibility for the production for SWH from RAFCs to the two WAFCs, and hence the closing down of the RAFCs.

c The implementation of a communication system/s for the distribution of WAFS products in the Asia/Pacific Regions, to all the States that require the products in support of international air navigation. The final phase envisages this will be achieved via satellite broadcast (SADIS and ISCS/2). States may need to use an alternative distribution system.

d The production and distribution (via satellite broadcast) by the WAFCs, of Global, quality controlled SWH (FL 250 - 630) in BUFR format, and Global SWM in BUFR format (in raw form, i.e. not quality controlled except over limited geographical areas where required by PIRGS)

e The capability of States to convert BUFR and GRIB messages to graphical products on an operational basis.

SIGWX Charts

~~3. The transfer of responsibilities for the production of high level SIGWX forecasts from the RAFCs to the WAFCs is the decision of the ICAO Regional Planning groups. As the quality and accuracy of the SIGWX forecasts are evaluated as acceptable for flight planning purposes, coordination is taking place for the transition of the Asia/Pacific RAFC responsibilities for SIGWX charts to the two WAFCs.~~

~~4~~3. ~~The sequence of events to transfer SWH responsibility from the RAFCs Melbourne, Tokyo and Wellington to the WAFC Washington and London as appropriate, and high/medium level SIGWX charts from the RAFC New Delhi to the WAFC London is shown below.~~ The table below shows the status of the ~~introduction of~~ SIGWX charts and responsible WAFCs.

Chart area & responsible WAFC	~~Status~~
G London (SWH)	~~Operational~~
K London (SWH)	~~Operational~~
D London (SWH)	~~Operational~~
Asia South medium & high	~~Operational~~
J Washington (SWH)	~~Operational~~
E London (SWH)	~~Operational~~
F Washington (SWH)	~~Operational~~
I Washington (SWH)	~~Operational~~
M Washington (SWH)	

~~5~~4. There will be an ongoing requirement for NMSs to monitor the quality of WAFC ~~produced~~ products ~~SIGWX charts~~, at least until the Final Phase of WAFS~~, that is beyond the date of transfer of responsibility for SIGWX~~.

~~6~~5. Action required to be taken by States to adhere to the provision of Annex 3 to ensure the relevant advisories for tropical cyclones, volcanic ash, the accidental release of radio active material and SIGMETs are made available to the WAFCs in a timely manner.

~~7. The table below shows the dates when SIGWX charts were considered operational by the Region:~~

~~RAFC~~	~~Chart area~~	~~Date when SIGWX chart considered operational~~
~~New Delhi~~	~~D and Asia South~~	~~July 1999~~
~~Tokyo~~	~~I, E and G~~	~~February 2000~~
~~Wellington~~	~~J and F~~	~~April 2000~~
~~Melbourne~~	~~E, F and K~~	~~July 2000~~

6. The SIGWX charts produced by WAFC Washington are also available on the US NWS Aviation Weather Center Internet site at: http://www.awc-kc.noaa.gov/awc/hilvl.html, with the exception of Area M. All WAFC London products will be available on an internet site, together with appropriate GRIB and BUFR decoding facilities, by the end of 2001.

~~8. The SIGWX charts produced by WAFC Washington are also available on the US NWS Aviation Weather Center Internet site at: http://www.awc-kc.noaa.gov/awc/hilvl.html~~

~~9~~ 7. States are encouraged to send comments to the WAFCs about the quality and accuracy of SIGWX on a frequent and regular basis during the transition period to the Final Phase. Contact details for comments are:

WAFC Washington

i. NWS/Aviation Weather Center
Attention Mr Ronald Olson
7220 NW 101st Terrace
Kansas City, Missouri
USA 64153-2371
ii E-mail addressed to: ronald.olson@noaa.gov
iii Fax number: 1 816 880 0650

WAFC London

i. The Met. Office
Attention : Mr. Neil Halsey
Civil Aviation Branch
Sutton House
London Road, Bracknell
Berkshire RG12 2SY, United Kingdom
ii E-mail addressed to: neil.halsey@metoffice.com
iii Fax number: +44 (1344) 854 156

~~10 An evaluation form to help focus the assessment comments is provided at Attachment 2.~~

~~11. SIGWX charts produced by the WAFCs for the respective areas of responsibility of the RAFCs Melbourne, New Delhi, Tokyo and Wellington have been evaluated as being of satisfactory quality and accuracy. Coordination, has been initiated for the transfer of responsibility from the RAFCs to the respective WAFCs.~~

Distribution of WAFS Products

~~12~~ 8. ~~Initially m~~Most States in the Asia/Pacific Regions ~~will receive~~ are receiving wind, temperature (and humidity in November 2001) forecasts in GRIB, and SIGWX in T4 facsimile format from the two WAFCs by VSAT, either SADIS or ISCS/2. A range of WAFS products ~~may be~~ are available via the Internet ~~or where possible~~ and through bilateral arrangements with neighbouring national meteorological services.

~~13~~ 9. In the final phase of WAFS the two WAFCs will distribute by satellite broadcast Global quality controlled, SWH, and Global SWM in raw form (~~i.e. not quality controlled~~ with quality assurance for limited geographical areas) Once suitable decoding software is made available to States in the Asia/Pacific Regions, to provide them with the ability to operationally construct graphical SIGWX from the BUFR messages, and graphical products from the GRIB messages, the T4 facsimile format charts will be eliminated from the satellite broadcasts.

The Production of Regional SWM Charts

~~14~~ 10. The WAFCs may, where there is a regional requirement, produce as an interim arrangement (prior to the production of Global SWM in BUFR) SWM charts for limited areas of coverage. ~~The requirement for the production by the WAFCs of a SWM chart within the Asia/Pacific Region will be investigated in coordination with States and IATA.~~

The Production of National SWM Charts

~~15~~ 11. The production and exchange of SIGWX in BUFR (i.e. when the final phase of WAFS is achieved) will add to the benefits derived from the WAFS by the States within the Asia/Pacific Regions.

Indicative Timetable for Achieving the Final Phase of WAFS

~~16~~ 12. The table given in Attachment 1 provides an indicative timetable for the implementation of the Final Phase of WAFS within the Asia /Pacific Regions.

Volcanic Ash Advisory Centres (VAACs)

~~17~~ 13. The VAACs will have an ongoing role of monitoring WAFS SIGWX charts that cover their areas of responsibility, and advising the appropriate WAFC to ensure the accurate inclusion of the volcanic ash symbol.

Tropical Cyclone Advisory Centres (TCAC)

~~18~~ 14. The TCACs will have an ongoing role of monitoring WAFS SIGWX charts that cover their areas of responsibility, and advising the appropriate WAFC to ensure the accurate inclusion of the tropical cyclone symbol.

ASIA/PAC WAFS Transition Plan and Procedures

Attachment 1

Indicative Timetable for achieving the Final Phase of WAFS

Item	Task/Stage of Implementation of WAFS	Anticipated Date
1	~~Transfer of responsibility from RAFCs to the WAFCs for the production of SWH, RAFCs Melbourne, and Wellington and New Delhi~~ ~~RAFC Tokyo~~ ~~for the production SWM, RAFC New Delhi~~ WAFC London products on access controlled internet site	~~September 2000~~ ~~March 2001~~ ~~September 2000~~ late 2001
~~2~~	~~The closing down of the RAFCs Melbourne, New Delhi, Tokyo and Wellington~~	~~March 2001~~
~~3~~ 2	The establishment of back-up distribution arrangements for WAFS products.	~~to be determined~~ late 2002
3	Training in the operational conversion of GRIB forecasts to Wind / Temp charts	late 2002
4	All states that receive GRIB products capable of converting GRIB forecasts to Wind / Temp charts	early 2003
5	Removal of T4 Facsimile Wind / Temp charts from the satellite broadcast	mid 2003
6	The provision to States in the Regions of suitable BUFR decoding software.	mid 2002
7	Training in the operational conversion of BUFR to SIGWX charts	late 2003
~~4~~	~~Consideration of the requirements for a regional SWM.~~	~~July 2001~~
~~5~~ 8	~~The provision to the States in the region of suitable BUFR decoding software, and the~~ States having the ability to operate the decoding software to convert BUFR SIGWX messages into graphical format.	~~Late 2001~~ mid 2004
~~6~~ 9	The satellite distribution by the two WAFCs of global SWH and SWM in BUFR format.	~~Early 2002~~ 2003
~~7~~ 10	Removal of T4 Facsimile SIGWX products from the satellite broadcast	~~2003/4~~ late 2004
~~8~~	~~Implementation of the Final Phase of WAFS~~	~~2004~~

ASIA/PAC WAFS Transition Plan and Procedures Attachment 2

***Evaluation of WAFC SWH Products* by** _____

Chart ..... from **WAFC London** ☐ **Washington** ☐ Valid .....UTC on...../...../200.....

No	Elements	Comments (mark appropriate box with a X)
1	Jet Streams	1.1 Position - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ 1.2 Strength - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ Comments:
2	Turbulence Areas	2.1 Position - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ 2.2 Strength - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ 2.3 Areas - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ Comments:
3	Embedded Cb	4.1 Position - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ 4.2 Height - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ 4.3 Areas - Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐
4	Surface fronts	Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐
5	Tropopause Heights	Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐
6	Tropical Cyclones	Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐
7	Navigation Information	Sufficient points ☐ Mostly OK ☐ Not sufficient ☐
8	Overall Acceptability	Fully acceptable ☐ Mostly OK ☐ Not acceptable ☐ Comments:

Evaluation by: _____ Date: ...../...../.....

Future Work Programme for the ASIA/PAC WAFS Transition Task Force

The issues to be addressed by the ASIA/PAC Transition Task Force include :

1. Planning and coordinating the replacement of Wind/Temp charts in T4 facsimile format to GRIB.

2 Planning and coordinating for the transfer of SIGWX charts from T4 facsimile format to BUFR format.

3 Developing guidelines and procedures for the operational conversion of BUFR products significant weather charts.

4 Coordinating the provision of assistance to smaller States to ensure the Final Phase of WAFS can be effectively implemented in the Asia Pacific

5 Keep the Draft Asia/Pacific WAFS Transition Plan and Procedures up to date.

Proposal for Amendment of
Regional Supplementary Procedures ICAO Doc 7030/4
(Serial No. APAC-S 01/1 - MID/ASIA/PAC MET)

a) **Regional Supplementary Procedures, Doc 7030/4:** MID/ASIA/MET & PAC/MET

b) **Originated by:** Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)

c) **Proposed amendment:**

1. MID/ASIA, PART 3 – METEOROLOGY, incorporating Amendment No. 194, page MID/ASIA/MET-1

Amend Section 1.0 – Aircraft Observations and Report as follows :

"These procedures are supplementary to the provisions contained in Annex 3.

1.0 AIRCRAFT OBSERVATIONS AND REPORTS
(A3 – Chapter 5)

1.1 ~~When air-ground data link is used and ADS is being applied, or when voice communications are used, a~~Aircraft cleared on high-density routes in the Kabul, Teheran, Muscat, Emirates, Bahrain, Jeddah, Amman and Damascus flight information regions between 2300 and 0500 UTC shall be required to transmit routine meteorological observations only when so designated at the time of receiving their clearance in accordance with MID/ASIA/RAC 3.5.1 and 3.5.2.

1.2 When voice communications are used, ~~A~~aircraft flying over Japan and Continental Asia shall be exempted from ~~making, recording and~~ reporting routine observations.

1.3 Aircraft ~~flying~~ cleared on high-density routes between Tokyo and Hong Kong, Tokyo and Taipei, Hong Kong and Taipei, Hong Kong and Bangkok, Hong Kong and Singapore, Hong Kong and Kuala Lumpur, Bangkok and Kuala Lumpur, Bangkok and Singapore shall be required to ~~make~~ transmit routine meteorological observations ~~at the designated ATS/MET reporting points~~ only when ~~requested by the appropriate authorities~~ so designated at the time of receiving their clearance in accordance with MID/ASIA/RAC 3.5.1 and 3.5.2."

2. PAC, PART 3 – METEOROLOGY, incorporating Amendment No. 181, page PAC/MET-1

Amend Section 1.0 – Aircraft Observations and Reports as follows :

"These procedures are supplementary to the provisions contained in Annex 3.

1.0 AIRCRAFT OBSERVATION AND REPORTS
(A3 – Chapter 5)

1.1 ~~Aircraft which are not equipped with RNAV equipment shall be exempted from making routine air reports.~~"

d) **Proposers' reason for amendment:** As consequential action by the Council in adopting Amendment 70 to Annex 3 to take account of automated air reporting.

e) **Proposed implementation date of the amendment:** Upon approval by the Council

f) **Proposal circulated to the following Sates and International Organizations:**

Afghanistan
Argentina
Australia
Bahrain
Bangladesh
Bhutan
Brazil
Brunei Darussalam
Cambodia
Canada
Chile
China
cc: Hong Kong, China
Cook Islands
Cyprus
Democratic People's Republic of Korea
Ecuador
Egypt
Fiji
France
Germany
India
Indonesia
Iran, Islamic Republic of
Iraq
Israel
Japan
Jordan
Kazakhstan
Kiribati
Kuwait
Kyrgyzstan
Lao People's Democratic Republic
Lebanon
Libyan Arab Jamahiriya
Luxembourg
Malaysia
Maldives
Marshall Islands
Mexico
Micronesia, Federated States of
Mongolia
Myanmar
Nauru
Nepal
Netherlands, Kingdom of the
New Zealand
Oman
Pakistan
Palau
Papua New Guinea
Peru
Philippines
Portugal
Qatar
Republic of Korea
Russian Federation
Samoa
Saudi Arabia
Singapore
Solomon Islands
Sri Lanka
Sudan
Syrian Arab Republic
Tajikistan
Thailand
Tonga
Turkmenistan
United Arab Emirates
United Kingdom
United States
Uzbekistan
Vanuatu
Viet Nam
Yemen
IATA
IFALPA
IFATCA
WMO

g) **Secretariat comments:**

1) No recording is required for any routine aircraft observations (provisions related to post-flight reporting have been deleted). The exemptions are applicable to voice communications only in accordance with Annex 3 — *Meteorological Service for International Air Navigation*, Chapter 5, paragraph 5.4.7.

2) MET designation procedures have been aligned to the MID/ASIA & PAC RAC Regional Supplementary Procedures.

3) This amendment is in line with plans to implement in the MID/ASIA and PAC Regions the provisions of Annex 3 concerning automated air reporting of meteorological information as required by the introduction of VHF and satellite air-ground data link communications.

4) The proposed amendment to the Regional Supplementary Procedures, ICAO Doc 2030/4 had been discussed and endorsed by APANPIRG/12 Meeting in its Conclusion 12/28 as recommended by the ASIA/PAC/3 RAN.

. . . . . .

ASIA/PAC FASID **6-3-~~H~~B-1**

FASID TABLE MET 3~~, PART II~~ B — VOLCANIC ASH ADVISORY CENTRE

EXPLANATION OF THE TABLE

Column

1. Location of the tropical cyclone advisory centre (VAAC)
2. Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
3. MWOs to which the advisory information on volcanic ash should be sent.
4. ACC to which the advisory information on volcanic ash should be sent
5. ICAO location indicator assigned to the ACC in Column 4.

Note. — ICAO location indicators for MWOs are shown in FASID Table MET 1B.

ASIA/PAC FASID **6-3-~~H~~B-3**

VOLCANIC ASH ADVISORY CENTRE	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT
Anchorage (United States)	Anchorage Oceanic Anchorage Continental Anchorage Arctic and west to 150˚ E, north of 60˚ N	~~Fairbanks~~ ~~Juneau~~ Tokyo ~~Washington~~
Darwin (Australia)	Southward from 10◦N and from 100◦E to 160◦E and the Perth FIR between 100˚ E and 75˚E, Colombo FIR and those parts of the Kuala Lumpur, Bangkok, Chennai, Yangon and Calcutta FIRs lying within 10˚N 100˚E to 20˚N 100˚E to 20˚N 82˚E to 10˚N 82˚E to 6˚N 78˚E to 2˚S 78˚E to 6˚E 75˚E	Adelaide Bangkok Biak Brisbane Chennai Darwin Denpasar Guam Hobart ~~Ho-Chi-Minh~~ Gia Lam Honiara Jakarta Kota Kinabalu Kuala Lumpur Manila Melbourne Perth Port Moresby Singapore Sydney Tokyo Townsville Ujung Pandang ~~Washington~~ ~~Wellington~~ Yangon
Tokyo (Japan)	60◦N to 10◦N – and from ~~100~~90◦E to Oakland Oceanic and Anchorage Oceanic and Continental FIR boundaries	Bangkok Beijing Darwin Guangzhou ~~Hanoi~~ ~~Ho-Chi-Minh~~ Gia Lam Hong Kong Khabarovsk Kunming Lanzhou Magadan Manila Naha Petropavlovsk-Kamchatsky Phnom-Penh Pyongyang Seoul Shanghai Shenyang Taibei Tokyo Ulan-Bator Urumqi Vientiane Vladivostok ~~Washington~~ Wellington Wuhan Yuznosakhalinsk

6-3-~~H~~B-4 **ASIA/PAC FASID**

VOLCANIC ASH ADVISORY CENTRE	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT
Washington (United States)	New York Oceanic, Oakland Oceanic and United States Continental FIRs, CAR Region, SAM Region, north of 10˚S	~~Anchorage~~ Darwin Guam Honolulu Tokyo ~~Wellington~~
Wellington (New Zealand)	Southward from the Equator ~~to 60˚S~~ and from 160˚E to 140˚W	Darwin Fiji Honiara Honolulu Nauru Tahiti Tokyo ~~Washington~~ Wellington

ASIA/PAC FASID **6-3-~~I~~A-1**

FASID TABLE MET 3~~, PART I~~ A — TROPICAL CYCLONE ADVISORY CENTRE

EXPLANATION OF THE TABLE

Column

1. Location of the tropical cyclone advisory centre (TCAC).

2. Area of responsibility for the preparation of advisory information on tropical cyclones by the TCAC in Column 1.

3. Period of operation of the TCAC.

4. MWO to which the advisory information on tropical cyclones should be sent.

Note. — ICAO location indicators for MWOs are shown in FASID Table MET 1B.

ASIA/PAC FASID **6-3-1A-3**

TROPICAL CYCLONE ADVISORY CENTRE	AREA OF RESPONSIBILITY[1]	TROPICAL CYCLONE SEASON[2]	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT
1	2	3	4
Miami (United States)	Eastern Pacific N: ~~30~~ 60°N S: 0°N W: ~~180~~140°W E: Coastline	May - November	Guam Honolulu Kansas City Miami Tahiti
Honolulu (United States)	Central Pacific N: 60°N S: 0°N W: 180°W E: 140°W	May - November	Anchorage Guam Honolulu Kansas City Tahiti
New Delhi (India)	1) Bay of Bengal 2) Arabian Sea: N: Coastline S: 5°N W: 60°E E: 100°E	April - June October- December	Calcutta Chennai Colombo Dhaka Delhi Jakarta Karachi Kuala Lumpur Male Mumbai Tehran Yangon
Darwin (Australia)	1) South-East Indian Ocean N: 0°S S: 36°S W: 90°E E: 141°E 2) South-West Pacific Ocean N: 0°S S: 40°S W: 141°E E: 160°E	November - April	Adelaide Biak Brisbane Colombo Darwin Denpasar Hobart Honiara Jakarta Melbourne Perth Port Moresby Sydney Townsville Ujung Pandang
Nadi (Fiji)	Southern Pacific N: 0°S S: 40°S W: 160°E E: 120°W	November - April	Brisbane Hobart Honiara Honolulu Melbourne Nadi Nauru Sydney Tahiti Townsville Wellington

6-3-AI-4 **ASIA/PAC FASID**

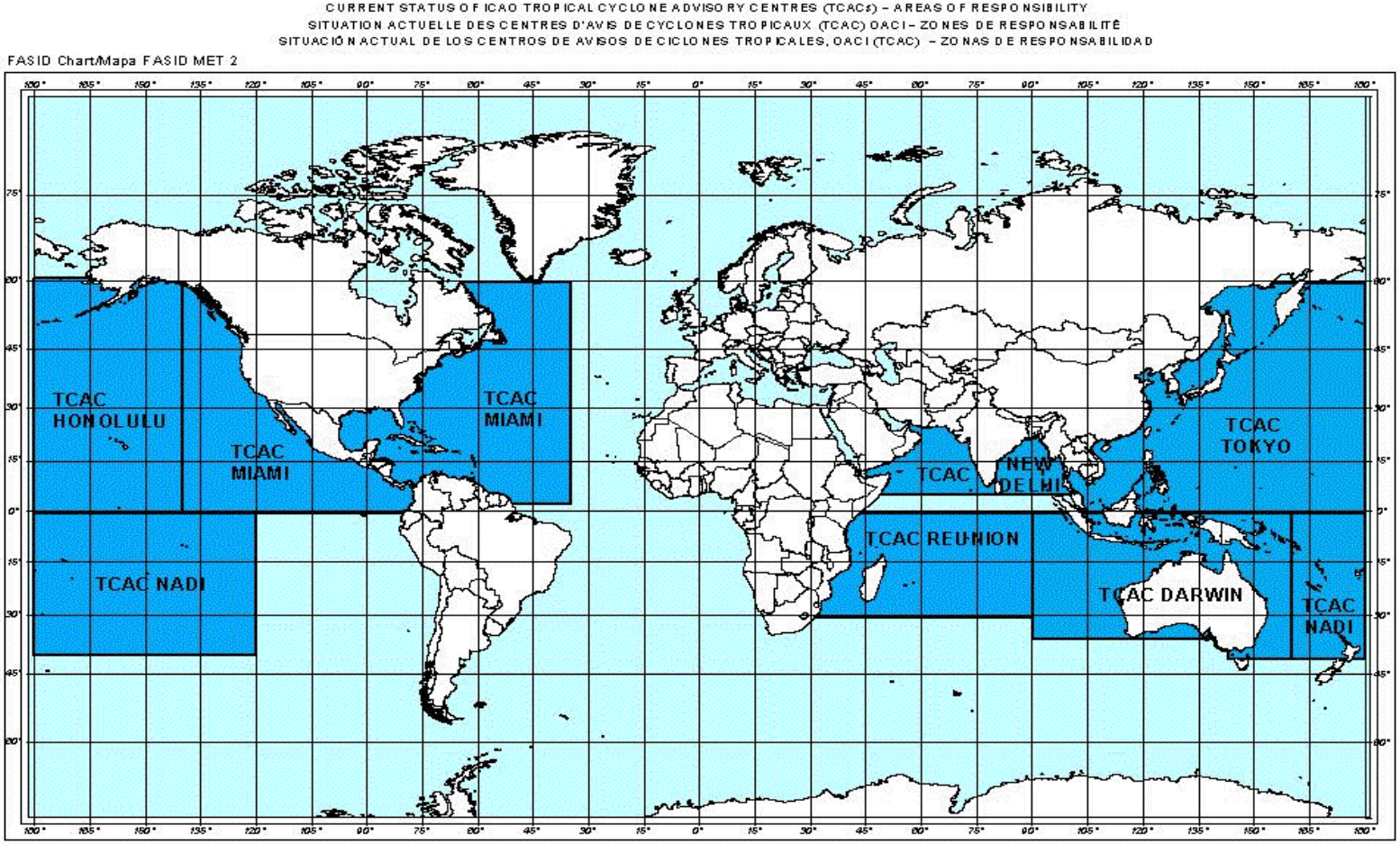
TROPICAL CYCLONE ADVISORY CENTRE	AREA OF RESPONSIBILITY[1]	TROPICAL CYCLONE SEASON[2]	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT
1	2	3	4
Tokyo (Japan)	Western Pacific (including South China Sea) N: 6 0°N S: 0°N W: 100°E E: 180°E	January - December	Bangkok Biak Denpasar Guam Guangzhou ~~Hanoi~~ ~~Ho-Chi-Minh~~ Gia Lam Hong Kong Honolulu Jakarta Kansas City Kota Kinabalu Kuala Lumpur Manila Nadi Naha Nauru Phnom-Penh Pyongyang Shanghai Singapore Seoul Taibei Tokyo Ujung Pandang

NOTES/NOTAS:

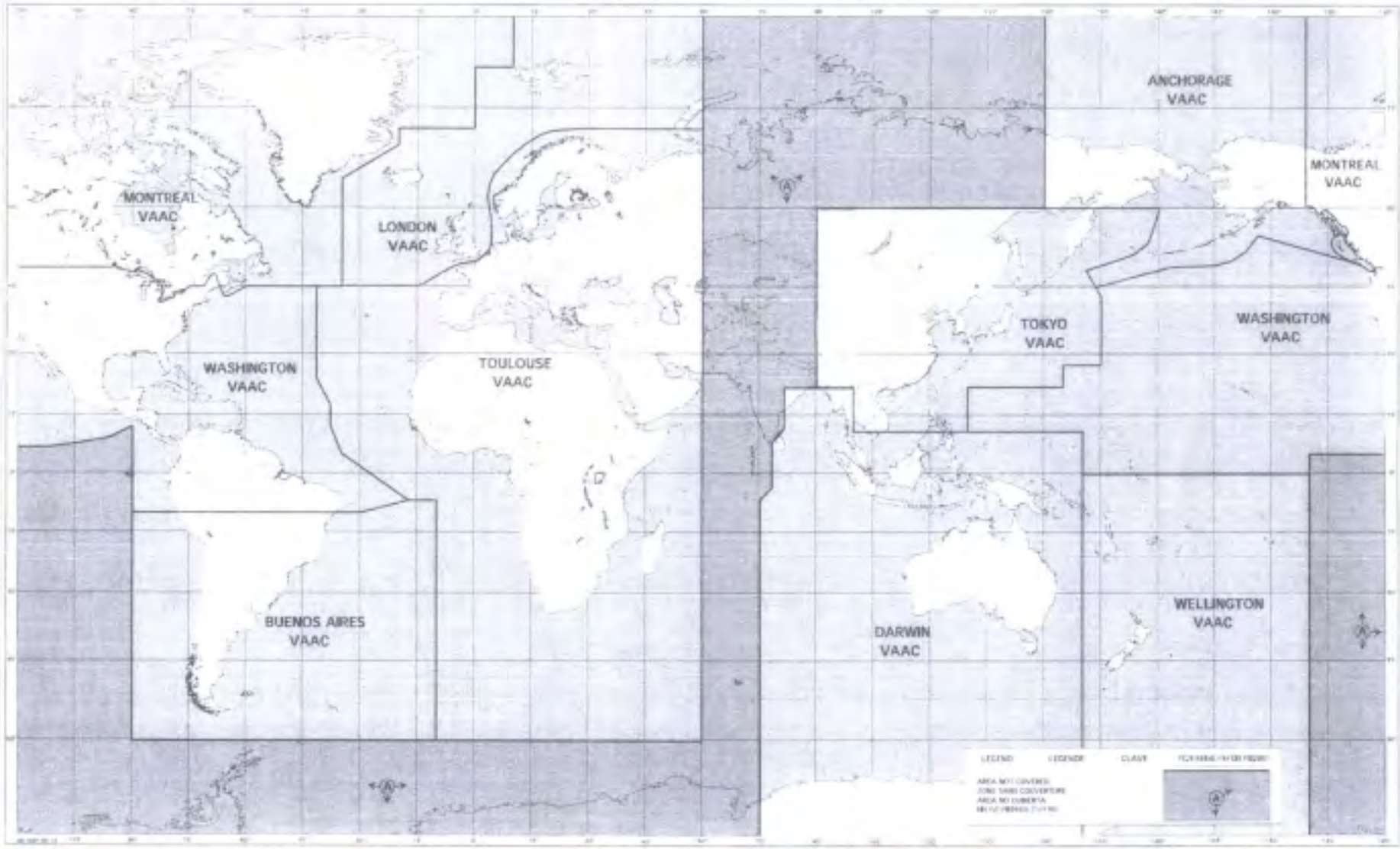
1 Co-ordinates of the areas of responsibility of the Darwin and Nadi Tropical Cyclone Advisory Centres to be confirmed./Les coordonnées des zones de responsabilité des centres d'avis de cyclones tropicaux Darwin et Nadi sont à confirmer./Coordenadas por confirmar de la zona de responsabilidad de los centros de asesoramiento de ciclones tropicales de Darwin y Nadi.

2 Indicates approximately the main seasons for tropical cyclones./Indique approximativement les principales saisons de cyclones tropicaux./Indica aproximadamente la estación principal de ciclones tropicales.

FASID CHART MET 2 – AREAS OF RESPONSIBILITY OF THE TCACs



FASID Chart MET 3 – Areas of responsibility of VAACs



ASIA/PAC BASIC ANP **6-0-1**

PART VI

METEOROLOGY (MET)

1. Introduction

1. This part of the ASIA/PAC Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to aeronautical Meteorology (MET) as developed for the ASIA/PAC Regions and considered to be the minimum necessary for effective planning of MET facilities and services. A detailed description/list of the facilities and/or services to be provided by States in order to fulfill the requirements of the Basic ANP is contained in the ASIA/PAC Facilities and Services Implementation Document (FASID). During the transition and pending full implementation of the future CNS/ATM systems, it is expected that the existing requirements will gradually be replaced by the new CNS/ATM related requirements. Further, it is expected that some elements of the CNS/ATM systems will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

1.2 The Standards, Recommended Practices and Procedures to be applied are contained in the following ICAO documents:

a) Annex 3 — *Meteorological Service for International Air Navigation*;

b) *Regional Supplementary Procedures — Meteorology* (Doc 7030).

1.3 Background information of importance in the understanding and effective application of the Plan is contained in the Report of the Third ASIA/PAC Regional Air Navigation Meeting (Doc 9614) supplemented by information appropriate to the ASIA/PAC Regions which is contained in the Reports of the other Regional Air Navigation Meetings.

1.4 RAN Meeting recommendations or conclusions and ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG) conclusions shown in brackets below a heading indicate the origin of all paragraphs following that heading. RAN Meeting recommendations or conclusions shown in brackets below a paragraph indicate the origin of that particular paragraph.

2. Meteorological service at aerodromes and requirements for meteorological watch offices

(FASID Tables MET 1A and MET 1B)
~~[ASIA/PAC/3, Rec. 8/16]~~

2.1 The service to be provided at international aerodromes listed in Table AOP 1 of the basic ASIA/PAC ANP is set out in FASID Table MET 1A. [ASIA/PAC/3 Rec.8/1, Rec. 8/16]

2.2 The service to be provided for flight information regions (FIR), upper flight information regions (UIR), control areas (CTA) and search and rescue regions (SRR) is set out in FASID Table MET 1B.
[ASIA/PAC/3 Rec. 8/2, Rec. 8/16]

2.3 Meteorological service should be provided on a 24-hour basis, except as otherwise agreed between the meteorological authority, the air traffic services authority and the operators concerned.
[ASIA/PAC/3 Rec. 8/16]

2.4 At aerodromes with limited hours of operation, routine reports and forecasts should be issued sufficiently early to meet pre-flight and in-flight planning requirements for flights due to arrive at the aerodrome concerned as soon as it is opened for use. Furthermore, aerodrome forecasts should be issued with adequate periods of validity so that, collectively, they cover the entire period during which the aerodrome is open for use.
[ASIA/PAC/3 Rec. 8/16]

2.5 When a meteorological office is without forecasters, the required aerodrome forecasts should be prepared and kept up-to-date by another meteorological office by arrangement with the meteorological authority concerned.
[ASIA/PAC/3 Rec. 8/16]

2.6 When a meteorological watch office (MWO) is temporarily not functioning or is not able to meet all its obligations, its responsibilities should be transferred to another MWO and a NOTAM should be issued to indicate such a transfer and the period during which the office is unable to fulfil all its obligations.
[ASIA/PAC/3 Rec. 8/16]

2.7 Details of the service provided should be indicated in Aeronautical Information Publications, in accordance with the provisions of Annex 15.
[ASIA/PAC/3 Rec. 8/16]

2.8 As far as possible, English should be among the

languages used in meteorological briefing and consultation.
[ASIA/PAC/3 Rec. 8/16]

2.9 FASID Tables MET 1A and MET 1B should be implemented as soon as possible, on the understanding that only those parts of the briefing and documentation called for in column 7 of Table MET 1A that are required for current operations need to be available, and that the implementation of new MWO or changes to the area served by existing MWO indicated in FASID Table MET 1B, columns 1 and 3 respectively, should take place coincidentally with the implementation of, or changes to, the FIR/UIR/CTA/SRR concerned.
[ASIA/PAC/3 Rec. 8/16]

3. Meteorological observations and reports
~~[ASIA/PAC/3, Rec. 8/16]~~

3.1 Hourly observations and reports with local ~~selected~~ special reports and special reports in the SPECI code form should be made at all aeronautical meteorological stations.
[ASIA/PAC/3 Rec. 8/16]

3.2 Observations should be made half-hourly for VOLMET broadcasts at the stations indicated in FASID Table ATS 2 contained in the ATS part of the Plan.
[ASIA/PAC/3 Rec. 8/16]

3.3 Routine observations and reports should be made throughout the 24 hours each day, except as otherwise agreed between the operators, air traffic services units and the meteorological authority concerned.
[ASIA/PAC/3 Rec. 8/16]

~~3.4 The air temperature, dew point temperature and the QNH value should be included in routine, special and selected special reports.~~

4. Aircraft observations and reports
~~[ASIA/PAC/3, Rec. 8/16]~~

The meteorological authority should adopt the approved list of ATS/MET reporting points, as it relates to points located within and on the boundaries of the FIR for which the State is responsible. Those ATS/MET reporting points should be published in the AIP of the State concerned.
[ASIA/PAC/3 Rec. 8/16]

Note.— The approved list of ATS/MET reporting points is published and kept up-to-date by the ICAO Regional Office concerned, on the basis of consultations with ATS and MET authorities in each State and the provisions of Annex 3 in this respect.

5. Forecasts
~~[ASIA/PAC/3, Rec. 8/16]~~

5.1 Aerodrome forecasts should normally be issued at intervals of six hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC). The period of validity should be of at least 18 or of 24 hours duration, to meet the requirements indicated in FASID Table MET 1A. The filing time of the forecasts should be approximately two hours before the start of the period of validity.
[ASIA/PAC/3 Rec. 8/16]

5.2 The period of validity for aerodrome forecasts given on request should commence one hour before estimated time of arrival or earlier if requested, and should cover a period up to the estimated time of arrival at the farthest alternate plus two hours.
[ASIA/PAC/3 Rec. 8/16]

5.3 Aerodrome forecasts and amended aerodrome forecasts should be issued and exchanged in the TAF code.
[ASIA/PAC/3 Rec. 8/16]

5.4 The group TT_FT_F/G_FG_FZ should be included in aerodrome forecasts for certain stations as agreed between the meteorological authorities and the operators concerned.
[ASIA/PAC/3 Rec. 8/16]

~~5.5 The groups $6I_ch_ih_it_L$ and $5Bh_Bh_Bt_L$ should not be included in aerodrome forecasts.~~

5.~~6~~5 Trend-type landing forecasts should be provided at the aerodromes as indicated in FASID Table MET 1A.
[ASIA/PAC/3 Rec. 8/1, Rec. 8/16]

6. SIGMET and AIRMET information
(FASID Tables MET 3, ~~Parts I and II)~~ A and MET 3B
~~[ASIA/PAC/3, Rec. 8/16~~
~~APANPIRG/4, Concl. 4/36~~
~~APANPIRG/5, Concl. 5/27~~
~~APANPIRG/7, Concl. 7/22, 7/24]~~

6.1 The period of validity of SIGMET messages should not exceed 4 hours. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, the validity period may be extended up to 6 hours and an outlook should be added giving information for an additional period of up to 12 hours concerning the trajectory of the volcanic ash cloud and positions of the centre of the tropical cyclone respectively.
[ASIA/PAC/3 Rec. 8/16]

6.2 In order to assist MWOs in the preparation of the

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outlook included in SIGMET messages for tropical cyclones, Tropical Cyclone Advisory Centres: Darwin; Miami; Honolulu; Nadi; New Delhi; and Tokyo, have been designated to prepare the required advisory information and disseminate it to the MWOs concerned in the ASIA and PAC Regions. FASID Table MET 3~~; Part I,~~ A sets out the area of responsibility and the MWOs to which the advisory information should be sent. Advisory information should be issued for those tropical cyclones in which the surface wind speed averaged over 10 minutes is expected to equal or exceed 63 km/h (34 kt). ~~Tropical cyclone advisory information should contain the following information:~~

~~- originator (i.e. location indicator or name of the tropical cyclone advisory centre)~~

~~- date and time of the advisory information~~

~~- name of the tropical cyclone~~

~~- position of the centre (in degrees and tenths of latitude and longitude)~~

~~- direction and speed of movement (respectively in 8 compass points, in km/h or knots)~~

~~- central pressure (in hPa)~~

~~- maximum surface wind near the centre (mean over 10 minutes, in km/h or knots)~~

~~- forecast of centre position for fixed valid time of ..... UTC (12 hours after time of issuance of advisory)~~

~~- forecast of maximum surface wind for fixed valid time of ..... UTC (12 hours after time of issuance of advisory)~~

~~- forecast of centre position for fixed valid time of ..... UTC (24 hours after time of issuance of advisory)~~

~~- forecast of maximum surface wind for fixed valid time of ..... UTC (24 hours after time of issuance of advisory).~~

~~For each tropical cyclone, advisory information should be updated every 6 hours.~~
[ASIA/PAC/3 Rec. 8/4, Rec. 8/16]
[APANPIRG/12 Concl. 12/...]

6.3 In order to assist MWOs in the preparation of the outlook included in SIGMET messages for volcanic ash, Volcanic Ash Advisory Centres Anchorage, Darwin, Tokyo, Washington and Wellington have been designated to prepare the required advisory information and send it to MWOs concerned in the Asia and Pacific Regions following notification/detection of the ash cloud. FASID Table MET 3~~, Part II,~~ B sets out the areas of responsibility of the volcanic ash advisory centres and the MWOs to which the advisory information should be sent. ~~The volcanic ash advisory message should contain the following information :~~

~~message type~~
~~- VOLCANIC ASH ADVISORY~~

~~issue time, date and name of issuing VAAC~~
~~- time (UTC), day/month/year; volcanic ash advisory centre issuing advisory~~

~~name of volcano and volcano reference number~~
~~- volcano name (if known) and reference number (International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)~~

~~the State or area in which volcano is located and latitude/longitude~~
~~- name of State or area (e.g. oceanic) and latitude/longitude of volcano~~

~~source(s) of information~~
~~- volcano agency or special AIREP etc.~~

~~details of eruption~~
~~- time (UTC), day/month/year of the eruption~~

~~details of ash cloud~~
~~- vertical/horizontal extent of ash cloud~~

~~trajectory of ash cloud~~
~~- indication of direction of movement of ash cloud at selected flight levels in broad descriptive terms~~

~~forecast movement of ash cloud~~
~~- forecast boundaries of ash cloud at selected flight levels for 6, 12 and 18 hours following time of issuance of advisory message~~

~~next advisory~~
~~- expected time of issuance of next advisory~~
[ASIA/PAC/3 Rec. 8/9, Rec. 8/16]
[APANPIRG/4 Concl. 4/36]

6.4 In order for volcanic ash advisory centres to initiate the monitoring of volcanic ash from satellite data and the forecast of volcanic ash trajectories, MWOs should notify the relevant volcanic ash advisory centre immediately on receipt of information that a volcanic eruption has occurred or volcanic ash has been observed in the FIR for which they are responsible.
[ASIA/PAC/3 Rec. 8/16]

6.5 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]

6.6 SIGMET information should be disseminated to flight information centres, area control centres and MWO so as to be available for aircraft-in-flight for distances corresponding to two hours flying time ahead of aircraft.
[ASIA/PAC/3 Rec. 8/16]

6.7 AIRMET messages are not required to be issued by MWOs.
[APANPIRG/7 Concl. 7/22]

7. Exchange of operational meteorological information
(FASID Tables MET 2A, MET 2~~A~~ B, MET 4A, ~~and~~ MET 4B~~)~~ and 4C)
~~[ASIA/PAC/3, Rec. 9/8~~
~~APANPIRG/7, Concl. 7/20]~~

7.1 *FASID Table MET 2A*

7.1.1 FASID Table MET 2A, sets out the operational meteorological information [not carried on the Regional OPMET Bulletin Exchange (ROBEX) Scheme] which should be available at meteorological offices, area control centres and flight information centres.
[ASIA/PAC/3 Rec. 9/1, Rec. 9/8]

7.1.2 FASID Table MET 2A should be regularly updated by the appropriate ICAO Regional Offices 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. 9/8]

7.1.3 The information specified in the table should be exchanged amongst ground stations, using aeronautical fixed service (AFS) channels, and be made available to the aeronautical users to the extent necessary to meet the requirements of existing operations.
[ASIA/PAC/3 Rec. 9/8]

7.1.4 Efforts should be made to accommodate as far as practicable local requests from operators for exchange of aerodrome forecasts and amendments, additional to those listed in FASID Table MET 2A, where so required for non-scheduled flights and for multi-segment flight planning.
[ASIA/PAC/3 Rec. 9/8]

7.1.5 The exchanges indicated in FASID Table MET 2A should be implemented as soon as possible, but only for those related to current aircraft operations. New exchanges should be started coincidentally with the introduction of new aircraft operations. Any changes required in respect of additional OPMET information or information no longer required should be notified to the corresponding meteorological authority which, in turn, should inform the ICAO Regional Office concerned.
[ASIA/PAC/3 Rec. 9/8]

7.1.6 Regular exchanges of routine reports in the METAR code form, ~~selected~~ special reports in the SPECI code form and aerodrome forecasts in the TAF code form and amendments should be made when required by five or more flights per week; hence non-regular exchanges should be arranged bilaterally between States concerned for fewer than five flights per week.
[ASIA/PAC/3 Rec. 9/8]

7.2 *FASID Table MET 2~~A~~ B*

FASID Table MET 2~~A~~B, sets out the exchange requirements for SIGMETs. This table should be updated, as necessary, by the appropriate ICAO Regional Offices 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. 9/2, Rec. 9/8]

7.3 *FASID Tables MET 4A, ~~and~~ MET 4B and MET 4C*

7.3.1 FASID Tables MET 4A and MET 4B, set out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the collection of routine reports (METAR), air-reports (AIREP) and aerodrome forecasts (TAF), respectively. When the designated ROBEX collection centres are not operational for any reason, the exchanges required under the ROBEX Scheme should be carried out by direct-address messages.
[ASIA/PAC/3 Rec. 9/6, Rec. 9/8]
[APANPIRG/7 Concl. 7/20]

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, Thailand.,in coordination with the ICAO Middle East Office, Cairo.

7.3.2 FASID Tables MET 4C sets out the responsibilities of the ASIA/PAC OPMET data banks/ODREPs to support the ROBEX Scheme.
[APANPIRG/7 Concl. 7/20]

7.3.3 FASID Tables MET 4A and MET 4B should be

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updated, as necessary, by the appropriate ICAO Regional Office on the basis of changes in the pattern of aircraft operations, the Statement of Basic Operational Requirements and Planning Criteria, the criterion warranting regular exchanges of ROBEX METAR/TAF bulletins, and in consultation with those States and international organizations directly concerned.
[ASIA/PAC/3 Rec. 9/8]

~~7.4 *Interregional exchanges of operational meteorological information*~~

~~7.4.1 Operational meteorological information required in ASIA and PAC States (AFTN Routing Area 0) from the EUR Region should be requested from Beirut (OLLLYP) if the information required is part of the Meteorological Operational Telecommunication network, Europe (MOTNE) programme (cf. Doc 7754). OPMET information from the AFI Region should be requested from Jeddah (OEJNYM). Other requirements should be satisfied by aeronautical fixed telecommunication network (AFTN) messages in accordance with bilateral arrangements.~~

~~7.4.2 Data required for inclusion in the MOTNE should be addressed to Beirut (OLLLYP). All ASIA/PAC data required in other Regions should also be addressed to Paris for AFTN predetermined distribution in the EUR Region and/or inclusion in the Bruxelles and Wien data banks and to the appropriate addressees in Regions other than EUR.~~

8. World area forecast system (WAFS)
(FASID Tables MET 5, MET 6 and MET 7)
~~[ASIA/PAC/3, Rec 8/19, 8/20 and 9/9;~~
~~APANPIRG/7, Concl. 7/19~~
~~APANPIRG/10, Concl. 10/18]~~

8.1 FASID Table MET 5 sets out the ASIA/PAC Regions requirements for WAFS products: upper wind and temperature and significant weather (SIGWX) charts, and the gridded binary (GRIB) data, and ~~WINTEM~~/abbreviated plain language SIGWX, to be provided by WAFCs London and Washington.
[APANPIRG/10 Concl. 10/18]

8.2 All the WAFS products should be prepared by WAFCs London and Washington for fixed valid times of 00, 06, 12 and 18 UTC.
[APANPIRG/10 Concl. 10/18]

8.3 The level for which upper air and SIGWX charts are to be provided by the WAFCs London and Washington and the areas to be covered by these charts and the GRIB data are indicated in FASID Table MET 5.
[APANPIRG/10 Concl. 10/18]

8.4 FASID Table MET 6 sets out the WAFCs responsibilities for the production of SIGWX forecasts and upper wind and temperature charts for the areas of coverage indicated, and GRIB data. Each WAFC is responsible for the routine production, and dissemination by satellite broadcast, of charts for the areas of coverage listed. For back-up purposes, each WAFC should have the capability to produce SIGWX forecasts for all areas of coverage.
[APANPIRG/10 Concl. 10/18]

~~*Note:- The responsibilities of RAFCs Brasilia, Buenos Aires, Dakar, Las Palmas, Melbourne, Nairobi, New Delhi, Tokyo and Wellington will be progressively transferred to the WAFC London and WAFC Washington in accordance with AFI/7 Recommendation 7/10, ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG) Recommendation 7/19 and CAR/SAM Regional Planning and Implementation Group (GREPECAS) Conclusion 8/24.*~~

8.5 The projection of the charts and their areas of coverage should be as indicated in FASID Charts MET ~~2~~4, MET ~~3~~5 and MET ~~4~~6 associated with FASID Table MET 6; their scale should be 1:20 X 10^6, true at 22.5^0 in the case of charts in the Mercator projection, and true at 60^0 in the case of charts in the polar stereo-graphic projection.
[APANPIRG/10 Concl. 10/18]
[ASIA/PAC/3 Rec. 8/21]
[APANPIRG/12 Concl. 12...]

8.6 WAFS products should be disseminated by WAFC London using the satellite distribution system for information relating to air navigation (SADIS) and by WAFC Washington using the international satellite communications system (ISCS2) covering the reception area shown in FASID Chart CNS 7. To fulfil the requirements of long distance flights, transmission of WAFS products should be completed not later than 11 hours before validity time.
[APANPIRG/10 Concl. 10/18]

8.7 The amendment service to the WAFS products issued by WAFCs London and Washington should be by means of abbreviated plain language messages disseminated through SADIS and ISCS2.
[APANPIRG/10 Concl. 10/18]

8.8 Each State should make the necessary arrangements to receive and make full operational use of WAFS products issued by WAFCs London and Washington. FASID Table MET 7 provides the status of authorized access by ISCS2 and SADIS users to the satellite broadcasts and location of the operational VSATs.
[APANPIRG/10 Conc. 10/18]

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~~8.9 Low level SIGWX is provided outside the WAFS.~~

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PART VI

METEOROLOGY (MET)

1. INTRODUCTION

1.1 The Standards, Recommended Practices and Procedures to be applied are as listed in paragraph 1.2, Part VI - MET of the ASIA/PAC ANP. The material in this part complements that contained in Part I - BORPC of the ASIA/PAC ANP and should be taken into consideration in the overall planning processes for the ASIA/PAC Regions.

1.2 This Part contains a detailed description/list of the facilities and/or services to be provided to fulfil the basic requirements of the Plan and are as agreed between the provider and user States concerned. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. This element of the FASID, in conjunction with the basic part of the ASIA/PAC ANP, is kept under constant review by the APANPIRG in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO Asia and Pacific Office, Bangkok.

2. METEOROLOGICAL SERVICE REQUIRED AT AERODROMES AND REQUIREMENTS FOR METEOROLOGICAL WATCH OFFICES

(FASID Tables MET 1A and 1B; FASID Chart MET 1)

2.1 The meteorological service to be provided to meet the requirement of international flight operations is outlined in FASID Table MET 1A. AFTN routing areas identified by the letters in FASID Table MET 1A are shown on FASID Chart MET 1. The requirements for meteorological watch offices (MWO) together with the service to be provided to flight information regions (FIR), upper flight information regions (UIR) and search and rescue regions (SRR) are listed in FASID Table MET 1B.

3. EXCHANGE OF OPERATIONAL METEOROLOGICAL INFORMATION

(FASID Tables MET 2A, ~~2A~~2B, 4A, 4B and 4C)

3.1 The requirements for the exchange of METAR, SPECI and TAF, not catered for by the ROBEX Scheme, to meet the requirement of international flight operations in the ASIA/PAC Region are shown in FASID Table MET 2A.

3.2 FASID Table MET 2~~A~~B contains the exchange requirements in the ASIA/PAC Region for SIGMET messages including those for volcanic ash and/or tropical cyclones.

3.3 FASID Tables MET 4A and 4B set out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the collection of routine reports (METAR), air reports (AIREP) and aerodrome forecasts (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 4C 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 based on predetermined distribution within the ASIA/PAC Regions;

b) operate as an OPMET Data Regional Exchange Point (ODREP) with responsibility of exchanging the OPMET information between stations within the ASIA/PAC Regions and in adjacent Region(s); 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.*

4. TROPICAL CYCLONE ~~WARNING SYSTEM AND INTERNATIONAL AIRWAYS VOLCANO WATCH~~ ADVISORY CENTRES

(FASID Table MET 3, FASID Chart MET 2)

4.1 The areas of responsibility, the period of

operation of the designated Tropical Cyclone Advisory Centres (TCACs) ~~and of the designated Volcanic Ash Advisory Centres,~~ and the MWOs to which the advisory information should be sent by the Centres are contained in FASID Table MET 3A~~, parts I and II respectively~~. The areas of responsibility of the designated TCACs in all regions are shown on FASID Chart MET 2.

5. VOLCANIC ASH ADVISORY CENTRES (FASID Table MET 3B, FASID Chart MET 3)

5.1 The areas of responsibility of the designated Volcanic Ash Advisory Centres (VAACs) and the MWOs to which the advisory information should be sent by the Centres are contained in FASID Table MET 3B. The areas of responsibility of the designated VAACs in all regions are shown on FASID Chart MET 3.

Note 1. — Operational procedures to be used for the dissemination of information on volcanic eruptions and associated ash clouds in areas which could effect routes used by international flights and necessary pre-eruption arrangements as well as the list of operational contact points are provided in the ~~document titled~~ "Handbook on the International Airways Volcano Watch (IAVW) - Operational Procedures and Contact List" *~~list of operational contact points between vulcanological agencies, meteorological watch offices and area control centres"~~ (Doc 9766). This ~~document~~ Handbook is published ~~annually~~ by ICAO ~~and circulated to States~~. The Handbook is available on the ICAO web site: http://www.icao.int/cgi/goto_anb.pl?met and "click" on "International Airways Volcano Watch".*

Note 2. — The information in particular on the problem of volcanic ash and the guidance regarding what each of the parties in the IAVW is expected to do and why, are contained in the "Manual on Volcanic Ash, radioactive materials ~~Debris~~ and toxic ~~Chemical~~ clouds" *(Doc 9691). This document is prepared by ICAO Secretariat with assistance of the Volcanic Ash Warning Study Group (VAWSG).*

Note 3. —"Volcanic Ash and Aircraft Operations ASIA/PAC Regional Handbook" *addresses the danger of airborne volcanic ash, procedures for notifying ash occurrences and provides assistance to pilots in avoiding actual ash encounters. The Handbook has been published as a single volume reference for both ground and air crews to assist coordination between the two in the event of an encounter with volcanic ash. The Handbook is published by the ICAO Asia and Pacific Office, Bangkok.*

~~5~~6. WORLD AREA FORECAST SYSTEM (WAFS)

(FASID Tables MET 5, MET 6 and MET 7
FASID Charts MET ~~2~~4, MET ~~3~~5, ~~and~~ MET ~~4~~6, and MET 7)

5.1 FASID Table MET 5 sets out the ASIA/PAC Regions requirements for WAFS products: upper wind and temperature and significant weather (SIGWX) charts, and the gridded binary (GRIB) data, and ~~WINTEM/~~ abbreviated plain language SIGWX, to be provided by WAFCs London and Washington.

5.2 FASID Table MET 6 sets out the WAFCs responsibilities for the production of SIGWX forecasts and upper wind and temperature charts for the areas of coverage indicated, and the GRIB data. WAFS maximum areas of coverage are shown on FASID Charts MET ~~2~~4, MET ~~3~~5, ~~and~~ MET ~~4~~6, and MET 7).

5.3 FASID Table MET 7 provides the status of authorized access by ISCS2 and SADIS users to the satellite broadcasts and location of the operational VSATs. The table is included in the FASID for information purposes and kept up-to-date by the Regional Offices concerned.

ASIA/PAC Regional Plan for the New CNS/ATM Systems

Chapter 8 – Meteorology

General

1. Meteorological Support to International Civil Aviation

1.1 Traditionally, the provision of meteorological information to support international civil aviation was based primarily at the national level and organized hierarchically, with a specific meteorological office designated to be associated with each flight information centre (FIC)/area control centre (ACC), approach control unit and air traffic control tower. The meteorological information provided was related to a flight information region (FIR) and particular aerodromes required as destinations and alternates in that FIR and in immediately adjacent FIRs. Communication of this information beyond the FIRs concerned was tightly controlled so as not to overload the AFTN unnecessarily. The meteorological information was provided to pilots before departure via face-to-face briefing and flight documents, and during the en-route phase, via voice communication broadcasts such as ATIS and HF/VHF VOLMET.

1.2 The fundamental changes in international civil aviation in the 1980s, such as deregulation, increased air traffic and longer direct flights, and the increased associated costs of the provision of facilities and services, prompted the creation of CNS/ATM systems. The growth in air traffic requires the provision of meteorological services to be coordinated globally and modernized taking advantage of emerging technologies. Notable developments since then have been, first, the introduction of WAFS, which centralized the production and dissemination of upper wind and temperature forecasts, and significant weather forecasts (above FL 100) and second, the enhancement of weather information provided to pilots and the more open exchange of OPMET messages.

2. Meteorological Systems to Support Global CNS/ATM

2.1 In recent years, advances in telecommunication and computer technology are making possible the provision of enhanced or additional meteorological data and products which are either critical to or are providing cost benefits to pre-flight planning, en-route or terminal operations. For example, medium level SIGWX forecasts and en-route diversion aerodrome reports and forecasts are provided to support ETOPS flights and centralized operational control. Also, the direct provision of en-route wind/temperature and SIGMET to ATC computers is producing beneficial effects on dynamic aircraft routing over the Pacific. In support to the global CNS/ATM, the past few years have witnessed substantial progress in a number of meteorological systems. Some highlights are: -

a) Final phase of WAFS - The rapid developments in computer and satellite technology and weather forecasting techniques have rendered it possible to migrate to the final phase of the WAFS much earlier than previously anticipated. The two WAFCs will be distributing via satellite broadcast forecast winds, temperatures and humidity in GRIB format by the end of 2001 and global SIGWX forecast in BUFR format by 2003.

b) Exchange of OPMET messages - Provisions for D-VOLMET (i.e. D-METAR, D-TAF and D-SIGMET) in the form of templates and for the issuance of graphical SIGMET for volcanic ash cloud and tropical cyclones in graphical format in BUFR code have been incorporated in Amendment 72 to Annex 3. Also, weather databases will be an integral component of the future global ATN. The ATS Message Handling Systems (AMHS) being developed under ATN will take over OPMET data exchange function from AFTN.

c) Uplink of meteorological information to the cockpit - Both national and commercial systems exist or are being developed to provide aircraft in flight with access to OPMET information. Systems delivering graphical information including weather radar and satellite cloud pictures to the cockpit are emerging. In addition, users have indicated interest in receiving TDWR (Terminal Doppler Weather Radar) products in the cockpit. TDWR and similar microburst detection systems are increasingly being deployed in a number of terminals in the Region such as Hong Kong, Kuala Lumpur, Singapore, Incheon, Narita and Kansai. A terminal weather information system for pilots has been developed in US to provide to pilots low level windshear alerts and microburst alerts from TDWR at a limited number of sites, utilizing the existing data link - ACARS (Aircraft Communication, Addressing and Reporting System).

d) Downlink of meteorological data from aircraft – a number of States are operating automatic aircraft weather reporting. New Zealand has started collecting ADS weather (wind and temperature) reports downlinked from aircraft and forwarding them to WAFCs on an operational basis. Hong Kong, China has also conducted trials in weather reporting using ADS and CPDLC.

Transition Guidelines

3. Meteorological Systems to support Transition to the new CNS/ATM Systems

3.1 The developments in meteorological systems must meet aeronautical requirements to improve safety and/or provide an identifiable cost benefit to users. The systems must converge, as far as possible, towards a seamless and transparent global system for the provision of meteorological service to international civil aviation. Processes should be automated as far as possible to enable virtual "instant" or real-time access to global meteorological information. With this in mind, the meteorologists' input will be increasingly transferred to the beginning of the processes, even to the extent of transferring knowledge and experience through artificial intelligence to dedicated expert systems.

3.2 The Global Air Navigation Plan for CNS/ATM Systems identifies the following development areas of the meteorological systems that are needed to support a global ATM system.

a) ***Final phase of WAFS***: rapid progress to the final phase of the WAFS with two WAFCs producing automated global upper winds/temperatures, and SIGWX forecasts (above FL 100) which may be input directly into ATC and airline computers;

b) ***Exchange of OPMET messages***: continued extension of the three ICAO direct satellite broadcasts to exchange global OPMET messages and, as necessary, other non-MET aeronautical information; the migration of ground-ground OPMET data exchange over AFTN to ATN AMHS;

c) ***Uplink of meteorological information***: automatic uplink of aerodrome weather observations to aircraft on approach or departure, including D-ATIS, METAR/TAF/ SIGMET data link to replace HF and VHF VOLMET; and dedicated systems to detect hazardous weather, such as automated TDWR;

d) ***Downlink of meteorological data***: automatic downlink of meteorological information derived from aircraft sensors (wind, temperature, turbulence and humidity) for dissemination to ATC computers after quality control and processing of background upper wind fields and real-time descent wind profiles to assist in the automatic sequencing of aircraft on approach to maximize runway capacity; and relay of this information to the two WAFCs for assimilation in global numerical weather prediction models thereby improving the overall quality of subsequent global forecasts;

e) ***ATN weather database***: making available at ATC centres and airline centralized operational control, background upper wind fields, both in the form of WAFS global upper wind forecasts and "real-time" wind fields derived from the wind information reported automatically from aircraft in ADS messages; and reports and forecasts of hazardous weather, particularly volcanic ash, thunderstorms, clear-air turbulence and icing, to assist in tactical decision-making for aircraft surveillance, air traffic flow management, and updating flight plans for flexible/dynamic aircraft routing;

f) ***Wake vortex***: use of meteorological sensors including Doppler radar, possibly providing input to expert systems, which will provide automated runway wake vortex reports and forecasts to assist in optimizing aircraft separation, thereby maximizing runway capacity;

g) ***Volcanic ash***: reduction in time delay for volcanic ash reports and advisories and associated SIGMETs to reach area control centres and aircraft in-flight from volcano observatories, volcanic ash advisory centres (VAACs) and meteorological watch offices by employing more direct routing; and

h) ***Pre-flight briefing***: harmonization of AIS, MET and flight plan (FPL) information to support combined automated AIS/MET/FPL pre-flight and in-flight briefing.

3.3 The implementation of these elements and development of new systems to form a seamless global system will proceed step by step as aeronautical requirements for the service are stated and reflected, as appropriate, in the relevant ICAO SARPs. This is critical in order to indicate clearly that the service is required by international civil aviation to contribute to the maintenance or improvement in air safety and/or provide a demonstrated cost benefit to users associated with global ATM. Once the requirements are firmly established, standardization of the relevant meteorological facilities and services will facilitate the planning of a seamless and transparent meteorological system to support the global ATM system.

3.4 In planning for the implementation of meteorological systems, account has to be taken of the existing national, regional and global meteorological and telecommunications infrastructures and a determination made as to which parts will be able to support the global ATM system and which will need to be upgraded or replaced.

3.5 The routing structure of meteorological information needs to be identified early in the planning process. In general, it would seem that increasing emphasis will be placed in the future on "routine" meteorological information being accessible by the pilot automatically on demand, with directed or broadcast transmissions being restricted mainly to hazardous weather information. But having information accessible to the pilot may be achieved in practice either by having it uplinked and stored in the aircraft computers or stored on the ground in OPMET databases and/or servers which may be interrogated by the pilot. The optimum balance between meteorological information broadcast or directed from the ground to aircraft - "push", and meteorological information obtained by pilots interrogating OPMET data bases - "pull", must emerge from the development of the operational requirements, which will then be reflected in the pattern of global OPMET exchange requirements.

Asia/Pacific Transition Timescale

4.1 The key Global and ASIA/PAC Region events in the transition to the new meteorological systems are shown in Table 1. The timescales for the occurrence of the key events reflect present knowledge and will have to be updated as information becomes available.

4.2 The table is divided into two sections. The first section of the Table provides details regarding the **Development of SARPs** and **Aircraft Equipage**. The second section of the Table gives a list of services and facilities for **Implementation and Operational Use**. The implementation time frames of individual items will be incorporated as the plan develops.

Table 1

Global Meteorological System Transition and Implementation																		
			1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
Development of SARPs	WAFS Final Phase	Automated global upper wind/temp	TBD																
		Automated global SIGWX																	
		Direct sat. broadcast																	
	Global OPMET exchange	ATN																	
		Direct sat. broadcast																	
	Uplink MET data	OPMET messages																	
		Graphical products																	
	Downlink MET data	Automated AIREPs																	
		Special AIREPs																	
Aircraft equipage	Uplink/ downlink MET data	AMSS																	
		HF data																	
		VHF data																	
		SSR Mode S																	
		ATN																	

Asia/Pacific – Meteorological System Transition and Implementation												
		2001	02	03	04	05	06	07	08	09	2010
WAFS Final Phase	Automated global upper wind/temp										
	Automated global SIGWX										
	Direct sat. broadcast										
Global OPMET exchange	ATN										
	Direct sat. broadcast										
Uplink MET data	D-ATIS	TBD									
	D-VOLMET	TBD									
	Terminal hazardous weather	TBD									
	Graphical products	TBD									
Downlink MET data	Automated AIREP: ADS	TBD									
	Automated AIREP: CPDLC	TBD									
	Automated AIREP: SSR Mode S	TBD									
	Real-time background wind field	TBD									
	Real-time descent wind profile	TBD									
	Special AIREPs	TBD									
	Relay reports to WAFCs	TBD									
ATN weather database		TBD									
Wake vortex		TBD									
Volcanic ash		TBD									
Pre-flight briefing		TBD									

TBD = to be developed

METATM Task Force on CNS/ATM Plan

Terms of Reference

a) Evaluate the current status of implementation, capabilities, and developments of meteorological systems in the ASIA/PAC Region.

b) Evaluate the future operational needs and emerging capabilities of meteorological systems in the ASIA/PAC Region, and develop proposals/requirements for changes necessary to meet those needs.

c) Develop the regional plan for the implementation of meteorological services and facilities for the new CNS/ATM systems.

d) Report to the CNS/MET Sub-group of APANPIRG for further co-ordination through the ICAO Secretariat with other relevant bodies.

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

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
1	RAN/3 C.8/6	Subject: Shortcomings in volcanic ash colour codes Task: Aviation volcanic ash color code		Study proposal by IFALPA to modify the aviation volcanic ash code.	COM/MET IFALPA	Completed
2	RAN/3 C.14/24	Subject: Relevance of the content of the table of navigation and surveillance services Task: a) To provide information for the update of the ANP taking into account required additions and deletions. b) Provide the above information in an informal document that can also be used as a planning instrument for action o other tasks.		a) Undertake a comprehensive review of the table of radionavigation aids at appropriate intervals in consultation with States and international organisations b) Develop a document to indicate the current ANP requirements, the implementation status of those requirements and future planning requirements Task completed: Review completed On-going review mechanism established	NAV/SUR	Completed
3	RAN/3 R.9/3b)	Subject: Procedures for exchange of METARS between regions Task: Exchange of METARS to support operations between ASIA/PAC and other regions.		Establish procedures for exchange of METARS between ASIA/PAC and other regions with a view of developing appropriate proposals to amend the ANP.	COM/MET	Completed
4	RAN/3 R.9/4	Subject: Designation of International OPMET data banks Task: Designation of international OPMET data bank to serve the Asia and Pacific Regions.		Recommend an international OPMET data bank or banks to be designated to serve the ASIA/PAC region.	COM/MET	Completed
5	RAN/3 C.10/12	Subject: Standard Protocols Task: Harmonization of ground-ground data links.		Consider harmonization of ground-ground data link protocols and procedures that will be inter-operable with the ATN.	COM/MET AFTN Mgmt. TF	Completed

Appendix V – Subject/Tasks List in the CNS/MET Fields

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
6	RAN/3 R.10/18	Subject: WAFS satellite coverage in Asia Region Task: Areas to be covered by World Area Forecast System (WAFS) satellite broadcast.		Co-ordination with WAFS satellite broadcast provider States to ensure access for States in western part of Asia/Pac Region completed.	ICAO WAFS provider State	Completed
7	RAN/3 C.10/20	Subject: Alpha numeric data on WAFS satellite broadcast Task: Inclusion of alphanumeric data on ASIA/PAC World Area Forecast System (WAFS) satellite broadcast.		Consider inclusion of alphanumeric format OPMET and AIS messages on WAFS satellite broadcast.	COM/MET WAFS provider States	Completed
8	RAN/3 C.11/9	Expansion of Communication Tables Legends.		Develop terminology and legends to represent elements used in ATN.	COM/MET	Completed
9	APANPIRG C.2/27	Subject: Frequency congestion on SEA-1 network Task: Aeromobile Communications Improvements - resolution of deficiencies		Identify aeromobile communications deficiencies in the region and develop appropriate solutions	ICAO States	Completed
10	APANPIRG C. 3/15	Subject: Regional radar data exchange Task: Standardize radar data formats		1) Gather information on formats used in the Region 2) Encourage the use of standardized and automated exchange of radar cross FIR boundaries 3) Consult with Eurocontrol on the use of ASTRIX 4) Consider ATN/ADS compatability issues	NAV/SUR ICAO US	Completed
11	RAN 3 C. 12/1	Minimum value of field strength for NDB's		Action on this subject completed.	NAV/SUR C.2/2	Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
12	RAN/3 C. 12/6	Subject: Provision of cost effective and operationally acceptable approach and landing guidance Task: 1) ILS/MLS transition planning 2) Action on the outcome of the Spec. om/Ops		Develop an ILS/MLS transition plan taking into account; 1) cost benefit studies conducted by states in the Region 2) studies and trials on MLS development and other relevant systems 3) progress achieved on technical and operation issues on MLS 4) progress in ILS/MLS transition planning in other regions 5) current plans of individual States in the Region on ILS/MLS an 6) outcome of the COM/OPS Div 95 Meeting. Task completed: ILS/MLS transition issues resolved by outcome of Spec. Com/Ops Div95 Meeting. Regional strategy review completed.	NAV/SUR	Completed
13	APANPIRG D.7/28	Subject: Non-implementation of carriage of ACAS in ASIA/PAC region Task: To examine the application of ACAS in the ASIA/PAC region and to develop a time-table for implementation		Review the benefits to be gained through carriage of ACAS in the region and develop a programme of implementation of carriage of ACAS	COM/MET/NAV/SUR	Completed
14	RAN/3 C.14/4 RAN/3 C.5/2 (TOR 1)	Development of detailed description for the contents of the ASIA/PAC Facilities and Services Implementation Document (FASID) Ensure harmonised Regional Com/Met/Nav/Sur plan development		Develop detailed format and content for the COM/MET/NAV/SUR part of the Facilities and Services Implementation Document (FASID) as a matter of priority. Take into account global CNS/ATM plans as adopted by APANPIRG.	COM/MET/NAV/SUR AFS MGT TF NAV/SUR TF	Completed
15	RAN/3 C.8/17 (TOR 3)	Subject: Lack of WAFS data for long-haul operations Task: WAFS support to long-haul operations		1) Study the development of interim arrangements to provide WAFS support to long haul operations. 2) India to rebroadcast WAFS charts received from Tokyo RAFC. 3) WAFC Washington provide wind/temp charts for 36 hours range.	COM/MET USA	Completed Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
16	APANPIRG D. 9/31	Problem : Revision of GNSS RAS Task : Development of an alternative strategy for the provision of GNSS RAS	A	Review the existing strategy and an alternative strategy be developed with a view to focus on ensuring appropriate service provision from the space-based system and alternative technology available	COM/MET/NAV/ SUR SG	Completed
17	RAN/3 C.14/19 (TOR 3)	Subject: Lack of AIDC procedures Task: Development of on-line data interchange procedures and table for use in the Region	B	1) Develop on-line data-interchange procedures to support CNS/ATM applications. (AFTN AIDC) 2) Develop a logical connectivity table for the exchange of flight data information using the ATN. (ATN AIDC Table)	ICD Task Force COM/MET/NAV/SUR (ATN Trans. TF)	Completed Completed
18	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/33 (TOR 3)	Subject: Provision of adequate COM/NAV/SUR services Task: Monitor the development and implement new com/nav/sur services eg ATN,GNSS, ADS with minimal transitional impact	A	1) Encourage States to conduct R&D, Trials & demonstrations of new com/nav/sur services eg. ATN, GNSS, ADS 2) Monitor global developments that may have beneficial impact on regional planning activities eg. ATN, WADGNSS, LADGNSS 3) Consolidate information on new capabilities in the CNS/ATM system, eg. FANS 1 avionics package, oceanic display systems etc. 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 Com/Nav/Sur eg RNP compatibility 5) Provide for co-ordinated training/seminars to keep all States informed on developments of trials and demonstrations 6) Establish a GNSS Task Force to develop a Regional Strategy for GNSS augmentation 7) Develop transition planning consistent with Regional requirements	COM/MET/NAV/SUR	Completed Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
19	RAN/3 C.9/7 (TOR 3)	Subject: Lack of adequate procedures for Exchange of OPMET data between regions Task: Exchange of OPMET data between the ASIA/PAC and other Regions.	A	1) Develop procedures and delivery scheme for exchange of OPMET data between ASIA and EUR regions Via Singapore ODREP. 2) Develop a draft proposal for amendment of the ANP and arrange amendment of the ROBEX handbook to reflect the new arrangements. 3) To develop procedure to make OPMET information available at Washington and London.	COM/MET/NAV/SUR OPMET WG	Completed Completed Completed
20	C.9/12 (TOR 3)	Subject: The need for SIGWX charts to be available in London and Washington for WAFS dissemination Task: Exchange of WAFS SIGWX charts.	A	1) Plan for the exchange of SIGWX charts between all relevant RAFCs and the London and Washington WAFC. 2) Develop transition plan for transfer of responsibilities from the RAFCs to WAFCs. 3) Coordination between RAFCs and the respective WAFCs be effected to meet time table for production of test high level SIGWX forecasts and the dates when the charts are expected to be considered operational	COM/MET/NAV/SUR WAFS Task Force States	Completed Completed Completed
21	RAN/3 R.10/19 (TOR 3)	Subject: Technical data not available for WAFS satellite broadcast implementation Task: Dissemination of World Area Forecast System (WAFS) products by satellite broadcast.	A	1) WAFS satellite broadcast provider States to advise ICAO of VSAT receiving equipment details. 2) ICAO to relay information to States in the region. 3) Develop draft proposal to amend the ANP as necessary. 4) States to install WAFS satellite receivers.	UK & US ICAO COM/MET States	Completed Completed Completed Completed
22	COM/MET /NAV/SUR /SG (TOR 2)	Subject: Protection of radio frequency spectrum to ensure safety and efficiency of aeronautical services. Task: Take steps to protect the aeromobile spectrum from unauthorised interference. Task: Suppport ICAO posistion on various Agenda at WRC including protecting GNSS spectrum for aeronautical use.	A	1) Encourage States to monitor and co-operatively resolve unauthorized intrusion into aeronautical HF bands, 2) Work actively with State Telecommunications Authorities to ensure ICAO positions are supported and aviation views are included in WRC deliberations.	ICAO States	Completed Completed

No	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
23	APANPIRG D. 10/13	Problem : Revision of Strategy for PA Landing System Task : Development of an up-dated strategy	A	Review the current strategy and develop an up-dated strategy taking into account : 1) standardized GBAS and SBAS 2) feasibility of GBAS to support CAT II and III operations 3) development and deployment of MMR 4) the definition of RNP for approach, landing and departure operations and 5)human, environmental and economic factors.	COM/MET/NAV/ SUR SG	Completed
24	APANPIRG D. 10/14	Problem : Lack of a general strategy for implementation of GNSS Task : Development of a more general strategy for implementation of GNSS.	A	A more general strategy for the implementation of GNSS navigation capability in the ASIA/PAC region taking into account : 1) RNP for all phases of flight 2) standardization of GNSS by ICAO through SARPs, PANS-OPS guidance material 3) human, environmental and economic factors.	COM/MET/NAV/ SUR SG	Completed
25	APANPIRG C. 8/21	Problem : Transition to the final phase of WAFS Task : Planning for transfer of responsibilities of the RAFCs to the WAFCs London and Washington.		Develop WAFS Transition Plan and Procedures and planning for Implementation of transfer of the RAFCs responsibilities to the WAFCs London and Washington.	COM/MET/NAV/ SUR SG WAFS Transition TF	Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
26	RAN/3 C.11/8 (TOR 1)	Subject: Planning of ground-ground communications required for implementation of ATN Task: Integration of ground -ground communications necessary for the implementation of the aeronautical telecommunication network.	B	Plan ground to ground communications for implementation of ATN, taking into account the work of the ATNP. 1) Development of ATN Routing architecture 2) Transition Plan	ATN Trans. TF/3	Completed
27	APANPIRG C. 9/29	Problem : Lack of procedures for OPMET exchange to support the ISCS and SADIS broadcasts. Task : Planning for dissemination of ASIA/PAC OPMET data to the WAFCs London and Washington	A	Develop procedures for dissemination of OPMET data to the WAFCs for uplink on the satellite broadcasts. Planning an implementation of the procedures for OPMET exchange to support the ISCS and SADIS broadcasts. - Develop the new procedure for dissemination of OPMET messages, as listed in Annex 1 to the SADIS User Guide, to the WAFCs London and Washington to meet IATA requirements. - Planning for implementation of the new procedures	CNS/MET SG with assistance of OPMET WG	Completed Completed 2002 on-going
28	RAN/3 C.10/11 (TOR 3)	Subject: Inadequate Ground-ground data coms. Task: Aeronautical Fixed Telecommunications Network (AFTN) management.	A	1) Develop procedures for the establishment operation and management of databases. 2) Review AFTN loading, develop possible circuit improvements and routing changes. 3) Develop alternate routing coordination procedures to take into account address stripping procedures. 4) Plan changes to the AFTN with due account to transition to ATN.	COM/MET/NAV/SUR ATN Trans. TF COM/MET/NAV/SUR	Completed On going Completed Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
29	RAN/3 C.11/10 (TOR 1)	Subject: Ensure effective transition to sat. coms. 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	On-going
30	RAN/3 C.11/11 (TOR 1)	Subject: Lack of com facilities to support aircraft access to Met Data-bank(s) Task: Communications facilities to support aircraft access to a MET data bank(s) and automation of meteorological information for aircraft in flight (VOLMET) broadcasts.	B	In planning CNS/ATM implementation consider com facilities to support direct access to OPMET data bank(s) and automation of VOLMET broadcast.	CNS/MET	2003
31	APANPIRG C.2/23 (TOR 2)	Subject: Lack of implementation of ATS voice circuits Task: Aeronautical Fixed Service (AFS) - resolution of deficiencies	A	Identify AFS deficiencies in the region and develop appropriate solution	CNS/MET States concerned	On-going On-going
32	RAN/3 C.8/14 (TOR 3)	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash Task: Regional planning for implementation of international airways volcano watch (IAVW)	A	Plan implementation of IAVW procedures to ensure provision of timely information on volcanic ash to aircraft.	CNS/MET WG on Volcanic Ash	On going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
33	APANPIRG D. 9/21	Problem : SADIS strategic assessment Task: SADIS strategic assessment of data/information to be included in the satellite broadcast.		Review requirements for SADIS broadcasts and maintain the SADIS strategic assessment tables.	CNS/MET SG	On-going
34	APANPIRG (TOR 3)	Subject: Lack of procedure for application of MET data in ADS messages Task: Use of MET data from ADS messages	A	1) Review MET information transmitted with ADS messages Presentation of the WP on the subject to the CNS/MET/SG/6 2) Develop procedures for utilization of the available MET data by operational units, MET offices and WAFCs	CNS/MET New Zealand CNS/MET	2003 2002 2004
35		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 CNS/ATM IC SG	On-going On-going On-going On-going
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	• Encourage States to conduct R&D, trials & demonstrations of new CNS/MET services • Monitor global developments that may have beneficial consequences on regional planning activities • Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action • Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET • Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations	CNS/MET	On-going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
37		Subject : Transition to the final phase of WAFS Task : Implementation of the transition to the final phase of WAFS	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/Pacific Regions.	COM/MET/NAV/SUR SG WAFS Transition Task Force	2002 2004 2003 2004
38		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.	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG with assistance of the METATM TF	Completed 2003 2004

AGENDA ITEM 2.3: ATS CO-ORDINATION GROUPS: ACTIVITIES

2.3 ATS Co-ordination Groups' Activities

2.3.1 The meeting noted the commendable work done by the various Co-ordination Group meetings. It was also noted that these Co-ordination Group meetings continue to address CNS/ATM implementation issues within their areas of responsibility, which is in accordance with APANPIRG Conclusion 8/32. A summary of these meetings is in **Appendix A** to the Report on Agenda Item 2.3.

2.3.2 The meeting noted that the 13th Bay of Bengal ATS Co-ordination Group (BBACG/13) meeting was not held in 2001 as their primary work was integrated into the EMARSSH TF/2 meeting which is detailed in Agenda Item 2.1 of this Report.

2.3.3 In regard to the Ninth Meeting of the South East Asia ATS Co-ordination Group activities, the meeting was advised that the majority of the time was taken up with work required by the South China Sea Revised ATS Route Structure Task Force to ensure implementation on 1 November 2001.

2.3.4 The meeting noted the work regarding the Informal Pacific ATC Co-ordination Group (IPACG), the Informal South Pacific ATS Co-ordination Group (ISPACG) and the Russian/American Co-ordinating Group for Air Traffic Control (RACGAT) work programme. The meeting recalled that each of these groups was responsible for implementing ATM operational enhancements along one or more of the major traffic flows of the Asia Pacific Region in full support of the activities of APANPIRG and ICAO. It was also recalled that the RACGAT forum was actively contributing to the work of the ICAO Informal Trans Asia/Trans Siberia/Cross Polar Routes High Level Steering Group (ITASPS), which is co-ordinating the implementation of ATS routes across Russia and surrounding States including the Polar Route Network.

2.3.5 The meeting was further advised that as a result of a decision of the Fourth Meeting of the ICO Informal Trans-Asia/Trans-Siberia/Cross Polar Routes High Level Steering Group (ITASPS/4) meeting held in Paris, France in January 2001, a Special Meeting between China, Mongolia, Russian Federation and IATA under the auspices of ICAO was conducted to study possibilities for further improvements in the alignment and use of cross-polar routes at their south ends.

1. **Special ATS Co-ordination Meeting between China, Mongolia, The Russian Federation and IATA (CMRI)**

1.1 The Fourth Meeting of the ICAO Informal Trans-Asia/Trans-Siberia/Cross-Polar Routes High Level Steering Group (ITASPS/4), which was held in Paris, France, from 23 to 25 January 2001, invited ICAO to organize as soon as possible a meeting between China, Mongolia, the Russian Federation and IATA to study possibilities for further improvements in the alignment and use of cross-polar routes at their south ends. This meeting was subsequently arranged by ICAO Asia/Pacific Office and held in Bangkok on 3-5 July 2001.

1.2 The meeting was advised that the choice in route selection remains the most important outstanding issue with airlines, as the cross-polar routes must be a route system of daily choice. There are two major operational factors that need to be considered in flight planning the cross-polar routes, choosing the minimum time track and avoiding excessive exposure to air masses of extreme low temperatures which affect certain aircraft types. The ability to flight plan the best cross-polar route is absolutely critical in developing a market plan that relies on these routes. The current Chinese procedures requiring flight plan routings to be approved without knowing or being able to forecast the weather conditions on the day of flight can have serious effects on the aircraft operation which could negate any benefit derived from the development of multiple tracks.

1.3 A further consideration involved the guaranteed access to the filed cross-polar track after the aircraft is airborne. This will become a critical issue for westbound operations in the near future and an air traffic management programme for cross-polar flights will become necessary as more and more flights choose to fly cross-polar tracks. The current phase of cross-polar operations has a limited flow capacity of 2 aircraft per hour per altitude. Although this greatly restricts airspace capacity, the few flights flying these routes today makes it easy to manage by ATC. However, as other airlines start operations using cross-polar routes, a programme must be in place to ensure airline access to its filed cross-polar route once the aircraft is airborne.

1.4 The final issue was the completion and enhancement of entry/exit points into China, in particular:

a) Approval for the SIMLI – Harbin route for Polar-4 that was also being addressed by RACGAT.

b) A relocation of TELOK which would eliminate the existing hard turns and extra track miles on A345. The proposal by RACGAT to relocate TELOK to the north and fly direct to Hailar would greatly improve Polar-3's efficiency, and

c) Efficient routing that would allow cross-polar flights to land at Shanghai.

1.5 The meeting noted that forecasts indicated that traffic should increase significantly by 2003 as the next generation of ultra long-range aircraft (A340-500/600 and B777/300 ER) are delivered. These pending aircraft deliveries placed urgency to IATA's request to address the outstanding work required on the cross-polar route system.

1.6 The Russian Federation agreed that an important issue for future operations, taking into account the forecast increase in traffic movements, was the flexible use of these routes together with the opening of further entry/exit points by China.

1.7 China advised the meeting that studies were underway to solve the IATA problem. However they need availability of present and forecast flight data and requested IATA to assist in this matter.

1.8 Mongolia advised that polar route flexibility was most important from their point of view and that they are working with China to solve this issue.

1.9 There was considerable positive discussion on how the Chinese flight plan approval process could be modified in order to support the flexible track selections required for cross-polar operations. Concerning the air traffic management challenge of guarantying access to the filed cross-polar route after the aircraft is airborne, the meeting was of the opinion that RACGAT was currently addressing this problem. However it was pointed out that once the Harbin – SIMLI portion of Polar-4 was completed many airlines may choose to use Polar-4 for eastbound operations. The meeting noted that the management of eastbound flights would also be addressed.

1.10 An agreed action was developed whereby China, Mongolia and Russia would review their current and future air traffic flow management (ATFM) needs and report back to the next meeting of the CMRI.

1.11 An Action Agreed Task List was developed by the meeting and will be followed-up at the next meeting, scheduled to take place in the first week of December 2001.

2. **Informal Pacific ATS Co-ordination Group (IPACG)**

2.1 The Fifteenth Meeting of the IPACG was held in Tokyo, Japan, from 2-4 August 2000.

2.2 The meeting discussed an extended list of issues which included the following:

a) Operational Trials on PACOTS Tracks 14/15 serving the city pairs Hong Kong/Taipei and Los Angeles/San Francisco;

b) Evaluation of the PACOTS structure in post-implementation RVSM;

c) 10-Minute Longitudinal Separation without Mach Number Technique (MNT);

d) Review of NOPAC Altitude Structure;

e) Expansion of Russian Routes;

f) Reduction of Longitudinal Separation Minima using Satellite Systems;

g) Implementation of RNP-10 in the Japan/Hawaii PACOTS;

h) Dynamic Aircraft Route Planning System (DARPS);

i) Status of Weather Deviation Analysis;

j) Expansion of Pacific RVSM;

k) CPDLC testing between Oakland and Tokyo;

l) Development of Contingency Plans;

m) North Central Pacific Operations Manual;

n) Proposed CTA Between Oakland, Tokyo and Naha;

o) Communication, Navigation and Surveillance (CNS) Issues;

p) Report of the Second IPACG FANS Interoperability Team Meeting;

q) Updates from Airframe Manufacturers, Datalink and Satellite Service Providers;

r) Problem Report Process Discussion.

2.3 A Summary of Actions Items is below:

IPACG OPEN ACTION ITEMS

Action Item	Description	Responsible Office	Status and Action to be taken
IP/11-2	Application of a 10 minute longitudinal separation minimum without the mandatory application of Mach Number.	FAA	Tests were extended in order to collect additional data. Initial results show that it is a viable technique. FAA will report on the operational trials at IPACG/16.
IP/11-3	International Air Traffic Flow Management.	FAA JCAB	Providers will continue to keep the meeting informed of developments in the area of International Air Traffic Flow Management.
IP/12-1	Establish a FANS Interoperability Team (FIT) to analyze data link performance.	FAA JCAB	The FIT structure and the roles of the stakeholders were established at FIT/2. Discussions on long-term funding of CRA functions will continue and should be resolved at FIT/3.
IP/12-2	Elimination of verbal coordination that is currently required in addition to AIDC coordination between Oakland ARTCC and Tokyo ACC	FAA JCAB	Oakland ARTCC needs to continue using voice coordination for the foreseeable future; however, they are developing a cost, schedule, and technical estimate of the necessary system changes that would allow elimination of voice coordination. Upon receipt of that information, a decision will be made whether or not to proceed with the modifications. An update will be provided at IPACG/16. Tokyo ACC is in the process of determining the specifications for system changes to support the elimination of voice coordination.
IP/13-1	Identify the details for development and operational implementation of AIDC at Anchorage ARTCC to ensure interoperability with Tokyo ACC.	FAA	Anchorage ARTCC successfully tested their AIDC software with Tokyo ACC and the WJHTC in May 2000. They intend to begin implementation of AIDC in November 2000, begin operational testing in December 2000, and be fully operational in January 2001. An update will be provided at IPACG/16.
IP/13-3	Expansion of Russian Routes	FAA JCAB ICAO	The meeting will be kept informed of developments in this area.

Action Item	Description	Responsible Office	Status and Action to be taken
IP/13-4	Explore the reduction of 50NM longitudinal separation minimum in the North Pacific area	FAA JCAB	Providers will develop detailed implementation plans for a trial of 50NM longitudinal and report back at IPACG/16. JCAB will propose amendment to Doc 7030 to permit application of 50NM longitudinal separation in the Tokyo and Naha FIRs with ADS.
IP/14-1	Contingency Plans	FAA JCAB	JCAB presented information and a schedule to develop the concept of bilateral contingency plans. JCAB's schedule for this work starts in 2000 and is to be completed in 2004. The meeting endorsed this work and the FAA agreed to work closely with the JCAB to bring the plans to completion**.**
IP/14-2	CNS/ATM Operations Manual	FAA	FAA will send current draft out for comments; based on comments, a revised draft will be prepared and circulated prior to IPACG/16.
IP/14-3	Dynamic Airborne Route Planning System (DARPS)	JCAB	JCAB has set 2005 as target date for introduction of DARPS. Operators requested trials be conducted in NOPAC in 2000-2001. JCAB has study in progress to be completed in early 2002.
IP/14-4	Floor of RNP-10 airspace	US DOD	The US DOD will assess the impact of lowering the floor of RNP-10 and report back at IPACG/16.
IP/15-1	Tracks 14/15	JCAB	Start year-long trials on 7 September 2000. Collect data on use of Tracks 14/15 and the impact to Tracks 11 and 12 during the trials.
IP/15-2	Review NOPAC altitude structure	FAA JCAB	Review was completed during the meeting. Anchorage proposals were agreed. Implementation dates will be coordinated between affected FIRs.
IP/15-3	Implement RNP-10 on Japan-Hawaii PACOTS	JCAB FAA	A two-phase plan was agreed. JCAB will provide an update at IPACG/16. FAA will conduct a study of the feasibility of allowing 50 NM lateral separation to be applied in the Central Pacific south of 30 degrees north latitude in areas where convective weather is not forecast and report to IPACG/16.
IP/15-4	Establish CTA between Oakland, Tokyo and Naha	JCAB FAA	Naha ACC will consider the proposal presented by Oakland Center and report to IPACG/16.
IP/15-5	Identify process to determine airspace capacity	JCAB FAA Airlines	Determine process to examine at what point the airspace capacity will drive mandatory technology implementation to support operational changes and report to IPACG/16.
IP/15-6	Identify airspace enhancements	IATA Airlines FAA JCAB	Identify enhancements that would provide operational benefits to airspace users and report to IPACG/16.

Action Item	Description	Responsible Office	Status and Action to be taken
IP/15-7	Expand use of CNS/ATM charts	FAA JCAB	Expand/revise the charts used for tracking CNS/ATM enhancements to reflect capacity enhancements. Include more detailed steps and timelines necessary for implementation. Add a standing agenda item "Review and update of CNS/ATM charts" to the agenda for future meeting plenary sessions.

3. **Informal South Pacific ATS Co-ordination Group (ISPACG) Meeting**

3.1 The fifteenth meeting of the Informal South Pacific ATS Coordinating Group (ISPACG) was held in Honolulu, Hawaii, during the period 2-3 February 2001.

3.2 The meeting made the following accomplishments during their deliberations:

- Finalized new LOA, structure and working arrangements for future meetings
- Established task forces to address the following tasks:
  - ✈ Funding for Continuation of Central Reporting Agency (CRA) Activities
  - ✈ 50NM In-Trail Climb Procedures
  - ✈ Preparation for Implementation of 30NM Lateral/30NM Longitudinal (30/30) Separation
  - ✈ Development of an ATM Contingency Plan
  - ✈ Regional Implementation of Lateral Offset Procedures
  - ✈ Application of 50NM Separation
  - ✈ Collaborative Decision-Making
- Finalized Terms of Reference for ISPACG FANS Interoperability Team (FIT)

3.3 A Summary of Actions Items is listed below:

OPEN ACTION ITEMS – ISPACG/15

Action Item
Funding for Continuation of Central Reporting Agency Activities • Provide IATA with Boeing budget • Get endorsement from all ISPACG States • Changes to ATS Provider User Charges • Request IATA to bill users on behalf of States • ATS Providers to provide traffic data to IATA

Action Item
Strategic Planning • Develop table of CNS/ATM technologies and enhancements for next meeting
Revision of Weather Deviation Procedures • Review existing change for application using 30/30 • Develop further material (if required) for inclusion in 7030 amendment for 30/30
Development of ATM Contingency Plan • ATS Providers to identify appropriate contact persons
Report on FANS Interoperability Team Activities
Participation in RTCA SC-189/EUROCAE WG-53 • Identify participants to provide operational expertise for the safety and performance requirements standard
Develop Procedures for 50NM In-Trail Climbs
Review Need for Regional Implementation of Lateral Offset Procedures • Determine if procedures are needed • Establish timetable for regional implementation
Confirm Publication of Procedures for Loss of Communications • Confirm State AIP's contain ICAO procedures
Security of Ground-Air Communications Using SATVOICE • Look at individual safeguards • Report further action needed to next meeting
Application of 50NM Separation • Clarify meaning
Collaborative Decision-Making • Develop test from LAX to SYD using CDM
Extension of No-Call for Release Trial • Consider adding departures from LAX to South Pacific to trials
Preparation for 30/30 • Begin airspace specific safety analysis • Preparation of 7030 implementation amendment

Action Item
Finalize LOA • Make agreed changes and circulate

4. **The Tenth Meeting Of The Russian/American Co-Ordination Group For Air Traffic Control (RACGAT/10)**

4.1 The tenth meeting of the Russian/American Co-ordination Group for Air Traffic Control (RACGAT/10) was held in Anchorage on 23 – 27 October 2000 and a summary of the meeting is provided below.

4.2 A new route, Kamchatka Four north of R220 was proposed, and agreement was reached on the alignment including a route segment between Onecotan and Memanbetsu VOR. Bilaterally agreements were required between Russia and Japan to operate the route. Demonstration flights would be carried out FL310 and above westbound only.

4.3 Arrangements were being considered for aircraft to transition between assigned altitudes (to/from meters-feet) on G-583 in Russian airspace where the aircraft were laterally separated from R-220. Improved VHF radio coverage was required.

4.4 A study was under consideration for the possibility of using flex-tracks instead of fixed tracks in the RFE for cross-polar routes and trans-east, which was economically beneficial to operators.

4.5 There was a need for volcanologists to be a key component of the volcanic eruption alert mechanism. A stable mechanism of financing for KVERT through the US/Russia Joint Economic Development Commission was being sought in order for the KVERT and AVO forecasting and reporting of volcano activities.

4.6 Letters of Agreement (LOAs) and procedures to be established between Anchorage ARTCC and the Russian ACCs responsible for ATC over the Arctic Ocean were being pursued.

4.7 Anchorage ARTCC proposed delegating a portion of their Arctic FIR to NAV CANADA and IATA was of the view that, as per the ICAO Chicago Convention, the US remained responsible for the standard of service provided in this airspace.

4.8 An assessment of the availability of METARs, TAFS, SIGMETs and PIREPS was being addressed.

4.9 A general aviation VFR route between Wales, Alaska, direct to Uelen on the Chukotka region at a minimum altitude of 1500 meters had been established.

4.10 A reduction in longitudinal separation to 10 minutes using mach number technique eastbound traffic at the FIR boundaries was permitted in the new Anchorage LOAs with Anadyr, Petropavolvsk-Kamchatsky, and Mys Schmidta permitted. More coordination with Japan and China was necessary to apply 10-minutes separation westbound throughout the Region.

4.11 A survey was conducted of Russian airports that could be used for emergency landing or diversionary fields. A special section was established in the AIP for listing emergency airports and IATA was requested to clearly define the criteria for establishing an emergency airport to be listed in the Russian AIP.

4.12 Anchorage ARTCC had proposed adjusting the floor of the usable altitudes on B327 to include 7,500 to 8,600 meters. This would provide two suitable eastbound and two westbound altitudes at BAMOK for traffic. Russia could approve operating as high as 13,100 meters; however, due to RVSM requirements and one-way traffic westbound on R220, it may not be practical to operate above 8600 meters.

4.13 A new transition route was being studied from Polar 4 to B337 via UESO direct to BA (NDB) direct to ODORA for traffic destined to Japan, South Korea, China, Taiwan, and Hong Kong. Consideration was being given on the possibility of using this route for FANS equipped aircraft. Anchorage ARTCC would consider procedures to sequence FANS aircraft on this route.

4.14 IATA requested the meeting to consider the following: to develop RNAV approaches for Russian airports based on WGS-84 program; a new transition called Polar 2A (unable to progress due to complexities of crossing Polar 1A without radar coverage); an increase in the 2 per hour aircraft limit on the cross-polar routes (increase was not feasible due to the current communication limitations).

4.15 A decision to be made to delegate Anchorage ARTCC airspace to Edmonton ACC, which would require communications to be established. If Anchorage ARTCC retained control of the airspace, improved communications would be required.

5. The Fifth Meeting of the Mini-Russian/American Coordinating Group for Air Traffic Control (MINI-RACGAT/5)

5.1 The MINI-RACGAT/5 meeting was held in Redondo Beach, California, USA, on 23 to 26 April 2001, and a summary of the meeting is provided below.

5.2 The meeting noted the successful accomplishment of the demonstration flight program along cross-polar routes and the routes being opened for regular operations since 1 February 2001. Currently, work is underway to increase cross-polar route capacity. Coordination of issues pertaining to the establishment of two new polar sectors in the Murmansk and Magadan ACCs is nearing completion. These sectors will provide ATS along cross-polar and trans-polar routes over the Arctic Ocean.

5.3 The meeting was informed that the alignment of Kamchatka Four air route has been agreed upon and Kamchataerocontrol is ready to handle demonstration flights. An additional sector was established within Petropovlovsk-Kamchatsky ACC (Ust-Bolsheretsk). To improve interfacility communications a satellite-based communication link has been established. Preparatory work was completed for operations using mach number technique with the separation minimum being 10 minutes.

5.4 A draft LOA was prepared between Magadan ACC and Anchorage ARTCC regarding air traffic control over the Arctic Ocean. This agreement will be signed when the decision is taken to establish an oceanic sector within Magadan ACC. Proposals have been drafted to establish a route segment for transition from Polar 4 to B337. The Flight Control Center in Magadan was put in trial operation in 2000. The Magadan ACC conducted trial operations with Automatic Dependent Surveillance and data link functions (ADS-CPDLC). Monitoring was carried out and trial communications were conducted with aircraft flying along cross-polar routes Polar 3 and 4.

5.5 Since RACGAT/10 (October 2000), the demonstration flight phase was completed and regular operations began on cross-polar routes. For this period, service was provided to over 300 aircraft on Polar 3 and 4.

5.6 A workstation was established in Norilsk ACC to provide control in the polar sector over the Arctic Ocean. During the demonstration flight phase, service was provided to 211 flights, and since the beginning of regular operations service was provided to 61 flights.

5.7 A letter had been sent to NAV CANADA informing them that the Federal Aviation Administration was prepared to proceed with the delegation of air traffic services in the polar region from Anchorage ARTCC to Edmonton ACC and complete operational agreements between the respective control centers.

5.8 Co-ordination has been ongoing to open up Kamchatka Four. Negotiations between Edmonton ACC and Anchorage ARTCC will begin in order to provide a smooth transition of the Arctic airspace delegation to Edmonton control.

5.9 The South China Sea area route structure revision implementation is scheduled for 1 November 2001; and RVSM implementation is scheduled for February 2002. The Europe Mid-Asia Route Structure South of the Himalayas (EMARSSH) implementation is scheduled for November 2002.

5.10 In China they are reducing the vertical separation standard to 500 meters from 600 meters in accordance with ICAO standards. They are also installing an Automatic Dependent Surveillance workstation in Harbin to provide full quality service to flights operating along cross-polar routes.

5.11 RVSM in Northern Canada should be introduced in April 2002 from 5700N to the North Pole and transition airspace south to 5200N. NAV CANADA is undertaking a project to increase radar coverage in Northern Canada. Two new radar systems have been installed and will be operational early this summer. Two additional sites have been approved for installation in 2002, and an additional four sites are under active consideration for installation in the following 2 years. Canada recently introduced the Arctic Control Area Track System (ACATS), which was implemented to connect with the existing PTS tracks in BIRK FIR and associated RNAV routes in the PANC FIR. NAV CANADA is in the process of preparing for introduction of Automatic Dependent Surveillance-Waypoint Position Reporting (ADS-WPR) in Northern Canada. A pre-operational trial will be conducted in the fall and of plans to cut over to the operational phase of ADS-WPR in early 2002.

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AGENDA ITEM 2.4: OTHER AIR NAVIGATION MATTERS

Agenda Item 2.4 Other Air Navigation Matters

Statement of Basic Operational Requirements and Planning Criteria (BORPC)

2.4.1 The meeting was presented with a Statement of Basic Operational Requirements and Planning Criteria as contained in Part I of the ASIA/PAC Basic Air Navigation Plan and FASID document that was recently approved by the President of the Council on 11 August 2001.

2.4.2 In explaining that the FASID was a rolling document that needed to be kept up-to-date, Mr. Shah noted that any amendment proposal to the FASID would undergo the established procedures. The meeting was also informed that the approved ASIA/PAC Basic ANP and FASID would be made available in the ICAO website as soon as possible.

2.4.3 The meeting felt that no changes to the BORPC were required at this stage.

Report of Asia/Pacific Area Traffic Forecasting Group (APA TFG)

2.4.4 The meeting was presented with a forecast of air traffic, which were developed by the Asia Pacific Area Traffic Forecasting Group (APA TFG). The meeting noted, in particular, Table 6 of the paper, which included forecasts of aircraft movements for the 9 major traffic flows associated with Asia and Pacific. As per these forecasts aircraft movements were projected to increase at varying rates from a low of 3.6 percent per annum for East Asia-North East Asia route group, which was a mature market, to 6.6 percent per annum for Australia/ Asia – Africa route group, which was a developing market. These forecasts would assist States in planning future facilities and also in undertaking cost benefit analysis of the investment required in developing the facilities.

2.4.5 The meeting noted the forecasts made for the nine major traffic flows within and across the Asia and Pacific regions and found them realistic. Explanations were provided in response to questions from delegates on the basis of developing traffic forecasts and comparison of traffic figures in various tables.

AGENDA ITEM 3: CNS/ATM IMPLEMENTATION AND RELATED ACTIVITIES

Agenda Item 3: CNS/ATM Implementation and Related Activities

CNS/ATM Implementation Co-ordination Sub-Group

3.1 The meeting reviewed the report of the eighth meeting of the Communications Navigation Surveillance and Air Traffic Management Implementation Co-ordination Sub-Group (CNS/ATM/IC/SG/8), as well as working papers covering CNS/ATM implementation matters. The meeting expressed its appreciation for the work progressed by the Sub-Group.

Guidance Material on CNS/ATM Operations in the Asia/Pacific Region

3.2 The meeting noted that the Air Navigation Commission (157-2) on 19 April 2001 reviewed the report of APANPIRG/11 (Conclusion 11/4 refers) regarding the revised *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region,* and was of the view that material on the application of separation based on ADS should not be included in the document until proposed amendments to the *Procedures for Air Navigation Services – Rules of the Air and Air Traffic Services* (PANS-RAC, Doc 4444, to be renamed PANS-ATM) had been approved by ICAO. In this regard, the meeting noted that these proposals, which included procedures for the use of ADS to provide Air Traffic Control services, had been circulated by State letter (SP 28/4-01/51) on 11 May 2001, and when approved by the Council would be applicable in November 2002. The meeting agreed to revise the material in line with the Commission's comments, and to publish the revised document as soon as practicable. Further, the meeting agreed that the CNS/ATM/IC/SG should review the PANS-ATM provisions on ADS and develop additional guidance material on ADS to be included in the *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* as appropriate.

3.3 In light of the foregoing, the meeting formulated the following Conclusion and Decision:

Conclusion 12/38 – Revision and Publication of Guidance Material on CNS/ATM Operations in the Asia/Pacific Region

That,

a) the *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region,* Chapter 4, paragraph 6 on the application of separation using ADS be revised in line with the views of the Air Navigation Commission (157-2) on reviewing the report of APANPIRG/11 as follows:

6. Application of procedural horizontal separation using ADS

Aircraft position information obtained by ADS may be used for the application of procedural horizontal separation minima contained in the PANS-RAC (Doc 4444), Part III. Area Control Service where aircraft position reports are necessary to apply the appropriate separation minimum.

Note: - ICAO is processing amendments to the PANS-RAC to include procedures for the provision of ADS services for air traffic control with an applicability date in November 2002.

b) the revised *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* be published by ICAO as soon as practicable.

Decision 12/39 – Development of guidance material on the use of ADS for the application of separation

That, the CNS/ATM/IC/SG review the provisions in the PANS-ATM. Part XII (Doc 4444) on ADS services, and develop guidance material on the use of ADS for the application of separation to be included in the *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* as appropriate.

Traffic Forecasts for Major Traffic Flows

3.4 The meeting noted that a special meeting of the Asia/Pacific Area Traffic Forecasting Group (APA TFG) was held in May 2000 in response to the APANPIRG Conclusion 10/28, and developed traffic forecasts for the nine major traffic flows across the Asia/Pacific Region. At the tenth meeting of the APA TFG held in Bangkok in June 2001, it was intended that the APA TFG would review these forecasts. There was insufficient time, however for a detailed review of the new values developed by the TFG. The values were considered to be within acceptable margins. The meeting agreed to include the tables of the traffic forecasts (Appendix A refers) in the *Asia/Pacific Regional Plan for the New CNS/ATM Systems*.

3.5 The meeting developed the following decision:

Decision 12/40 – Inclusion of traffic forecast tables in the *Asia/Pacific Regional Plan for the New CNS/ATM Systems*

That, the tables of the traffic forecast values for the nine major traffic flows across the Asia/Pacific region be included in the *Asia/Pacific Regional Plan for the New CNS/ATM Systems* as shown in Appendix A to the Report on Agenda Item 3.

Status of CNS/ATM Implementation

Australia

3.6 Development and research activities on the ATN through a project called Investigation of Networked CNS/ATM Applications (INCA) had been carried out in Australia. The aim of the project was to continue trials and acquire reliable information about the deployment of (CNS/ATM) applications and associated data communication network services in Australia.

3.7 An Automatic Message Handling System (AMHS) had been tested with procedure that automatically recovers all messages without data being lost, corrupted or duplicated. Facilities supporting ADS/CPDLC for FANS 1/A Aircraft were available and the Australian Advanced Air Traffic System or TAAATs had been put into operation. CPDLC and ADS had implemented. AIDC was implemented with New Zealand.

3.8 Australia now had some 140 GPS non-precision approaches in place with an ongoing design program adding some 30-40 approaches per year. Australia had developed a primary means domestic en-route approval to provide GPS navigation in domestic airspace.

Brunei Darussalam

3.9 Development of Brunei Darussalam CNS/ATM System was in accordance with ICAO's plan for a terminal area for high-density traffic with full radar coverage in the provision of air traffic control services within Brunei airspace. An advanced air traffic system was in operation with provision for Mode S data link. WGS 84 implementation had been completed and airspace classification had been published. Further development would include establishment of GNSS augmentation as supplementary air navigation system for IFR arrivals and departures including GPS letdowns for non precision approach by 2002, an ATN connection by 2005 and ADS services was necessary pending on development of the proposal on joint airspace management of the Kota Kinabalu flight information region with Malaysia.

China

3.10 A new CNS/ATM route L888 was being implemented in western part of China utilizing the ICAO new CNS/ATM concept and FANS technology. Features of the new route are:

a) workstations providing ADS surveillance and CPDLC communications. VHF, HF and satellite telephone are used as backup;

b) a trial flight utilizing the ADS/CPDLC function was conducted on 24 June 2000. The VHF Air/Ground Data Link Network Project will be implemented in 3 phases with about 100 Remote Control Air-Ground (RCAG) Stations to be installed throughout China, 80 RCAGs have been deployed in Phase I and II; and

c) a dedicated aeronautical communications network has been put into operation since March 2000 with 16 nodes interconnected by both VSAT and DDN trunk circuits at speed of 128 Kbps. The network supports several communication protocols including Frame Relay and X.25

3.11 Trails for HF data link had been conducted in the western part of China and this would be introduced to enhance communication capability in that area.

Hong Kong, China

3.12 Hong Kong will implement the CNS/ATM systems in three phases. Phase 1 comprises of System Study & Analysis (1999-2004); Phase 2 covers CNS/ATM Trials & Evaluation (2000 –2007); and Phase 3 on CNS/ATM Implementation & Transition (2003 –2016).

3.13 A CNS/ATM Committee, with members from IATA, IFALPA, Cathay Pacific, HKATC Association etc, had been set up to discuss issues relating to the study, trial and implementation of CNS/ATM systems in Hong Kong.

3.14 So far, trials had been organized for ADS/CPDLC, D-VOLMET, PDC and ATN (with Thailand). With satisfactory and encouraging results, both D-ATIS and D-VOLMET had been put into operational use since 19 April 2001.

3.15 Planned trials include AMHS (with Australia), AIDC (with Guangzhou, China) and SMGCS.

Fiji

3.16 Fiji had set up a National CNS/ATM Planning Group to assist in the planning and implementation of the future CNS/ATM Systems. Currently, Fiji was able to provide CPDLC through the Automated Datalink Interim System, This would be replaced by a new Enhanced ADS System (EASY) or EUROCAT 2000X system to be commissioned in the first week of December 2001. The new system, which provided for both present and future requirements of airlines, was being installed in the new Air Traffic Management Centre close to the Nadi Control Tower. The system would provide ADS/CPDLC, AIDC, FDPS and a conflict probe function for ATM in the Nadi FIR.

French Polynesia - Tahiti

3.17 VIVO 2, with CPDLC implementation was implemented in March 1996, and the dynamic airborne re-routing program (DARPS) phase 1 was implemented in July 1998. ADS was implemented with VIVO 3 installation in March 1999. Implementation of a limited subset of AIDC messages set is under discussion with neighboring FIRs. The available functions are:

a) CPDLC
b) ADS
c) ATM

India

Communication

Routers and Gateways

3.18 Airports Authority of India had placed orders for the provision of routers and gateways. It was proposed to provide these at Kolkata and Chennai for trial operation. After successful trial operation, these would be provided at Mumbai for test operation with Bangkok. Finally, it was planned to link Mumbai, the Gateway of India, with the neighboring countries as proposed in the ICAO Plan by the year 2005.

RCAG

3.19 The RCAG Circuits between Kolkata-Port Blair, Kolkata-Vizag, Chennai-Port Blair & Chennai-Vizag, had already been implemented to provide VHF coverage over the Bay of Bengal using VSAT Circuits. The RCAG Circuits between Mumbai-Agatti and Mumbai-Porbandar was under test operation and going to be implemented by the end of year 2001.

Navigation

3.20 Airports Authority of India had decided to implement a Satellite Based Augmentation System (SBAS) which would cover the entire designated Indian Airspace. In the first phase, a Technology Demonstration System (TDS) would be implemented jointly by Airports Authority of India and Indian Space Research Organisation (ISRO). On successful implementation of TDS, the system would be expanded and redundancy built up in phases leading to a full operational capability system.

Surveillance

RADARS

3.21 Airport Surveillance Radar (ASR) and Monopulse Secondary Surveillance Radar (MSSR) with Mode-S capability had been provided at 11 airports and one more Bahrampur (near Bhubaneshwar Airport) was under installation and likely to be commissioned by end of year 2001. With the provision of these Radars, the major ATS routes would come under surveillance coverage for aircraft flying at an altitude higher than 25,000 feet.

ADS/CPDLC

3.22 ADS and CPDLC systems were already in operation at Kolkata Airport. The existing system would be replaced by an enhanced version supplied by M/s Electronics Corporation of India Ltd. (ECIL), India by October 2001.

3.23 M/s ECIL, India had already installed and tested ADS/CPDLC system at Chennai Airport. Training of Air Traffic Controllers (ATCOs) on the system was in progress. The system would be commissioned in September 2001.

Indonesia

3.24 Communication: VSAT supporting ground communications operates to more than 40 stations all over the Indonesia Archipelago. Air-ground data communication services were mostly supported by SITA, although the VHF data link was also supported by ARINC.

3.25 Navigation: All international airports in Indonesia will implement GNSS-NPA procedures in the year 2002. RNP10 would be gradually implemented within Jakarta FIR from July/August 2001.

3.26 Surveillance: Almost 70% area in Indonesia was covered by radar, but some were not integrated technically. Operational trials on ADS/CPDLC within Jakarta FIR would commence in June/July 2001 for a 6 month period.

3.27 The new ATM station would be installed in Ujung Pandang/Makassar. The Radar, ADS/CPDLC including the AIDC functions would be blended into a single work station. The installation in the new ACC building would be finished sometime in April 2003.

Japan

3.28 The Japan Civil Aviation Bureau (JCAB) planned to implement an ATM Center in Fukuoka City to provide ATM service employing new CNS technologies to cope with future traffic demand. This was due to rapid growth in trans-pacific traffic experienced in recent years because new airports had been developed and were operating in the region. JCAB planned to implement the ATM Center in two phases commencing in approximately October 2005 and to be completed in 2010.

3.29 ADS/CPDLC services were provided at Tokyo ACC. The data link operation within the Tokyo FIR commenced in October 1997 using the ODP-2.5 system. This was upgraded to a new system ODP-3 that became operational in June 2000. The ODP-3 system includes an electronic strip

display and conflict probe functions. CPDLC was currently the primary means of communications within Tokyo oceanic airspace with HF as a back up.

3.30 Some 16 airlines and 80 data link capable aircraft per day use ADS/CPDLC. Japan intends to apply 50 NM longitudinal separation for RNP 10 or better certified aircraft in the cruise phase of flight, when the new Multi-functional Transport Satellite-MTSAT-1 becomes operational.

3.31 New MTSAT-1 and MTSAT-2 would be launched in early 2003 and in the summer of 2004 respectively. The AMSS functions would become operational within fiscal year 2003. MTSAT Satellite-based Augmentation System (MSAS) would commence its initial operation in Japan in 2004.

Lao PDR

3.32 GNSS would be used as supplemental means for en-route, terminal area and approach and landing starting year 2010 in accordance with ICAO SARPs.

3.33 Three radars had been provided, two of them in Vientiane and one in Savannakhet in the Southern province of Lao PDR.

3.34 The long range radars provided coverage of nearly 400 KM and were used for en-route control. The combination of Vientiane and Savannakhet Radars covers most of the LAO PDR airspace, at least for the altitude of the main commercial flights.

3.35 ADS/CPDLC services were expected to be provided using SITA or ARINC services.

Malaysia

3.36 Malaysia was focusing on the implementation of ADS/CPDLC in the Bay of Bengal and South China Sea areas where there was no radar coverage. Stand-alone ADS equipment had been installed and currently was on technical test. ADS/CPDLC system evaluation would take place from October 2000 to December 2004. A Primary and Secondary Radar System would be installed at Miri to provide full radar coverage in the Kota Kinabalu FIR.

Myanmar

3.37 Myanmar traffic growth had increased 10 per cent in the Yangon FIR with a 30 per cent increase in flights between Asia and Europe. With about 200 overflights per day, this had led to congestion at peak times, and improvements to the air navigation system was needed. A study had been conducted with the assistance of Airways Corporation of New Zealand of ICAO CNS/ATM systems, and a transition plan had been developed for the Yangon FIR. Funding had been obtained for the procurement of SSR and a CNS/ATM system. Improvements were also made to the VHF data link service and two remote ground stations were operating. Training of engineers, technicians and controllers had taken place.

3.38 A phased approach to CNS/ATM implementation had been adopted. A solid state mono pulse SSR –Alenia SIR-M with multi radar tracking up to five radars was installed at Yangon in late 1997 and flight checking was done in June 1998. It covers about 220 miles around Yangon ACC. Thompson CSF's EASY-Enhanced ADS/CPDLC System was installed in August 1998. ATS AIRCOM service made with SITA.

3.39 Yangon RCAG was operational since September 1998 and a second RCAG at Mandalay is planned to be operational by end of 2001. ADS/ACPDLC services had been provided to equipped aircraft on air routes R325 and B579. The number of aircraft using this service is around 10 daily. Myanmar has a plan to introduce RNAV trunk RNP 10 airways between FL 280 and FL 460 in its airspace over the Bay of Bengal in 2003. Height monitoring will be carried out for RVSM. Procedures will be developed covering both normal and emergency situations. Myanmar preferred the structure of parallel airways only for uni-directional operations.

Mongolia

3.40 A decision was made to adopt the ICAO CNS/ATM implementation plan which included the preparation of a domestic GPS route structure; the equipping of the domestic fleet with GPS; the introduction of GPS non-precision approaches at the regional airports to supplement NDB only guidance; the construction of a new Area Control Centre and Control Tower; the provision of ATM workstations capable of utilizing ADS/ CPDLC; and an extensive network of RCAG and VSAT stations throughout the country to provide the necessary communications for coordination functions.

3.41 Most of this work was now complete. ADS workstations were operational with the flight progress of all suitably equipped aircraft monitored; CPDLC had been trialed and was tested on a regular basis; the use of GPS as a primary means of navigation had been approved by the CAA and was in full operation on the domestic network; GPS procedures were being drafted for Ulaanbaatar International Airport and the regional airports and would be approved upon completion of flight-testing.

Nepal

3.42 Nepal launched a CNS/ATM project in 1995 to implement CNS/ATM system in a phased manner. National CNS/ATM Transition Plan had been prepared in 1998 for implementation within 2008.

3.43 Transformation of airports and Navigation Aids coordinates into WGS-84 system had been completed in 1998 and incorporated in AIP Nepal.

3.44 GPS based non-precision approach procedures for 7 airports including Tribhuvan International Airport had been prepared and currently being evaluated for implementation.

3.45 Automatic Message switching system, at TIA had been upgraded and action had been initiated to introduce VSAT link to support ground-to-ground communication.

New Zealand

3.46 The Oceanic Control System (OCS) went operational during mid – 2000 after a five – year period of testing using an Interim OCS and a transitional period before OCS came on line. The OCS has ADS, conformance monitoring, CPDLC and had been performing ATS Inter – facility Data Link Communications (AIDC) with Australia. AIDC testing with the USA and Fiji was due to commence shortly.

3.47 New Zealand had implemented RNP 10 from FL 245 to FL 460 and RVSM from FL 290 to FL 410 within the Auckland Oceanic FIR. The domestic AIRCAT radar system was being replaced over the next two years by the Lockheed Martin SKYLINE system, which was expected to

include Minimum Safe Altitude Warning (MSAW) and Short Term Conflict Alert (STCA, already used on AIRCAT) and had facility for ADS, AIDC and CPDLC.

Philippines

3.48 The Master Plan for CNS/ATM systems had been developed in which high priority projects were identified and project implementation was expected to complete in 2006. Under the Plan, the Manila ATM Center would combine the Manila ACC, Mactan Sub-ACC and all Approach Control Units. The ATM automation system would be integrated system consisting of data processing sub-systems, data acquisition sub-systems, consoles, displays, etc. It would also include functions such as Air Traffic Management Functions, Safety Measure Function, Weather Information Functions and Data Recording. The communications system would utilize the ATN, D-ATIS, AMHS and VSAT. The navigation system would utilize SBAS and GBAS while the surveillance system would utilize ADS and three new SSR radars.

Pakistan

3.49 WGS-84 survey of airports, waypoints etc in Pakistan had been completed and would shortly be published for implementation. Pakistan had continental airspace covered by SSR and extended VHF. The upgrading of present radar system would include built in ADS and CPDLC, which was being evaluated. With complete SSR coverage and extended VHF CAA Pakistan would be able to implement RNP 10 and RNP 5 as and when such routes were implemented in the region. ATN would be considered in phase-II (2005-2010) of CNS/ATM implementation.

Russian Federation

3.50 The Russian Federation provided information on the results of recent research and trials associated with implementations of CNS/ATM systems including ADS-A, ADS-B, CPDLC, Non-Precision Approach (NPA) and Precision Approach (PA) using GNSS procedures. An oceanic ATS center in Magadan ACC was setup in 2000, serving all traffic on cross-polar routes 3 and polar 4 bridging North America and South-East Asia with regular flights commencing on 1 February 2001. An ADS-B project using VDL mode 4 was launched in Tyumen region, and the system installation was scheduled to start in late 2001 to early 2002.

3.51 NPA was implemented at Kurumoch International Airport and State civil Authority of the Ministry of Transport of the Russian Federation was planning to continue NPA implementation at other Russian airports. Tests of GBAS manufactured in Russia would be completed later this year and SCAA would begin implementing GNSS PA1 in 2002. 7 GLONASS satellites were currently available and a complete GLONASS constellation would be available within 4-6 years according to the plan, and several combined GPS/GLONASS receivers had been built in compliance with ICAO GNSS SARPs.

Singapore

3.52 Singapore provided ADS/CPDLC services for FANS-1/A equipped B747-400s and B777s operating in the Singapore FIR. This service was provided round the clock and was used primarily in areas beyond radar cover in the South China Sea.

3.53 ADS/CPDLC service for B747-400 first commenced in February 1997 on a limited time basis using a standalone workstation. In February 1999, the ADS/CPDLC system was

integrated into LORADS II (the Singapore ATC system) and the service was extended to 24 hours from October 1999. Modifications were carried out to enable B777s to logon and this was completed in June 2000.

3.54 The average logon per month is 1800, or about 60 per day (current as at July 2001). This constitutes about 35% percent of the traffic on the major trunk routes over the South China Sea. Major users include Singapore Airlines, Cathay Pacific Airways, Thai International and Qantas.

3.55 Data link ATIS service commenced in February 2000 and was available 24 hours.

Sri Lanka

3.56 Installation of new equipment capable of providing ADS/CPDLC services commenced in May 2000 and was completed in July 2000. The Sri Lanka Air Traffic Control Centre now has operational capabilities of providing ADS, CPDLC, a Flight Plan Air Situation Display and Flight Data Processing;

3.57 The EASY system has been made available on 24 hours basis from 01 November 2000. Sri Lanka requested all FANS 1/A equipped aircraft to "log-on" with Colombo Area Control Centre (VCCC) when over flying Colombo airspace.

Thailand

3.58 The communications infrastructure for the ATN in Thailand was being implemented to support the new CNS/ATM. The AFTN/ATN gateway and ATS Message Handling System had been implementing within the country since 1999.

3.59 The ATS Messages Handling System or AMHS comprises of a set of ATS Message Servers, ATS Message User Agents, and AFTN/AMHS gateways. After the successful implementation of ATN within Thailand, AEROTHAI decided to connect the network with other organizations and countries. Currently an ATN trial connection with Hong Kong, China was successfully tested using Inter Domain Routing Protocol (IDRP).

3.60 ADS/CPDLC had already been implemented. The successful inaugural trial was conducted at the end of 1996. ADS/CPDLC were used to communicate with aircraft on ATS route UM 501 and in certain other areas within Bangkok FIR. ADS/CPDLC were expected to be used for routine transactions. AEROTHAI Satellite Telecommunications Network or AERONET, established in 1992, had been developed continuously in order to serve the expansion of CNS/ATM systems, which consists of Star and Mesh topology. AEROTHAI also was a service provider that provides AERONET connection for its customers.

USA

3.61 The initial operating capability of the Wide Area Augmentation System (WAAS) was expected to be available from December 2003.

3.62 Local Area Augmentation System or LAAS would allow precision approach capability from CAT I down to CAT III levels. CAT I type acceptance by FAA was expected in September 2002. An initial CAT I public use LAAS system was scheduled by 2003 and a CAT III public use LAAS system by late 2006.

3.63 The initial operational capabilities of ADS/CPDLC service for operational use at Oakland Center and Anchorage Center were expected to be available in April 2003 and in April 2004 respectively.

Vanuatu

3.64 Vanuatu was investigating the implementation of new ground/ground communication systems and ADS. Every effort was being made to implement appropriate CNS/ATM systems.

Viet Nam

3.65 There were 5 SSR and 3 PSR radar sensors in operation in Vietnam. The sixth SSR radar sensor on the southern tip of Vietnam would be put into operations before October 2001. This will allow full radar coverage over Vietnam's area of responsibility. The RDPs in Hanoi and Ho Chi Minh ACCs process the signals from all radar sensors. VSAT stations had been installed for ground-to-ground communication with Lao PDR, Cambodia, and Thailand. The VSAT network comprises 23 stations in the whole country.

Establishment of airspace system performance monitoring organization and funding arrangements after February 2002

3.66 The meeting noted that CNS/ATM/SG/IC/8 had reviewed in considerable detail information provided by the United States that it intended to reduce the level of support provided by the FAA to the Asia/Pacific Approvals Registry and Monitoring Organization (APARMO) for the RVSM monitoring programme in support of RVSM implementation in the Asia Region after February 2002. Also, the Sub-Group addressed the impact on States in the region of the new ICAO provisions on airspace safety management contained in Amendment 40 to Annex 11 and Amendment 4 to the PANS-RAC (Doc 4444) applicable on 1 November 2001.

3.67 In regard to the FAA participation in APARMO, the United States assured the meeting that it would continue to provide the present level of support to APARMO. Further, the US welcomed and fully supported the initiative being taken by the meeting to put in place a monitoring structure for the Asia/Pacific Region with appropriate funding, as this would resolve many of the problems associated with a shortage of resources and expertise in the Region to support ICAO monitoring requirements. In particular, the FAA would provide support in terms of transfer of knowledge, data, training and any other requirements as resources would allow.

3.68 The meeting expressed its appreciation to the United States for providing the leadership and substantial resources to enable major airspace improvement projects to be implemented in the Region which had led to significant benefits to users and ATS service providers. The meeting gratefully accepted the offer by the United States of continued support for the RVSM monitoring programme for the Asia Region, particularly with the South China Sea ATS Route system being implemented in November 2001 followed by RVSM in February 2002, and the EMMARSH programme.

3.69 The meeting was presented with information on ICAO's airspace safety management requirements, which would establish a sound safety basis for future implementation of CNS/ATM systems to improve airspace capacity and efficiency. The meeting noted that ICAO had adopted a safety assessment approach using collision risk modelling of route structures, and the establishment of a target level of safety (TLS) for the airspace concerned to develop reduced separation minima. It

was recognized that as a condition for implementation of these separation standards, the performance of the communications, navigation, surveillance systems and the air traffic management services must be subjected to safety assessment to ensure that the established TLS was achieved prior to implementation, and maintained during ongoing operations. In this regard, the meeting recalled that Annex 11, Attachment B, recommends that a TLS of 5×10^{-9} fatal accidents per flight hour per dimension (horizontal and vertical) be established where appropriate by regional agreement, for route systems implemented after the year 2000. The meeting agreed that this TLS should be adopted for route systems in the Asia Pacific Region.

3.70 In light of the foregoing, the meeting formulated the following Conclusion:

Conclusion 12/41 – Establishment of a Target Level of Safety for the Asia/Pacific Region

That, a target level of safety of 5×10^{-9} fatal accidents per flight hour per dimension be established for en-route systems in the Asia/Pacific Region where a TLS is required for implementation of separation minima.

3.71 The meeting recognized that ICAO safety provisions were regulatory requirements necessary for States to ensure that operators and ATS service providers were in compliance with ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS). Contracting States of ICAO were therefore obligated to establish appropriate national regulations for airspace safety management. The meeting further recognized that for international airspace, a comprehensive and permanent airspace safety system performance monitoring structure should be established by APANPIRG for the Asia/Pacific Region to enable States to achieve an appropriate level of safety oversight in an efficient and cost effective manner.

3.72 The meeting recalled that monitoring organizations had been established in other regions, the North Atlantic, Europe, Middle East and the South Atlantic, which would provide useful models to develop a regional structure. In this regard, the meeting was of the view that ICAO should take a global approach to establish airspace monitoring arrangements. The meeting was informed that ICAO had approved SARPs and PANS on airspace safety management including monitoring which would be applicable on 1 November 2001. Also, ICAO was preparing detailed guidance material on the subject but this was not expected to be published until next year or later. Further, the meeting was informed that the expansion of the ICAO Universal Safety Oversight Audit Programme to include air traffic services (Annex 11) and aerodromes (Annex 14) had been approved by the Council, and this would be considered by the 33rd Session of the Assembly of ICAO in November. In regard to these developments, the meeting agreed that States should take the necessary action to provide the regulatory framework for safety oversight of their air navigation services.

3.73 The meeting developed the following Conclusions:

Conclusion 12/42 – State regulatory framework for safety oversight

That, States establish the necessary regulatory framework to provide safety oversight of their air navigation services in accordance with Annex 11 and PANS-ATM provisions on airspace safety management applicable on 1 November 2001.

Conclusion 12/43 – Provision of ICAO guidance material on the establishment of airspace safety arrangements

That, as matter of urgency, ICAO develop guidance material for States to establish safety management arrangements in accordance with Annex 11 and PANS-ATM provisions on airspace safety management applicable on 1 November 2001.

3.74 Turning to a funding mechanism for the provision of monitoring services, the meeting noted the practices of other monitoring organizations to cover the cost of providing such services from route charges. In this regard, the meeting recognized that any charges applied for this purpose should be in accordance with ICAO's policies contained in *ICAO's Policies on Charges for Airports and Air Navigation Services (*Doc 9082 refers). Further, the *Manual on Air Navigation Services Economics* (Doc 9161, Chapter 4 refers) provided information on determining the cost basis for air navigation services. Also, the meeting noted the information in Doc 9161 (Chapter 2) on ICAO's joint financing agreement with Denmark and Iceland provided for under Chapter XV of the Chicago Convention. Under this agreement, ICAO administers on behalf of the Contracting Governments concerned, financing of certain air navigation services for the safe operation of flights by civil aircraft across the North Atlantic north of 45 degree latitude.

3.75 The meeting was informed by IATA that they fully supported the need for monitoring for RVSM and other separation applications, and for implementation and operation of CNS/ATM systems and for costs to be recovered through route charges. In IATA's view, such charges were as a result of a regulatory requirements and should not be seen as additional airways fees or service provider charges. The meeting stressed that charging for safety monitoring would need to be thoroughly investigated and detailed costing requirements determined to identify the cost of the monitoring operations and charges to be made.

3.76 In regard to the establishment of a regional monitoring structure and funding mechanism, the meeting recognized that, although this was an urgent task, the immediate monitoring requirements were being met by the FAA for the Pacific Region and through APARMO for the RVSM programme. Also, the Civil Aviation Authority of Singapore (CAAS) was providing the monitoring for the implementation of RNP 10 on the South China Sea ATS route system.

3.77 The meeting was informed by Thailand that Aeronautical Radio of Thailand (AEROTHAI) was willing to assist ICAO on behalf of the Department of Aviation (DOA) of Thailand in the safety assessment programme for the implementation of RVSM and other monitoring requirements as determined by APANPIRG. Such services would be provided on cost-recovery basis of AEROTHAI's operating expenses only. Further, AEROTHAI had made contact with EUROCONTROL to obtain assistance to set-up the necessary infrastructure, and would be able to provide the appropriate expertise to meet ICAO requirements. The meeting noted with appreciation the offer made by Thailand.

3.78 Information was provided by Australia on requirements for and possible funding arrangements to carry out monitoring functions to support CNS/ATM activities in the Asia/Pacific Region. With the changing nature of airspace safety assessments over the years, and now with innovations such as FANS-1 and FANS-A aircraft systems and reduced separation minima, this had led to a range of data collection, trials and reporting structures such as the APARMO and the FANS Inter-operability Team (FIT). The organization, structure, staffing and funding of these structures evolved out of their hosts' safety requirement needs and ability to provide resources. There was a need to rationalize and refine the organization and funding of these activities.

3.79 The meeting held a lengthy discussion on the safety arrangements necessary to meet the safety requirements for future regional airspace planning, implementation and operation of reduced separation minima, CNS/ATM systems and related airspace changes. The group agreed that priority would be given to examining in detail the necessary arrangements to establish an appropriate regional safety structure and a funding mechanism. To undertake this work, it was agreed that a Task Force be established reporting directly to APANPIRG with members to be provided from States and international organizations with appropriate expertise and resources to support the Task Force work.

3.80 In establishing the Task Force, the meeting sought the support of the United States to lead the Task Force, as it was recognized that they had the necessary expertise, experience and technical facilities to undertake and complete this task in as short a time as possible. The United States, appreciating the confidence of the meeting that it could meet the objectives of APANPIRG to lead the Task Force, accepted the role and would provide the Chairperson from the FAA, and provide all necessary support. The meeting expressed its appreciation to the United States and to the States and international organizations who agreed to become members of the Task Force. The meeting reviewed and agreed to the draft terms of reference of the Task Force prepared by the CNS/ATM/IC/SG, and developed a set of principles to guide the Task Force to establish and carry out its work programme. The composition, guiding principles and Terms of Reference of the Task Force are provided in Appendix B.

3.81 In light of the foregoing the meeting formulated the following Decision:

Decision 12/44 – Establishment of a Task Force to Develop an Airspace Safety System Performance Monitoring Structure for the Asia/Pacific Region

That**,** a Task Force be established reporting to APANPIRG to develop an airspace safety system performance monitoring structure and funding mechanism for the Asia/Pacific Region in accordance with ICAO provisions. The composition, guiding principles and Terms of Reference of the Task Force are as shown in the Appendix B to the Report on Agenda Item 3.

Business Case Task Force

3.82 The meeting noted information regarding business cases for the implementation of CNS/ATM systems, which involved major financial and technological risk. The business case approach was a good starting point for investigating CNS/ATM systems but did not address the implementation and ongoing operational risks. Access to finance and expertise in the implementation and operation of these highly complex software systems were essential as well as knowledge of the safety and regulatory issues involved.

3.83 It was further noted that a co-operative approach to the purchase and implementation of highly complex CNS/ATM systems was seen as one way of mitigating against these risks. With this approach, the following issues could be addressed in a comprehensive package:

a) finance;

b) alignment of user requirements and willingness to pay;

c) the requirement for sophisticated technical support at and beyond implementation;

d) commercial management of air navigation service provision; and

e) individual states' requirements;

3.84 In regard to the above, the development of the CNS/ATM systems should be looked at as a whole and involve representation from the State concerned, the equipment manufacturer, and a service provider experienced in the implementation of CNS/ATM systems. This relationship was likely to be in the form of a commercial agreement. This team along with the users of the system, and representatives from adjoining states should ensure that any risks were minimized, and offer the best chance of a successful, cost effective introduction of a new CNS/ATM system.

3.85 The meeting recalled that APANPIRG/11 in Conclusions 11/38, 11/39, 11/40 and 11/41 had comprehensively addressed the business case approach as it pertained to the Asia/Pacific Region, and this was firmly embedded in the regional implementation planning process. Also, this subject was covered in the Global Air Navigation Plan for CNS/ATM Systems. The meeting agreed that in the business case, a partnership approach was an inherent component, and it was recognized that there was need for all stakeholders to be fully involved at all levels of CNS/ATM planning and implementation.

Development of a framework for inter-regional co-ordination (IRC) meetings

3.86 The meeting was noted that following on Recommendation 3/10 c) of ALLPIRG/3, the First Inter-Regional Co-ordination Meeting (IRCM/1), between Asia/Pacific, Middle East and the EUR/NAT Regional Offices, as well as the Regional Affairs Office at ICAO Headquarters, was held in Bangkok Regional Office from 11 to 13 October 2000.

3.87 The meeting noted that IRCM/1 discussed the development of an Inter Regional Co-ordination Framework (IRC-F). The purpose of the framework was to facilitate IRC between the respective air navigation regions, currently served by the seven Regional Offices of ICAO.

3.88 It was further noted that as air navigation continued to evolve into an increasingly seamless systems infrastructure, IRC would form a vital activity in enhancing the pace of implementation. In the course of developing an Inter Regional Co-ordination Framework (IRC-F), it was agreed that care should be exercised so as not to create additional structured layers. Rather, maximum advantage should be taken of the current mechanisms in effecting IRC.

3.89 The meeting noted the Draft Terms of Reference (TORs) which could also be used for other regions. The IRC-F and draft TORs are at Appendices C and D to the Report on Agenda Item 3.

Updating the Asia/Pacific Regional Basic Air Navigation Plan (ANP) and Facilities and Services Implementation Document (FASID)

3.90 The meeting was informed that the ASIA/PAC Basic Air Navigation Plan (ANP) and the ASIA/PAC Facilities and Services Implementation Document (FASID) had been approved by Council and the document would be published as soon as practicable.

3.91 The meeting noted that the ASIA/PAC FASID was prepared in such a manner as to serve as a planning tool to facilitate transition from the ground based air navigation system to the satellite based CNS/ATM systems in an evolutionary manner. The FASID was therefore expected to be updated regularly to facilitate planning and implementation of the air navigation services and facilities in the region.

3.92 It was noted that in the list of Key Priorities in CNS/ATM Implementation, the need to incorporate CNS/ATM material in the Basic ANP and FASID had been identified. This task was expected to be addressed by all Sub-Groups. The meeting noted that the CNS/MET Sub- Group had undertaken the task to review the Regional Procedures contained in Part IV CNS of the Basic ANP. The task was expected to be completed in 2002.

3.93 In the MET Part of the Basic ANP and FASID the CNS/MET Sub-Group reviewed and updated the Regional Procedures and Tables and amendments to the Tables were also developed. Further the Regional Office, in coordination with States and users concerned, would initiate proposals for amendment of the FASID.

Review and update the Asia/Pacific Regional Plan for the New CNS/ATM Systems

3.94 The meeting noted that ICAO was currently processing the ASIA/PAC Regional Plan for publication. Also, it was recognized that amending the document could be a lengthy process, and it was considered important to ensure that it was kept up to date in a timely manner, as this was a living document. This would facilitate the planning process and accordingly, it would be beneficial to all users of the Plan for the material contained in the tables, matrixes and appendices to be updated as soon as practicable after an APANPIRG meeting.

Key Priorities for CNS/ATM Implementation

3.95 The meeting reviewed and updated the key priorities for CNS/ATM implementation in the Asia/Pacific Region. The meeting also recognized that where possible, items entered as key priorities should have definite target dates and avoid the use of the term “ongoing’. In addition, target date should be realistic. Accordingly, the meeting developed the following conclusion:

Conclusion 12/45 – Key Priorities for CNS/ATM Implementation

That, the updated key priorities for CNS/ATM implementation at Appendix E to the Report on Agenda Item 3 be adopted.

Future work programme

3.96 The meeting recalled that APANPIRG/10 on reviewing the work programme of the three Sub-Groups was of the opinion that the CNS/ATM/IC/SG was providing a very important venue for exchange of information and updates on activities within the region. However, it was noted that the Sub-Group was unable to fully perform the “co-ordination” function and only met part of charter. Consequently, a Task Force comprising the three Sub-Group Chairpersons and the Secretariat was formed to review the present tasks of all the Sub-Groups including key issues. Subsequently, the Task Force met in March and September 2000, reviewed the work programmes of the Sub-Groups and was of the opinion that the CNS/ATM/IC/SG had completed most of its tasks and could be dissolved.

3.97 The report of the Task Force was reviewed by each of the three Sub-Groups for their comment: the COM/MET/NAV/SUR/SG/4 supported the recommendation, the ATS/AIS/SAR/SG/10 noted the recommendation; and CNS/ATM/IC/SG had a differing of opinion. In view of the different

positions of the Sub-Groups, APANPIRG/11 decided to defer a decision on the CNS/ATM/IC/SG dissolution and review the matter at APANPPIRG/12.

3.98 The meeting noted that following the CNS/ATM/IC/SG/7 meeting in August 2000, the Sub-Group reviewed its Terms of Reference, work programme and method of operation, and was of the view that the goal of the Sub-Group had been achieved.

3.99 In regard to the future of the Sub-Group, the meeting noted that the CNS/ATM/IC/SG/8 members were very enthusiastic in their support that the Sub-Group should continue its activities with revised terms of reference, and with a work programme that placed greater emphasis on the co-ordination, monitoring and advancement of CNS/ATM activities. Also, there was a need to eliminate areas of duplication of work with other Sub Groups.

3.100 The meeting revised the Terms of Reference of the Sub-Group, added additional tasks on business cases for various options of CNS/ATM implementation taking into account environmental benefits, to develop a framework for regional training plans and to co-ordinate and harmonize the establishment and operation of ASIA/PAC system performance monitoring agencies. The tasks were refocused to be more action oriented and to achieve specific deliverables. The meeting agreed that a new work programme should developed by the Secretariat in consultation with the members of the Sub-Group.

3.101 In light of the foregoing, the meeting developed the following Decision:

Decision 12/46 – Amendment to the Terms of Reference of the CNS/ATM/IC/SG

That, the CNS/ATM/IC/SG should continue as an active Sub-Group of APANPIRG and the revised Terms of Reference be adopted as shown in Appendix F to the report on Agenda Item 3.

3.102 In concluding its review of the report of CNS/ATM/IC/SG/8, the meeting recognized and expressed its appreciation to the Sub-Group for the good work it had accomplished. With a new direction and Terms of Reference, the meeting expected that the output of CNS/ATM/IC/SG would be productive and that it would play an important role to facilitate States to implement CNS/ATM systems in the region to achieve the expected benefits as soon as practicable.

First amendment to the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750)

3.103 The meeting recalled that, in line with instructions of the Council in 1996, the Secretariat had revised and updated the Global Co-ordinated Plan for Transition to ICAO CNS/ATM Systems, which was re-titled as the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750). The revised Global Plan was accepted by the Council on 13 March 1998.

3.104 The meeting was informed that several bodies, including the PIRGs, had recognized the utility of the Global Plan in relation to their work, and its relevance in the overall ICAO CNS/ATM documentation structure. As a result of recent developments, the need to amend the document to reflect the latest work of these groups was recognized. Based on the above, a review was conducted by the secretariat in co-ordination with several panels, working groups and PIRGs and a comprehensive proposal in the form of first amendment to several parts of the document was developed; it was reviewed and accepted by the Council of ICAO on 15 June 2001.

3.105 The meeting was made aware that the amendments to Part I of the Global Plan covered chapters on Global Planning Methodology (Planning levels), ATM (Operational concept), Communications (ATN and VDL Modes 3 and 4), Navigation (Levels of GNSS implementation), Surveillance (ASAS technology), Meteorology (International volcano watch), AIS (data model), Human Resource Development (HRD) and Training needs (Human resources planning), Legal matters (Resolutions 19 and 20 of A32) and Financial aspects (ANSConf 2000). A new chapter has been added on the subject of Environmental benefits associated with CNS/ATM systems. The new chapter reflects the development of a methodology by the Committee on Aviation Environmental Protection for quantification of benefits associated with implementation of CNS/ATM systems. The methodology, after the necessary validation process would be extended to all the PIRGs.

3.106 The meeting noted that the updated information with regard to Part II of the Global Plan was submitted by the regional offices in co-ordination with the PIRGs. In this regard, 54 homogeneous ATM areas and major traffic flows had been identified by the PIRGs and were included in the amendment. It was emphasized that the implementation timelines shown should be viewed in general terms only, since they imply only a broad indication of the approach adopted by PIRGs.

Global Air Navigation Conference

3.107 The meeting was informed that the Air Navigation Commission had agreed that States and appropriate international organizations be consulted on the convening of an air navigation conference to discuss subjects in the fields of air traffic management (ATM), communications (COM), navigation (NAV) and related operational issues which are expected to be mature for worldwide consideration in September /October 2003. At present, this meeting has been included in the triennial meeting Programme of the Organization for planning and budgetary purposes only.

3.108 In the ATM field, the main objective of the conference would be to obtain consensus on a newly developed global ATM operational concept and to review the technical means of implementation of the concept. Other ATM subjects to be discussed include: safety in air traffic management; air traffic management performance targets for safety, efficiency and regularity; the concept of required total system performance (RTSP); and capacity enhancement measures.

3.109 In the COM field, the conference would review the outcome of the International Telecommunications Union (ITU) World Radio Conference (2003) (WRC-2003) and its impact on aeronautical electromagnetic spectrum utilization. In addition, the conference would review developments in ICAO towards the introduction of air-to-ground and air-to-air digital links in the HF, VHF and L bands, and develop principles for the future evolution of these digital links as well as the currently available analogue (Voice) air/ground link.

3.110 In the NAV field, a host of aeronautical navigation issues would be reviewed, including a review of up-to-date information on the status of the GNSS, its future architecture and levels of service that could be provided at various stages of system evolution. The discussions are expected to address, in particular, the need for a backup system(s) and conclude with updated guidelines for transition to satellite navigation.

3.111 The results of the conference could include recommendations for amendments to SARPs, PANS and guidance material. In particular, updates of the ICAO strategy for introduction and application of non-visual aids to approach and landing and the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) may be expected. Also, the conference may address the need for the

development of proposals for new SARPs and further guidance for the implementation of CNS/ATM systems.

3.112 It is envisaged that two committees namely NAV and ATM may be established to address the agenda of the conference. The views of States and international organizations were now being sought on the need for an air navigation conference in September/October 2003 to consider the subjects and on the maturity of the subjects themselves. The meeting called upon States to respond to the communication received from ICAO Headquarters by 26 October 2001.

Results of the ALLPIRG/4 meeting - Follow-up actions to be taken by the APANPIRG

3.113 The group was informed of the results of the ALLPIRG/4 meeting that was held in Montreal, Canada from 6 to 8 February 2001 to address interregional issues in planning and implementation of air navigation systems including CNS/ATM systems in ICAO Regions and to advise the ICAO Council on related matters as appropriate. The Group noted that ALLPIRG/4 meeting had developed sixteen conclusions enveloping a wide range of issues, which are detailed in the Appendix G to the report on Agenda item 3.

3.114 It was noted that the ICAO Council had reviewed the ALLPIRG/4 report on 8 June 2001, taking into account the comments of the Air Navigation Commission, and approved the ALLPIRG/4 report. As a follow-up, the APANPIRG, as well as other planning and implementation regional groups (PIRGs) were to take certain follow-up actions on the conclusions of ALLPIRG/4.

3.115 The group noted those conclusions or parts thereof that did not require any specific action by APANPIRG. In regard to Conclusion 4/8 (Environmental benefits of CNS/ATM Systems), the group supported ICAO/CAEP efforts to expand the methodology that has been developed for the quantification of CNS/ATM environmental benefits to each region. In relation to Conclusion 4/9 (Support for ICAO position at WRC-2003), the group recognizing the need to accord high priority to the protection of aeronautical frequency spectrum, stressed that the issue be addressed by ICAO at the forthcoming DGCA conference. The group welcomed the proposal in Conclusion 4/14 (Expansion of the Universal safety Oversight Audit Programme) to include Annex 11 (Air Traffic Services) and 14 (Aerodromes) in the expansion of Universal Safety Oversight Audit Programme.

3.116 As a result of analysis of the conclusions of ALLPIRG/4, the group identified those conclusions, which require follow up by APANPIRG and assigned the task to the relevant subgroup. Accordingly, the following Decision was formulated:

Decision 12/47 – Follow-up actions on the Conclusions of ALLPIRG/4 Meeting

That, the following conclusions of ALLPIRG/4 meeting be addressed by the relevant subgroups as part of their work programme and report its outcome.

Conclusions 4/1, 4/2, 4/8 and 4/13- CNS/ATM IC SG
Conclusions 4/3 and 4/7- ATS/AIS/SAR SG
Conclusions 4/3 - CNS/MET SG
Conclusions 4/10 and 4/11- All Subgroups

Report on developments in the modernization of air navigation systems

3.117 The group was presented with an overview on developments in the modernization of air navigation systems including CNS/ATM Systems that took place in 2000 and up to April 2001.The group among other things noted the following

a) Development of Global Air Navigation Plan for CNS/ATM Systems.

b) Summary of work of ICAO's Planning and Implementation Regional Groups (PIRGs).

c) Development status of Standards and Recommended Practices (SARPs) and guidance material available in Appendix H to the agenda item 3.

d) Work programme of various panels and study groups engaged in CNS/ATM related activities available in Appendix I to the agenda item 3.

Summary Forecast by Route Group (1996/2010)

Table 19
Total Number of Seats Available

				AAGR (%)
	1996	**1999**	**2010**	**1999/2010**
Asia/Australia - Africa		1,382,140	2,892,155	6.9
Asia - Australia/New Zealand		16,869,733	35,238,417	6.9
Asia - Europe (North of Himalayas)		36,907,200	72,307,419	6.3
Asia - Europe (South of Himalayas)		22,993,560	45,048,256	6.3
Asia - North America (via Eastern Russian)		192,600	371,857	6.2
Asia - North America (via central & North Pacific)		39,002,778	75,630,335	6.2
Australia/NewZealand - South America		152,400	284,153	5.8
Australia/New Zealand - North America (via South Pacific)		4,021,796	7,906,984	6.3
South East Asia - North East Asia		47,495,531	74,646,978	4.2
Total		169,017,738	314,326,554	5.8

Table 20
Total Number of Passengers

				AAGR (%)
	1996	**1999**	**2010**	**1999/2010**
Asia/Australia - Africa		939,855.2	2,082,351.6	7.5
Asia - Australia/New Zealand		11,808,813.1	25,371,660.3	7.2
Asia - Europe (North of Himalayas)		27,126,792.0	54,230,564.2	6.5
Asia - Europe (South of Himalayas)		16,900,266.6	33,786,191.6	6.5
Asia - North America (via Eastern Russian)		138,672.0	278,892.8	6.6
Asia - North America (via central & North Pacific)		28,082,000.0	56,722,751.1	6.6
Australia/New Zealand - South America		91,440.0	184,699.4	6.6
Australia/New Zealand - North America (via South Pacific)		2,935,911.1	5,930,238.4	6.6
South East Asia - North East Asia		32,296,961.1	55,238,763.7	5.0
Total		120,320,711.1	233,826,113.1	6.2

Table 21
Aircraft Movements

				AAGR (%)
	1996	**1999**	**2010**	**1999/2010**
Asia/Australia - Africa	4,735	4,766	9,641	6.6
Asia - Australia/New Zealand	51,323	54,080	106,564	6.4
Asia - Europe (North of Himalayas)	131,295	102,520	170,135	4.7
Asia - Europe (South of Himalayas)	55,030	63,871	105,996	4.7
Asia - North America (via Eastern Russian)	577	535	896	4.8
Asia - North America (via central & North Pacific)	73,941	108,341	182,242	4.8
Australia/New Zealand - South America	245	420	710	4.9
Australia/New Zealand - North America (via South Pacific)	9,364	10,580	19,767	5.8
South East Asia - North East Asia	154,415	164,618	244,063	3.6
Total	480,925	509,731	840,014	4.6

Table 22
Load Factor

			AAGR (%)
	1999	**2010**	**1999/2010**
Asia/Australia - Africa	68	72	0.5
Asia - Australia/New Zealand	70	72	0.3
Asia - Europe (North of Himalayas)	74	75	0.2
Asia - Europe (South of Himalayas)	74	75	0.2
Asia - North America (via Eastern Russian)	72	75	0.4
Asia - North America (via central & North Pacific)	72	75	0.4
Australia/New Zealand - South America	60	65	0.7
Australia/New Zealand - North America (via South Pacific)	73	75	0.2
South East Asia - North East Asia	68	74	0.8
Total	70	73	0.4

Table 23
Average Aircraft Seat Capacity

			AAGR (%)
	1999	**2010**	**1999/2010**
Asia/Australia - Africa	290	300	0.3
Asia - Australia/New Zealand	312	331	0.5
Asia - Europe (North of Himalayas)	360	425	1.5
Asia - Europe (South of Himalayas)	360	425	1.5
Asia - North America (via Eastern Russian)	360	415	1.3
Asia - North America (via central & North Pacific)	360	415	1.3
Australia/New Zealand - South America	363	400	0.9
Australia/New Zealand - North America (via South Pacific)	380	400	0.5
South East Asia - North East Asia	289	306	0.5
Total	341	380	1.0

COMPOSITION OF THE

ASIA/PACIFIC REGION SYSTEM PERFORMANCE MONITORING TASK FORCE

The Task Force members will be provided by the following States and International Organizations:

Member States:

Australia

Fiji

Japan

India

Thailand

Singapore

United States (Chairperson)

International Civil Aviation organization (ICAO):

Chairperson of the ATS/AIS/SAR/SG

Chairperson of the CNS/ATM/IC/SG

Chairperson of the CNS/MET/SG

Secretary

International Organizations:

International Air transport Association (IATA)

International Airline Pilots' Associations (IFALPA)

International Federation of Air Traffic Controllers Associations (IFATCA)

TERMS OF REFERENCE OF THE ASIA/PACIFIC REGION SYSTEM PERFORMANCE MONITORING ORGANIZATION TASK FORCE

The Draft Terms of Reference are as follows:

- To develop the organization and structure of a system performance monitoring organization for the Asia/Pacific Region, and to coordinate with other regional monitoring organizations to ensure inter-regional harmonization;
- To examine requirements of regulatory bodies, operators and service providers;
- To determine the size and functions of the monitoring services to meet safety goals;
- To identify the cost of operating monitoring services and requirements for its funding;
- To address any other matters as appropriate and relevant to establishing an appropriate monitoring system;
- The Task Force will include participation from all parties concerned; and
- The Task Force will report to the APANPIRG.

GUIDING PRINCIPLES

a) airspace safety oversight and system performance monitoring requirements to be established in accordance with ICAO provisions;

b) all regional monitoring activities to be integrated in a regional monitoring structure under APANPIRG;

c) a single monitoring agency to be established for an airspace or major traffic flow;

d) States willing to undertake the management of a regional monitoring agency to be capable of providing appropriate support and expertise;

e) the cost of providing monitoring services to be recovered from route charges and used in accordance with ICAO's policies on route charges; and

f) States with the expertise and appropriate resources to be encouraged to provide support and assistance to the regional safety programme.

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FRAMEWORK FOR INTER-REGIONAL-CO-ORDINATION MEETINGS

The following principles were recognized as elements to be considered in developing a framework for IRC:

1) IRC may be carried out at the levels of

   – ALLPIRG
   – RDs
   – PIRGs on a peer-to-peer basis within the auspices of ICAO Secretariat

2) IRC convened by ICAO Regional Directors should also have the attendance of the Chief of the Regional Affairs Office. Care should be exercised not to involve too many regions at one time so that information, views and proceedings can be managed efficiently.

3) Support for ICAO Regional Directors at IRC Meetings may be required when dealing with operational issues in order to come to a meaningful conclusion;

4) A practice of rotating the venue within the common area of interest should be followed.

5) The host ICAO Regional Director will normally oversee the proceedings of the meeting;

6) IRC meetings will be kept at an informal level, with minimum focus on documentation and maximum focus on implementation enhancement;

7) IRC meetings will take place on an ad hoc basis. The prime task will be to identify major impediments and issues as well as to progress the implementation of other air navigation matters;

8) A matrix is to be developed to follow-up on inter regional issues which will identify, prioritize and describe actions by appropriate parties with specific target dates. Consideration should be given to the development of a global common database of inter regional co-ordination issues.

9) Progress will be reported to ALLPIRG where appropriate.

10) On issues of major procedural or operational differences between regions, which pose as major impediments to inter regional harmonization, the Air Navigation Commission or the Council may be advised as appropriate.

11) Care must be exercised to avoid duplication of efforts. The prime objective is to streamline and complement the functions of existing bodies;

12) Air navigation is the major thrust of IRC. Consideration should also be given to developing methodologies in other areas where gaps in States' capabilities require ICAO assistance;

13) IRC Meetings are unique opportunities and should be utilized to consider strategies that would give a common approach to issues of mutual interest in a manner that would enhance the visibility and presence of ICAO in the regions;

14) Where projects or issues cross regional boundaries consideration should be given to common agenda items at relevant PIRG meetings.

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DRAFT TERMS OF REFERENCE

a) Identify major impediments and issues and assess the progress of implementation of air navigation matters of inter-regional nature;

b) Identify, prioritize and describe actions by appropriate parties with specific target dates;

c) Develop a common database of inter-regional-co-ordination issues;

d) Ensure that appropriate regional initiatives and information are shared with other regions;

e) Strategize to give a common approach to air navigation issues of inter-regional nature.

f) Keep the inter-regional – co-ordination process under continuous review to ensure optimum productivity and enhancement of the pace of implementation on air navigation matters.

g) Facilitate and contribute to the work of the ALLPIRG/Advisory Group.

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Key Priorities for CNS/ATM Implementation in the Asia Pacific Region

Key Priority	Description	Milestone	Sub-group	Status
ATN Transition	The development of an ATN transition plan is required.	2001	CNS/MET ATN Transition Task Force	Completed Completed development of the Plan
Incorporation of CNS/ATM Material into Regional ANP & FASID	To reflect regional agreement for the implementation of CNS/ATM facilities and services and the determination of priorities for financing.	APANPIRG/12	All	On-going CNS/MET SG/5 established Working Group to incorporate CNS/ATM materials in the Regional Procedure Part CNS FASID.
Revised South China Sea ATS Route Implementation	Successful implementation of this important route structure alleviates airspace congestion and provides a project model for similar route structure activity elsewhere in the Region.	1 November 2001	ATS/AIS/SAR	Implementation project has been progressed through the ICAO South China Sea Route Implementation Task Force.
WGS-84 Implementation	To achieve uniformity in aeronautical data publication across the Region in order to ensure a standard reference system for CNS/ATM.	Immediate (Effective Date was 1 Jan 1998)	ATS/AIS/SAR	Implementation is monitored at each meeting using the uniform format for the reporting of WGS-84 implementation. Report progress to APANPIRG/12.

Key Priority	Description	Milestone	Sub-group	Status
RVSM Implementation	To provide more efficient flight profiles and to increase airspace capacity in conjunction with the implementation of CNS/ATM.	21 Feb 2002 – Western Pacific/South China Sea 31 Oct 2002- Hong Kong FIR and Sanya AOR 27 Nov 2003- Asia to Europe South of the Himalayas Australia Nov 1	ATS/AIS/SAR	Phased implementation. RVSM Implemented in the Pacific 24 Feb 2000.
RNP Implementation	Global standard for navigation is seen as a prerequisite for many CNS/ATM implementation activities.	RNP-10/South China Sea 2001 RNP-10/ Australia-Indonesia Nov 2001 RNP-10/Bay of Bengal 2002	ATS/AIS/SAR & CNS/ATM/IC	Phased implementation. RNP-10 is implemented in NOPAC, CENPAC, CEP & Tasman Sea.
ADS	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.	APANPIRG/12	ATS/AIS/SAR	Phased implementation. Revised Regional CNS/ATM Guidance Material developed containing ADS section. Implementation focus and timetable need to be developed. ANC/Council review indicates that CNS/ATM/GM shall not include ADS section. States are gaining experience in the use of ADS.

Key Priority	Description	Milestone	Sub-group	Status
Technical Co-operation in Regional CNS/ATM Planning & Implementation	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.	APANPIRG/12	All	Sub-groups to identify requirements.
Preparation for WRC2003	The co-operative participation of States is required with their respective communications authority, regional groups such as the APT and at the WRC, preparatory meetings and study groups to ensure that aviation spectrum requirements are fulfilled including GNSS spectrum requirements.	WRC2003	All	ICAO Position presented at APT meetings in Sept.2000 and June 2001. State letter issued to follow up APANPIRG Conclusion 11/24, A Seminar on spectrum management will be held in conjunction with AMCP WG-F meeting in November 2001in Bangkok.

Key Priority	Description	Milestone	Sub-group	Status
GNSS Implementation	To implement GNSS in accordance with the Asia Pacific Regional Strategy.	Phase 1- 2003	All	Phased implementation Sub-groups to develop plan and report progress to APANPIRG/13 1. GNSS Implementation Workshop was held in May 2001. • States are encouraged to implement GNSS for En-route and NPA functions. • States advised to participate in the GNSS Measurement Campaign. • GNSS Implementation checklist was developed. • GNSS strategy was reviewed.
Airspace Management	To implement revised ATS route structures for the major traffic flows.	Phase 1 – Asia to Europe via South of the Himalayas, Nov 2002	ATS/AIS/SAR CNS/MET	Phased implementation. Report progress to APANPIRG/12.

Key Priority	Description	Milestone	Sub-group	Status
Final phase of WAFS	To implement transition to the final phase of WAFS to support the CNS/ATM system.	2004	CNS/MET SG	• WAFS Transition Plan and Procedures has been developed and is being successfully implemented. • Transfer of responsibility of RAFCs to WAFCs London and Washington has been implemented. • Closure of RAFCs has been implemented.
MET Chapter 8 of the ASIA/PAC Regional Plan for New CNS/ATM System	To develop MET components of the ASIA/PAC CNS/ATM concept/strategy To develop MET Chapter of the Regional CNS/ATM Plan	2003 2004	CNS/MET with assistance of the ATS/AIS/SAR SG METATM TF	• The first draft of MET Chapter of the Regional CNS/ATM Plan has been developed. • METATM TF to develop MET components of the ASIA/PAC CNS/ATM concept/strategy.
Data – link Communications	1. Implementation of CPDLC (with HF and/or SATCOM back-up) in oceanic or remote airspace. 2. AIDC to be introduced where ATS automated systems are implemented.	2002 2005	All All	Sub – Groups to review progress of implementation.

**COMMUNICATIONS, NAVIGATION, SURVEILLANCE
& AIR TRAFFIC MANAGEMENT
IMPLEMENTATION CO-ORDINATION SUB-GROUP (CNS/ATM/IC/SG)**

TERMS OF REFERENCE

1. Review and update, on a regular basis, the "Asia/Pacific Regional Plan for the New CNS/ATM Systems" and ensure the harmonization with the Global Air Navigation Plan for CNS/ATM Systems;

2. Develop, based on the research and development, trials and demonstrations being carried out in the Asia/Pacific as well as other regions, regional guidance material for the implementation of CNS/ATM systems;

3. Co-ordinate the plans of States, international organizations, airlines and industry for the implementation of the ASIA/PAC Regional Implementation Plan for the CNS/ATM systems under development and implementation;

4. Identify key priorities for implementation of CNS/ATM for the ASIA/PAC region, co-ordinate and monitor implementation;

5. Review and identify intra and inter-regional CNS/ATM co-ordination matters and where appropriate recommend actions to address these issues;

6. Co-ordinate and harmonize the establishment and operation of ASIA/PAC system performance monitoring agencies for implementation of CNS/ATM systems and reduced separation minima, and co-ordinate with other regional monitoring agencies; and

7. Develop guidance material for the applicability of the ICAO ATM Concept in the Asia/Pacific Region, taking into account national planning;

8. Develop business cases for various options of CNS/ATM implementation taking into account environmental benefits; and

9. 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".

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CONCLUSIONS DEVELOPED BY ALLPIRG/4

Conclusion 4/1 – A general framework and terms of reference for interregional coordination meetings

That the Council agree to adopt a general framework and terms of reference for interregional coordination meetings (IRCMs) as set out in Appendices A and B to the report on Agenda Item 2.

Conclusion 4/2 – Interregional meetings specifically dedicated to interface areas

That ICAO convene interregional meetings, as and when required, to address the specifically focussed interface problems and other issues of neighbouring States and/or neighbouring regions as a whole.

Conclusion 4/3 – Increased emphasis on addressing interregional issues and missing elements

That, with a view to facilitating interregional planning and the harmonization of air navigation systems, ICAO and the CNS/ATM partners put more emphasis on the addressing of interregional issues and the missing elements as outlined in Appendix C to the report on Agenda Item 2.

Conclusion 4/4 – Publication and maintenance of ANP/FASID documents

That:

a) ICAO ensure that sufficient resources and priorities are accorded to the publication of ANP/FASID documents; and

b) the ANP/FASID be kept up-to-date through regular amendments thereto.

Conclusion 4/5 – Consistency in aeronautical information

That, on the basis of work being done in the European Region, ICAO:

a) make every effort to increase the awareness of all States of the need to ensure the consistency of aeronautical information, including the development of additional guidance material, if necessary; and

b) draw States' attention to the importance of implementation of the new ICAO standard aeronautical information publication format.

Conclusion 4/6 – RVSM certification process

That ICAO develop a suitable standard for use by States in certification of aircraft for RVSM operation and provide appropriate guidance to support the global harmonization of RVSM approval processes.

Conclusion 4/7 – Adoption of a uniform format for the reporting of WGS-84 implementation

That the table available at Appendix D to the report on Agenda Item 2 be adopted as a uniform format for the reporting of WGS-84 implementation by PIRGs and States.

Conclusion 4/8 – Environmental benefits of CNS/ATM systems

That:

a) ICAO Regional Offices and PIRGs support ICAO/CAEP efforts to expand the methodology for the quantification of CNS/ATM environmental benefits to each region by collecting data, as necessary;

b) ICAO/CAEP continue its work on the expansion of the methodology for the assessment of the environmental benefits associated with the implementation of CNS/ATM systems to the various regions; and

c) ICAO proceeds with the revision of the methodology for inclusion in the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) at the earliest opportunity.

Conclusion 4/9 – Support for the ICAO position at WRC-2003

That regional planning groups and regional offices address matters concerning the allocation and protection of radio frequency spectrum, in coordination with national civil aviation authorities, ICAO Headquarters and regional telecommunication organizations.

Conclusion 4/10 – Reporting of shortcomings and deficiencies

That where a State, by virtue of Article 38, has notified ICAO of a difference to Standards and Recommended Practices governing the actual provision of facilities and services listed in an air navigation plan, the non-implementation of a facility or service, in the context of the uniform methodology for the identification and reporting of air navigation shortcomings and deficiencies, should not be reported as either a shortcoming or a deficiency when it has no negative impact on safety, regularity and/or efficiency.

Conclusion 4/11 – Single definition

That ICAO be invited to refine the following single definition of a shortcoming/deficiency with a view to its incorporation into the uniform methodology for the identification and reporting of air navigation shortcomings and deficiencies:

"A *deficiency* is a situation where a facility, service or a procedure is not provided in accordance with ICAO Standards and Recommended Practices which has a negative impact on the safety, regularity and/or efficiency of international civil aviation".

Conclusion 4/12 – EUROCONTROL planning and implementation methods

That, with a view to benefitting from EUROCONTROL's experience and expertise in the field of performance-driven planning and implementation methods, particularly with regard to the collaborative links that the agency maintained with its CNS/ATM partners, PIRGs:

a) study the approach to planning and implementation taken by EUROCONTROL, with a view to the possible application of its elements in their respective regions of responsibility; and

b) take steps to issue appropriate invitations for EUROCONTROL's attendance at PIRG meetings.

Conclusion 4/13 – Database developments

That ICAO:

a) post promptly all tabular material from all regional air navigation plans relating to facilities and services to an ICAO-controlled web site in a simple PDF format;

b) invite CNS/ATM partners to post their relevant planning material on the web site referred to in a) above;

c) provide appropriate free access to relevant ICAO Headquarters' Sections, Regional Offices, PIRGs and participating CNS/ATM partners;

d) maintain the currency of this database, *inter alia*, to take account of amendments made to hard copy ANPs;

e) with the assistance of PIRGs and interested CNS/ATM partners, refine and develop the database, as a matter of urgency, to provide access and functionality commensurate with its use as a planning tool and in line with ICAO sale of publications practices.

Conclusion 4/14 – Expansion of the Universal Safety Oversight Audit Programme

That the Universal Safety Oversight Audit Programme be expanded to include Annexes 11 and 14 and the necessary resources be made available.

Conclusion 4/15 – Remedial action

That, in following up the audits carried out in the context of the Universal Safety Oversight Audit Programme, the necessary remedial actions be taken as a matter of urgency.

Conclusion 4/16 – Databases for CNS/ATM systems planning activities

That ICAO set up a mechanism to collect and update the relevant data to be used by regions, sub-regions and States for their CNS/ATM systems planning activities.

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ALLPIRG/4 CONCLUSIONS REQUIRING ACTION BY PIRGS

Conclusion/Follow-up	Action by PIRG	Q3, 2001			Q4, 2001			Q1, 2002			Q2, 2002			Q3, 2002		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
A general framework and terms of reference for interregional coordination meetings (Conclusion 4/1)																
The Council approves a general framework and terms of reference for interregional coordination meetings (IRCMs) as set out in Appendices A and B to the report on Agenda Item 2.	Adopt the general framework and terms of reference for IRCMs – one-time task															
Interregional meetings specifically dedicated to interface areas (Conclusion 4/2)																
ICAO will convene interregional meetings, as and when required, to address the specifically focussed interface problems and other issues of neighbouring States and/or neighbouring regions as a whole.	Convene interregional meetings – ongoing task															
Increased emphasis on addressing interregional issues and missing elements (Conclusion 4/3)																
With a view to facilitating interregional planning and the harmonization of air navigation systems, ICAO and the CNS/ATM partners to put more emphasis on the addressing of interregional issues and the missing elements as outlined in Appendix C to the report on Agenda Item 2.	Address relevant issues – ongoing task															
Publication and maintenance of ANP/FASID documents (Conclusion 4/4)																
ICAO to ensure that sufficient resources and priorities are accorded to the publication of ANP/FASID documents	Note that ICAO is progressing the task															
The ANP/FASID to be kept up-to-date through regular amendments thereto.	Note – ongoing task															
Consistency in aeronautical information (Conclusion 4/5)																
On the basis of work being done in the European Region, ICAO to make every effort to increase the awareness of all States of the need to ensure the consistency of aeronautical information, including the development of additional guidance material, if necessary	Note that ICAO is progressing the task															

Conclusion/Follow-up	Action by PIRG	Q3, 2001			Q4, 2001			Q1, 2002			Q2, 2002			Q3, 2002		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
On the basis of work being done in the European Region, ICAO to draw States' attention to the importance of implementation of the new ICAO standard aeronautical information publication format.	Note that ICAO has addressed a State letter															
RVSM certification process (Conclusion 4/6)																
ICAO to develop a suitable standard for use by States in certification of aircraft for RVSM operation and provide appropriate guidance to support the global harmonization of RVSM approval processes.	Note that ICAO is progressing the task															
Adoption of a uniform format for the reporting of WGS-84 implementation (Conclusion 4/7)																
The table available at Appendix D to the report on Agenda Item 2 to be adopted as a uniform format for the reporting of WGS-84 implementation by PIRGs and States.	Adopt the uniform format for reporting of WGS-84 implementation															
Environmental benefits of CNS/ATM systems (Conclusion 4/8)																
ICAO Regional Offices and PIRGs to support ICAO/CAEP efforts to expand the methodology for the quantification of CNS/ATM environmental benefits to each region by collecting data, as necessary;	Support the ICAO/CAEP efforts															
ICAO/CAEP to continue its work on the expansion of the methodology for the assessment of the environmental benefits associated with the implementation of CNS/ATM systems to the various regions	Note that ICAO is progressing the task															
ICAO to proceed with the revision of the methodology for inclusion in the Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) at the earliest opportunity	Note that ICAO is progressing the task															
Support for the ICAO position at WRC-2003 (Conclusion 4/9)																
Regional planning groups and regional offices address matters concerning the allocation and protection of radio frequency spectrum, in coordination with national civil aviation authorities, ICAO Headquarters and regional telecommunication organizations	Address and support ICAO's position at WRC-2003															

Conclusion/Follow-up	Action by PIRG	Q3, 2001			Q4, 2001			Q1, 2002			Q2, 2002			Q3, 2002		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Reporting of shortcomings and deficiencies (Conclusion 4/10)																
That, where a State, by virtue of Article 38, has notified ICAO of a difference to Standards and Recommended Practices governing the actual provision of facilities and services listed in an air navigation plan, the non-implementation of a facility or service, in the context of the uniform methodology for the identification and reporting of air navigation shortcomings and deficiencies, should not be reported as either a shortcoming or a deficiency when it has no negative impact on safety, regularity and/or efficiency.	Note and implement in addressing shortcomings and deficiencies in air navigation services – ongoing task															
Single definition (Conclusion 4/11)																
That ICAO be invited to refine the following single definition of a shortcoming/deficiency with a view to its incorporation into the uniform methodology for the identification and reporting of air navigation shortcomings and deficiencies: "A deficiency is a situation where a facility, service or a procedure is not provided in accordance with ICAO Standards and Recommended Practices which has a negative impact on the safety, regularity and/or efficiency of international civil aviation".	Note that further refinement of the definition is on hand by the ANC/Council															
EUROCONTROL planning and implementation methods (Conclusion 4/12)																
That, with a view to benefitting from EUROCONTROL's experience and expertise in the field of performance-driven planning and implementation methods, particularly with regard to the collaborative links that the agency maintained with its CNS/ATM partners, PIRGs:																
study the approach to planning and implementation taken by EUROCONTROL, with a view to the possible application of its elements in their respective regions of responsibility; and	Note															
take steps to issue appropriate invitations for EUROCONTROL's attendance at PIRG meetings.	Note															

Conclusion/Follow-up	Action by PIRG	Q3, 2001			Q4, 2001			Q1, 2002			Q2, 2002			Q3, 2002		
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Database developments (Conclusion 4/13)																
ICAO to post promptly all tabular material from all regional air navigation plans relating to facilities and services to an ICAO-controlled web site in a simple PDF format	Note that ICAO has already implemented this task for the AFI and MID Regions – ongoing task															
ICAO to invite CNS/ATM partners to post their relevant planning material on the web site referred to above	Note that ICAO is progressing the task															
ICAO to provide appropriate free access to relevant ICAO Headquarters' Sections, Regional Offices, PIRGs and participating CNS/ATM partners	Note															
ICAO to maintain the currency of this database, inter alia, to take account of amendments made to hard copy ANPs	Note – ongoing task															
ICAO, with the assistance of PIRGs and interested CNS/ATM partners, to refine and develop the database, as a matter of urgency, to provide access and functionality commensurate with its use as a planning tool and in line with ICAO sale of publications practices	Support ICAO in the implementation of this task															
Expansion of the Universal Safety Oversight Audit Programme (Conclusion 4/14)																
The Universal Safety Oversight Audit Programme to be expanded to include Annexes 11 and 14 and the necessary resources made available	Note that ICAO is progressing the task															
Remedial action (Conclusion 4/15)																
In following up the audits carried out in the context of the Universal Safety Oversight Audit Programme, the necessary remedial actions to be taken as a matter of urgency	Invite States and regional offices to initiate remedial action as a follow-up to the audits															
Databases for CNS/ATM systems planning activities (Conclusion 4/16)																
ICAO to set up a mechanism to collect and update the relevant data to be used by regions, sub-regions and States for their CNS/ATM systems planning activities	Note that ICAO is progressing the task															

– END –

DEVELOPMENT STATUS OF SARPs AND GUIDANCE MATERIAL RELATED TO CNS/ATM SYSTEMS

MAIN FIELD		ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
			TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
ATM	ATM	Global air traffic management requirements	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures under development.		Operational concept of global ATM being defined as part of updated global plan.
		Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures under development.		
		Required total system performance (RTSP)	2005	Draft policy statement under development.		
		ATM requirements for communications, navigation and surveillance	2002	Annexes 2, 6 and 11 SARPs and PANS-ATM procedures under development.		
	ASM	Airspace infrastructure planning	—	—	Completed	*Manual on Airspace Planning Methodology for the Determination of Separation Minima* (Doc 9689) published.
	ASM	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.

1) final action by the Air Navigation Commission
2) approval by the Secretary General

MAIN FIELD		ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
			TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
ATM	ATS	Separation between aircraft	2002	PANS-ATM procedures approved by Council in 1998; further amendment to Annexes 2, 6, 11 and PANS-ATM under development.	2001	Amendment to *Air Traffic Services Planning Manual* (Doc 9426) to be developed. 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 APM (Doc 9689).
		ATS (uplink of MET data)	2001	Annex 3 SARPs and PANS-ATM procedures concerning D-ATIS and D-VOLMET being developed with the assistance of the METLINKSG.	—	—
		ATS (uplink of SIGMET information in graphical format)	2004	Initial Annex 3 SARPs specifying the code to be used for graphical SIGMETs being developed with the assistance of the METLINKSG.	—	—
		WAFS planning and implementation (final phase)	2004	Annex 3 SARPs for global WAFS SIGWX forecasts in binary format (BUFR code) for direct transmission to airline and ATM computers being developed with the assistance of WAFSSG.		

1) final action by the Air Navigation Commission
2) approval by the Secretary General

MAIN FIELD		ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
			TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
		ATS applications for air-ground data links	2003	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	2002	Annex 11 SARPs and PANS-ATM procedures under development.		
		ILS/MLS/GNSS[3] operations	2002	PANS procedures under review.		
	ATFM	ATFM systems and procedures	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures to be developed.	2001	ATFM part of the ATM operational concept under development.
CNS/ATM		Human Factors	2001	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.	2001	A chapter on Human Factors issues was developed and included in the *Manual of Air Traffic Services Data Link Applications* (Doc 9694). A manual on Human Factors Guidelines for Air Traffic Management Systems (Doc 9758) was completed and published in 2000.

1) final action by the Air Navigation Commission
2) approval by the Secretary General
3) OCP is developing PANS-OPS criteria for SBAS/GBAS

MAIN FIELD	ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
		TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
	Human Resource Planning and Training			2001	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	Mode 4 validation commenced in 1997. Mode 3 validation started in 1998. Validation of material in manuals ongoing.	Ongoing	SARPs adopted in 2001. Manuals on VDL technical details and implementation aspects will be published in 2001.
COM (cont'd)	AMS	Completed	Included in Amendment 75 to Annex 10.	Completed	Included in Amendment 75 to Annex 10.
	Next generation satellite system	Completed	SARPs development completed by AMCP/7	Ongoing	Guidance material on specific systems to be developed as required.
NAV	RNP (en-route)	Completed	Adopted/approved by Council in 1994 (Annexes 2, 4, 6, 11, 15 and PANS-ATM).	Completed	Guidance material for RNP1 operations under development.
		—	—	Completed	The *Manual on Airspace Planning Methodology for the Determination of Separation Minima* (Doc 9689) published in 1998.
	RNP (terminal area, approach, landing, departure)	Completed	Recommended by AWOP/16 and adopted by the Council in 1999.	Completed	Developed by AWOP, in parallel with SARPs.
	WGS-84	Completed	Adopted by Council in 1994, 1995, 1997 and 1998.	Completed	*WGS-84 Manual*, (Doc 9674) and Amendment 1 issued.

1) final action by the Air Navigation Commission
2) approval by the Secretary General

MAIN FIELD	ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
		TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
			Annexes 4, 11, 14 (both volumes) and 15 updated, provisions applicable from 1 January 1998.		Amendment 2 concerning taxiway and apron points has been written and submitted for translation and publication. ICAO WGS-84 website is under development.
	Aeronautical data bases	2003	SARPs for the standard conceptual information model required for the provision and exchange of electronic aeronautical data initiated at the AIS/MAP/98 Divisional Meeting, are being developed by the Secretariat with the assistance of ADMSG.	2004	To be developed by the Secretariat with the assistance of AISMAPSG and ADMSG.
NAV (cont'd)		2001	Initial SARPs for electronic aeronautical charts for cockpit display were included in Amendment 52 to Annex 4.		
		2004	SARPs for the electronic terrain data are under development in consultation with RTCA/EUROCAE.		
	GNSS performance criteria to support operational requirements	2001	Draft material was developed at the GNSSP/3 (12 to 23 April 1999).	2001	Developed by GNSSP in parallel with SARPs.

1) final action by the Air Navigation Commission
2) approval by the Secretary General

MAIN FIELD	ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
		TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
	SARPs for the use of existing satellite navigation systems with augmentation sub-systems	2001	First package of SARPs was recommended by GNSSP/3 and adopted by Council in March 2001 for applicability on 1 November 2001.	2001	Developed by GNSSP in parallel with SARPs.

1) final action by the Air Navigation Commission
2) approval by the Secretary General

MAIN FIELD	ELEMENTS	SARPS/PANS		GUIDANCE MATERIAL	
		TARGET COMPLETION DATE[1]	STATUS	TARGET COMPLETION DATE[2]	STATUS
	SARPs for the longer-term GNSS	2004	Guidance on the long-term GNSS was developed by GNSSP/3 and the work on SARPs for new elements of GNSS (GPS second civil frequency, Galileo, GLONASS-M) is under way.	2004	Developed by GNSSP in parallel with SARPs.
SUR	Surveillance system specifications for emerging surveillance systems and architectures	2004	Surveillance enhancements (ANC Task No. CNS-9601) being developed by SCRSP.	Ongoing	
	SSR procedures	Completed	Update of Annex 11 and PANS-ATM.	Completed	
	ADS procedures	2001	Annex 11 SARPs and PANS-ATM procedures being developed by the OPLINKP and SASP.	Completed	*Manual of ATS Data Link Applications* (Doc 9694) published and dispatched in second quarter 1999.
	ADS-B and equivalent	On-going	Being developed by OPLINKP	Ongoing	Amendment to the *Manual of ATS Data Link Applications* (Doc 9694) to be developed.
	ADS: inclusion of turbulence reporting	2001	Annex 3 SARPs and PANS-ATM turbulence reporting procedures based on the eddy dissipation rate being developed with the assistance of METLINKSG.		

1) final action by the Air Navigation Commission
2) approval by the Secretary General

LEGEND

ATM	—	Air traffic management
ADS	—	Automatic dependent surveillance
ADS-B	—	ADS broadcast
AIS	—	Aeronautical information services
ASM	—	Airspace management
ATFM	—	Air traffic flow management
ATN	—	Aeronautical telecommunication network
ATS	—	Air traffic services
CNS	—	Communications, navigation, and surveillance
COM	—	Communications
GNSS	—	Global navigation satellite system
NAV	—	Navigation
RNAV	—	Area navigation
RNP	—	Required navigation performance
SSR	—	Secondary surveillance radar
SUR	—	Surveillance
WAFS	—	World area forecast system
WGS	—	World geodetic system

1) final action by the Air Navigation Commission
2) approval by the Secretary General

PANELS AND STUDY GROUPS INVOLVED IN CNS/ATM-RELATED ACTIVITIES

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS (PROGRESS IN 2000)
OPLINKP	ATM-9102	ATS applications for air-ground data links	2001 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	2001 and beyond	The development of the concept of required communication performance was progressed.
	ATM-9506	Automatic dependent surveillance (ADS) systems and procedures	2001 and beyond	
	ATM-9103	Data interchange between automated ATS systems	2001	Provisions applicable to air traffic services interfacility data communications (AIDC) are being developed.
	ATM-0002	ADS-B, Traffic situational awareness and airborne separation assurance	Ongoing	Ground work was prepared for an operational concept and operational requirements for the use of a system to increase aircraft situational awareness and airborne separation assurance are being developed.
AMCP	CNS-7002	Aeronautical electromagnetic spectrum	Ongoing	AMCP continued work on spectrum protection tasks inherited from the disbanded FMSG.
	CNS-8702	Aeronautical mobile satellite air-ground data link (AMSS subnetwork)	Completed	Work on upgrades to the AMSS SARPs was completed.
	CNS-9902	Next-generation AMSS systems	Ongoing	Work on the development of acceptability criteria and SARPs for next-generation satellite systems was completed.
	CNS-9102	VHF air-ground digital link (VDL subnetwork)	Ongoing	Validation of the detailed technical specification for VDL Modes 3 and 4 ongoing.
	CNS-9603	Air-ground data link to support navigation and surveillance applications	Ongoing	Validation of the VDL Modes 3 and 4 SARPs completed.
	CNS-9602	High frequency data link (HFDL)	Ongoing	Validation of detailed technical specifications ongoing.

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS (PROGRESS IN 2000)
ATMCP	ATM-9501	Required total system performance	2002	The ATMCP Working Group has held 5 meetings. Progress is being made on operational concept document.
	ATM-9202	Global air traffic management	2002 and beyond	
	ATM-9510	Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2002	
ATNP	CNS-7001	AFS systems planning studies	Completed	SARPs and technical specifications for ATN systems management, security and directory services were completed in 2000. Future work involves the incorporation of new and revised operational requirements and subnetworks into the ATN and enhancements to existing functions.
	CNS-8101	AFTN procedures and message format	Completed	
	CNS-9403	Aeronautical telecommunication network (ATN)	Completed	
	CNS-9901	AFS procedures	Completed	
GNSSP	CNS-9401	Global navigation satellite system (GNSS)	Completed	First set of SARPs recommended at GNSSP/3 Meeting, 12 to 23 April 1999.
	CNS-7002	Aeronautical electromagnetic spectrum	Ongoing task	
	OPS-8502	Flight procedures and obstacle clearance criteria based on GNSS & RNP systems	2001	
	ATM-8505	Required navigation performance and area navigation for en-route operations	2001	Route spacings based on RNAV and RNP 1, a global target level of safety and the effects of GNSS on aircraft separation continued to be studied. Guidance material was developed for inclusion in the *Manual on Airspace Methodology for the Determination of Separation Minima* (Doc 9689).

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS (PROGRESS IN 2000)
SASP	ATM-6301	Separation between aircraft	2001 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 lateral and longitudinal was presented to ANC for review in 1999. The reduction of longitudinal separation to below 10 minutes is 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	2004	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)	2004	
	CNS-9701	Airborne separation assurance system (ASAS)	2004	
ADMSG	AIS-9401	Aeronautical data bases	2005	Evaluation and validation of the SICIM and FAA/EUROCONTROL AICM/AIXM were initiated at the first meeting in November 1999; further work in 2001-05.
AISMAPSG	AIS-9801	Electronic aeronautical charts for cockpit display	2003	Amendment 29 to Annex 15 introduced aeronautical data base requirements including the quality system, data integrity and protection and publication resolutions. At the 3rd meeting (December 1999) work continued on tasks AIS-9801 and AIS-9802. The group will continue work in 2001-05.
	AIS-9802	Electronic terrain data	2003	
	AIS-9806	Electronic exchange of aeronautical information	2005	
AVSSSG	CNS-7001	AFS systems planning studies	2001	The third meeting of AVSSSG was held in Montreal in October 2000. SARPs on ATS voice networks were adopted in 2001. Guidance material is being completed.

PANEL/STUDY GROUP	WORK PROGRAMME			
	TASKS	TITLE	TARGET COMPLETION DATE	STATUS (PROGRESS IN 2000)
HFSG	PEL-9001	Flight safety and human factors	2001	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. Further, HF-related requirements are to be included in PANS-RA have been developed.
HRPTSG	PEL-9601	Regional human resource planning and training needs	2002	The first draft of the Human Resource Development Manual is under development. An initial version of a computer programme designed to indicate how CNS/ATM technologies affect job profiles and the consequential human resource planning and training requirements was developed.
METLINKSG	MET-9101	Amendment to Annex 3 concerning automated air-reporting	2001	Amendment 72 to Annex 3 being developed including the details of the turbulence index to be reported.
	MET-9301	Future requirements for the uplink of OPMET information to aircraft in flight	2001	Amendment 72 to Annex 3 being developed including the meteorological specifications (templates) for D-ATIS and D-VOLMET.
	MET-9602	SIGMET information in graphical format	2004	Amendment 72 being developed including the specification of the numerical code to be used for the dissemination and uplink of graphical SIGMETs.
TRNSG	CNS-9402	Testing of radio navigation aids	Completed	First and second meetings of the study group produced a revised version of Doc 8071, Volume I, *Manual on testing of ground-based radio navigation systems* (replacing former Volumes I and II). TRNSG/3 produced Volume II (GNSS)
	CNS-9401	Global navigation satellite system (GNSS)	Completed	
WAFSSG	MET-8802	WAFS planning and implementation	2001	Amendment 72 to Annex 3 being developed to include global WAFS SIGWX forecasts in binary format (BUFR) code for direct transmission to airline and ATM computers.

LEGEND

ANC Panels

AMCP	—	Aeronautical Mobile Communications Panel
ATMCP	—	Air Traffic Management Operational Concept Panel
ATNP	—	Aeronautical Telecommunication Network Panel
GNSSP	—	Global Navigation Satellite System Panel
OCP	—	Obstacle Clearance Panel
OPLINKP	—	Operational Data Link Panel
RGCSP	—	Review of the General Concept of Separation Panel
SCRSP	—	Surveillance and Conflict Resolution Systems Panel (Former SICASP)

Study Groups

ADMSG	—	Aeronautical Data Modelling Study Group
AISMAPSG	—	Aeronautical Information and Charts Study Group
AVSSSG	—	ATS Voice Switching/Signalling Systems 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
TRNSG	—	Testing of Radio Navaids Study Group
WAFSSG	—	World Area Forecast System Study Group

AGENDA ITEM 4: SHORTCOMINGS AND DEFICIENCIES IN THE AIR NAVIGATION FIELDS

Agenda Item 4: Shortcomings and Deficiencies in the Air Navigation Field

4.1 The meeting recalled that the Uniform Methodology for the identification, assessment and reporting of air navigation shortcomings and deficiencies was prepared with the assistance of ICAO's planning and implementation regional groups (PIRGs) and approved by the ICAO Council on 23 June 1998 for the efficient identification, assessment, and clear reporting of air navigation deficiencies.

4.2 For the purpose of this exercise, a situation where a facility is not installed or a service is not provided in accordance with a regional air navigation plan is considered to be a **shortcoming**. A situation where an existing facility or service is partially unserviceable, incomplete or not operated in accordance with appropriate ICAO specifications and procedures is considered to be a **deficiency**. The net effect of either a shortcoming or a deficiency is a negative impact on safety, regularity and/or efficiency of international civil aviation.

4.3 ICAO Assembly Resolution A 31-5, Appendix M calls for States to give priority to the implementation of those facilities and services the lack of which would likely to have a serious effect on international air operations. The Assembly Resolution also directs ICAO to carry out identification, investigation and action on important shortcomings in the implementation of Regional Plans in a minimum practical time, and that the PIRGs shall identify problems and shortcomings in Regional Plans and the implementation thereof, along with suggested remedial measures.

4.4 The meeting noted that during the 4th Meeting of the ALLPIRG/Advisory Group which was held in ICAO Headquarters in Montreal from 6 to 8 February 2001, that ALLPIRG/3 had agreed that PIRGs keep the uniform methodology for the identification, assessment and reporting of air navigation shortcomings and deficiencies under regular review and propose modifications thereto if needed in light of experience gained.

4.5 ALLPIRG/4 Meeting noted that certain Contracting States may not be favourable to the idea that the non-implementation of a Standard which has been notified to ICAO as a difference be nevertheless qualified and listed as a deficiency in PIRG reports.

4.6 During the same meeting, it was agreed that PIRGs should be advised to apply a general guideline that a lack of implementation of air navigation systems with reference to the notification of a difference, where there is no negative impact on safety, regularity and/or efficiency of international air navigation as assessed by PIRGs, should not be listed in the reporting form as an air navigation shortcoming or deficiency.

4.7 The meeting also recognized that some difficulty existed with the definitions of the Uniform Methodology and noted that a review was planned to develop a single definition for shortcomings and deficiencies to further enhance the Uniform Methodology.

4.8 In reviewing the list of shortcomings and deficiencies, the meeting expressed concern that some of the issues dating as early as 1992 remained unresolved and requested for affirmative actions both from APANPIRG and States for speedy resolution as these issues affect the safety of air navigation.

4.9 The meeting was informed that some of the shortcomings and deficiencies require a concerted effort by States as well as financial commitment and high capital outlay for resolution. In this regard, the proposed establishment of a mechanism for an International Financial Facility for Aviation Safety (IFFAS), to be discussed during the upcoming 33rd General Assembly, would

provide a mechanism for the mobilization of funds for civil aviation and enable States to address long term problems.

4.10 The meeting was apprised on the formation of an Aviation Safety Board in one ICAO region which comprised representatives from PIRGs, sub-groups and international organizations which look not only into the resolution of shortcomings and deficiencies but also the various funding mechanisms.

4.11 The meeting was advised by some of the States attending the meeting of the actions taken by them with regard to the items in the list of shortcomings and deficiencies. The updated information is attached in the Appendix A to the Report on Agenda Item 4. The meeting also advised States to respond officially and in a timely manner the status of the shortcomings and deficiencies in an official communication to the ICAO regional office.

4.12 The meeting was advised that in the field of ATS/AIS/SAR, the following progress has been made since APANPIRG/11:

i) eleven (11) entries related to ATS routes were removed from the previous list because they were implemented or requirements in the ANP were amended/added to/deleted;

ii) four (4) States implemented airspace classification and they were removed;

iii) two (2) States implemented the new AIP format and they were removed.

4.13 In the CNS field, of the six (6) shortcomings and deficiencies identified in the list of shortcomings and deficiencies, States concerned had taken actions to correct two (2) shortcomings and deficiencies and the remaining four (4) were expected to be corrected by 2002. Similarly, in the MET field, twelve (12) shortcomings and deficiencies were identified and corrective actions were suggested.

4.14 In the AOP field, forty-two (42) shortcomings and deficiencies were identified and reflected in the list of shortcomings and deficiencies. Based on additional information provided at the meeting and corrective actions taken by States concerned, one (1) shortcoming and deficiency was removed from the list, another twenty (26) were identified as being completed.

4.15 The meeting requested States and users sources to provide regular updates on the list of shortcomings and deficiencies including instances where actions have been taken by States for the resolution of the shortcomings and deficiencies.

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN AOP FIELD IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
	Bangladesh								
RAN 3 Rec.4/10	Dhaka	Rwy Twy and apron markings and marker boards faded.	1999	D	All markings on paved areas should be inspected and a schedule of painting be established.	Rwy, Twy and apron markings and marker boards being repainted.	CAAB	Rwy markings - Mid August 2001. Twy under repair; to be completed 2002.	"U"
	China								
RAN 3 Rec. 4/2	Beijing	Rwy 18L/36R Slippery when Wet.	1999	D	Rwy surface to provide good friction characteristics when wet.	Rwy friction measured monthly or as requested by ATC. Rubber removal using high pressure water jet once $\mu<0.47$. Last recorded in July 2001, min.ave. $\mu=0.55$.	CAAC	Completed	
RAN 3 Rec. 4/10		RFF Inadequate.	1999	S	Level of RFF protection shall be appropriate to the aerodrome category.	BCIA has 10 fire lighting vehicles; with water capacity of 96,500 Land pure foam solution 12,500. Discharge rate 41,800L/min. Dry chemical powders 1000 kg.	CAAC	Completed	
RAN 3 Rec. 4/10	Guangzhou	No PAPI's Rwy 03/21.	1999	S	PAPI/VASI to be provided to serve approach to rwy.	PAPI calibrated two times per year – test calibration in May 2001 and found to comply with Annex 14.	CAAC	Completed	
RAN 3 Rec. 4/1, 4/2	Shanghai	Twy lighting inadequate.	1999	D	To comply with Annex 14 §5.3.15 &16.	Reconstruction carried out after 2000; comply with ICAO Annex 14.	CAAC	Completed	

Appendix A to the Report on Agenda Item 4

Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
RAN 3 Rec. 4/1, 4/2		Poor markings.	1999	D	All markings on paved areas should be inspected and a schedule of paining be established.	Std. of marking comply with ICAO requirements. All markings repainted twice a year, inspection and repair carried on same day.	CAAC	Completed	
RAN 3 Rec. 4/1, 4/2		Rwy uneven and slippery when wet.	1999	D	Rwy surface to provide good friction characteristics when wet.	Rwy friction value measured bi-weekly or as reqd by ATC. Rubber removal using high pressure water jet once $\mu<0.47$. Last recorded in July 2001, min.ave.μ= 0.57.	CAAC	Completed	
RAN 3 Rec. 4/10		Twys poorly Signed & lit.	1999	D	To comply with Annex 14 §5.3.15 &16.	Replacement of all 105 signs carried out from July – Dec 2000. Comply with Annex 14.	CAAC	Completed	
RAN 3 Rec. 4/10		Non ICAO Std. Rwy surface markings	1999	D	To comply with Annex 14 Vol. 1 Requirement.	Std. of marking comply with ICAO requirements. All markings repainted twice a year, inspection and repair carried on same day.	CAAC	Completed	
RAN 3 Rec. 4/10		RFF inadequate	1999	S	Level of RFF protection shall be appropriate to the aerodrome category.	SHIA has 9 fire fighting vehicles, water capacity 69924L and pure foam solution 9410L. Discharge rate 27994 L/min. dry chemical powder 1800 kg. Comply with Annex 14.	CAAC	Completed	
	Japan								
RAN 3 Rec. 4/10	Kagoshima	Rwy lead-in lights for rwy 16 difficult to identify.	1999	D	To comply with Annex 14 §5.3.7.	Runway lead-in lights for rwy 16 have been implemented at present location where it is considered to be a suitable site following a thorough survey & flight inspection. JCAB considers this as meeting international standards.	JCAB	Completed	

Appendix A to the Report on Agenda Item 4

Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
RAN 3 Rec. 4/10	Osaka Int'l	Rwy lead-in lights for rwy 14 difficult to see.	1999	D	To comply with Annex 14 §5.3.7.	-ditto- , some lights have not been installed due to geographical reasons.	JCAB	Completed	
RAN 3 Rec. 4/10		Taxiway signboard too small.	1999	D	To comply with Annex 14 §5.3.4.	Size of signboards is larger than the required size in Annex 14	JCAB	Completed	
RAN 3 Rec. 4/10	Tokyo Int'l	Rwy lead-in lights to rwy 22 not curved for tracking.	1999	D	To comply with Annex 14 §5.3.7.	Runway lead-in lights for rwy 22 have been implemented at present location where it is considered to be a suitable site following a thorough survey & flight inspection.	JCAB	Completed	
RAN 3 Rec. 4/5		No RFF equipment for water rescue.	1999	D	To comply with Annex 14 §9.2.				
		No approach light.		S	Where physically practicable, approach light system shall be provided.	Approach lights installed for all runways except rwy 04 where landing is not permitted excepting light VFR acft due to acft noise.	JCAB	Completed	
		No PAPIs.		S	PAPI/VASI to be provided to serve the approach to rwy.	PAPI & VASI installed for all runways including rwy 04	JCAB	Completed	
		Twy markings not clear.		D	All markings on paved areas should be inspected and a schedule of painting be established.				
	Maldives								
RAN 3 Rec. 4/10	Male	Rwy often wet or sandy as a result of sea pray/strong winds. Touchdown RWY 18 has subsidence filled sand.	1996	D	Surface irregularities may adversely affect the take-off or landing of aircraft.	The sea wall/sheet piling around RWY 18 touchdown zone has been raised up, preventing the runway from getting wet as a result of sea spray/strong winds. Part of the service road around the runway is paved and remaining portion will be paved in the near future, which will eventually cease sand being blown on the runway.	CAD	Raising of sea wall /sheet pile completed. Paving of remaining portion of service road – TBD.	"A"

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Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
RAN 3 Rec. 4/10	**Myanmar** Yangon	Apron markings hardly discernible.	1996	D	All markings on paved areas should be inspected and a schedule of painting be established.	Due to limited parking space available it is not feasible to have designated parking positions or aircraft stands and hence the safety lines required at aircraft stands. However, Apron edge lines and apron service roads are marked. Maneuvering of aircraft on the apron are precisely controlled by trained marshallers so that at all times they will be kept clear of the adjacent aircraft, buildings and service vehicles on the apron.	CAD	On-going	"A"
RAN 3 Rec. 3/1		Rwy 03 – no approach light and VASIs.	1994	S	Where physically practical, a simple approach lighting system shall be provided. PAPI/VASI to be provided to serve the approach to runway.	PAPI already provided in 2000. To install precision approach lighting system for Rwy 03.	DCA	PAPI - Completed. Approach Lights - TBD	"A"'
RAN 3 Rec. 4/10		Rwy slippery when wet.	1998	D	Rwy surface to provide good friction characteristics when wet.	Friction characteristics was improved by asphalt pavement overlay works completed in April 2001.	DCA	Completed	
		RFF Category inadequate.	1996	D	Level of RFF protection shall be appropriate to the aerodrome category.	To increase RFF Cat. fr. 6 to 7.	DCA	31.12.2001	"B"
		Emergency plan to be updated.	1996	D	Emergency exercises to be carried out and AEP updated.	To carry out emergency exercises and to update AEP.	DCA	TBD	"A"

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Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
	Nepal								
RAN 3 Rec. 4/10	Kathmandu	No side stripe markings	1996	D	Side stripe marking shall be provided between the thresholds of a paved rwy where there is a lack of contrast between rwy edge and the shoulders or surrounding terrain.	Side stripe marking already provided.	CAAN	Completed	
		Twy 1 too narrow for wide body aircraft.	1996	D	Min. width of twy is 23 m. If used by aeroplanes with outer main gear wheel space ≥9 m.	All taxiways are 23 m width with reqd. marking and taxiway edge lighting.	CAAN	Completed	
		Emergency plan to be updated.	1996	D	Emergency exercises to be carried out and AEP updated.	AEP has been updated and emergency exercises carried out regularly.	CAAN	Completed	
	New Zealand								
RAN 3 Rec. 4/10	Wellington	Rwy-end safety area-rwy 16/34 inadequate.	2000	D	RESA shall be provided and shall extend from the end of a rwy strip to a distance of at least 90 m.	NZ has filed a difference with respect to RESA and statutory rule making process is underway.	CAANZ	TBD	
	Papua New Guinea								
RAN 3 Rec. 4/10	Vanimo	No rwy lights.	1999	D	Where physically practicable, a simple approach lighting system should be provided.				

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Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
RAN 3 Rec. 4/10	**Philippines**	No RFF facilities.	1999	S	Level of RFF protection shall be appropriate to the aerodrome category.				
RAN 3 Rec. 4/1, 4/2	Manila	Rwy 06/24 surface rough heavy rubber deposits and very slippery when wet.	1998	D	Minimal rubber deposits on touchdown zone after derubberizing work. Rwy friction values to be taken regularly.				
		No approach lights on rwy 06.	1995	S	Where physically practicable, a precision approach Cat. I lighting system to be provided.				
RAN 3 Rec. 3/1	**Republic of Korea** Gimhae	Runway slippery when wet.	1999	D	Rwy surface to provide good friction characteristic when wet.	A new parallel rwy (3,200m x 60m) was constructed in March 2000. The other rwy was already repaired.	KMOCT	Completed	
RAN 3 Rec. 4/2		No. PAPI on Rwy 18.	1999	S	PAPI/VASI to serve the approach to runway.	The PAPI on rwy 18 has been installed as of December 1996.			
RAN 3 Rec. 4/10		Non-ICAO std. Rwy touchdown marking.	1999	D	To comply Annex 14 Vol. I.	The old rwy touchdown marking was marked by ICAO regulation in 1970 and new rwy touchdown marking was marked in 2000.	KMOCT	Completed	
Ran 3 Rec. 4/10		No circling lead in guidance lights rwy 18.			Circling guidance lights should be provided when existing approach and rwy lighting systems to not permit identification of runway and approach area.	The guidance lights have been installed as of March 2000.	KMND KMOCT KMOCT	Completed Completed	

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Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
Ran 3 Rec. 4/2	Gimpo	Rwy slippery when wet.	1999	D	Rwy surface to provide good friction characteristics when wet.	Rwy 32R was repaired in Nov. 2000 and rwy 14R/L is under modification.	KMOCT KAA	Dec. 2001 for Rwy 14 R/L	"A"
	Viet Nam								
RAN 3 Rec. 4/1	Hanoi	Rwy surface is rough.	1996	D	Surface unevenness may adversely affect take-off or landing of aircraft.	Runway repaired.	CAAV	1998	Completed
		Apron congested. Poor security with no proper security fencing. Public frequently on ramp and twy.	1996	D	Security fencing to be installed.	Security improved after installation of fence.	CAAV	1999	Completed
		Faint twy and ramp markings.	1996	D	All markings on paved areas should be inspected and a schedule of painting be established.	A regular schedule of painting of markings was established.	CAAV	1998	Completed
	Ho Chi Minh	Rwy 25L Slippery when wet.	1998	D	Runway surface to provide good friction characteristic when wet.	Upgrading of runway in progress.	CAAV	1st quarter 2002	"A"
		Rwy 07R, 25L -no PAPIs, no approach lighting	1996	S		PAPIs to be provided PA 2-Rwy 25L(Cat2) SA-Rwy 07R.	CAAV	1st quarter 2002	"A"

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Identification		Shortcomings and Deficiencies				Corrective Action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implemen-tation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE CNS/MET FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target 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.HF used for ground-to-ground COM due to lack of ER VHF and reliable ATS DSCs.	1992	No change S	HF air ground channels are used to exchange co-ordination messages causing frequency congestion	Survey of the installation sites for RCAG stations has been completed and other formalities are in progress.	Civil Aviation Authority of Bangladesh	Target date being changed each time the status was reviewed and currently established for June 2002.	A
Reliable AFS communications between Calcutta and Dhaka FIRs.	Bangladesh and India	Performance of the Calcutta/Dhaka HF RTT AFTN Circuit has been far below the required reliability of 97%. ATS DSC not implemented. IDD service used for ATS coordination not meeting operational requirement. Agartala/Dhaka and Dhaka/Guwahati. ATS DSCS not implemented.	ATS DSC 1993 AFTN 1995	No change D	HF RTT circuit needs to be upgraded to LTT. Corrective action required to improve performance of the IDD services initially. A dedicated circuit should be established between Calcutta and Dhaka. IDD service to be provided for Agartala/Dhaka and Dhaka/Guwahati ATS DSC.	Action is being initiated to upgrade the HF RTT circuit and also to introduce Hotline IDD to enhance reliability pending, establishment of a dedicated circuit. Requirement for Agartala/Dhaka and Dhaka/Guwahati ATS DSC to be satisfied by IDD initially. India is ready for establishing the circuits with microwave.	CAA Bangladesh and Airports Authority of India	10/01 06/02	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
Reliable HF/VHF and ATS direct speech circuits in India FIRs	India	RCAG VHF not reliable. HF congested. Some of the ATS DSCs use IDD and operational requirement is not met.	1999	D Implementation processing	Provision for a reliable link to RCAG stations is required to improve quality of VHF. Implementation of reliable ATS DSC is required to satisfy 15 second access time. HF congestion will be reduced upon improvement in coverage of VHF and availability of reliable of ATS DSCs.	VSAT progressively introduced for RCAG VHF stations. RCAG VHF stations at Porbandar and Agatti controlled from Mumbai is to be established by October 2001. RCAG VHF station at Vishakhapatanma controlled by both Chennai and Calcutta is established on 10 Oct. 2000. IDD Hotlines have been introduced for ATS DSC communication, satisfying requirements in most cases. HF congestion reduced due to enhancement in IDD communication and also to some extent due to the use of CPDLC.	Airports Authority of India	Oct. 2001	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
Adequate and reliable VHF COM	Myanmar	Quality and reliability of RCAG VHF inadequate and unavailability of required coverage	1998	No change D	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.	DCA Myanmar	Established target date of end 1999 was not achieved. Revised target date is end of 2002	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
Meteorological observations and reports. Provision of Annex 3, Chapter 4	Solomon I.	Weather information is inadequate and not provided on a regular basis	1996	No Change D	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.	To be determined	A
a) Requirements for forecasts to be provided. ASIA/PAC ANP, Part IV- Meteorology. Table MET 1A b) Meteorological observations and reports. Provision of Annex 3, Chapter 4.	Kiribati	a) TAFs for Kiritimati not regularly provided by MET Centre of Fiji. b) MET observations from Kiribati not available on regular basis	1998	S D	Reported by the National Weather Service concerned during introduction of the new flight operations. Fiji reported that MET observations not regularly available due to communication problems	a) Temporary arrangements have been made for the Honolulu MET Office to issue 18-hour TAFs during special flight operations. b) Communication between Kiribati and Fiji required to be considered c) Fiji issues TAFs for Kiribati on a regular basis. d) MET observations in Kiribati in process of implementation	Directorate of Civil Aviation, Kiribati Civil Aviation Authority, Fiji COM/MET/NAV/SUR SG	To be determined	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
a) Reporting of information on volcanic eruptions to civil aviation units. Provision of Annex 3, Chapter 4. b) International airways volcano watch (IAVW) operational procedures.	Indonesia Philippines	Information on volcano activities not always reach civil aviation units due to lack of fixed communications with volcano observatories	1995	D	a) Observed by States concerned b) Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	a) MOU will be signed between Department of Transportation and Department of Mining and Energy, Indonesia b) Volcano observations and warnings will be made available on the Internet by Department of Mining and Energy. c) It is expected that MOU between Air Transportation Office and the Philippines Institute of Volcanology and Seismology will be considered.	a) Volcanic Ash Warning Study Group (VAWSG) to develop proposal. b) ICAO Regional Office to monitor developments on this subject.	to be determined	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action****
a) Service for operators and flight crew members Provision of Annex 3, Chapter 9. b) Requirements for WAFS products for flight documentation. ASIA/PAC ANP, Table MET 1A	Cambodia Myanmar	VSATs for reception of the ISCS and SADIS satellite broadcasts not installed	1999	D	Expected lack of products for flight documentation due to forthcoming implementation of the final phase of WAFS and cease of RAFCs operations.	States consider urgent action to be taken for implementation of the ISCS and/or SADIS to install VSATs	Civil Aviation Administrations in co-ordination with Met. Authorities of the States concerned. CNS/MET SG to monitor and coordinate.	to be determined	A

Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
a) Aerodrome meteorological office meteorological watch office Provisions of Annex 3, Chapter 3. b) Requirement for aerodrome meteorological office to be established ASIA/PAC ANP, Table MET 1A Requirements for meteorological watch office to be established ASIA/PAC ANP, Table MET 2A	Cambodia	Requirements for aerodrome meteorological office and meteorological watch office (WMO) to be established at Phnom-Penh international airport have not been met	1992	No Change S	Requirements have not been met due to staffing and funding problems. MET briefing and flight documentation for return flights provided by the MET offices of other aerodromes	The Authority concerned to take urgent actions to meet requirements of ANP. If MWO is not able to meet all its obligations, proposal to be considered for temporary transfer of its responsibilities to another MWO and a NOTAM to be issued to indicate such a transfer	State Secretariat of Civil Aviation, Cambodia	To be determined	A

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Identification		Shortcomings and deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Target for completion**	**Priority for action** **
a) SIGMET information Provision of Annex 3 Chapter 7. b) Requirements for dissemination of SIGMETs, including SIGMETs for volcanic ash ASIA/PAC ANP (FASID) Table MET 2A c) International airways volcano watch (IAVW) operational procedures.	Bangladesh Cambodia India Indonesia Lao Malaysia Myanmar Nepal Papua New Guinea Philippines Sri Lanka	Requirements for issuance and proper dissemination of SIGMETs, including SIGMET for volcanic ash, have not been fully implement	2000	a) D b) S	a) reported by airlines, b) noted by Volcanic Ash Advisory Centres	a) ICAO to consider proposal for Special Implementation Project be Established with the primary objective to improve implementation of SIGMET procedures b) States to take urgent actions to implement the procedures	a) ICAO to establish and implement the SIP b) ICAO Regional Office to co-ordinate c) Volcanic Ash Working Group to assist Secretariat with development of SIP and its implementation d) CNS/MET SG to monitor	2002	A
METAR/TAF Provision of Annex 3 Chapter 4 and 6	Nauru Solomon I. Papua New Guinea	Routine reports and aerodrome forecasts are issued using old WMO codes.	2001	D	Reported by airlines	a) Arrangements to be made for use of the new WMO codes. b) Training to be provided to staff as required	Civil Aviation Administration in coordination with MET Services	2002	A

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
ATS routes									
A202	China/Hong Kong, China/Japan/Lao PDR /Thailand/Viet Nam	Not implemented	24/11/93	S	Co-ordination is in progress among States and ICAO through SCS/TF. Hong Kong-Bangkok segment will be implemented on 1 November 2001.	ICAO - continue on-going implementation co-ordination related to the Revised South China Sea route structure with States. China/Hong Kong, China/Lao PDR/Thailand/Viet Nam - implementation on 1 November 2001. Japan-propose deletion of Hong Kong-Chitose segment.	China/Hong Kong, China/ Japan/Lao PDR/ Thailand/Viet Nam	HongKong-Bangkok segment 1/11/2001	B
A203	China/Hong Kong, China	Not implemented	24/11/93	S		China - consider implementation	China/Hong Kong, China		B
A211	Malaysia	Not implemented	24/11/93	S	ICAO has requested Malaysia to co-ordinate the early implementation of A211 with States concerned, and awaits input from Malaysia	ICAO - co-ordinate with Malaysia and report the outcome to SEACG. Malaysia co-ordinating with Indonesia.	Malaysia ICAO	12/2001	B
A218	China/Russian Federation	Partially implemented	24/11/93	S	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.	China/Russian Federation - consider implementation	China/Russian Federation		B
A223	Japan	Not implemented	24/11/93	S		Japan - consider implementation	Japan		B
A335	China/Mongolia/Russian Federation	Not implemented	24/11/93	S	China and Mongolia advised that this segment is covered by other ATS routes propoerly; thus will propose its deletion from ANP.	China, Mongolia - propose ANP amendment	China/Mongolia		B
A341	Indonesia/Malaysia	Partially implemented	24/11/93	S	ICAO has requested Indonesia to co-ordinate implementation with Malaysia	Indonesia/Malaysia - consider full implementation	Indonesia/Malaysia	12/2001	B

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
A450	Indonesia/United States	Partially implemented	24/6/94	S	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		B
A469	Viet Nam	Implemented as W9	19/8/94	S	ICAO has requested Viet Nam to implement as A469. Viet Nam advised that W9 will be replaced with L643 on 1 November 2001.	Viet Nam - propose deletion of the requirement as A469	Viet Nam	1/11/2001	B
A470	China/Viet Nam	Partially implemented	19/8/94	S	Co-ordination is in progress among States and ICAO through SCS/TF. Mersing-Hong Kong segment will be deleted from the ANP requirement, and the rest will be implemented on 1 November 2001.	ICAO - continue on-going implementation co-ordination related to the Revised South China Sea route structure with States	China/Viet Nam	1/11/2001	B
A473	India/Nepal	Not implemented	16/3/99	S	India has advised that realignment is being co-ordinated with Nepal.	India/Nepal- consider implementation	India/Nepal	12/2001	B
A581	Lao PDR/Thailand	Partially implemented	17/2/97	S	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. Lao PDR/Thailand - implement accordingly.	Lao PDR/Thailand		B
A584	United States	Partially implemented	24/6/94	S	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		B
B201	Fiji/New Zealand	Not implemented	24/11/93	S	Fiji/New Zealand have advised that they agreed to delete the requirement, ICAO will process ANP amendment.	Fiji/New Zealand - propose an amendment to delete the requirement in ANP	Fiji/New Zealand ICAO		B

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
B204	Maldives	The requirements for this route are not detailed in ANP	24/1/96	S		Maldives - propose an amendment to ANP to add the route	Maldives		B
B212	Japan/Rep of Korea	Not implemented	24/11/93	S	Japan is considering implementation as a conditional route	Japan/Rep of Korea - consider implementation	Japan/Rep of Korea		B
B213	China	Not implemented	24/11/93	S		China - consider implementation	China		B
B456	Papua New Guinea	Partially implemented	24/11/93	S	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 ANP. ICAO-process ANP amendment.	Papua New Guinea ICAO		B
B591	China	Partially implemented	22/7/97	S	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		B
G211	Malaysia	Not implemented	24/11/93	S	ICAO has requested Malaysia to implement G221. Malaysia has advised that implementation co-ordination is on-going.	Malaysia - consider implementation	Malaysia	12/2001	B
G348	India	Partially implemented	2/3/99	S	Bhutan has advised that route segment in Bhutan airspace has been implemented.	India - implement the route	India	31/10/2001	B
G461	Indonesia	Implemented with different route specification	24/11/93	S	ICAO has taken action to co-ordinate with Indonesia to amend ANP requirement. APAC00/1-ATS to amend the requirement has been circulated.	ICAO - process APAC 00/1. APAC00/1 was approved on 15 January 2001. Indonesia-implement the requirement accordingly.	Indonesia ICAO		B
G466	Malaysia	Partially implemented	22/7/97	S	Co-ordination is in progress among States and ICAO. Route requirement will be amended in relation to SCS route structure and be implemented on 1 November 2001.	ICAO - continue on-going implementation co-ordination related to the Revised South China Sea route structure with States Malaysia - consider implementation	Malaysia	1/11/2001	B

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
G473	Lao PDR/Philippines Thailand/Viet Nam	Partially implemented	24/11/93	S	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	Lao PDR/Philippines Thailand/Viet Nam		B
G589	DPR Korea/ Rep of Korea	Not implemented	24/11/93	S		DPR Korea/ Rep of Korea - consider implementation	DPR Korea/ Rep of Korea		B
R207	Lao PDR	Partially implemented as W29	24/11/93	S		Lao PDR - consider promulgation of the route with route designator R207	Lao PDR		B
R216	China/Kazakhstan	Not implemented	24/11/93	S		ICAO - co-ordinate with States for implementation and report the outcome to EAAR	China/Kazakhstan		B
R221	Russian Federation	R221 was implemented on 19 April 2001 in Malaysia in accordance with the reuiqrement in ASIA/PAC ANP. The same route designator in use in Russian Federation	24/11/93	S	ICAO has requested Russian Federation to delete R221 and promulgate the route as R466 in AIP. Input from Russia is being awaited.	ICAO - co-ordinate with Russian Federation to redesignate the route as R466 as already assigned as a matter of priority	Russian Federation		A
R333	China	Not implemented	24/11/93	S	China is considering future implementation	China - consider implementation	China		B
R335	China/Hong Kong, China	Not implemented	24/11/93	S		China - consider implementation	China/Hong Kong, China		B
R345	Cambodia/Lao PDR/Thailand	Not implemented	24/11/93	S	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/Lao PDR/Thailand		B
R455	Malaysia	Not implemented	24/11/93	S	ICAO has requested Malaysia to co-ordinate the implementation of R455 with States concerned.	Malaysia - consider implementation	Malaysia	12/2001	B
R459	Indonesia	Implemented as W51 and W36	24/11/93	S	ICAO has requested Indonesia to implement as R459	Indonesia - consider promulgation of the route with designator R459 in AIP	Indonesia		B

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Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
R466	Russian Federation	Implemented as R221 in Russian Federation. Route requirement is listed in EUR/NAT ANP	24/11/93	S	ICAO has requested Russian Federation to delete R221 and promulgate the route as R466 in AIP, and awaits input from Russia.	ICAO - co-ordinate with Russian Federation to redesignate the route as R466 as already assigned as a matter of priority	Russian Federation		A
R579	Indonesia/Malaysia	Not implemented	24/11/93	S	ICAO has requested Malaysia to co-ordinate with Indonesia for implementation.	Indonesia/Malaysia - consider implementation	Indonesia/Malaysia	12/2001	B
R593	India/Oman	Not implemented	24/11/93	S		India - consider implementation ICAO - co-ordinate with Oman for implementation and report the outcome to SWACG	India/Oman (SWACG) ICAO		B
Revised South China Sea Route Structure	Cambodia/China/ Hong Kong, China/Malaysia Philippines/Singapore/ Thailand/Viet Nam	Not implemented	22/7/97	S	Co-ordination is in progress among States and ICAO. States concerned agreed to implement SCS route structure on 1 November 2001.	ICAO - continue on-going implementation co-ordination related to the Revised South China Sea route structure with States through SCS/TF.	Cambodia/China/ Hong Kong,China/Malaysia/ Philippines/Singapore/ Thailand/Viet Nam	1/11/2001	A
WGS-84									
WGS-84	Bhutan	Not implemented	2/7/1999	D	Data conversion completed, but not published		Bhutan		A
WGS-84	Cambodia		28/6/2001	D	Cambodia has previously informed ICAO that their WGS-84 conversion had been completed. Cambodia has now informed ICAO of flaws in their conversion and their intention to start all over again.		Cambodia		A
WGS-84	China	Not implemented * implemented in the Sanya AOR as of 1 Nov 2001	2/7/1999	D	Differences to Annex 15 - *Aeronautical Information Services* are notified		China		A
WGS-84	DPR Korea	Not implemented		D			DPR Korea		A
WGS-84	French Polynesia	Implemented at main airports		D	in progress		French Polynesia	2003	A
WGS-84	Kiribati	Not implemented		D			Kiribati		A

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
WGS-84	Lao PDR	Partially implemented		D			Lao PDR	1999	A
WGS-84	Malaysia	Partially implemented		D	in progress		Malaysia	June 2001	A
WGS-84	Nauru	Not implemented		D	Conferring with consultant		Nauru		A
WGS-84	Philippines	Partially implemented		D			Philippines	Aug 2001	A
WGS-84	Solomon Islands	Not implemented		D			Solomon Islands	1999	A
WGS-84	Vanuatu	Implemented at main airports	2/7/1999	D			Vanuatu	1999	A
Type of ATS									
Area Control Services	India	Some ATS route segments in part of Mumbai FIR are subject to Advisory Services	24/11/93	D	Co-ordination in progress through BBACG	India - implement Area Control Services	India		A
Area Control Services	Sri Lanka	Several ATS route segments are subject to Advisory Services	24/11/93	D	Co-ordination in progress through BBACG	Sri Lanka - implement Area Control Services	Sri Lanka		A
Airspace Classification									
Airspace Classification	China	Not implemented	7/7/99	D			China		A
Airspace Classification	Cook Islands	Not implemented	7/7/99	D			Cook Islands		A
Airspace Classification	DPR Korea	Not implemented	7/7/99	D			DPR Korea		A
Airspace Classification	Japan	Not implemented	7/7/99	D		Implementation in progress	Japan		A
Airspace Classification	Kiribati	Not implemented	7/7/99	D			Kiribati		A
Airspace Classification	Lao PDR	Not implemented	7/7/99	D			Lao PDR		A
Airspace Classification	Nauru	Not implemented	7/7/99	D			Nauru		A
Airspace Classification	Papua New Guinea	Not implemented	7/7/99	D			Papua New Guinea	mid 2001	A
Airspace Classification	Republic of Korea	Not implemented	7/7/99	D			Republic of Korea		A

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
Airspace Classification	Samoa	Not implemented	7/7/99	D			Samoa		A
Airspace Classification	Solomon Islands	Not implemented	7/7/99	D			Solomon Islands		A
Airspace Classification	Sri Lanka	Not implemented	7/7/99	D			Sri Lanka		A
Airspace Classification	Tonga	Not implemented	7/7/99	D			Tonga		A
Airspace Classification	Viet Nam	Not implemented	7/7/99	D			Viet Nam		A
AIP Format									
AIP Format	China	Not implemented	7/7/99	D			China		A
AIP Format	Cook Islands	Not implemented	7/7/99	D			Cook Islands		A
AIP Format	Fiji	Not implemented	7/7/99	D			Fiji		A
AIP Format	India	Not implemented	7/7/99	D			India	Oct, 2001	A
AIP Format	Indonesia	Not implemented	7/7/99	D		Implementation in progress	Indonesia		A
AIP Format	Kiribati	Not implemented	7/7/99	D			Kiribati		A
AIP Format	Lao PDR	Not implemented	7/7/99	D			Lao PDR		A
AIP Format	Myanmar	Not implemented	7/7/99	D			Myanmar		A
AIP Format	Nauru	Not implemented	7/7/99	D			Nauru		A
AIP Format	New Zealand	Not implemented	7/7/99	D	Differences to Annex 15 - *Aeronautical Information Services* are notified		New Zealand		A
AIP Format	Papua New Guinea	Not implemented	7/7/99	D			Papua New Guinea	mid 2001	A
AIP Format	Philippines	Not implemented	7/7/99	D			Philippines	Aug 2001	A
AIP Format	Samoa	Not implemented	7/7/99	D			Samoa		A
AIP Format	Sri Lanka	Not implemented	7/7/99	D			Sri Lanka		A

AIR NAVIGATION SHORTCOMINGS AND DEFICIENCIES IN THE ATS/AIS/SAR FIELDS IN THE ASIA/PACIFIC REGION

Identification		Shortcomings and Deficiencies				Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Implementation status (S, D)***	**Remarks**	**Description**	**Executing body**	**Date of completion**	**Priority for action****
AIP Format	Tonga	Not implemented	7/7/99	D			Tonga		A
SAR capability									
SARPs in Annex 12	Cambodia	Annex 12 requirements not implemented. No agreements with adjacent States.	20/2/97	D		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		U
SARPs in Annex 12	Cook Islands	Annex 12 requirements not implemented. No agreements with adjacent States.	31/1/95	D		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		U
SARPs in Annex 12	Maldives	Annex 12 requirements not implemented. No agreements with adjacent States.	24/4/1997	D		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		U

AGENDA ITEM 5: REVIEW OF 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 eleventh meeting.

5.2 In reviewing Conclusion C11/39 Methodology for a Business Case Study, the meeting was informed that a methodology for the development of a business case for CNS/ATM implementation is under development and is expected to be available during the first quarter of 2002.

5.3 The actions taken by States and the Secretariat on the above mentioned conclusions and decisions were reviewed and updated. The meeting decided on a consolidated list of outstanding conclusions and decisions on which further action were required, as included in Appendix A to the Report on Agenda Item 5.

OUTSTANDING CONCLUSIONS/DECISIONS OF APANPIRG IN ATS/AIS/SAR FIELDS

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 2/28		**Implementation of Area Control Service** That in view of recent improvements in the point-to-point communications and imminent improvement in HF air-ground communication, States concerned be urged to take urgent action to upgrade advisory and flight information services to area control service in the area over the Bay of Bengal by early 1993 along major ATS routes in their respective FIRs to enhance the safety of the rapidly increasing air traffic movement.	Area Control Services is now provided over the most of the Bay of Bengal area except for the southern portion where point-to-point communications are not reliable.	On-going
C 3/24		**Implementation of RVSM & RNP in the Pacific Region** That, Australia, New Zealand and United States requested to prepare proposals for the implementation of RVSM and RNP in the Pacific Region based on the work done by the ISPACG.	a) RNP-10 has been implemented in most of the Pacific Region Note: RVSM was implemented in the Pacific Region on 24 February 2000. This action on RVSM was completed.	On-going
C 4/2	 C	**States in the Asia Region to review their SAR system** That, a) States in the Asia Region review their SAR system in the context of the matters which require urgent addressing in the PAC Region and detailed in Appendix B, and advise the ICAO Regional Office. Noted the Conclusion**.**	a) Review of Asian States SAR is continuing. The ICAO Regional Office is actively fostering the enhancement of SAR throughout the Region as part of the normal work programme. Shortcomings and Deficiencies will be listed as they become apparent.	On-going

Appendix A to the Report on Agenda Item 5

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 6/13		**SAR Agreements** That, a) States are encouraged to develop formal SAR agreements on a bi-lateral or multi-lateral basis; and ICAO establish and maintain a register of SAR agreements between States.	a) The Regional Office continues to encourage States at regular intervals b) A register has not yet been established. Monitoring undertaken by ATS/AIS/SAR/SG	On-going On-going
C 6/19	 C	**Japan Area "G"** That, the Task associated with Japan area "G" be removed from the work programme of ATS/AIS/SAR/SG as the problem had been determined not to be of an ATS or AIS technical nature, noting that APANPIRG and ICAO will take further steps as appropriate. Noted the conclusion and requested the Secretary General to pursue the subject as a matter of high priority and report the outcome to the Council and inform the APANPIRG accordingly.	The Task has been removed from the work programme of ATS/AIS/SAR/SG. No progress could be made by the Secretariat on this subject. Japan is currently undertaking internal co-ordination with respect to resolving this issue.	On-going
C 8/9	 ANC	**Co-ordinated Activity – SAR** That, ICAO undertakes co-ordinated activity on a regional basis to improve the level of SAR response throughout the Asia/Pacific Region. Noted the conclusion and requested the Secretary General to take appropriate action.	A SAREX and associated Search and Rescue Seminar is being organised initially for the Bay of Bengal followed by the South China Sea and Pacific areas.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 8/39	C	**CNS/ATM Training Workshops and Seminars** That, the ICAO Regional Office continue to arrange CNS/ATM training workshops and seminars with the assistance of CNS/ATM Stakeholders and partners as necessary. Noted the conclusion	Several CNS/ATM workshops and seminars were held in the year 2000 and are planned for 2002.	On-going
C 9/1	C	**Implementation of the Revised South China Sea ATS Route Structure** Noting the need to expedite progress, it is reiterated that, in the interest of improved efficiency and to enhance the on-going safety of operations over the South China Sea (SCS), China and Viet Nam are strongly urged to continue their efforts, under the auspices of ICAO, with the aim of resolving outstanding issues which will permit the early implementation of the Revised South China Sea ATS Route Structure. Noted the conclusion, its relation to APANPIRG/8 Conclusion 8/2 and the need to continue the on-going efforts of the parties with the support of ICAO to implement the revised South China Sea ATS route structure.	Outstanding issues have been resolved between China and Vietnam and all SCS States are continuing their efforts in working towards an implementation date of 1 November 2001.	On-going
C 9/2		**Transition to WGS-84 in the ASIA/PAC Region** That, in order to achieve uniformity in aeronautical data publication across the Regions, those States which have not yet determined and published WGS-84 data, urgently undertake to complete the task in the shortest possible time frame.	ICAO Regional Office continues to undertake follow-up action with States concerned. The non-implementation of WGS-84 is listed as a Deficiency.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 9/3		**Examine the Possibility of Including the Asia Region to the Implementation Schedule of RVSM in the Pacific Region** In view of the RAN/3 agreement for an RVSM implementation schedule for the Pacific Region, there should be an examination of the capacity needs, fuel-saving benefits and height-keeping performance for routes in the Asian Region, and if warranted, the RVSM implementation schedule should be developed to include the Asian Region.	The ICAO RVSM/TF is planning for and facilitating the implementation of RVSM in Asia Region. A target implementation date of 21 February 2002 has been set for the Western Pacific/South China Sea area except for the Hong Kong FIR and the Sanya AOR. RVSM across the Bay of Bengal through India and the Middle East Region is planned for 27 November 2003.	Completed
	ANC	Noted the conclusion and its basis on capacity needs and fuel saving benefits**.**		
C 9/6		**Establishment of Area Control Service and 10-Minute Longitudinal Separation using Mach Number Technique** That, States, a) Identify ATS routes where the 10-minute longitudinal separation minima for RNAV equipped aircraft using MNT could be applied and subsequently implement such minima before the end of 1999.	a) With respect to the application of MNT, the ICAO Regional Office will progress an amendment to Doc 7030 to streamline the existing provisions	On-going
		b) Identify ATS routes where 10-minute longitudinal separation minima can be applied for RNAV equipped aircraft without using MNT.	b) Implementation subject to provisions of ICAO separation standards.	On-going
	C	Noted the conclusion.		

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 9/8		**ATS Route Amendments** It is reiterated that, States should provide information regarding implemented, re-aligned or deleted ATS Routes to ICAO by 30 April of each year in order to permit the periodic update of the Document of ATS Route Network.	Some information has been received. The Document of ATS Route Network has been revised and updated.	On-going
C 9/9	ANC	**Human Factor in the Provision of ATS** That, a) ICAO consider holding Human Factors seminars in the Asia/Pacific Region which are focused directly on Human Factors associated with the provision of ATS, and; b) States be urged to make regular presentations to Sub-Group meetings regarding "lessons learned" relating to Human Factors associated with the implementation of the new CNS/ATM Systems. Noted the conclusion	a) The first ATS Human Factors Seminar was conducted in 2000. b) Very little information has been received from States	On-going On-going
D 9/39		**CNS/ATM Training and Human Resource Development Task Force** That, a CNS/ATM Training and Human Resource Development Task Force be established with the following Terms of Reference: a) Recommend a strategy for a regional approach towards planning the development and implementation of CNS/ATM training; b) Recommend a co-ordination mechanism for the establishment of regional training capabilities in CNS/ATM systems; c) Recommend a framework for regional training plans and consider the applicability of including this material in the Regional Air Navigation Plan;	The Task Force held its first meeting in July 1999. A Regional CNS/ATM Training & Human Resource Development Strategy was developed. Further work may be progressed when the outputs of the ICAO Human Resource Planning and Training Needs Study Group become available.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
D 9/39		d) Take into consideration the work of ICAO TRAINAIR, the ICAO Regional Human Resources Planning and Training Needs Study Group and the APANPIRG/7 Training Task Force and recommend mechanisms for regional integration of the outputs from these group.		
C 9/51	C	**Strengthening the Regional Office Resources** That, the ASIA/PAC Regional Office resources be strengthened to permit the proper maintenance of the ASIA/PAC FASID and implementation of uniform methodology for the identification of shortcomings, the first step being the filling of the vacant AIS/MAP post Noted the conclusion and requested the Secretary General to take appropriate action thereon	Secretary General has been requested to take appropriate action.	On-going
C10/1		**Application for SSR Code Allotment** That States, which require additional SSR Codes, forward their application to the Regional Office, listing the required information and justification in accordance with paragraph 5.3 of the Asia/Pacific SSR Code Management Plan.	An earlier request from Myanmar is being co-ordinated with ICAO. SSR Codes have been allocated to Myanmar. There have been no requests from other States.	Completed
C10/2		**Uniform Promulgation of FIR Boundary Way-points** That, States review their aeronautical materials and that of their adjacent States and, through co-ordination with adjacent States, ensure uniform promulgation of FIR boundary way-points using WGS-84 as the basis of the Datum.	ICAO continues to monitor situation and will co-ordinate with individual States where the uniform promulgation of FIR Boundary way-points has not been achieved.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C10/3		**ANP Amendment Proposal to include SIGMET in VOLMET Broadcasts (ASIA)** That, the ASIA/PAC Air Navigation Plan (Doc 9673) be amended to add a requirement for inclusion of SIGMET in VOLMET broadcasts for the Asia Region.	Amendment proposal APAC 99/9-ATS has been drafted. On-going consultation with provider States and users is continuing.	On-going
C10/4		**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) complete the implementation of 10-minute longitudinal separation minima using Mach Number Technique; and c) 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) B c) above.	1) a) Implemented; b) Implemented; c) 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).	Completed Completed On-going Closed
C 10/7		**Carriage of ACAS and Pressure-Altitude Reporting Transponders** That, a) ICAO survey States in the Asia Pacific Region and ascertain the implementation plans of States regarding the carriage of ACAS and pressure-altitude reporting transponders with respect to APAC-S 98/4 B ASIA/PAC RAC.	a) ICAO conducted a survey on 22 October 1999, and information provided by States was compiled. In order to obtain additional and more specific information, ICAO conducted the 2nd survey in Aug 2000.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
	C	b) Operators upgrade to ACAS as soon as possible. Noted the conclusion in relation to the worldwide implementation of ACAS II by January 2003 and requested the Secretary General to initiate a worldwide survey to ascertain the implementation plans of States for ACAS II.	b) ATS/AIS/SAR SG recognized a need to establish a transition period to allow operators to use TCAS version 6.04 as an interim measurement before equipping their aircraft with ACAS II completely by 1 January 2002.	On-going
C 10/27	C	**ASIA/PAC Basic ANP and FASID** That, the draft ASIA/PAC Basic ANP and FASID be updated and processed in accordance with established procedures. Noted the conclusion and requested the Secretary General to arrange for the completion, approval and publication of the documents as a matter of priority, in accordance with established procedures.	The ASIA/PAC Basic ANP and FASID were approved by the President of the Council on 11 August 2001.	Completed
C 10/37		**Development of General Contingency Plans** That, The Asia Pacific Regional and State Y2K Contingency Plans and SLOAs or MOUs be used to form the basis on which to develop general contingency arrangements which will permit the continuation of air traffic in the event of any significant degradation of air traffic services and systems.	States have agreed to revise their general contingency plans using their Y2k State Contingency Plans as a model. A target date for finalization of State Contingency Plans to be the end of 2001.	On-going

OUTSTANDING CONCLUSIONS/DECISIONS IN THE CNS/MET FIELDS

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 5/19		**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.	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.	On-going
	C	Noted the conclusion and requested the Secretary General to take action as appropriate.		

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 5/23		**Operation of the OPMET data banks as an OPMET Data Regional Exchange Points (ODREP) under the ROBEX Scheme** That, a) Bangkok, Brisbane, Nadi, Singapore and Tokyo OPMET data banks be designated as ODREPs under the ROBEX Scheme; and b) ICAO develop a draft proposal for amendment of the regional procedures given in the introductory text to Part IV – Meteorology of the MID/ASIA (Doc 8700) and NAT/NAM/PAC (8755) ANPs and arrange for a consequential amendment of the list of the ODREPs as given in the ROBEX Handbook and their responsibilities as follows: i. Bangkok ODREP/OPMET data bank be responsible for the ASIA/PAC- MID and ASIA/PAC – AFI (except south-east part of the region) OPMET data exchanges; ii. Brisbane ODREP/OPMET data bank be responsible for the ASIA/PAC – SAM and ASIA/PAC – South-east AFI OPMET data exchanges;	- OPMET data banks have been implemented. - ROBEX Handbook has been amended to reflect operation of OPMET data banks/ODREPs. - New Table MET 4C - OPMET Data Banks has been included in the draft ASIA/PAC FASID.	Completed Completed Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	Status
C 5/23		iii. Nadi ODREP/OPMET data bank be responsible for the South PAC – NAM OPMET data exchanges; iv. Singapore ODREP/OPMET data bank be responsible for EUR – ASIA/PAC OPMET data exchanges; v. Tokyo ODREP/OPMET data bank be responsible for the ASIA/PAC – NAM OPMET data exchanges.		
	C	Noted the conclusion on the understanding that necessary co-ordination would be made with the APIRG and GREPECAS.		
C 6/27		**Areas of Responsibilities of the Designated OPMET Data Banks to Support the ROBEX Scheme** That, a) the areas of responsibilities of the designated OPMET Data Banks to support the ROBEX Scheme be defined as follows: i) Areas of responsibility of Bangkok OPMET Data Bank Bangkok, Bombay, Calcutta, Delhi and Karachi Main and/or TAF Collection Areas; ii) Area of responsibility of Brisbane OPMET Data Bank – Port Moresby, Sydney and Auckland Main and/or TAF Collection Areas; iii) Area of responsibility of Nadi OPMET Data Bank Nadi TAF Collection Area;	OPMET Data Banks have been implemented. ASIA/PAC and global OPMET data are available on the ISCS and SADIS broadcasts.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	
C 6/27		iv) Area responsibility of Singapore OPMET Data Bank – Singapore, Jakarta and Kuala-Lumpur Main and/or TAF Collection Areas; and v) Area of responsibility of Tokyo OPMET Data Bank Beijing, Hong Kong, Tokyo and Seoul Main and/or TAF Collection Areas. b) Data banks exchange the METAR/TAF Bulletins collected within their areas of responsibility with other data banks; and c) Data banks disseminate the METAR/TAF Bulletins within their areas of responsibility to meet operational requirements.		
	ANC	Noted the conclusion with the understanding that its substance will be incorporated in a proposal to amend the relevant regional air navigation plans		
C 9/18		**Operational efficacy of the ISCS/2** That, a) ICAO carry out a survey on the operational efficacy of the ISCS/2 and b) results of the survey be made available to the ISCS/2 provider State and reported to the COM/MET/NAV/SUR SG/3 Meeting.	- Proposal to carry out a survey on the operational efficacy of the ISCS/2 was forwarded to the ISCS Provider State for review and consideration. - The United States was invited to review the proposed survey form and to provide comments.	To be completed in 2002

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	
C 9/30	ANC	**Global exchange of OPMET messages** That, ICAO develop a proposal to amend Annex 3 and the regional air navigation plans to introduce a requirement for the global exchange of OPMET messages and their dissemination by the ICAO satellite broadcasts. Noted the conclusion and requested the Secretariat to develop a proposal to amend Annex 3 and the air navigation plans to provide for global exchange of OPMET information using all elements of the aeronautical fixed service, as appropriate.	Requirements regarding the global exchange of OPMET information have been included in Amendment 72 to Annex 3 adopted by the Council on 7 March 2001.	Completed
C 10/12		**Conclusion 10/12 – Need to monitor AFTN circuit loading** That, States concerned closely monitor loading conditions on the following AFTN circuits and provide the result of monitoring of plans for upgrading circuits to ICAO. 1. Manila/Singapore 2. Nadi/Apia-Faleolo 3. Nadi/Noumea 4. Hong Kong/Manila 5. Kuala Lumpur/Chennai	1. Manila/Singapore is expected to be upgraded in 09/01. 2. Nadi/Apia-Faleolo is planned to be routed via USA by the end of 2001. 3. Nadi/Noumea already upgraded to 2400 bps. 4. Hong Kong/Manila expected to be upgraded in 09/01. 5. Kuala Lumpur/Chennai planned for upgrading in 12/01.	To be completed by 12/01

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	
C 10/16		**SADIS operational focal point in user States** That, SADIS USER States nominate an operational person involved with day-to-day SADIS operations in that State, to act as the SADIS operational focal point, and to provide the person's name, official title and contact details. Note: - a) to assist States in nominating the appropriate officer, the request to States should indicate clearly that the SADIS operational focal point would be expected to be available to respond to queries and receive information from the SADIS provider State and Secretary, SADISOPSG on operational matters, and maintain contact with any other SADIS users in the State concerned; and b) On receipt of the information from States, the Secretary of the SADISOPSG should provide the information to the SADIS provider State, and include the list of the SADIS operational focal points in a future amendment to the SADIS User Guide.	The required information has been collected from the SADIS user States. The completed list of the SADIS focal points has been forwarded to the Secretary of the SADISOPSG.	Completed
C 10/19	C	**Future development of the WAFS** That, ICAO give consideration to the future development of the WAFS with a view of meeting the States' requirements for WAFS and non-WAFS products after transition to the final phase of WAFS and RAFCs cease to operate. Noted the conclusion and requested the Secretary General to arrange for a study on how to meet any non-WAFS requirements indicated by States, in response to the survey requested in Conclusion 10/20.	Proposal is being studied by the Secretariat with assistance of the WAFSSG.	On-going

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	
C 10/20		**Survey on future requirements of States for the WAFS and non-WAFS products and services** That, States define their future requirements for the WAFS and non-WAFS products and services so that all requirements be met after transition to the final phase of the System.	A survey was undertaken by the ASIA/PAC WAFS Transition Task Force to assess the capability of States to obtain and process GRIB forecasts into Wind/Temp Charts on a operational basis. A survey was undertaken by the Task Force to assess the operational effectiveness of WAFS.	Completed
C 10/21	ANC	**Internet access to the WAFS products and OPMET data** That, ICAO consider developing the policy for use of the Internet by States to obtain the WAFS products and OPMET data for operational purposes. Noted the conclusion and its relationship to APIRG/12 conclusion 12/27 and requested the Secretary General to consider developing a uniform policy for the use of the Internet by States to obtain WAFS products and OPMET data for operational purposes, as well as for the dissemination of AIS products.	The Uniform policy for the use of the Internet by States for operational purposes is being developed by the Secretariat as requested by the ANC. It was proposed to be included in the agenda of the MET Divisional Meeting to be held in September 2002. The United Kingdom agreed to implement the SADIS internet-based service as a back-up to the SADIS broadcast to be provided only to States and users authorized to receive SADIS and ISCS broadcasts.	On-going
C 10/22		**Dissemination of ASIA/PAC OPMET data to WAFC Washington** That, a) Tokyo ROBEX OPMET Data Bank forward ASIA/PAC METAR bulletins to the WAFC Washington; b) Brisbane and Nadi ROBEX OPMET Data Bank forward ASIA/PAC TAF bulletins to the WAFC Washington; and The operational procedures and the respective responsibilities of the data banks to facilitate distribution of the ASIA/PAC OPMET data to the WAFCs London and Washington be as shown in appendix I to the report on the Agenda Item 2.2.	The ASIA/PAC and global OPMET data is available at the Washington WAFC from the Centres concerned and from London WAFC for the ISCS broadcast.	Completed

Report Reference ---------- Conc/Dec No	Action by ANC/ Council	Decision/Conclusion Title/ ANC/Council Action, if any	Action by States/ICAO	
C 10/23		**Revision of the ROBEX Scheme** That, in order to facilitate distribution of the ASIA/PAC OPMET information to the WAFCs London and Washington for uplink to the satellite broadcasts, the ROBEX Scheme be revised as shown in appendix J to this report on Agenda Item 2.2.	The revised ROBEX Scheme is being implemented. The collection areas of some ROBEX Centres have been extended.	On-going

AGENDA ITEM 6: DEVELOP FUTURE WORK PROGRAMME

Agenda Item 6: Future Works Programme

Schedule of Future meetings

6.1 The meeting noted that the 33rd Session of the ICAO Assembly and the 38th Annual Conference of Directors-General of Civil Aviation will be held on 25 September - 5 October 2001 and 5 - 9 November 2001 respectively, and decided that the tentative schedule of meetings for 2002 and 2003 shall be as follows:

2002

CNS/ATM IC SG/9	4 -8 March 2002	Bangkok
ATN Transition Task Force	18-22 March 2002	Mumbai
ATS/AIS/SAR SG/12	17-21 June 2002	Bangkok
CNS/MET SG/6	15-19 July 2002	Bangkok
APANPIRG/13	September 2002	Bangkok

2003

ATS/AIS/SAR SG/13	June 2003
CNS/MET SG/7	July 2003
CNS/ATM IC SG/10	August 2003
APANPIRG/14	September 2003

6.2 The meeting decided on the following provisional agenda for the next meeting:

Provisional Agenda for APANPIRG/13

Item 1: Review of Council and ANC actions on APANPIRG/12 Report

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

2.1 ATS/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: Shortcomings and Deficiencies in the Air Navigation fields

Item 5: Review of Outstanding Conclusions and Decisions of APANPIRG

Item 6: Develop Future Works Programme

Item 7: Any other business

AGENDA ITEM 7: ANY OTHER BUSINESS

Agenda Item 7: Any other business

Tonga's Application for Full Membership with APANPIRG

7.1 The meeting was provided with a brief summary of the current ATS provision in Tonga and the establishment of a National CNS/ATM Committee tasked with overseeing all aspects pertaining to CNS/ATM.

7.2 The meeting was informed that Tonga had initiated major policy changes during the beginning of the year to reflect developments in the transportation sector with large emphasis being placed by the government on aviation. However, Tonga found themselves in a stage where it is difficult to determine, with reasonable accuracy, the most appropriate solution, in terms of cost-effectiveness, to CNS/ATM implementation.

7.3 Due to the vast geographical distance between ICAO Headquarter, Bangkok Regional Office and Tonga, there were difficulties in communications and in implementing some of the decisions made by APANPIRG. There were also situations peculiar to Tonga and some small island States in the region that are often, in Tonga's view, overlooked when CNS/ATM was discussed at the regional level.

7.4 The meeting, whilst drawing Tonga's attention to the added responsibilities and obligations of being APANPIRG member, unanimously decided to recommend Tonga's application for APANPIRG membership for approval by the Council of ICAO.

7.5 Tonga appreciated and thanked the meeting for the endorsement and pledged full commitment to APANPIRG.

Business Aviation Participation in Asia Pacific Regional Planning

7.6 The meeting noted that the International Business Aviation Council (IBAC) has been approved by the President of the Council to participate in APANPIRG/12 and consideration is to be given to IBAC's regular participation at APANPIRG meetings.

7.7 The meeting was briefed on the nature of business aviation, its global dimensions, its representative bodies, its participation at ICAO forums, its operations, its Asia Pacific Associations and the rational for continuing participation in APANPIRG.

7.8 Reasons for IBAC participation in APANPIRG include: size of business aviation; business aviation is different from the airlines; importance of business aviation to commerce; active business aviation participation at other ICAO regional bodies; business aviation growth in Asia; new business aviation representative bodies in Asia-Pacific; response to the ICAO President's thrust for more industry participation and IBAC's ability to provide professional technical and operational input.

7.9 The meeting, in considering the inputs by IBAC towards enhancing the safety of aviation, unanimously decided to recommend IBAC's application for regular attendance at APANPIRG meetings for approval by the Council of ICAO.

7.10 IBAC, in thanking the meeting, informed that it will endeavour to participate regularly in APANPIRG and its sub-groups.

Body for discussion of aerodrome matters

7.11 It was suggested that it would be opportune to look into the need for establishing a contributory body under the framework of APANPIRG to address issues pertaining to aerodrome matters including the List of Shortcomings and Deficiencies.

7.12 The meeting whilst acknowledging in principle such a need felt that it would have to be considered in the light of resource constraints of States and the Regional Office and whether such issues could be addressed by taking into account various modalities such as adjusting the agenda of the existing sub-groups.

ATTACHMENTS TO THE REPORT

Attachment 1

Twelfth Meeting of the ASIA/PACIFIC Air Navigation Planning and Implementation Regional Group (APANPIRG/12)
Bangkok, Thailand, 20 to 24 August 2001

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International Civil Aviation Organization

TWELFTH MEETING OF THE
ASIA/PACIFIC AIR NAVIGATION PLANNING AND
IMPLEMENTATION REGIONAL GROUP (APANPIRG/12)
Bangkok, 20 to 24 August 2001

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