INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA AND PACIFIC OFFICE

REPORT OF THE NINTH MEETING OF COMMUNICATIONS, NAVIGATION AND SURVEILLANCE/ METEOROLOGY SUB-GROUP (CNS/MET/SG/9)

BANGKOK, THAILAND 11– 15 JULY 2005

The views expressed in this Report should be taken as those of the Sub-Group and not of the Organization. This Report will be submitted to the APANPIRG/16 Meeting and any formal action taken will be published in due course as a Supplement to the Report of the APANPIRG Meeting.

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

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Report on Agenda Items

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List of Appendices:

1. Introduction

1.1 The Ninth Meeting of the Communications, Navigation and Surveillance/Meteorology Sub-Group (CNS/MET SG/9) of Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) was held in "the Kotaite Wing" of the ICAO Asia and Pacific Regional Office Bangkok, Thailand from 11 to 15 July 2005.

2. Attendance

2.1 The meeting was attended by 76 experts from 23 States, WMO and IATA. A list of participants is in Attachment 1.

3. Opening of the Meeting

3.1 On behalf of Mr. L B. Shah, Regional Director, ICAO Asia and Pacific Office, Mr. K.P.Rimal, Regional Officer, CNS, welcomed the participants. He provided an overview of the developments that had taken place in the CNS and MET fields since the eighth meeting of the Sub-group. He stated that, an amendment to the Global Air Navigation Plan for the CNS/ATM systems is being processed within ICAO to incorporate in the Plan relevant materials from the Industry Roadmap with an objective of transforming the Plan into the baseline for measurable achievements. The highlights of the meeting of the ACP Working Group of the Whole held in June 2005 were also provided**.**

3.2 The meeting was expected to review various strategies relating to ATN and air-ground data links and review the strategies for the approach and landing guidance and GNSS implementation. Updating of the CNS Tables of the FASID was one of the important items to be addressed by the meeting.

3.3 The meeting was also expected to deal with various MET issues such as, the transition to BUFR-coded significant weather forecasts, status of implementation of the SADIS and ISCS in the region, regional procedures related to the ROBEX scheme and OPMET data banks and improvement of availability of OPMET data from the PACIFIC States, the regional planning for the transition to BUFR-coded OPMET information.

3.4 He pointed out the direction given by APANPIRG/15 to the Sub-groups to review the List of Key Priorities in the CNS/ATM Implementation with a view to evaluate Key Priorities relevant to the activities of the Sub-group and make it highly focussed, fit the purpose intended and be time-bound. This would be one of the important tasks to be addressed by the meeting.

3.5 He emphasized that elimination of Air Navigation Deficiencies was one of the important activities of APANPIRG and its contributory bodies. The Sub-group should continue to accord high priority in developing solutions to correct the noted deficiencies in accordance with the established procedure.

3.6 Mr. Jeffrey Bollard, Chairman of the CNS/MET Sub-Group, highlighted the main issues to be addressed by the meeting and emphasized the need to focus on the implementation of the ICAO provisions and programmes in the CNS and MET fields.

4. Officers and Secretariat

4.1 Mr. Jeffrey Bollard, Chairman of the Sub-group, presided over the meeting and Mr. Shun Chi-ming, Vice-Chairmen, chaired the sessions of the MET Working Group of the Sub-group.

4.2 Mr. K .P. Rimal, Regional Officer, CNS, and Mr. Dimitar H. Ivanov, Regional Officer, MET, acted as Secretaries of the meeting and were assisted by Mr. Li Peng, Regional Officer, CNS.

5. Organization, Working Arrangement, Language and Documentation

5.1 The working language was English inclusive of all documentation and this report. The Sub-group met as a single body on 11 and 14 July 2005 to deal with subjects of common interest in both CNS and MET fields. On other days the CNS and MET Working Groups met separately to deal with specific tasks.

5.2 A list of Working Papers and Information Papers presented at the meeting is at Attachment 2.

6. Terms of Reference of the CNS/MET Sub-Group

1) Ensure the continuing and coherent development of the ASIA/PAC Regional Air Navigation Plan and the ASIA/PAC Regional Plan for the New CNS/ATM System in the CNS/MET field;

2) Review and identify deficiencies that impede the implementation or provision of efficient CNS/MET services in the ASIA/PAC region;

3) Monitor CNS/ATM system research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States;

4) Make specific recommendations aimed at improving CNS/MET services by the use of existing procedures and facilities and/or through the evolutionary implementation of CNS/ATM system; and

5) Review and identify inter-regional co-ordination issues in the fields of CNS/MET and recommend actions to address those issues.

7. Conclusions and Decisions - Definition

7.1 The Sub-groups of APANPIRG record their actions in the form of Draft Conclusions, Draft Decisions and Decisions with the following significance:

a) Draft Conclusions deal with matters, which, in accordance with the Sub-group's Terms of Reference, require the attention of States or actions by ICAO in accordance with establishment procedures;

b) Draft Decisions relate solely to matters dealing with the internal working arrangements of APANPIRG and its contributory bodies; and

c) Decisions relate solely to matters dealing with internal working arrangement of the Sub-group only.

Agenda Item 1: Adoption of provisional agenda

1.1 The agenda items adopted by the meeting were as follows:

Agenda Item 1: Adoption of provisional agenda

Agenda Item 2: Review follow-up action on:

1) report of CNS/MET SG/8 and APANPIRG/15 meetings
2) relevant action items of 41st DGCA Conference
3) Key Priority for CNS/ATM Implementation

Agenda Item 3: Aeronautical Fixed Service:

1) review report of Seventh Meeting of ATN Transition Task Force

Agenda Item 4: Aeronautical Mobile Service:

1) review report of CNS/MET Air-Ground Datalink Study Task Force meeting
2) review air-ground communication system

Agenda Item 5: Navigation:

1) review strategies for Precision Approach and Landing Guidance Systems and GNSS Implementation
2) review States' input on amendment to FASID Table CNS-3 Radio Navigation Aids
3) implementation of GNSS approach with Vertical Guidance (APV)

Agenda Item 6: Surveillance:

1) review report of Third ADS-B Study and Implementation Task Force
2) review surveillance systems
3) review FASID Table CNS-4- Surveillance Systems

Agenda Item 7: Aeronautical electromagnetic spectrum utilization:

1) review preparations for WRC-2007
2) result of Second APT Regional Preparatory Group meeting

Agenda Item 8: Implementation of WAFS:

1) review implementation of ISCS and SADIS
2) review transition to GRIB and BUFR coded WAFS products

Agenda Item 9: Exchange of OPMET Information:

1) review report of OPMET/M TF/3 meeting
2) regional planning for BUFR coded OPMET information

Agenda Item 10: ICAO Warning Systems:

1) review implementation of International Airways Volcano Watch (IAVW)
2) review implementation of tropical cyclone watch

Agenda Item 11: Quality assurance in the MET field
1) review preparations for the ASIA/PAC QMS seminar

Agenda Item 12: MET support for operations at aerodromes and terminal areas

Agenda Item 13: Review CNS/ATM systems planning and implementation:

1) CNS related issues
2) MET related issues
3) Inter-disciplinary issues

Agenda Item 14: Review of deficiencies in the CNS and MET fields:

1) Status of CNS deficiencies (APANPIRG Deficiency List)
2) Status of MET deficiencies (APANPIRG Deficiency List)
3) Coordination with RASMAG and USOAP

Agenda Item 15: Regional Contingency Planning in the CNS and MET fields

Agenda Item 16: Future Work Programme

Agenda Item 17: Any other business

Agenda Item 2: Review follow-up action on:

1) report of CNS/MET SG/8 and APANPIRG/15 meetings
2) relevant action items of 41st DGCA Conference
3) Key Priority for CNS/ATM Implementation

Report of the CNS/MET SG/8 and APANPIRG/15 meetings

2.1 The meeting carried out a review of the actions taken by APANPIRG, Air Navigation Commission (ANC) and the Council on Decisions and Conclusions formulated by the Eighth meeting of the CNS/MET Sub-group held in Bangkok from 12 to 16 July 2004. The meeting also noted with satisfaction actions taken by States and the Secretariat. The result of the review is provided in Appendix A.

Relevant action items of the 41st DGCA Conference

2.2 The 41st Conference of Directors General of Civil Aviation (DGCAs), Asia and Pacific Regions was held in Hong Kong, China from 1-5 November 2004. The Action Items developed by the meeting included 4 items of direct interest to the Sub Group including as follows:

Air Navigation Deficiency

2.2.1 The Conference reviewed the status of air navigation deficiencies identified by APANPIRG and strongly urged States to resolve the deficiencies and developed Action Item 41/2.

Preparation for WRC-2007

2.2.2 The Conference strongly urged States to support ICAO position for WRC-2007 and the regional preparatory activities for WRC-2007.

ADS-B

2.2.3 In order to enhance the regional coordination of the ADS-B implementation issues, the Conference developed Action Item 41/5 to urge States to designate a focal point of contact person responsible for implementation of ADS-B in each administration.

Enhance Cooperation in the provision of meteorological services

2.2.4 In order to enhance the cooperation between their civil aviation administrations, meteorological authorities/providers and other relevant organizations the Conference developed Action Item 41/4.

2.2.5 The meeting also noted that the 42nd DGCA Conference will be held from 26 to 30 September 2005 at Gold Coast, Brisbane, Australia. The theme subject for the Conference is “Challenges and Opportunities: Working together to manage growth, change and emerging environment”.

Key Priorities in the CNS/ATM Implementation

2.3 The meeting was reminded of previous APANPIRG actions in regard to the Key Priorities. The Key Priorities were established to focus the implementation of CNS/ATM and APANPIRG/12 recognized that, where possible, items entered, as Key Priorities, should have definitive target dates and avoid the use of the term “on going”. In addition, target dates should be realistic.

2.3.1 APANPIRG/15 agreed to retain the list of Key Priorities as updated by the Sub Groups and adopted the mechanism whereby the Sub Groups compile and evaluate key priorities relevant to their activities and present these to APANPIRG. In its Decision 15/52, APANPIRG has stated that the list should be highly focused, fit the purpose intended and be time bound.

2.3.2 The meeting undertook a critical review of the Key Priorities based on the direction provided by APANPIRG. The outcome of the review is presented in Appendix B. The meeting formulated the following draft Decision.

Draft Decision 9/1 - Updated Key Priorities

That, the updated list of Key Priorities provided in Appendix B be adopted.

Outstanding Conclusions

2.4 The APANPIRG/15 meeting reviewed and updated the list of Outstanding Conclusions in the CNS/MET field. In the List, there was only one outstanding Conclusion 13/23 in the CNS filed. This Conclusion was implemented by conducting three sub-regional Seminars in New Delhi, Beijing and Bangkok under a Special Implementation Project (SIP) approved by the ICAO Council to assist States in the establishment of a procedure with the assistance of a data base for review of SARPS and notification of differences. In view of this, it is considered that the outstanding Conclusion has been implemented. The meeting agreed to indicate in the list and thus is proposed for deletion from the List.

Agenda Item 3: Aeronautical Fixed Service:

1) review report of Seventh Meeting of ATN Transition Task Force

Review report of the Seventh Meeting of the ATN Transition Task Force

3.1 The meeting noted with appreciation the tasks accomplished by the Seventh Meeting of the ATN Transition Task Force held in Shanghai, China from 18 to 22 April 2005. The meeting noted the decisions of the Task Force and endorsed the draft Decisions and Draft Conclusions formulated by the Task Force. The result of the review is stated in the following paragraphs.

TCP/IP

3.2 The meeting noted developments in the ACP on matters of interest to the Task Force. It was noted that the ATN protocol suite 8208 and TCP/IP dual stack protocols will be implemented where required in the United States. It was also noted that dual stack protocol will be implemented at the entry/exit points between EUR region and other regions to ensure interoperability between Regions where ATN in full compliant with the SARPs is being or has been implemented.

3.2.1 It was also noted that introduction of materials on the use of TCP/IP in the air-ground data links require significant technical work that may only be completed in a three to five years time frame. Initial operational deployment of an air/ground TCP/IP Internet can only takes place when this work is completed.

Use of TCP/IP Protocols in ASIA/PAC Region

3.2.2 The meeting noted that TCP/IP may be used to interconnect ATN Ground-Ground Routers by bilateral agreement between states/administrations; however the ATN Internet using CLNP and IDRP is still required in order to ensure regional interoperability. It was further noted that the Task Force had clarified that in the ASIA/PAC region TCP/IP may only be used as an encapsulation sub-network of the ATN under bilateral agreement between States. Administrations in the ASIA/PAC region are expected to provide AMHS over ATN infrastructure that complies with provisions of Doc 9705.

Voice-over-Internet Protocol (VoIP)

3.3 It was noted that ACP is considering possible usage of VoIP. If feasible, the introduction of VoIP could reduce the need for communication links with adjacent centres. Currently, at least two dedicated links are required, one for voice and another one for data. VoIP, together with TCP/IP data, could reduce these links to one. Similarly, use of VoIP over air-ground links may, if feasible, allow for more parties to use the same frequency, including data communications. So far, the studies are based on what is happening in EUROCAE in this regard. In the ASIA/PAC region VoIP option is not considered to support ATS direct speech communications however the developments in this field are being monitored.

Use of Lower Cases characters in the NOTAM messages

3.4 The meeting noted that at the request from the user community, the Air Navigation Commission (ANC) is considering to allow for the inclusion of lower case letters, in addition to upper case letters, in the NOTAM message text. It was also noted that the AFTN/AMHS gateway service fully complies with the provisions of Annex 10 and will not have the capability to handle both upper and lower case characters.

ATN Documents

3.5 The meeting noted that the Task Force had completed development of seven ATN documents required to provide guidance to States for implementation of the ground-to-ground ATN and had proposed for adoption and publication. These documents were posted in the ICAO APAC website under the heading: Meetings 2005, Seventh Meeting of the Aeronautical Telecommunication Network (ATN) Transition Task Force of APANPIRG in Appendices A, B, C, E, F, H and I. These documents, upon adoption by APANPIRG, will be posted in the ICAO APAC website eDocuments under the heading CNS Documents where all ATN related documents adopted by APANPIRG have been posted.

3.6 In view of the foregoing, the meeting endorsed relevant draft conclusions of the Seventh meeting of the ATN Transition Task Force and formulated the following draft Conclusion consolidating all the documents that are required to be adopted.

Draft Conclusion 9/ 2 - ATN Documents

That, the following ATN documents be adopted and published in the ICAO web site under CNS Documents.

1) ASIA/PAC System Integrity Policy
2) ASIA/PAC System Management Policy
3) Communication Performance Document
4) First edition of ASIA/PAC ICD for ISO/IEC 8208
5) Second edition of ASIA/PAC ICD for ATN ground-to-ground Router Internet Communication Service (ICS)
6) ASIA/PAC technical document on the use of ATN Directory Service and
7) AMHS/MTA Routing Policy

ATN Documentation Tree

3.7 The ASIA/PAC ATN Documentation Tree provides an index and hierarchy of relevant ATN documents. The 3rd Edition of the ATN Document Tree was prepared. The documentation profile has been updated. The meeting noted the decision of the Task Force to publish the third edition of the Documentation Tree with its profile description as a reference document for use by States.

AMHS Description

3.8 The meeting noted the decision of the Task Force for publication of a Reference Document for the AMHS Description. This document developed by the Task Force provides description of AMHS functionality, system performance, information security requirements and system management requirements. It also provides additional information on the transitional guidance material and will assist States for implementation of AMHS. It is also proposed to include it in the Documentation Tree.

3.9 The meeting also noted that the Task Force had decided to assign a task for monitoring the activities carried out by the ACP WGN-4 and report results to the next meting of the Task Force.

3.10 The Working Group was also tasked to review impact on the implementation of Directory Service in the EUR region, and study the impact of delaying implementation in the ASIA/PAC region until the review of ATN-specific schema elements has been carried out by WGN.

3.11 The meeting noted that the Task Force had recognized a need for further development of Profiles for the Directory Access and Exchange Protocols and had assigned this task to its Working Group.

Interim Regional AMHS Address Database

3.12 The meeting discussed a proposal for establishment of a centrally administered AMHS database that can be used during the initial phase of AMHS implementation until a regional Director Service is established.

3.13 States in the Asia/Pacific region are currently in the process of implementing AMHS services to replace AFTN services in accordance with the ATN transition plan of APANPIRG. As the number of AMHS User Agents (UA) and Message Transfer Agents (MTA) in the region grows, there is an urgent requirement for a regional database of AMHS addresses. There is an urgent need to establish a regional AMHS address database as a stopgap measure that States will be able to access to obtain information on MTA and UA addresses, points of contact, etc.

3.14 It was therefore proposed that the ICAO Asia and Pacific Regional Office administer such a database. However, it was informed that the ICAO Asia and Pacific Regional Office might not have the required resource to support and maintain such a database. Thailand was requested to provide necessary support to the Regional Office to carry out this task. Thailand indicated that it would support if details of the requirements were identified. Accordingly, the meeting requested Japan to study the detailed requirements for the resource needed and inform ICAO Regional Office to take further action in coordination with AEROTHAI, Thailand.

AMHS Addressing Scheme and Private Management Domain Name Value

3.15 The meeting noted the Translated Form (XF) and Common AMHS Addressing Scheme (CAAS) Addressing Scheme. A draft of the AMHS Addressing Scheme and Private Management Domain (PRMD) value for each State/Air Traffic Service Organization (ATSO) in the ASIA/PAC Region was recommended for endorsement by the ATN Transition Task Force.

3.16 The meeting endorsed the description of the two addressing scheme. The meeting agreed that the proposed sample values of CAAS Addressing Scheme for States/ATSOs in ASIA/PAC Region should be circulated to States for consideration. The meeting also agreed that the information provided in the presentation be included in the 3rd Edition of the AMHS Naming Plan. Accordingly the meeting endorsed the following draft Conclusion:

Draft Conclusion 9/3 – ASIA/PAC AMHS Naming Plan

That,

1) the updated ASIA/PAC AMHS Naming Plan provided in Appendix C be adopted; and

2) ICAO issue a State letter requesting States to reconsider and adopt the proposed AMHS Address Scheme and PRMD name values described in the Plan.

ASIA/PAC AMHS MTA/UA Naming Registration Table & Contact List

3.17 The meeting noted the Table for registering AMHS MTA/UA and a contact list for use in the Asia/Pacific Region. The Meeting endorsed the final draft of table for registering AMHS MTA/UA and a contact list for use in the Asia/Pacific Region and endorsed the following draft Conclusion:

Draft Conclusion 9/4 - ASIA/PAC AMHS Naming Registration Table and Contact List

That,

a) the Table for registering AMHS MTA/UA and a Contact List for use in the Asia/Pacific Region provided in Appendix D be adopted; and

b) the registration Table be circulated to States by ICAO with a request to commence the registration process.

ICD for ATN AIDC

3.18 The meeting noted that the Task Force was expected to complete development of an Interface Control Document (ICD) for the ATN ATS inter-facility ground/ground data communications (AIDC) application and present the document for consideration by this meeting. The meeting was advised that due to various factors it was not possible to complete the document.

ATN Security and AIDC

3.19 It was noted at the ACP WGN/2 meeting (Bangkok, 2003) that the ATN security solution couldn't be applied to Version 1 AIDC owing to the fact that it does not use the Dialogue Service. Possible solutions have been mooted to address this deficiency, including re-specifying AIDC over the GACS application, and enabling applications to invoke the Security Service Object (SSO) directly rather than through the UCLS SASO. However, such developments will probably wait work starting on AIDC Version 2.

3.20 Under the current circumstances, it was recognized that it would be premature to proceed with the development of the Interface Control Document for ATN AIDC Version 1.Delaying work on the ICD is not expected to have an adverse impact on the deployment of AIDC in the region as existing operational requirements are currently being met by APANPIRG AIDC based on AFTN procedure. In view of the above the work on the Interface Control Document for the ATN AIDC will be delayed until performance criteria have been properly addressed by the appropriate bodies within ICAO.

APANPIRG AIDC and ATN AIDC

Table CNS 1D- ATS Inter-facility Data communications (AIDC)

3.21 The meeting noted that the format of Table CNS-1D to reflect requirement for ATS Inter-facility Data Communication (AIDC) developed by APANPIRG and contained in Part IV of the ASIA/PAC Facilities and Services Implementation Document (FASID) was slightly modified to improve presentation of requirements. The entries in the Table were required to complete reflecting existing and /or planned operational requirements for AIDC, where this function was required.

3.22 In accordance with Conclusion 15/16 of APANPIRG the Table was circulated and the responses from States were reflected in the Table. The meeting reviewed the Table and updated the requirements. It was agreed that the existing Table CNS-1D, which was included in the FASID Table as a sample, should be replaced with the new Table CNS-1D. In view of the foregoing the meeting endorsed the following draft Conclusion.

Draft Conclusion 9/5 - Amendment to the ASIA/ PAC CNS FASID Table CNS-1D-AIDC

That, the Table CNS-1D-ATS Inter-facility Data Communication (AIDC) Plan reflected in Part IV CNS of the ASIA/PAC FASID be amended by replacing the existing Table CNS-1D with an updated Table in accordance with established procedure

Japan and the United States - AMHS Operational Service

3.23 The meting noted that on 15 March 2005, Japan and the United States commissioned the AMHS operational service using AMHS/AFTN gateways through the 64 Kbps ATN circuit, which installed between Salt Lake City and Tokyo in 2003. The AMHS operational service has been used to carry all the AFTN messages between the US and Japan and it forms part of the Aeronautical Fixed Service infrastructure. The AFTN service between Salt Lake City and Tokyo has been withdrawn effective 17 June 2005.

Dual Stack ATN Router developed by China

3.24 The meeting noted that under an ATN Research project of CAAC, a type of dual stack ATN router had been developed by Aero-Info Technologies Co., Ltd. China. The router does not only comply with the ISO/OSI protocol stacks but also support IP protocol stacks that are extensively used by more and more civil aviation systems.

3.25 The ATN router supports ISO/OSI protocol stacks and complies with ICAO SARPs and technical provisions for data-link layer, network layer and transport layer. However, the most of application systems currently used by CAAC are based on TCP/IP protocol stacks and the platforms supporting these applications also have to support TCP/IP protocol stacks. In order to continue providing connectivity to these platforms and supporting the TCP/IP based applications it is necessary to develop ATN router with dual-stacks capability. This task was given by ATMB/CAAC for the development of the extended function over the standard ATN router. It was informed that the conversion job between different protocol stacks is realized through a gateway server. It was also noted that the function of dual stack router has been successfully tested.

3.26 Hong Kong shared the experience that extensive loading tests should be conducted during system acceptance. Though data communication protocols will ensure message integrity in data links, messages can be lost within the end systems under various situations such as internal software interface and server/ LAN changeovers, depending on the specific designs. In AFTN operations, missing messages in a message switching system is protected by the CSN, but there is no similar protection in AMHS operations. To resolve the problem and reducing the testing effort, missing-message protection should be provided by refining the AMHS SARPs or the AMHS Routing Policy (to a certain extent), to be explored by the Task Force and/or the ACP WG-N.

3.27 It was noted that Indonesia was drawing up a transition plan of migration from AFTN to ATN in four phases. The ATN Routers will be installed in Jakarta and Ujung Pandang. More routers will be deployed as the next step in Denpasar, DGAC Head Quarter and NASC respectively. The ATN implementation plan would commence in September 2006.

ATN Implementation Plan in the Republic of Korea

3.28 It was noted that in Republic of Korea AMHS was installed in 2001 as the first step to accept the ATN standard. The AMHS is implemented as AFTN/AMHS centre for the domestic service to gain experience.

Network configuration to be used during AFTN/AMHS Transition

3.29 It was noted that according to the 1st Edition of Asia Pacific Regional Interface Control Document (ICD) for ATS Message Handling System, transition plan based on a set of network configurations was considered by Sri Lank for implementation during the transition from AFTN to AMHS.

Transition to BUFR Coded information

3.30 Japan clarified that the current operational AMHS service is a basic AMHS, which processes AFTN messages. It may not be able to support those extended service. To support BUFR code, necessary study is required. USA confirmed that the AMHS commissioned may be able to support the emerging requirement if necessary changes are made to the software.

3.31 The meeting noted that the ATN Transition Task Force had assigned a task to its Working Group to study the capability of AMHS being introduced in the region and detailed requirement for the BUFR code. The result of study will be presented to the next OPMET/M Task Force meeting to be held early 2006.

AFTN Performance

3.32 The meeting recalled that the ASIA/PAC/3 RAN Meeting formulated three Conclusions relating to AFTN performance and established reliability requirements of 97% or higher for the AFTN circuits. Regarding the need to exchange data on AFTN circuit performance and transit time statistics, it was recognized that as stated in Conclusion 10/2 and 10/3 of the ASIA/PAC/3RAN meeting it is not required to exchange performance reports, if the established requirements were met consistently.

3.33 New Zealand proposed that in view of the modern communication links that exceeds the actual data traffic level to the extent that circuit loading statistics are effectively insignificant and the bi-annual collection of loading statistics would not be required.

3.34 The meeting noted that it will not be necessary to compile and review the statistics on a routine manner for all AFTN circuits in view of the high quality, capacity and reliability of leased circuits available in the region. However, it was recognized that where circuit occupancy exceed the permissible levels specified in the Manual of Planning and Engineering of AFTN, Doc. 8259, circuit loading statistics should be compiled and exchanged to initiate remedial action before the overloading situation approaches. In view of the foregoing the meeting endorsed the following draft Conclusion:

Draft Conclusion 9/6 - AFTN performance reports

That States operating AFTN circuits;

a) may discontinue the practice of exchanging AFTN circuit performance charts, transit time statistics and circuit loading statistics where performance requirements are satisfied consistently; and

b) exchange circuit loading statistics only for those circuits where occupancy level exceed permissible levels specified in the Manual on Planning and Engineering of AFTN, Doc. 8259.

Upgrading of the Tokyo/Moscow AFTN circuit

3.35 It was noted that a proposal received by Japan from the Russian Federation to make a routing change to use the Tokyo/Moscow circuit, as a back up to the Tokyo/Khabarovosk circuit was not acceptable. Japan had proposed to the Russian Federation to upgrade the Tokyo/Moscow circuit from 200 baud to 2400 bps as had been previously agreed by both States at the CNS/MET SG/6 meeting.

3.36 In mid-March 2005, Japan received another proposal from the Russian Federation to close down the Tokyo/Moscow circuit and exchange all "U" AFSRA traffic through the Tokyo/Khabarovsk circuit. Japan responded to the Russian proposal in April 2005, first proposing to upgrade the Tokyo/Moscow inter-regional trunk circuit as agreed, and alternatively, if the Russian Federation could not afford the cost of both the Tokyo/Moscow and Tokyo/Khabarovsk circuits, to upgrade the Tokyo/Moscow inter-regional trunk circuit and to withdraw the Tokyo/Khabarovsk circuit, as study has indicated that it would be more cost-effective to upgrade the Tokyo/Moscow circuit than to retain the Tokyo/Khabarovsk circuit. However, Japan identified that this alternative would require changes to the ICAO Asia/Pacific Basic ANP and the ICAO AFTN Routing Directory. The Secretariat informed the meeting that subject to mutual agreement between Japan and the Russian Federation to maintain only the Tokyo/Moscow circuit, a provision for alternate routing could be explored in coordination with States concerned.

Strategy for Implementation of ATN in the ASIA/PAC Region

3.37 In order to assist States in the implementation of the ground-to-ground ATN it was agreed to develop a strategy. The meeting endorsed the strategy developed by the Task Force and agreed to present to APANPRG for review and adoption. It was also recognized that the strategy needs to be reviewed from time to time in light of developments and as required. In view of the foregoing the meeting endorsed the following draft Conclusion.

Draft Conclusion 9/7 - Strategy for Implementation of ATN in the ASIA/PAC Region

That, the Strategy for Implementation of ATN in the ASIA/PAC Region provided in Appendix E of this report be adopted and States be notified.

Terms of Reference and Subject/ Tasks List of the ATN Transition Task Force

3.38 While reviewing the Tasks List, it was noted that of the 10 Tasks 5 Tasks were fully completed, one items each of the 5 Tasks were on hold awaiting result of the global activities undertaken by the ACP. The Task Force was monitoring developments in the OPLINKP and ACP to seek guidance to carry out the tasks. The guidance from the OPLINK and ACP on the remaining Tasks is uncertain at this stage. However, if the desired result becomes available it could easily be addressed and the work could progress. The Tasks List is provided in Appendix F.

3.39 With regard to the two Tasks assigned to the Task Force referred to in Decision 15/22 of APANPIRG, that with respect to the meeting noted AMHS performance it was considered that AMHS Description Document would provide adequate guidance on performance.

3.40 The Working Group was tasked to review AMHS performance related information already contained in the documents adopted by APANPIRG and ascertain the need to consolidate information in one single document or to develop a completely new document on performance.

3.41 The meeting noted that the Working Group had clarified that it would only be logical to establish a sunset date for the AFTN when AMHS implementation has progressed satisfactorily in the region. The meeting recognized that it would be premature at this stage to establish a sunset date

for international AFTN connections given the current lack of maturity and operational experience of AMHS.

3.42 Since all the major tasks had already been completed including the ATN ground-to-ground transition plan and associated FASID Tables it was proposed to dissolve the ATN Transition Task Force and assign the residual tasks to the proposed Group. In light of the above the meeting endorsed the following draft Decision.

Draft Decision 9/8 - Dissolution of the ATN Transition Task Force

That, the ATN Transition Task Force be dissolved as it has completed major tasks and the residual work would be absorbed by the proposed ATN Implementation Co-ordination Group.

3.43 The meeting recognized a need to carry out coordination to ensure satisfactory transition from AFTN to ATN without causing any disruption to services and proposed to establish an ATN Implementation Co-ordination Group of APANPIRG. In addition to the new tasks the Group should also absorb the residual tasks of the ATN Transition Task Force. In view of the above the meeting proposed a new Terms of Reference of the Group and developed the Tasks List provided in Appendix G and formulated a draft Decision as follows:

Draft Decision 9/9 - Establishment of an ATN Implementation Co-ordination Group

That, an ATN Implementation Co-ordination Group be established composed of membership of the ATN Transition Task Force and any other State or organization willing to contribute to the activities of the Group with the Terms of Reference and Tasks List provided in Appendix G.

Working Group of the ATN Transition Task Force

3.44 The meeting noted the decision of the Task Force to retain its Working Group which would continue to deal with the tasks assigned to it by this meeting until the first meeting of the ATN Implementation Coordination Group meeting.

Expression of Appreciation to the ATN Transition Task Force

3.45 The meeting appreciated the work done by the ATN Transition Task Force. The Task Force, in 7 years since its establishment, conducted 7 meetings, two seminars and 13 meetings of the its Working Group. It has completed the development of required regional guidance materials, various ICDs, ATN ground-to-ground implementation plan and also developed ATN related Tables of ASIA/PAC FASID. The meeting thanked all the States who nominated members to the Task Force and to the members themselves for their valuable contributions.

Change of location and Location Indicator of the Tokyo AFTN COM Centre

3.46 The meeting was informed by Japan that a new ATM Centre at Fukuoka, which will operational from October 2005. In order to relocate the Tokyo AFTN COM Center from Narita International Airport to the ATM Center in Fukuoka without affecting AFTN service with adjacent AFTN centers, JCAB has installed AFTN and AMHS systems at the ATM Center separate from the currently operating AFTN and AMHS systems at Narita. AFTN service operation will be changed from Narita to Fukuoka by switching the AFTN circuits within Japan from Narita to Fukuoka at 15:00 UTC on February 15, 2006.

3.47 The relocation of Tokyo AFTN COM Center from Narita to Fukuoka will therefore have no impact on AFTN service with adjacent AFTN centers. The location of the Tokyo AFTN COM Center will be changed from "RJAA" to "RJJJ" and its AFTN address will be changed from "RJAAYFYX" to "RJJJYFYX". In addition, the name of the facility will be changed to Fukuoka AFTN/AMHS COM Center. It was proposed to amend the name of the location of the AFTN COM Centre in the FASID document and also in other relevant documents. While noting the change in the name, Japan was advised to issue AIC in time and also coordinate the changes with the adjacent AFTN COM Centres.

South Pacific AFS network implementation

3.48 The United States informed the meeting that Australia, Fiji, New Zealand, Papua New Guinea, and the United States established mutual requirements to exchange air traffic data and voice communications with each other through state-of-the-art network which supports multiple services, voice compression, multiple protocols, re-routing, network security, remotely manageable, and easily expandable network. In addition to the benefits listed above, implementation of the meshed network would also allow States to potentially disconnect point-to-point circuits that would no longer be needed. It was further noted the use of a common multi-service access platform to support the exchange of air traffic data and voice communications between centres with alternate routing capability.

Use of X.25 protocol

3.49 IATA expressed the view that the X.25 protocol referred to in Conclusion 15/11 of APANPIRG needs to be reviewed as it was not considered suitable for use in the medium term (10 years) for implementation of ATN ground-to- ground infrastructure. IATA viewed that the words "States not implementing X.25 consider the use of emerging replacement technology" may give wrong interpretation to understand X.25 as emerging technology.

3.50 In this regard, the meeting noted that as a result of the comprehensive study carried out by the ATN Transition Task Force, it was concluded that X.25 protocol would support ATN ground-to-ground infrastructure during the near and medium term (5 to 10 years). The study had also indicated that the ATN network, unlike in the EUR region, is not dependent on X.25 packet switched networks but uses private leased channels for point to point communications between ATN routers. It does not involve the X.25 switches operated by telecommunications service providers. It was further stated that available spares to support X.25 was assured by manufacturers and investment in X.25 cards by vendors was continuing. APANPIRG/15 adopted a draft conclusion of the CNS/MET SG/8, which was slightly modified to include IATA's concern to permit the use of emerging technologies such as frame relay and IP protocols.

3.51 It was recalled that during the SITA seminar held in Bangkok from 7 to 8 July 2005 in response to a query SITA had confirmed that they use X.25 without any problem and would continue to use X.25 as well as IP protocols to support their network.

3.52 It was further clarified that the subject was considered closed as the technical experts of the Task Force had already concluded that the X.25 protocol would be suitable for use in the ASIA/PAC region during the short and medium terms.

Agenda Item 4: Aeronautical Mobile Service

1) review report of the CNS/MET Air-Ground Datalink Study Task Force meeting
2) review air-ground communication system

Review report of CNS/MET Air-Ground Data Link Study Task Force meeting

4.1 The meeting reviewed the report of the CNS/MET air ground Data Link Study Task Force meeting which was held from 19 to 20 May 2005 at the ICAO Regional Office, Bangkok, Thailand in accordance with Decision 8/13 of the Eighth Meeting of CNS/MET Sub-group of APANPIRG. The meeting was attended by nine participants from seven members of the Task Force nominated by Australia, China, Hong Kong China, India, Japan, SITA and ARINC. The meeting noted that the Fifteenth Meeting of the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG/15) held in August 2004 renamed it from Working Group to a Task Force.

4.2 It was recognized that there was a lack of guidance available for the deployment of data communications and that current implementations of data link did not conform to ICAO standards. Though it did provide satisfactory service for the current applications, the technology being used will face limitations in the future. A strategy for selection and implementation of communications data links was considered to be of value to States in planning and implementation.

4.3 It was noted that the "Near-Term" referred in the strategy was considered to be the time period when implementations would occur within the next 5-10 years from now. It was also recognized that systems being implemented or to be implemented would have a life cycle of at least 10 to 15 years from the date of implementation. The Long-Term was considered to be a period beyond the Near-Term and it would be considered as 15 years and beyond.

4.4 The meeting noted that the important applications of data link for uplink of MET data to aircraft are ACARS based D-ATIS and D-VOLMET. The implementation of D-VOLMET was encouraged by APANPIRG (Conclusion 13/29 refers) since D-VOLMET solves a long-standing problem for the inclusion of SIGMET in VOLMET. Recent data from Hong Kong China showed that the number of uplink requests for VHHH D-ATIS messages continue to be on an increasing trend, reaching 20,455 (14,740 for arrival D-ATIS and 5,715 for departure D-ATIS) in May 2005. It is expected that in the near future D-ATIS and D-VOLMET will gradually replace their voice predecessors.

4.5 Based on the information presented by States, data service providers, industries and the users, the CNS/MET air-ground data link study Task Force formulated a draft Strategy for implementation of the Air-Ground data link in the Asia and Pacific Regions

4.6 As a result of review of the draft strategy for implementation of the air-ground data link in the ASIA/PAC region, which is provided at Appendix H to this report, the meeting endorsed the following draft Conclusion:

Draft Conclusion 9/10 - Strategy for implementation of the air-Ground data link in the ASIA/PAC region

That, the Strategy for implementation of the air-ground data link in the ASIA/PAC region as provided in the Appendix H to the report of the Task Force meeting be adopted.

4.7 The meeting considered that the task assigned to the CNS/MET air-ground data link Task Force has been completed. It was also noted that similar to other strategies adopted by APANPIRG, the strategy for data link should be kept dynamically as a living document and the CNS/MET Sub-group of APANPIRG can revisit and update it from time to time. Therefore the meeting decided that the air-ground data link Study Task Force be dissolved. Accordingly the meeting made the following Decision:

Decision 9/11 – Dissolution of the air-ground data link Study Task Force

That, the air-ground data link Study Task Force Task Force be dissolved as the task specified in the TOR has been completed.

Air-ground communication improvement in Myanmar

4.8 The meeting noted the progress made in improving air-ground communication in Myanmar. Due to the vast geographical area of Myanmar, the Department of Civil Aviation had to implement Remote Controlled Air Ground (RCAG) VHF stations to provide VHF coverage through out Yangon FIR. In 1989, Myanmar implemented two RCAG stations in Mandalay and Dawei, followed by RCAG stations installed at Lashio, Kawthoung and Pathein in 1996 providing VHF coverage over 90 per cent the Yangon FIR. The system was supported by crystal controlled radio transmitters and linked by leased microwave lines from Myanmar Post and Telecommunication Department. In the past several years, the system suffered from severe interference particularly on 134.200 MHz caused by illegal high power cordless phone. The operation was also affected by poor quality of the terrestrial link. Myanmar had reported this problem to their telecommunication regulator and efforts had been made to overcome the problem but with little success. The meeting discussed similar the interference problems experienced by some other States.

4.9 In 2004, DCA, Myanmar made agreement with Aeronautical Radio of Thailand Ltd. (AEROTHAI) to replace the RCAG system with modern digital VHF, solar powers system and VSAT links. The installation started in March 2005, and the new system has been fully operational since 9 June 2005 after a month trial, as published in AIP SUP 01/05. The frequency 133.2 MHz of sector I of Yangon ACC (the northern sector) was replaced with 126.75 MHz and the Sector II, (the southern sector) frequency 134.2 was replaced by 128.75 MHz. It was further noted that DCA Myanmar had also contracted with THALES for supply of HF SSB transmitter with SELCAL system, which will be delivered and installed by the end of July 2005.

4.10 The meeting congratulated Myanmar for the successful installation of VHF RCAG station and associated systems for the improvement of air-ground communications in the Yangon FIR. With this improvement, the long-standing deficiency in air-ground communications in Myanmar will be resolved. IATA indicated that the user feed back report on the condition of the air-ground in the Myanmar airspace is fundamental and required. Myanmar advised that any report of communication difficulty should be provided to Myanmar within one month of the occurrence, otherwise it would be difficult to investigate and to take remedial action.

MTSAT status and Reduction of longitudinal separation

4.11 Japan informed the meeting of JCAB's implementation plan for the reduced longitudinal separation minimum in the North and Central Pacific airspace using ADS/CPDLC. It was noted that the MTSAT-1R satellite was successfully launched on 26 February 2005 and it is expected to be operational for ATC communication in late December 2005. Further test of meteorological functions is being conducted and some of which have been operational since June 2005. It was informed that JCAB introduced 50NM longitudinal separation minimum during level changes (step climb/descent) in the oceanic airspace of Tokyo FIR on 11 April 2005. The introduction of step climb/descent resulted in increase of opportunities for aircraft to climb to their optimum levels. JCAB plans to introduce the seamless application of 50NM longitudinal separation minimum for aircraft at cruise in the Pacific airspace using ADS from December 2005 in Tokyo FIR. In this regard, it is

necessary to harmonize the implementation with Anchorage and Oakland FIRs. JCAB intends to complete the ADS-C trial using Inmarsat in August 2005 leading to the next step of using MTSAT, the test operation of which is scheduled from October to December 2005.

Modernization of air-ground VHF and HF Communication in Australia

4.12 The meeting noted the rationalization and modernization of air-ground VHF and HF voice communication facilities being implemented in Australia. It was informed that the primary communications method for the majority of aircraft in the Enroute, Terminal and Approach phase of flight is envisaged to remain for the next ten to fifteen years to be VHF and HF voice communications. As a consequence of this restated requirement and the state of the extant infrastructure following little investment over the past 20 to 25 years, Airservices Australia is undertaking a major renewal and rationalization program on its communications infrastructure. Approximately 150 sites located at major centres and remote locations across Australia provide enroute coverage of VHF voice services down to around 20,000 ft with many areas better covered down to 10,000ft and often ground. The Upgrade project is well advanced with the pilot network and first sites installed. The project is scheduled for completion in mid to late 2006. For VHF, 25 kHz channel assignments will be introduced in stages. For HF, MWARA and RDARA services are provided from 18 separate HF transmitter and receiver sites. Similar to the VHF network, little investment had been made over the last three decades and an opportunity to significantly rationalize the number of sites was available with the use of modern technology. The central element of the new HF communications system scheduled commissioning by August 2005 uses high gain multi-modal antennas combined with modern receivers and voting technology. This has allowed the rationalization of sites down to 6 transmitter and receiver sites from the current 18.

PDC Implementation status in Hong Kong China

4.13 Hong Kong China made a presentation on the current status of PDC implementation and operation in Hong Kong China. It was informed that the Pre-Departure Clearance (PDC) Delivery function is provided to nine airlines operating in Hong Kong via data link. Over 160 flights each day use the service representing about 46% of daily departure traffic. Two more airlines are planning to use the service before October 2005. Average message transit time is less than 30 seconds. The system is being upgraded to support AEEC623 protocol and the target is to provide 60% of departure clearance delivery via data link daily.

Discussion on Implementation of DFIS and Satellite Communications

4.14 Singapore informed the meeting that PDC service was introduced in 1999 at Singapore and the system is being upgraded to support AEEC623 protocol. The new system will be available in 2007.

4.15 China informed the meeting that Air Traffic Management Bureau (ATMB) currently carried out a trial project of PDC service at Beijing Capital airport. China has a plan to implement PDC service at Shanghai, Guangzhou, Xi’an and other major airports in China. ATMB has set up a Working Group as an implementation team for the PDC implementation.

4.16 It was observed by the meeting that without ACARS capability, aircraft would not be able to the PDC service. It is a requirement issue for fitment, which needs to be further, addressed at future meeting. The meeting also recalled that one of reasons for introduction of D-VOLMET service at Hong Kong and other busy airports in the region was because of lack time slot to include SIGMET in the VOLMET broadcast. The meeting also noted that implementation of DFIS in the region is considered as the Key Priority for Implementation of CNS/ATM system and the target date established for implementation is by 2008.

SATCOM voice

4.17 There was a general discussion on difficulties being experienced in the use of SATCOM voice for ATC purpose. In Australia and USA had received a number of requests for the use SATCOM for ATC purpose. Hong Kong, China indicated that they had conducted several tests and identified a number of problems. One of the problems was that the connection time from ground to air would take more than 10 minutes and it could not be reduced to meet the ATS requirements. The connection test was conducted with Cathay Pacific using INMARSAT via SITA AIRCOM FANS 1/A based service. The high costs for SATCOM and the high connection time from ground to air direction were matters of concern.

4.18 The other difficulty was that unlike VHF, SATCOM voice does not provide broadcast mode. In addition, regulation for the use of telephone type service for air-ground communication including call identification and security aspects were to be addressed before SATCOM voice service could be considered for implementation.

SITA data link

4.19 The meeting noted that a data link and ADS-B seminar was conducted by SITA at the ICAO Conference Hall in Bangkok from 7 to 8 July 2005 in coordination with ICAO. The seminar was held just before the CNS/MET SG/9 meeting and was attended by representatives from several States in the ASIA/PAC Region. A video on SITA data link was presented at the meeting.

Agenda Item 5: Navigation:

1) **review strategies for Precision Approach and Landing Guidance Systems and GNSS Implementation**
2) **review States' input on amendment to FASID Table CNS-3 Radio Navigation Aids**
3) **implementation of GNSS approach with Vertical Guidance (APV)**

Review of strategies for Precision Approach and Landing Guidance Systems and GNSS Implementation

5.1 A series of information papers were reviewed prior to the consideration of the strategies.

Military Avionics

5.2 The United States of America detailed the certification requirements for Department of Defense and allied aircraft and how this process was applied to military avionics including the use of GPS Precise Position Services (GPS-PPS). The intent is military platforms conducting peacetime operations will conform to applicable rules to ensure interoperability and transparency within domestic and international controlled airspace.

5.3 The US DoD operates a standards program known as Military Standard Orders (MSOs) that is similar to the civilian FAA TSO program. Military Standard Order (MSO) C145 "Airborne navigation sensors using the global positioning system (GPS)/precise positioning service (PPS) for area navigation (RNAV) in required navigation performance (RNP) airspace; RNP-20 RNAV through rnp-0.3 RNAV" was quoted as an example of an approximation of the civilian TSO C-145 "airborne navigation sensors using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)".

WAAS Development

5.4 The United States informed the meeting that it continues to aggressively work towards the operational implementation of GPS and its Wide Area Augmentation System (WAAS) and Local Area Augmentation System (LAAS) to complete the transition to satellite-based navigation.

5.5 WAAS was commissioned on July 10, 2003 for use in all phases of air navigation in the U S NAS. WAAS performance consistently demonstrates 1 meter horizontal and 1.5 meters vertical accuracy. WAAS provides users with the capability to fly approaches with vertical guidance throughout the U.S. NAS. WAAS capability also provides improved guidance to users in the en route and departure domains. Presently, over 700 LNAV/VNAV published procedures are available which WAAS capable aircraft can fly. LNAV/VNAV is an approach procedure with vertical guidance with nominal minimums of a 350' decision height, 1½-mile visibility, 556m horizontal alert limit (HAL), and 50m vertical alert limit (VAL). The WAAS service area is the continental United States and portions of Alaska.

5.6 In the third quarter of 2003, FAA improved the precision approach capability provided by WAAS through terminal approach procedures (TERPS) optimization. This improvement took full advantage of the capabilities of the WAAS Signal-in-Space and provided a new approach procedure with vertical guidance called LPV. LPV provides more lateral precision over LNAV/VNAV resulting in lower approach minima for most runways. LPV procedures have nominal minimums of a 250' decision height, ¾ mile visibility without proper lighting (½ mile visibility with proper lighting), 40m HAL, and 50m VAL.

5.7 LPV and LNAV/VNAV approaches do not require any equipment beyond standard WAAS Technical Standard Order (TSO) avionics, and will make vertical guidance safety benefits accessible to the general aviation community, thus directly affecting flight safety for general aviation aircraft and other WAAS users.

5.8 Enhancements to the WAAS include:

- The integration of new reference stations at Alaskan sites in Fairbanks, Bethel, Kotzebue, and Barrow. (Q1, 2006)
- Integration of new Canadian sites in Gander, Goose Bay, Iqaluit, and Winnipeg (Q2 2005 to Q3 2006)
- Integration of new Mexican sites in LaPaz, Puerto Vallerta, Mexico City, Merida, and Tapachula (Q2 2005 to Q3 2006)
- Additional GEO satellite services

5.9 The completion of WAAS Full LPV Capability (FOC) is expected in the late 2008 time frame. At this time, the U.S. Government plans to incorporate a second civil frequency (L5 at 1176.45 MHz) will be more solidified. When available for use, WAAS will incorporate L5 into its operation to upgrade the LPV capability available at full operational capability (FOC) to a GPS Landing System (GLS) capability. GLS is the Category I precision approach equivalent for GPS systems with aviation minimums of 200' decision height and ½ mile visibility (with proper lighting). GLS Capability is expected in the 2013 timeframe.

Australian transitioning activities

5.10 Australia described it plans from transition from a point-to-point navigation system to an Area Navigation system with GNSS as the enabling technology for all levels of aviation. The Australian plan is described in the second edition of the ATM Strategic Plan published in September 2003.

5.11 The Navigation Strategy envisages Area Navigation will be the prime means of navigation for all phases of flight except Precision Approach. A thin network of Navigation Aids (less than 200) (the backup network) will be retained to provide a backup capability for Terminal and Non-Precision Approach operations and assist older international aircraft.

5.12 Instrument Landing System will remain the general Precision Approach aid for at least five and probably 10 years. GPS augmented by Ground Based Augmentation System (GBAS) is expected to replace ILS; the timing will be driven by industry and is not yet clear.

5.13 Modern jet aircraft will use a Flight Management System supported by GPS and Inertial sensors to provide Area Navigation. A new generation of GPS Sensors and Navigators designed to FAA Technical Standards Order TSO-C145a/146a, meet the basic requirements for "only means" navigation. This equipment is suitable to provide Area Navigation in Regional, Charter and General Aviation aircraft. A CASA project, strongly supported by AsA is developing the case to support a Rule change authorising "Only Means" navigation using this equipment.

5.14 Navaids required in the Backup Network will be replaced and the recovered old equipment will be used to extend the life of the remaining Aids until wide spread fitment of Area Navigation is in place. Replacement Projects are underway to renew navaids required in the Backup Network to ensure continuity of service as transition to GNSS/Area navigation proceeds;

- Replacement of the Terminal VORs at Adelaide (completed), Hobart (completed), Cairns (in progress) and Canberra is underway

- Replacement of 61 NDBS and 23 VORs; Contract signed with major equipment suppliers and installation will commence towards the end of the year.

- A project to replace 14 ILS is also in progress

Regional Strategies

5.15 The regional strategies for implementation of GNSS air navigation capability and the provision of precision approach and landing guidance systems were reviewed and updated by the Eighth Meeting of CNS/MET Sub-group of APANPIRG in July 2004 and adopted by APANPIRG/15 in its Conclusions 15/23. The meeting reviewed that strategies based on new information available.

5.16 The Regional Strategy for Precision Approach and Landing Guidance Systems was considered and no changes were proposed. It was noted that new aircraft are being supplied with avionics certified for operation with Annex 10 compliant GBAS ground stations however there are no certified ground systems available on the market. The meeting encouraged States in a position to do so to facilitate the availability certified ground system.

5.17 The Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC Region was revised taking into account new terminology for non-precision approach and the availability of DOC 9849 AN/457 "Global Navigation Satellite System (GNSS) Manual". The revised strategy is presented in Appendix I.

Draft Conclusion 9/12 - Revision of the Strategy for the implementation of GNSS Navigation Capability in the ASIA/PAC region

That, the updated Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC region provided in Appendix I to the report on Agenda Item 5 be adopted and provided to States.

Implementation of GNSS approach with Vertical Guidance (APV)

5.18 Australia presented a paper that informed that as an outcome on CFIT studies into aircraft approach accidents ICAO developed an additional classification of approach design – APV (approach with vertical guidance). The CFIT studies indicated that providing vertical guidance as opposed to a 'dive and drive' approach was significantly safer. The AN-Conf/11 of 2003 recommended that these approaches be the minimum level provided by states and this recommendation was adopted by ICAO. Standards for APVs have been published in DOC 8168-OPS Vol II PANS-OPS for one form of APV – Chapter 34 on baro-VNAV and work is continuing to develop further designs. Some states have already developed designs and are currently implementing SBAS supported APVs.

5.19 APVs may be currently divided into two types – those that use vertical guidance provided by a path derived by the baro-altimeter and the flight management systems and those where the vertical guidance is provided by a GNSS augmentation system such as SBAS.

5.20 The ICAO baro-VNAV APV design incorporates a sloping splay design and requires the aircraft to be fitted with a certified baro/FMC combination capable of containing the vertical error budget within the design limits. ICAO designs also allows this form of vertical guidance to be provided for RNP based designs in Chapter 35 of PANS-OPS.

5.21 The difference between vertical 'advisories' and vertical guidance should be noted as there have already been a number of incidents arising from this confusion.

5.22 In addition some states have approved RNP (baro-VNAV) designs to RNP levels less than the 0.3NM used in PANS-OPS and the US FAA has recently published Order 8260.52 to provide standards for the design and implementation of such approaches.

5.23 APV designs using an augmented GNSS are nominally divided into two types, APV-I and APV-II – the difference being the vertical error limits. At this time the United States is the only State to certify an SBAS system (WAAS) and to provide APV-I approaches (known in the US as an LPV). Flying these approaches requires a SBAS capable receiver such as the TSO C145 or C146 design operating within a defined SBAS service area. At present larger airline aircraft are not fitted with SBAS receivers and current indications are that no such fitments are planned.

5.24 The meeting discussed the implementation of the APVs and confirmed that APV were the preferred GNSS guided approach implementation. In the development of the Strategy for Implementation of GNSS Air Navigation Capability the meeting consider non-precision approaches based on GNSS without vertical guidance should be used as an intermediate step to achieving APV approaches.

5.25 The requirement for either a certified baro/FMC or SBAS augmentation raised the issue that major aircraft manufacturers are not implementing SBAS on new aircraft and that IATA does not support SBAS. It was also pointed out that at least modern aircraft, according to the flight manual, required additional augmentation external to the aircraft to achieve APV operations. SBAS provides the required additional augmentation.

5.26 The outcome of the discussion was reflected into the strategy for GNSS implementation.

Amendment to Table CNS - 3 of ASIA/PAC FASID

5.27 The meeting noted that APANPIRG, in its Conclusion 15/24, had urged States to review and revise FASID Table CNS-3 -Navigation, to reflect comprehensive description of the future provision of radio navigation aids. It was observed that the entries of many States were either out of date or lack adequate information on their plans for transition to GNSS. The meeting noted that in accordance with the above Conclusion, States were requested to update the Table CNS-3. The responses from States were compiled by the Secretariat and were presented to the meeting. The meeting reviewed and further updated the Table and proposed to amendment the Table. Accordingly, the meeting formulated the following draft Conclusion.

Draft Conclusion 9/13 - Amendment Table CNS-3 - Radio Navigation Aids

That, the Table CNS-3 – Radio Navigation Aids provided in ASIA/PAC FASID, Part IV CNS be replaced with the updated Table CNS-3 accordance with the established procedure.

Agenda Item 6: Surveillance:

1) review report of Third ADS-B Study and Implementation Task Force
2) review surveillance systems
3) review FASID Table CNS-4- Surveillance Systems

ADS-B study and Implementation Task Force

6.1 The meeting reviewed the work carried out by the Third Meeting of ADS-B Study and Implementation Task Force which was held from 23 to 25 March 2005 in Bangkok in conjunction with an ADS-B Seminar held on 21-22 March 2005. The meeting also reviewed the result of the ADS-B working group meeting held in Singapore 13-15 October 2004.

States' activities on trials and implementation of ADS-B

Upper Airspace Project (UAP) update

6.2 Airservices Australia has committed to deploying a network of ADS-B ground stations across Australia during 2005 under the UAP. This project is expected to provide near-nationwide coverage above FL300, with significant coverage at lower levels.

6.2.1 The 28 new ground stations will be progressively deployed, with the first two UAP ground stations installed at Melbourne airport as the Airservices Australia Test & Evaluation unit and at Bundaberg. Integration of the high performance GPS engine in the ground station has been completed. The unit uses HPL to generate the site monitor NUC (integrity) value. The installation at remote sites will be progressively completed through the second half of 2005. Commissioning of the UAP network is expected to take place by the end of 2005.

6.2.2 A RAIM prediction system as a modification to the existing system has been purchased to provide predictions of when aircraft can be expected to report integrity values corresponding to HPL<0.5NM. Formal testing of the Eurocat enhancements has commenced. An ADS-B bypass system had been developed which takes ADS-B data from the ADS-B ground stations and presents it to the controller workstation directly without centralised processing. ATC procedure development had commenced. Design safety case for the UAP had been completed. Preparation of the Implementation Safety case has commenced.

ADS-B Trial and Implementation Regulatory Aspect

6.3 It was noted that for the Burnett Basin Operational Trial, the Civil Aviation Safety Authority (CASA) approved the use of a 5 NM minimum horizontal separation distance between trial aircraft on 5 December 2004. A copy of the instrument authorizing ADS-B separation in the trial is available at http://www.casa.gov.au/rules/miscinst/2004/CASA559.pdf

6.3.1 It was noted that recently CASA has issued two Australian Technical Standard Orders (ATSOs) for the certification of ADS-B avionics. ATSO-C1004 is a standard for Mode A/C transponders capable of transmitting ADS-B 1090ES messages, while ATSO-C1005 is a standard for the certification of a stand-alone (non-transponder) ADS-B 1090ES transmitter. The two ATSOs are available at:
http://www.casa.gov.au/avreg/aircraft/ATSO.htm.

France

6.4 ADS-B validation trials were performed based on an 1090 MHz ES Ground station installed in Toulouse Airport within EUROCONTROL ADS-B validation activities called CRISTAL. CRISTAL Toulouse has started with the participation of consortium made of French DSNA, Airbus, Thales ATM and Alticode. It includes the installation of an ADS-B ground station with good coverage of the airport and of the surrounding airspace and validation activities through data collection and analysis. Equipped aircraft are detected with a very good detection quality at 200 NM at high altitude and sometimes up to 250 NM. The data are transmitted to DSNA facilities in Toulouse for recording and analysis. For French DSNA, the study will also prepare the operational implementation of ADS-B especially in La Réunion Island by gaining confidence in ADS-B data and identifying potential issues. A final public report will be delivered to Eurocontrol and can be made available to the ADS-B community at the end of 2005.

6.4.1 It was noted that the French DSNA is also involved with EUROCONTROL, ENAV (Italy), AENA (Spain) and HCAA (Greece) in the CRISTAL MED project that will deploy an ADS-B 1090 MHz ES infrastructure for the Mediterranean airspace. The operational scope is ATC ground surveillance for en route and TMA using aircraft derived data. ADS-B will be used to allow radar-like procedures with goal to provide radar like separation even in areas without radar coverage and currently under procedural control. It is also envisaged to use ADS-B ground stations for airport surface surveillance on some major airports close to the Mediterranean area where ADS-B data could support aircraft identification and vehicle tracking for A-SMGCS.

ADS-B Project study and Implementation Plan in Fiji

6.5 The meeting noted the progress of ADS-B study and tentative plans for implementation of ADS-B in Fiji. The ADS-B core Project team was liaising with some of the Stakeholders to complete and Cost Benefit Analysis (CBA) study. The following tentative project plan had been developed to be provided with Cost Benefit Analysis report for approval by the State which leads us to implementation of ADS-B in Fiji.

1	CBA Study and presentation to the appropriate authorities for the State.	30 April 2005
2	Specification documentation, ROI, tender and sign contract.	31 October 2005
3	Equipment delivery, implementation, commissioning of systems and the ADS-B service in Fiji.	30 April 2006

6.5.1 Four VHF sites are being considered for initial location of the ADS-B Ground Stations including two remote sites at Delaikoro and Koro-o and two local sites at Nadi and Nausori Airports. The ADS-B solution for surveillance capability in Fiji is a typical example for where no radar surveillance service is provided.

ADS-B plan in Indonesia

6.6 To extend the surveillance coverage within Indonesian airspace, in the Near-Term DGAC of Indonesia is considering installation of ADS-B ground station for use as complementary surveillance tool. In the Long-Term will consider SSR replacement program and to explore other applications. In the near term, the installation would be divided into Phase-1 and Phase-2.

6.6.1 Phase-1 to install 11 ground stations with 3 stages at the following location to extend radar-like coverage and replace the unserviceable radar.

- Stage-1: Jayapura, Timika, Merauke and Saumlaki
- Stage-2: Ambon, Biak, Sorong and Ternate
- Stage-3: Palu, Kupang and Natuna

6.6.2 Phase-2 to install the following 9 ground stations as a backup for the old SSR station which is appraoching their end-of-life cycle. The Makassar Automation Air Traffic System will have the capability to process ADS data.

Japan

6.7 The evaluation tests of ADS-B and multilateration on surface and terminal areas have been conducted by the Electronic Navigation Research Institute (ENRI). The evaluation tests of multilateration on surface area conducted used the experimental vehicle. The test results were generally satisfactory in comparison with EUROCAE MOPS. The target losses observed in front of the terminal building and large errors observed at the left and right corners were caused by shielding and reflection from buildings or parking aircraft. To resolve these problems, height of an antenna was extended and a remote unit was added near the terminal building area. The tests with these improvements were conducted on September 2004. The comparison of tracking outputs near the terminal building was analyzed

ADS-B System Implementation Activities in the Republic of Korea

6.8 In the 2nd phase construction of Incheon International Airport, ADS-B system has been considered to enhance surveillance capability for approaching aircrafts to the airport and moving vehicles on the ground by providing efficient RIMCAS (Runway Incursion Monitoring and Conflict Alert System) function and fostering smooth air traffic flow. Incheon International Airport, which is currently operating Ku-band ASDE (Airport Surface Detection Equipment) with a MRI (Multi Radar Tracking) function, will be improved by adding X-band ASDE to ensure a perfect ground system for CAT-IIIb operation during the 2nd phase construction.

6.8.1 Two aspects are identified to design ADS-B system during the 2nd phase construction of Incheon International Airport. First, ADS-B system will be established for interface with ASDE system in order to supplement the detection function which is easily influenced by blind area or by more than a 16 mm/h rainfall. Second, when an independent parallel runway operation is available, the ADS-B system is to be integrated with ARTS (Automated Radar Terminal System) in order to enhance precision approach monitoring for simultaneous parallel arrivals and departures. The information derived from ADS-B would be also provided to controllers on the screen of working stations. Four sets of ground ADS- B receivers are to be established at appropriate positions in the airport to secure sufficient visual range for detecting approaching and moving aircrafts and vehicles. The ADS-B system plan will be determined after review of expert committee with consideration of international standards and then the final decision will be made in the consultation with concerned authority and organizations about timeline, budget etc.

6.8.2 The SSR Mode S 1090 MHz ES will be used and the project is anticipated to be completed by 2008.

An Example of A-SMGCS Trial in Singapore

6.9 Singapore plans to implement ADS-B in 3 phases as follows:

- Phase 1 (2006/7) involves the tracking of ground movement of vehicles with ADS-B transponders and ADS-B equipped aircraft using sensors installed at

Changi Airport. The ADS-B tracking will be displayed at the Advanced Surface Movement Guidance and Control System (A-SMGCS) at Tower.

- Phase 2 (2007/8), the ADS-B coverage will be extended up to 250 NM by installing a high-gain antenna in the airport vicinity, if required.

- Phase 3 (2009/10) we will integrate ADS-B data into the new ATC system for ATC operations.

6.9.1 In early October 2004, Singapore took the opportunity of flight inspection to long range radar to conduct a simple ADS-B trial (with the support from Singapore Engineering Software Systems Pte Ltd and Sensis Corporation) to assess performance of ADS-B. After analysis of the data captured during the radar flight check, the following results were observed:

a) Initial pick-up of aircraft, the ADS-B receiver (located at Changi) was able to track the flight check aircraft at Seletar Airport (about 13 KM away from Changi) while still on the ground. Due the fact that there is no line of sight between the long range radar and the flight check aircraft at Seletar Airport, the long range radar was able to pick up the flight check aircraft only after take-off;

b) At Changi Airport, touch and goes were conducted at the 4 runway ends. The long range radar performed accurately according to the specifications for all runway ends except for one probably due to blockage. In comparison, ADS-B was able to track the aircraft from arrival, touch-down to taxi-ing. At a certain point, the flight track was dropped probably due to the blockage by the terminal buildings.

c) ADS-B antenna cone of silence, at a certain distance from radar head, the radar would drop the flight check aircraft track. Flying at varying flight levels of FL 350, 330 and 290, it was observed that the cone of silence for the long range radar was 9, 8 and 7 NM radius respectively. For ADS-B, it was observed that the cone of silence was larger at 11, 10 and 9 NM radius. It was understood that the cone of silence of the ADS-B antenna was wide as a standard DME antenna was used for this trial.

d) Potential ADS-B coverage, the flight check aircraft was flying on a specific airway at 7000ft. It was observed that ADS-B could track the flight check aircraft all the way to 118 NM while the radar could only track the aircraft up to 130 NM but intermittent detection started at around 120 NM.

e) Performance on specific SID/STAR and aircraft maneuvering, when the flight check aircraft flew along the SID/STAR, both radar and ADS-B provided comparative position reporting. At certain points of the aircraft maneuvering, we lost some ADS-B tracks. That was probably due to the fact that the aircraft was only equipped with 1 transponder antenna attached on the top of the aircraft. However, with the fast update rate of ADS-B, the track drop was recovered within 2 - 3 seconds. This fast update rate would be useful in improving the conflict alerts (ie reduce false alerts) in the ATC system.

Thailand

6.10 The ADS-B operational trial in Thailand will mainly focus on assessing the system's performance in the local environment utilizing targets of opportunity in Bangkok Flight Information Region and the possibility to improve the Secondary Surveillance Radar (SSR) coverage using ADS-B as an additional source. A single, non-redundant, ADS-B ground station will be installed. The sites under considerations for the installation of the ADS-B ground station will be located either in

Bangkok or Phuket where an existing communication link and other necessary infrastructure are available. In December 2004, AEROTHAI approved the budget to conduct the ADS-B operational trial. AEROTHAI is currently in the procurement process and expects the installation of the equipment to be completed by the third quarter of 2005. The trial will be conducted as a standalone test system. A cost estimate for provision of a 9600 bps communication link without ADS-B ground station between ADS-B site and the air traffic control centre in Thailand is about US$ 4,800 covering both additional hardware to accommodate an extra communication link and initial installation. The cost estimate was based on the assumption that the ADS-B system would be installed at a location which already has a communication infrastructure (VSAT Network). It was further noted that Thailand intends to initiate an operational trial of ADS-B for ATC surveillance from 2005 with the target time frame 2010 for full operation, operating in parallel with the existing Secondary Surveillance Radar (SSR). ADS-B is expected to provide improved radar like coverage for Bangkok FIR, as well as backup, or replace existing radar systems in Thailand.

Potential Area for using ADS-B

6.11 It was noted that a requirement for using ADS-B can be identified in area between D.P.R. Korea and Russian fast east including Northern of Japan which would be potential area to use ADS-B technology serving those flights between Republic of Korea and Russia and beyond via DPR. Korea. There is minimal procedure airspace in DPR Korea and large part of military airspace in Northwest of Japan. IATA was requested to provide details information at next Task Force meeting listing advantage and benefits by extension of surveillance coverage with the use of ADS-B ground station.

ADS-B Radar – Like Service with a Regional ADS-B Provider

6.12 It was informed that SITA and Airservices Australia had become partner in providing ADS-B radar like service. To minimize capital investment by ANSPs and technical/commercial ANSP risk, the ADS-B air-ground surveillance service can be provided jointly with ANSPs. For example SITA will buy, install and maintain ADS-B ground stations and operate on existing SITA RGS sites or on ANSP sites. Example of ADS-B data sharing implementation sites could be at Norfolk Island and Christmas Island of Australia and Port Blair of India.

Problem Report System

6.13 It was informed that an interim ADS-B problem and issue reporting database has been developed by Australia based on the proposal agreed by the Task Force. ADS-B related problems and issues may be submitted online using a data entry form on the Airservices Australia website at www.airservicesaustralia.com/adsb/issues with following user name and password. Members of the ADS-B Task Force were invited to provide any comments regarding the web page and the database.

User name:	icao
Password:	abit2004
Domain:	leave this field blank

Airbus Transponder Status

6.14 It was informed that Airbus certified in 2003 three new Mode S transponders, capable of ELS (Elementary Surveillance), EHS (Enhanced surveillance) and 1090ES (Extended Squitter, first implementation of ADS-B out). These three Mode S transponders ELS/EHS/ES capable are:

- ACSS XS-950, P/N 7517800-10005
- Honeywell TRA-67A, P/N 066-01127-1402
- Collins TPR-901, P/N 822-1338-021

6.14.1 Basically, Airbus aircraft are equipped with Honeywell transponder P/N: 066-01127–1101, which is not ELS-EHS capable. However, through the RFC process, new Airbus customers have the possibility of install on their aircraft an ELS-EHS capable transponder from the list above. This RFC is free of charge for customers, and the installation of a new transponder capable of extended squitter does not imply add costs to customers.

6.14.2 Some concerns have been raised about the ability for Airbus transponders to provide the integrity parameter NUCp, coded by HIL value to ground stations. The current Airbus transponder status indicated that the principle of encoding NUCp value is in BDS 0.5 (Airborne position) and BDS 0.6 (Surface position) using HIL as the input.

Development of Technical Standard

6.15 It was noted that the United States Technical Standard Order (TSO)-C166 for Extended Squitter ADS-B and TIS-B Equipment Operating on 1090 MHz became effective on 20 September 2004, which can be electronically downloaded at:
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/MainFrame?OpenFrameSet

Comparison of ADS-B vs. radar

6.16 The meeting noted the U.S. activities concerning comparison of ADS-B vs. radar data and plan for a national 3 NM terminal ADS-B separation standard. These activities are documented in the Plan to Obtain Approval for Automatic Dependent Surveillance - Broadcast (ADS-B) Terminal Area Separation Standards (TermSepStdPlan). (FAA, Final Coordination v1.0, 31 August 2004). Analyses were performed on the horizontal position accuracy of ADS-B and radar targets reported to the ATC automation system. Comparing ADS-B accuracy to terminal SSR cross track accuracy at 40 NM from the radar, the data indicates that ADS-B is from 18 to 60 times more accurate. Comparing ADS-B accuracy to enroute SSR cross track accuracy at 200 NM, the data indicates that ADS-B is from 90 to almost 300 times more accurate.

ADS-B Data Sharing Policies

6.17 The meeting noted the following two levels of service could be adopted for sharing ADS-B data.

- LEVEL 1: Use of the ADS-B data for radar like separation standards (eg. 5 NM). This requires availability, reliability, accuracy and integrity equivalent to that offered by radar.

- LEVEL 2: Use of ADS-B data for situational awareness and perhaps some automated safety alerting features such as Cleared level adherence monitoring. For this service, integrity and accuracy are most important whilst lower standards could be tolerated for availability and reliability. Accuracy and integrity are determined in most part by the system design and by the avionics. Maintenance support is not as critical for this level of service.

ASTERIX Format for sharing ADS-B data

6.18 It was noted that Eurocontrol maintains ASTERIX data format standards for data sharing between Air Traffic Control automation systems. The format which has worldwide acceptance by the ATM system manufacturing industry is called ASTERIX Cat 21 for ADS-B.

6.18.1 The meeting recognized that the ASTERIX 21 format will evolve, and should consider the potential for future upgrades in their system designs. It was informed that the version number of ASTERIX21 data format are changed every three months. It was confirmed that version 0.23 was issued in November 2004. It was further informed that the versions are now backward compatible. The deficiency of non compliance of using WGS84 was cited as an example for important to have a common data exchange format crossing the FIR boundary.

6.18.2 Eurocontrol exercises configuration control of the standard and version 0.23 is considered the current baseline for deployment of ADS-B systems. Accordingly the meeting endorsed the following draft Conclusion formulated by the ADS-B SITF:

Draft Conclusion 9/14 - ADS-B Data Exchange format

That,

1) the Eurocontrol Cat 21 version 0.23 or later message format be adopted for ADS-B data exchange in the Asia Pacific region.

2) ICAO be requested to seek agreement from Eurocontrol to use the Eurocontrol Asterix Cat 21 document in the Asia Pacific region as was done for radar data exchange in the region.

ADS-B Implementation and operational Guidance Document (AIGD)

6.19 The meeting reviewed the updated draft ADS-B Implementation and operational Guidance Document –AIGD with few editorial changes. The meeting noted that the AIGD would be a living document and it should keep consistency with PANS-ATM as indicated by the Task Force. Accordingly the meeting endorsed the following draft Conclusion.

Draft Conclusion 9/15 - ADS-B Implementation and Operational Guidance Document (AIGD)

That, the ADS-B Implementation and Operational Guidance Document as provided in Appendix J be adopted and circulated to States in the Asia and Pacific region and International Organizations.

6.20 The meeting appreciated efforts made by the ADS-B Task Force in completing the draft AIGD.

FASID Table CNS 4 –Surveillance Systems

6.21 The meeting reviewed and updated the information contained in the Table CNS 4 of the ASIA/PAC Air Navigation Plan FASID. It was noted that ADS-B was marked as emerging technology and listed as one system in the table. The meeting suggested that such remark should be removed as ADS-B has been identified by APANPIRG as one enabler for new ATM concept and system. It was also proposed to add a new column for A-SMGCS to reflect the current requirement.

6.22 Considering that States were encouraged by APANPIRG to implement ADS-B at sub-regional bases with target date commencing from 2006 and information contained in the Regional Plan for the CNS/ATM System needs to be gradually transferred into the tables of FASID. The meeting endorsed the following draft Conclusion formulated by the ADS-B SITF.

Draft Conclusion 9/16 – Amendment to Table CNS-4 – Surveillance System

That, the existing Table CNS-4 – Surveillance System provided in ASIA/PAC FASID, Part IV CNS be replaced with an updated Table in accordance with established procedure.

Review of the revised BORPC for regional air navigation planning

6.23 The meeting also reviewed the comments made by the ADS-B SITF regarding the Surveillance part contained in the revised BORPC approved by Air Navigation Commission on 22 February 2005. The meeting noted the role played by ADS-B in the surveillance system. ADS-B based air-ground surveillance has been identified by APANPIRG as one cost effective alternative to the radar system in remote continental airspace and for backup or redundant surveillance system. ADS-B has also been identified as an enabler for the new ATM concept. Therefore, the meeting agreed the proposal for removal of the last two sentences in the paragraph 7.2. The proposed amendment to the revised BORPC relating the surveillance is provided in the Appendix K to this report. Accordingly, the meeting endorsed the following draft Conclusion formulated by the ADS-B SITF:

Draft Conclusion 9/17 - Amendment to Surveillance Part of BORPC

That, the paragraph 7.2 of the revised BORPC be amended as indicated in the Appendix K to this report.

Subject/Tasks list of the ADS-B Study and Implementation Task Force

6.24 The meeting reviewed the Subject/Tasks list of the ADS-B SITF. The meeting considered the need to continue its efforts in cost benefit study. The sub-regional based ADS-B implementation plan and project should be developed and issues emerged during the trial and implementation stages should be appropriately addressed in a harmonized manner. The exchanging information and experiences gained during the trial and implementation of ADS-B should be further encouraged. Accordingly, the meeting endorsed the following draft Decision for adoption by APANPIRG of the updated subject/task list

Draft Decision 9/18 - ADS-B Study and Implementation Task Force Subject/Tasks List

That, the updated subject/Tasks list for ADS-B Task Force as provided in Appendix L be adopted.

6.25 It was noted that in order to attract more participants from the Industry from other region, ADS-B air-to-air surveillance service should also be addressed by the Task Force.

6.26 It was informed that the next meeting of ADS-B SITF will be held in Nadi Fiji from 24-28 October 2005 hosted by Fiji Airports limited.

Designated Contact Persons for ADS-B

6.27 The meeting noted the an action item agreed by 41st DGCA Conference and updated the list of Designated Contact Persons for ADS-B Responsible for ADS-B Study and Implementation Task Force in the ASIA/PAC Region as provided in the Appendix M to this report.

Airbus view regarding SCRSP/1

6.28 The meeting noted a decision made by the 3rd meeting the ADS-B SITF regarding an Airbus view on the proposed amendment to Annex 10 -Aeronautical Telecommunications, Volume III - Communication Systems Part I - Digital Data Communication System Appendix of Chapter 5 Mode S Data Link Surveillance by the first meeting of the Surveillance and Conflict Resolution Systems Panel (SCRSP/1). Airbus stated that the amendment requiring RTCA DO-260A MOPS for air-to-air ASAS applications is considered unnecessary. The Task Force member from Japan was requested to prepare an information paper for consideration by the CNS/MET/SG/9 meeting on this issue based on the result of the outcome WG meetings of SCRSP held in May 2005.

6.28.1 Japan presented an information paper on the result of discussion of two working group meetings of SCRSP held in end of May 2005. It was informed that the working group meeting unable to reach an conclusion in this regard and the question had been referred to a technical group meeting to be held in July 2005 and Working Group of whole meeting to be held in October. Japan was requested to follow up the result of discussion of these two meetings and bring the clarification back to the ADS-B SITF meeting for consideration.

Advanced Technologies and Oceanic Procedures (ATOP) IOC

6.29 The US informed the meeting that on June 30, 2004, Initial Operating Capability (IOC) of the Advanced Technologies and Oceanic Procedures (ATOP) system was declared at the Oakland Air Route Traffic Control Center (ARTCC). The ATOP system provides a new automation platform for the provision of air traffic control (ATC) services in the Oakland oceanic flight information region (FIR). It is planned to transition to full twenty four hours a day, seven days a week use in the entire Oakland FIR by October 2005. The ATOP system is also installed at the New York ARTCC and was declared operational on March 31, 2005. Finally, the ATOP system is planned to go operational in the Anchorage ARTCC in March, 2006. It was informed that aircraft tracked in the ATOP system is by means of a cleared four dimensional (4-D) profile. An automated conflict probe ensures that all 4-D profiles being maintained by the system are separated from each other, both in space and time. The ADS-C application is used in the ATOP system as the primary surveillance means. The meeting recognized that the implementation of a satellite-based surveillance system using ADS-C in the oceanic area can not be substituted by ADS-B.

Safe Flight 21 (SF-21) Programme

6.30 The US updated the information on the progress of Safe Flight 21 (SF-21) program. As a result of SF-21demonstration activities in Alaska, along the East Coast and in the Ohio River Valley, progress has been made toward implementing operational enhancements and applications related to the use of GPS, ADS-B, TIS-B, FIS-B, and the multi-functional display in the cockpit. The Airport Map Database (AMDB) will supply current digital airport maps to cockpit avionics and airport vehicle displays to enhance airport surface situational awareness and improve runway safety. In April, the FAA published a Notice to Airmen (NOTAM) to announce initial ADS-B availability along the East Coast, and in locations in the upper Midwest and in Arizona. In 2005 MOPS compliant GBTs were installed in the Bethel area and aircraft avionics were changed out to be compatible with the GBTs. The FAA ADS-B link decision will recognize a national deployment of 900 ADS-B ground based transceivers by 2012. Further detailed information about the Safe Flight 21 program and Capstone program is provided at the following FAA websites:

http://www.faa.gov/safeflight21 and
http://www.alaska.faa.gov/capstone

Agenda Item 7: Aeronautical electromagnetic spectrum utilization:

1) review preparations for WRC-2007
2) result of Second APT Regional Preparatory Group meeting

7.1 The meeting noted that the First Meeting of the Regional Preparatory Group for WRC-2007, was held in conjunction with Working Groups F and B of the Aeronautical Communications Panel (ACP) and the Spectrum Subgroup of the Navigation Systems Panel (NSP) in Bangkok from 17 to 25 February 2005. A large number of States from the ASIA/PAC region had attended the meeting.

7.2 The ACP WG F reviewed the draft ICAO Position for WRC 2007 in light of comments received from States and International Organizations on WRC Agenda Items 1.1, 1.3, 1.4, 1.5, 1.6 1.13, 1.16, 1.17, 1.20, 1.21 and 2. The meeting incorporated the comments and updated the draft ICAO Position for consideration by the ANC and Council. Subsequently, the Council has approved the updated ICAO Position. It will be sent to States during early August 2005.

Regional preparation for WRC-2007

7.3 The meeting noted the preparatory activities for WRC 2007 carried out in the ICAO ASIA/PAC Office. It was noted that the 41st Conference of Directors General of Civil Aviation (DGCAs), Asia and Pacific Regions held in Hong Kong, China in November 2004 adopted the following action item:

Action Item 41/3 - The Conference strongly urged States to:

a) nominate a focal point of contact responsible for preparation for WRC 2007 and provide the details to ICAO, if they have not already done so, and

b) ensure active participation by aviation representatives at national and regional level discussions and to the extent possible incorporate ICAO position in the States position pertaining to spectrum protection paper to APT preparatory meetings and at WRC 2007

7.4 It was further noted that the APANPIRG/14 Meeting held in Bangkok from 4 to 8 August 2003 adopted the following Conclusion to initiate actions for preparation for WRC-2007.

Conclusion 14/24 - Preparation for World Radiocommunication **Conference- 2007 (WRC-2007)**

That, States

a) assign high priority to aeronautical spectrum management;

b) participate in the development of States' position for WRCs at the national level to ensure support to the ICAO position;

c) ensure, to the extent possible that, aviation representatives are included in States delegations to the Asia-Pacific Telecommunity (APT) Conference Preparatory Group meetings and at WRCs;

d) to nominate an ICAO designated focal point or contact person for aviation issues related to the WRC-07; and

e) ensure participation of the designated focal point or contact person at the ICAO Regional Preparatory Group Meetings for WRC-07, APT Conference Preparatory Group Meetings for WRC-07, and at WRC-2007.

7.5 The APANPIRG/15 meeting held in Bangkok from 23 to 27 August 2004 recognized that the two ICAO Regional Preparatory Group (RPG) meetings conducted for WRC-2003 at the ICAO ASIA/PAC Office in conjunction with the ACP Working Group F meetings were found to be very helpful and highly productive. It was therefore, supported that the First RPG meeting for WRC-2007 should be held in Bangkok in conjunction with ACP Working Group F Meeting during February 2005.

7.6 From these activities, the meeting agreed that all preparatory activities that could be undertaken by the Regional Office were in place. The list of contact points was updated at the meeting.

Asia-Pacific Telecommunity (APT) Conference Preparatory Group Meetings for WRC-2007

7.7 The regional preparatory activities undertaken by the Asia-Pacific Telecommunity (APT) inclulding its organization for the preparatory work for WRC 2007 was noted. APT was convening five APT Conference Preparatory Group (APG) meetings for WRC-2007 and extended invitation to Regional and International Organizations, including ICAO. It was stressed that at such meetings, in which ICAO and IATA are participating, representatives from civil aviation administrations should also be included in the national delegation to provide necessary support to the ICAO position as emphasized in the Action Item 41/3 of the DGCA Conference.

Result of the Second APT preparatory group meeting

7.8 The first APT APG 2007-1 meeting was held in Bangkok from 11 to 12 November 2003. The objectives of the meeting were to review the APG activities for WRC-03 and results achieved at the conference, establish the APG new structure and plan for the preparatory work for WRC-07. ICAO observer presented an information paper on the areas of critical concern to aviation at WRC-07 and a preliminary timetable for the development of the ICAO position for WRC-07. The new APG structure and plan for the preparatory work have been established by the meeting.

7.9 The second meeting APG2007-2 was held in Bangkok from 28 February to 3 March 2005. The meeting was attended by 260 participants. The objectives of the meeting were to review the APG activities for WRC-2007, consider results of ITU-R studies available and develop APT preliminary views on WRC 2007 agenda items. ICAO presented an information paper on the draft ICAO Position for WRC 2007. Several members of the ACP WG F attended this meeting, in addition to representatives from the civil aviation administrations in the ASIA/PAC region. There was a general support to the draft ICAO Position at the meeting.

7.10 The third APT meeting (APG 2007-3) will be held in February 2006 in Malaysia. The meeting will update APT provisional views and draft proposals on WRC-07 agenda items.

Preparatory activities in Australia and USA

7.11 The meeting noted the Australian positions for WRC-07, which were preliminary and would mature as the results of the ITU-R studies progress. There were significant issues that have implications for aviation in the Agenda for WRC-07 including new co-primary allocations in the 9 000 – 9 500 MHz band used for aeronautical radar, spectrum requirements for UAV and aircraft flight test programmes, air-ground voice communication and other safety of life aeronautical applications, and modernization of civil aviation telecommunication systems through current satellite allocations. It was advised that States should carefully consider requirements for aeronautical services identified in the WRC-07 Agenda and adopt national positions in support of the ICAO position to ensure the availability and protection of this spectrum for aviation use. States were also urged to

actively participate and support aeronautical spectrum issues through national, regional and international fora including the APT Conference Preparatory Meetings for WRC 2007 and ITU-R World Radio Conference 2007

7.12 United States highlighted the areas of critical concern to aviation at WRC 2007 in Agenda Items 1.1, 1.2, 1.3, 1.6 and 7.2. Among other things, deletion of country names from footnotes limiting GNSS implementation in some countries was a matter of concern and States whose names appear under such footnotes were encouraged to have the footnote deleted. It was also emphasized that civil aviation will need to insure that such allocations proposed under agenda item 1.2 and 1.3 do not limit current aeronautical usage or future enhancements to aviation systems.

7.13 Under Agenda item 1.6 additional allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz and 6 GHz is being considered. It was stated that among other things agenda item 1.6 may be used to study the spectrum needs of the universal access transceiver (UAT), the potential for Airport Network and Location Equipment, aeronautical fixed links in the 5091-5150 MHz band, and allocations for new technologies to support aeronautical mobile communications requirements.

7.14 Agenda Item 7.2 was also considered important as it deals with problem of lack of an appropriate communication infrastructure that meets the evolving requirements of modern civil aviation.

7.15 States were encouraged to participate in ICAO preparatory activities for WRC- 2007 in support of the ICAO position for WRC-2007.

7.16 IATA expressed the view to provide strong support to the ICAO position for WRC-2007 and emphasized the need for States representatives to participate at the ICAO Regional Preparatory Meetings, APT Preparatory Group Meetings. States were encouraged to work closely with the respective radio regulators to have the aviation position reflected in the State’s position paper to be presented at the APT meetings and also at WRC-2007. In the event that aviation representatives would not able to attend the meeting they should ensure in coordination with the regulators, that aviation position is incorporated in the national position paper.

Agenda Item 8: Review of the implementation of WAFS

8.1 **Implementation of ISCS and SADIS**

8.1.1 Under this agenda item the meeting reviewed the current status of implementation in the ASIA/PAC Region of the Satellite Distribution System for information relating to air navigation (SADIS) provided by the United Kingdom, and the International Satellite Communication System (ISCS/2) provided by the United States of America as integral part of the ICAO aeronautical fixed service (AFS).

SADIS development

8.1.2 The meeting was informed that as a result of SADISOPSG Conclusion 9/15, United Kingdom launched the SADIS 2G service on 12 November 2004. This new service was available to new and current SADIS users who would like to change to modern technology to receive their aeronautical meteorological data.

8.1.3 The following benefits of SADIS 2G for the users were outlined:

- Access to ICAO Annex 3 products including all of the WAFS (World Area Forecast System) data and global quality controlled OPMET data;

- Use of the latest technology and up-to-date hardware making the service much more cost effective - savings in excess of 50 % off the cost of current generation SADIS hardware;

- SADIS 2G uses modern industry standard formats and protocols, including internet protocol (IP), making the service immediately compatible with most new end systems;

- SADIS 2G receivers are ‘off-the-shelf’ units, available from a number of different suppliers;

- 24 hour, 365 day support available;

- Internet back-up service available to all users: SADIS data can be downloaded over the internet, direct to your desktop, covering any exceptional circumstances when the satellite broadcast is unavailable; and

- Resolves problems of hardware obsolescence which are increasingly affecting the SADIS 1G service.

8.1.4 It was recalled that SADISOPSG Conclusion 9/15 required the SADIS 1G service to be available in addition to the SADIS 2G service until 31 December 2008. An ICAO State letter was issued during mid-2004 informing users of the imminent introduction of the SADIS 2G service and the termination of the SADIS 1G service on 31 December 2008. Guidance material for users accessing the SADIS 2G broadcast was also sent together with the ICAO State letter to assist States in planning for the transition. The meeting was informed that an update of the guidance material was recently available.

8.1.5 The meeting was informed that WAFSOPSG/2 meeting agreed that an international SADIS seminar would be held at the ICAO European and North Atlantic Regional Office during September 2006. The main purpose of this seminar was to assist users in the procurement of SADIS 2G hardware. SADIS 2G hardware and GRIB/BUFR visualization software suppliers would be present at the event to advise users about the range of services and products which could be provided.

Considering that such a seminar would also be useful to SADIS users in the ASIA/PAC Region, the meeting agreed that a similar seminar either just before or after the 10th meeting of the CNS/MET SG in Bangkok should be held. The meeting formulated the following draft Conclusion:

Draft Conclusions 9/19 - Fostering transition to SADIS 2G service in the ASIA/PAC region

That,

1) ICAO urges the ASIA/PAC SADIS user States to plan for the replacement of their SADIS 1G receiving systems well in advance to the planned discontinuation of SADIS 1G by 31 December 2008; and

2) the SADIS Provider State, in coordination with ICAO and WMO, be invited to organize a SADIS 2G seminar for the ASIA/PAC States to be held back-to-back with the CNS/MET SG/10 meeting in July 2006.

Notes: 1) Updated guidelines on the transition from SADIS 1G to SADIS 2G is provided in Appendix N.

2) It is expected that the SADIS 2G seminar will cover also the visualizations of software for GRIB and BUFR coded WAFS forecasts.

8.1.6 The meeting considered that the proposed seminar would also be useful for the users of the ISCS service since they were using the same or similar GRIB/BUFR visualization software. Therefore, the participation in the seminar should not be limited to the SADIS user States, but the invitation should also be forwarded to the ISCS user States in the ASIA/PAC Region.

SADIS FTP service

8.1.7 The SADIS Provider State informed that approximately 100 user accounts had been activated for both SADIS and ISCS users to access the SADIS FTP service. The meeting recalled that this service would be available to any SADIS and ISCS authorized users at no additional charges to the users. Any SADIS or ISCS users who were not already users of this service were invited to contact WAFC London (Richard Orrell: richard.orrell@metoffice.gov.uk) to establish an account. Consideration was being given by WAFC London to further improve the resilience and security of the SADIS FTP service. Issues being considered included:

- implementing Public Key Infrastructure (PKI);
- distributing data with digital certificates;
- duplicating service provision at a remote site; and
- implementing NIPS (Network Intrusion Prevention System) and HIPS (Host Intrusion Prevention System).

8.1.8 The meeting was also advised that the SADIS FTP service currently supported up to 50 simultaneous users and in the case of maximum occupancy (50 users simultaneously) data transmission rate would drop to 38 kbps. However, the current occupancy rate was normally much lower. There was a plan to enhance the communication facility to support higher data transmission rate and larger number of simultaneous users. Users of the service were invited to provide feedback to WAFC London if lower-than-expected data transmission rate was encountered.

Long-term planning of SADIS development

8.1.9 To assist ASIA/PAC States in planning for maintaining and upgrading their SADIS receiving systems, the meeting considered it very useful for the SADISOPSG to develop a long-term plan for SADIS development. Information including the life expectancy of the related services and systems would be particularly relevant for States to justify the expenditures needed for upgrading their systems. The meeting was advised by the experts from the UK and USA that the life expectancy of the satellite reception equipment would be typically 10 years. Other key planning issues such as the period over which different WAFS products would continue to be distributed through the SADIS and ISCS satellite broadcasts would also be important. In this connection, the meeting formulated the following draft Conclusion:

Draft Conclusions 9/20 - Long-term planning of SADIS development

That, in order to facilitate SADIS user States' planning for maintaining and upgrading their SADIS receiving systems, the SADISOPSG be invited to consider development of a long-term plan for the SADIS development, including the life expectancy of the related services and systems.

Note: To ensure harmonized development of the two satellite broadcasts, the ISCS Provider State would be consulted in the development of the SADIS long-term plan.

Follow-up of the SADISOPSG/10 meeting

8.1.10 The meeting reviewed the executive summary of the 10th Meeting of SADISOPSG, held at the ICAO Regional Office, Paris from 24 to 27 June 2005, and noted that there were no specific SADISOPSG/10 conclusion to be addressed by the PIRGs. The ICAO secretariat informed the meeting that State letters would be sent to States shortly regarding the following outcomes of the SADISOPSG/10 meeting:

a) planned discontinuation of SIGWX forecasts in chart form on 30 November 2006 (Conclusion 10/4);

b) real-time monitoring at the SADIS gateway (Conclusion 10/12); and

c) improvement of OPMET data availability for AOP aerodromes (Conclusion 10/9).

SADIS Strategic Assessment Tables

8.1.11 The meeting reviewed the draft strategic assessment tables, 2006 – 2009, for the ASIA/PAC Region as presented at SADISOPSG/10 meeting. It was noted that the current exchange of OPMET data from ASIA/PAC region had exceeded the expected data volumes in the previous version of the strategic assessment tables, which was evidence of the improved availability of ASIA/PAC OPMET data in the last two years. The tables were updated to reflect the current OPMET information volumes and the expected growth, and the meeting adopted the following Decision:

Decision 9/21 - SADIS Strategic Assessment Tables

That, the ASIA/PAC SADIS strategic assessment tables, as given in Appendix O to the report, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.

ISCS Developments

8.1.12 The meeting was informed that as a follow up of APANPIRG Conclusion 15/31, the Secretariat, in coordination with the ISCS provider State, developed the procedure and documentation for the conduct of an annual ISCS/2 operational efficacy survey in a similar manner to the one for the SADIS operational efficacy. The first ISCS/2 survey was conducted in May and June 2005 and 14 responses were received from almost all ISCS user States in the Region. In response to the survey, the ISCS users States also designated ISCS focal points. It was expected that the annual operational efficacy surveys would provide valuable feedback to the ISCS Provider State to facilitate the resolution of the observed implementation problems.

8.1.13 As regards the ISCS transition from X.25 to TCP/IP protocol, the meeting was informed by the expert from the US that the ISCS terrestrial network had been upgraded to minimize the loss of data experienced on the TCP/IP broadcast. Currently, the loss was considered small enough and a test of the TCP/IP broadcast was being conducted. The X.25 broadcast would be terminated upon successful completion of the test and the ISCS Provider State would notify ICAO of any change in status.

8.2 Transition to GRIB and BUFR coded WAFS products

WAFSOPSG/2 outcomes in relation to GRIB and BUFR migration

8.2.1 The meeting reviewed the executive summary of WAFSOPSG/2 held from 8 to 11 March 2005 at ICAO Office, Bangkok. In particular, the meeting noted the following outcomes related to GRIB and BUFR migration.

8.2.2 WAFSOPSG/2 concurred with APANPIRG Conclusion 15/32 and decided that the issuance of SIGWX forecasts in T4 chart form should be continued, in parallel with the use of BUFR code form, for a limited period of time until 30 November 2006. On the other hand, it was emphasized that this extension did not concern the GRIB code form, i.e. the exclusive use of the GRIB code form for the Wind/Temp forecasts within the WAFS had taken place on 1 July 2005 as scheduled.

8.2.3 WAFSOPSG/2 also decided that ICAO Regional Offices should carry out a survey in May 2006 to verify the implementation of the reception and utilization of BUFR-coded SIGWX forecasts by States, and that the Secretariat should present the results of this consultation for consideration and future action by WAFSOPSG/3 scheduled to be held in September 2006. States and users were expected to be able to purchase the necessary BUFR decoding software in time for the new cut-off date.

8.2.4 As a follow up of WAFSOPSG conclusion 2/13, calling for the WAFC Provider States to provide, on a trial basis, WAFS SIGWX forecasts in chart form for the fixed ICAO areas of coverage using the industry standard Portable Network Graphics (PNG) graphical format or an equivalent industry standard, WAFC London SIGWX forecasts in PNG format had been made available on the SADIS FTP server since May 2005. The PNG formatted charts could be viewed via a standard web browser and there was no need to use bespoke visualization software to display them. The representative of WAFC Washington informed that SIGWX forecasts in PNG format have been made available on the USA NWS FTP server since June 2005. Discussions were on-going between the two WAFCs to make available WAFC Washington SIGWX charts in PNG or similar format on the SADIS FTP server.

8.2.5 As a result of the deliberations at the SADISOPSG/10 meeting, action was being taken by WAFC London to add PNG versions of the WAFS SIGWX charts to the SADIS satellite broadcasts in addition to the SADIS FTP server. These products were scheduled to be in place from mid-July 2005.

8.2.6 The meeting agreed that States' feedback on the trial PNG formatted SIGWX charts would be sought in the regional survey to be conducted in May 2006 to ascertain if the provision of these charts should be continued after 30 November 2006. The expert from the US advised the meeting that the WAFC Washington was considering to continue the provision of products in chart form in a suitable graphical format after 30 November 2006 either via the Internet (outside the WAFS framework) and/or the ISCS satellite broadcasts.

8.2.7 The meeting noted that in response to APANPIRG Conclusion 15/34, WAFSOPSG/2 also agreed that WAFC London should amend the Guidelines for representing WAFS significant weather (SIGWX) data in BUFR by adding a requirement for the WAFS visualization software to automatically generate compliant SIGWX charts from the BUFR code for the standard ICAO areas and bring the amended guidelines to the attention of software vendors. The meeting noted that the amendments had been made by WAFC London and the Guidelines had been updated (Version 2.6) correspondingly. The updated Guidelines also addressed a number of technical issues, including:

a) specification for representing SWM forecasts in BUFR;

b) plotting scheme for coinciding tropical cyclone, volcano and/or radiation events, which would give the highest priority to volcanic ash, followed by radiation events and tropical cyclones;

c) plotting scheme giving preference to the letters of the cities over labels and text boxes with the understanding that the meteorological phenomena would continue to maintain the highest priority at all times as far as the display was concerned; and

d) a recommendation that the workstation software complies fully with ICAO Annex 3 (especially the Appendix 8 SARPs).

8.2.8 The expert from UK informed the meeting that a further update to the Guidelines (Version 2.7) was recently made to incorporate some relatively minor changes and the users should check with the BUFR visualization software vendors whether these changes would require another software update/upgrade. This latest document was available from the WAFSOPSG website at http://www.icao.int/anb/wafsopsg/guidelinesUK.pdf and the changes would be posted on the "WAFS Change Implementation Notice Board" accessible from the WAFSOPSG website at http://www.icao.int/anb/wafsopsg/ by clicking "Status of implementing changes to the WAFS".

8.2.9 The meeting was informed that six WAFS visualization systems could now be considered compliant to the SADISOPSG software criteria. Details of these systems and the results obtained from the latest software evaluation were available from http://www.icao.int/anb/sadisopsg. Following a request from the CNS/MET SG/8 meeting, which was studied by the WAFSOPSG/2 in a global context, a further round of software assessments was currently taking place. It would cover, *inter alia*, the ability of the software to produce compliant SWM charts from the SWM BUFR data, to display the jet depth information correctly, and those items not tested in the previous evaluations (e.g. decoding and displaying of WAFC Washington products). The results from this latest review would be made available on the SADIS website at http://www.metoffice.gov.uk/sadis/software/index.html during September and October 2005 and users were requested to consider these results in their procurement of new visualization software.

Regional progress

8.2.10 The meeting reviewed the progress of WAFS implementation in the Asia/Pacific Region against the "Indicative Timetable for Implementation of WAFS" given in the "ASIA/PAC WAFS Implementation Plan and Procedures". The meeting noted that the exclusive use of the GRIB code form for the Wind/Temp forecasts within the WAFS had already been achieved on 1 July 2005 even though a user reported that it was obtaining the Wind/Temp forecast charts available on the

Internet. As regards GRIB/BUFR training, the meeting was pleased to note that the SADIS and ISCS Provider States had provided a conjoint training on the operational use of GRIB and BUFR coded WAFS products for both SADIS and ISCS user States in the ASIA/PAC Region at the ICAO Regional Office in January 2005.

8.2.11 As regards BUFR coded SIGWX forecasts, the meeting was advised that the satellite distribution of SWM for limited geographical areas in BUFR format was achieved by WAFC London in early April 2005. The satellite distribution of SWH and SWM in BUFR format by WAFC Washington was also achieved by the end of June 2005. Development work was carried out at both WAFCs to ensure that production methods were consistent with current working practices and the methodologies employed to produce the BUFR encoded SWH data. The BUFR coded SWM forecasts for Northern Atlantic had also become available on the SADIS satellite broadcast.

8.2.12 In view of the need of continuous monitoring of the progress of BUFR migration and SADIS 2G transition in the ASIA/PAC Region, the meeting agreed that the ASIA/PAC WAFS Implementation Plan and Procedures and the work programme of the WAFS/I TF should be updated, and formulate the following Decision:

Decision 9/22 - Updating the ASIA/PAC WAFS Implementation Plan and the work programme of WAFS Implementation Task Force (WAFS/I TF)

That, the ASIA/PAC WAFS Implementation Plan and Procedures, and the WAFS/I TF work programme be amended as shown in Appendix P to the report.

8.2.13 As regards assistance to States for upgrading their WAFS workstations to cope with the BUFR migration, the observer from WMO informed the meeting that WMO were currently processing 17 requests from user States (9 ISCS user States and 8 SADIS user States) for assistance under the WMO VCP.

Airline Survey in Hong Kong, China

8.2.14 During 30 November – 23 December 2004, Hong Kong, China conducted a survey to collect feedback from airlines operating at the Hong Kong International Airport (HKIA) on the new SIGWX charts generated from BUFR coded WAFS data using one of the visualization software packages evaluated by WAFC London. The majority of the airlines found the new BUFR charts an improvement over the existing T4 charts and supported them replacing the existing T4 charts. In view of this positive feedback, Hong Kong, China was planning for the operational use of BUFR charts and to progressively introduce new customized BUFR charts for additional areas based on airlines' requests. Details of the survey results can be found in a working paper (WP/17) discussed at WAFSOPSG/2 (http://www.icao.int/anb/wafsopsg/meetings/wafsopsg2/wp/Wp17.pdf).

8.2.15 Based on users' feedback to the survey, a suggestion was made at the WAFSOPSG/2 that aerodromes on the SIGWX charts should be indicated using the standard ICAO location indicator, instead of the first letter of the city, as currently stipulated by Appendix 8 para. 4.1.1.1 d) of Annex 3. The rationale of the feedback was to avoid confusion and for consistency. The view of WAFSOPSG/2, however, was that the proposed addition of three letters could, under certain circumstances, increase clutter and would therefore be undesirable.

Other WAFS developments

8.2.16 The meeting noted with interest that, invited by the WAFSOPSG, the WAFC Provider States had been requested to study the possibility of improving the temporal and spatial resolution of WAFS upper wind and other upper-air forecasts in the GRIB code form. It was expected that the impacts of adding two levels between FL300 and 400 (e.g. FL320 and 370) of improving the

horizontal resolution to 60 km and of increasing the temporal resolution to 3 hours or less would be studied.

8.2.17 The meeting also noted that the feasibility of amending the lead time of SIGWX forecasts to address the needs of long-haul flights was being considered and the WAFCs had been requested to advance the lead time of issuance of the existing SIGWX products to 13 hours before their validity time. Furthermore, the WAFC Provider States had been invited by the WAFSOPSG to consider the possibility of advancing the lead time further to 17 hours. The meeting was also advised that the development of new forecasts for icing, turbulence and convective clouds was in progress and they held the promise of providing airlines and other users with the information they required to plan for long-haul flights by 2010.

Long-term planning of WAFS

8.2.18 The meeting recalled that a number of changes to the BUFR encoding sequence were made during 2004 and in April 2005 which necessitated changes to end users' software. This impact on the end users was a natural consequence and disadvantage of using the BUFR code where the responsibility for SIGWX chart production shifts from central control by the WAFC to the end users. The meeting noted with concern that the WAFS visualization software was still undergoing frequent changes, some of them done without sufficient advanced notice to users. This created some serious problems for the uninterrupted operation of the States' WAFS workstations and provision of the required WAFS products to users. It was noted also, that the WAFSOPSG/2 meeting addressed this issue in Conclusion 2/4 and established a tracking system displaying on the WAFSOPSG website the status of implementation of operational changes to the WAFS. From the information already provided on the WAFSOPSG website, it was seen that one major and two intermediate changes of the WAFS reception and processing software would take place within one year. In particular, the expert from UK informed the meeting that a revision to the format used to display jet depth information on WAFS SIGWX charts was planned to take place in March 2006 and users would need to obtain updated BUFR visualization software that could display the jet depth information in the new format.

8.2.19 The meeting expressed concern about the planning and financial aspects of the frequent upgrade/updates which were necessary for the continuous operation of their systems. It was stressed that changes to WAFS operations, especially those having financial implications for the users, should be part of a long-term plan, including an established schedule of the system changes. It was also agreed that the number of changes should be minimized and preferably be aligned with the Annex 3 amendment cycle. In view of this, the meeting formulated the following draft Conclusion:

Draft Conclusion 9/23 - Long-term planning of the WAFS implementation

That, WAFSOPSG be invited to consider development of a long-term plan for the WAFS, establishing a schedule for the changes, which require upgrade/update of the users' systems. In order to minimize the frequency of changes and the corresponding operational and financial implications to the users, the schedule of changes should adhere to the Annex 3 amendment cycle.

WAFC backup provision

8.2.20 The meeting was advised that WAFC London was enhancing its backup arrangements for provision of GRIB data. Backup of BUFR data was also planned and tested. The objective is to continue to provide consistent operational data using routine bulletin headers in the event of successive model and system failures. An on-going programme of development would help WAFC London work towards achieving this objective but in the unlikely event of a sequence of system failures WAFC London would issue unmodified WAFC Washington GRIB data, which had some minor differences with the WAFC London GRIB data. In this regard, all end user systems should be configured to

accept both London and Washington GRIB data. SADIS users had been reminded about this requirement on 11 June 2004, which was consistent with one of the SADISOPSG software criteria.

Use of WAFS products in flight documentation

8.2.21 The meeting reviewed some of the current national practices in the provision of Wind/Temp charts and SIGWX charts in flight documentation and noted that there were certain significant differences in the interpretation of the validity of these fixed time forecasts with reference to the time and duration of the flight concerned. The issues included: (a) whether or not a forecast would be useable within plus or minus 3 hours either side of the validity time; (b) whether or not a forecast from an earlier model run would be automatically cancelled by a forecast from a later model run; and (c) what Wind/Temp charts and SIGWX charts would be considered to form the "best set" for flight documentation. After some discussions, the meeting agreed that additional guidance should be sought from ICAO regarding these issues and formulated the following draft Conclusion:

Draft Conclusion 9/24 - Guidance on the use of WAFS products in the flight documentation

That, WAFSOPSG be invited to consider development of additional guidance on the harmonized use of the fixed time WAFS forecasts in the flight documentation, with reference to the time and duration of the flight.

Agenda Item 9: Exchange of OPMET Information:

9.1 **Review of the report of OPMET/M TF/3 meeting**

9.1.1 The third meeting of the ASIA/PAC OPMET Management Task Force (OPMET/M TF/3) was held in Bangkok, Thailand from 2 to 4 March 2005. The meeting was attended by experts from Australia, Hong Kong, China, India, Indonesia, Japan, Singapore, Thailand, Vietnam and IATA. Electronic version of the full report of the 3rd meeting of the Task Force with relevant Appendices was available on the ICAO web at: http://www.icao.int/cgi/goto_m_apac.pl?/apac/meetings.htm.

9.1.2 The meeting appreciated some important achievements, such as the finalization and publication of the new editions of the *ROBEX Handbook* and the *ASIA/PAC OPMET Data Banks ICD*. Both documents were distributed in hard copy and CD-ROM to all ASIA/PAC and MID States, as well as posted on the ICAO web site. In view of the completion of this important task the meeting decided that in the future the focus of the work should be on developing monitoring and quality management procedures for the OPMET exchange and ensuring full availability of the required OPMET information from the region.

9.1.3 It was appreciated also that since the first meeting of the OPMET/M TF the availability of OPMET data from the ASIA/PAC region had noticeably improved. Nevertheless, there were a number of shortfalls yet to be resolved.

AIREP Survey

9.1.4 The AIREP Team of the OPMET/M TF conducted a survey on the AIREP exchange in the ASIA/PAC Region in order to verify the current exchange procedures and to check the availability and correctness of the AIREP bulletins. A survey questionnaire was developed and sent to ROBEX centres, with the survey conducted over a 10-day sampling period from 1 to 10 November 2004. The core group of the AIREP Team, comprising experts from Australia (Brisbane) and Singapore, performed a comprehensive analysis of the survey responses from 15 ROBEX centres. The full report of the AIREP Survey was available on the ICAO ASIA/PAC website as WP/8 for the OPMET/M TF/3 meeting (http://www.icao.int/icao/en/ro/apac/2005/OPMET_M_TF3/wp08.pdf).

9.1.5 The scope of the survey was the exchange of air-reports received by voice communication compiled as UA-type bulletins and exchanged between the ROBEX centres. The meeting noted that the total number of UA bulletins during the survey period was 6,662 with 43,252 individual AIREP messages included.

9.1.6 More than 30% of the replies to AIREP survey indicated different non-compliances with Annex 3 provisions related to air-reporting, such as:

- MWOs do not collect air-reports;
- No procedure in place for relaying air-reports received by ATS units to MWOs;
- No adequate coding procedures;
- No procedures for issuance of SIGMET based on special air-reports;
- No procedures for exchange of AIREP with ROBEX centres.

9.1.7 The meeting expressed concern in particular on the following issues identified by the survey:

- *The lack of special AIREP*. Only less than ten special AIREP message were identified for the whole region during the 10-day trial period. Knowing the importance of special AIREP for the issuance of SIGMET, concern was expressed on the extremely low availability of these reports. It was felt that an

additional investigation should be carried out to find out the reasons. In this regard, IATA was requested to look at this issue and consult with airlines;

- *Use of GTS instead of AFTN*. The exchange of the UA bulletins in ROBEX scheme should be via AFTN. It was recalled that once the bulletins reach WAFCs, their further dissemination should be via the WMO GTS, since after that point the air reports were considered "basic" data;

- *Irregularities in the AIREP exchange*. A lot of irregularities have been observed, such as, non-issuance, repetitions, retransmissions of bulletins, etc. In general, most of the centres did not follow the distribution lists provided in the ROBEX Handbook; and

- *Formatting errors*. A number of formatting errors in the AIREP messages have been found, the most common being: reporting of the position of aircraft by reporting points instead of latitude/longitude values; reporting wind direction in values not rounded to the nearest 10 degrees; inconsistencies in the WMO abbreviated headings of some bulletins.

9.1.8 The meeting advised that most of the identified deficiencies of the AIREP exchange should be resolved by providing advice to the corresponding ROBEX centres. On the other hand, the insufficient number of special air-reports was considered as serious deficiency influencing the provision of the safety-related SIGMET information by the States. It was recognized that the availability of special air-reports at the Meteorological Watch Offices depended on their regular issuance by the pilots and the transmission of the messages received by the ACCs to the MWOs. Therefore, the meeting agreed that, in order to improve the availability of special air-reports, the airlines, the ATS provider units and the MWOs should be reminded of their obligations related to the provision of special air-reports, and formulated the following draft Conclusion:

Draft Conclusion 9/25 - Special air-reports

That, ICAO be invited to:

1) urge the ASIA/PAC States to implement the requirements for the reception and exchange of the special air-reports received via voice communication, as specified in the Annex 3; and

2) request IATA to encourage airlines to improve the availability of the special air-reports for safety critical meteorological phenomena, such as volcanic ash clouds.

Note: The requirements in p. 1) above are to be addressed by both the States' MET and ATS authorities/providers.

Operations of the RODBs and Inter-regional exchange

9.1.9 The meeting concluded that all ASIA/PAC Regional OPMET Data Banks (RODB): Bangkok, Brisbane, Nadi, Singapore and Tokyo, had been operating satisfactorily during the period since the last meeting. There was a positive tendency towards standardizing the RODB procedures and improving the availability of OPMET information from the region.

9.1.10 Regarding the inter-regional OPMET exchange, it was recognized that the current exchange between ASIA/PAC and EUR, MID and NAM Regions was satisfactory. It was considered necessary to provide updated information on the status of the exchanges between ASIA/PAC and AFI and SAM regions. The Secretariat would coordinate with the corresponding ICAO Regional Offices advise the OPMET/M TF at its fourth meeting in early 2006.

9.2 Regional guidance material on OPMET exchange

9.2.1 The meeting recalled that the 12th edition of the *ROBEX Handbook* and the 3rd edition of the *ASIA/PAC OPMET Data Banks Interface Control Document (ICD)* were published by the ICAO Regional Office, Bangkok in November 2004. Both documents were distributed in hard copy and CD-ROM to all States in the ASIA/PAC Region. Copies of the Handbook were also sent for distribution in the MID Region and for information to all other ICAO Regions. The regional documents were available on the ICAO website. The OPMET/M TF/3 meeting provided information for updating of the document; the updated versions would be published by the end of August 2005.

9.2.2 The meeting expressed appreciation to Brisbane RODB for the development of a new management tool called *ROBEX Database*. The Database contained detailed information related to all ROBEX bulletins and centres/aerodromes. It was a query-driven application based on Microsoft Access which allowed for a variety of searches and generation of different tables and reports. It was envisaged that the Database would be used by all ROBEX Centres and RODBs.

OPMET monitoring and related quality control (QC) procedures

9.2.3 The meeting reviewed results of quality monitoring exercises performed on a trial basis by some of the RODBs. It was agreed that quality control procedures should be harmonized and automated to the extent possible. The meeting noted that an OPMET Quality Control Team (QC Team) was set up by the OPMET/M TF to develop standardized procedures and report to the OPMET/M TF/4 meeting in March 2006. The QC Team comprised members from all RODBs with the member from Singapore acting as coordinator of the Team.

9.2.4 The expert from Singapore presented the results on some initial trials by RODB Singapore aimed at determining adequate OPMET performance indices to be used in the Region. Indices for bulletin availability and bulletin regularity, as well as an index for ROBEX bulletin compliance had been designed and tested over a period of 30 days in March 2005. The meeting expressed appreciation for the work done so far by RODB Singapore in regard to the development of standard QC procedures. It was expected that the OPMET/M TF at its fourth meeting in early 2006 should finalize the procedures and present them to the CNS/MET SG/10 meeting.

9.3 FASID Tables related to OPMET exchange

9.3.1 The OPMET/M TF/3 meeting discussed proposals for harmonization of the FASID MET Tables related to the OPMET exchange and the similar tables in other documents: ROBEX Handbook, the OPMET Data Bank ICD and the SADIS User Guide. The meeting recognized that all FASID Tables related to ROBEX and other OPMET exchanges needed significant updates and formulated an action item on the subject.

9.3.2 As a follow up, the Secretariat presented to the meeting proposals for amendment of FASID Tables MET 4A, 4B and 4C related to the ROBEX Scheme. It was proposed to combine Tables 4A and 4B into one table, based on the simplified ROBEX structure in which the former METAR Collection Centres (MCC) and TAF Collection Centres (TCC) in the ASIA/PAC Region were replaced by seventeen ROBEX centres, five of which served also as RODBs. The format of the new FASID Table MET 4A was harmonized with the new edition of the ROBEX Handbook. Similar changes had been made to FASID Table MET 4C, which was renamed to MET 4B. The new tables are shown in Appendix Q to the report.

9.3.3 The meeting discussed further the current status and the need for amendments to FASID Tables MET 2A and 2B. It was noted that these tables were introduced in the regional ANP long ago and under entirely different communication environment, i.e., before the establishment of the RODBs and before the introduction of the satellite broadcasts SADIS and ISCS that were now used for global distribution of OPMET data.

9.3.4 The meeting agreed that, the ROBEX scheme had already covered almost all required OPMET information from the ASIA/PAC Region. The scheme included arrangements for efficient relay of the ASIA/PAC OPMET information to the other ICAO regions through the designated Inter-Regional OPMET Gateways (IROG); this information was also made available for global distribution via SADIS and ISCS. Therefore, the continuation of bilateral exchanges by individual AFTN addressing outside the ROBEX scheme was considered inefficient and should be used only in exceptional cases.

9.3.5 In view of the above, FASID Table MET 2A could be simplified. It was also recognized that SADIS User Guide (SUG) Annex 1 included information for all OPMET data required globally. Therefore, it was agreed that the current FASID Table MET 2A should be replaced by the ASIA/PAC part of SUG Annex 1, so that the requirements for OPMET data from ASIA/PAC Region stated by the users were reflected in the regional ANP.

9.3.6 As regards FASID Table MET 2B which specified requirements for exchange of SIGMET, the meeting considered it obsolete for the following reasons. There existed global Annex 3 provisions for the distribution of SIGMET to the international OPMET data banks and SADIS and ISCS providers. It was also noted that the Statement of Basic Operational Requirements and Planning Criteria (BORPC), which formed part of the ANP, specified requirements for availability of SIGMET at the centres providing VOLMET broadcasts or D-VOLMET, as well as at the MWOs and ACCs of the adjacent FIRs in order to cover distance of two hours flying time. These requirements should be taken into account by the States when planning for bilateral exchanges of SIGMET and there was no need for a special FASID Table in this regard. It was also considered that the existing FASID Tables MET 1B, MET 3A and 3B, established clear regional provisions for all SIGMET types to be issued by the ASIA/PAC States. In view of this, the meeting recommended that the Secretariat consider, after consultation with the other ICAO regions, deletion of FASID Table MET 2B from the regional plan as obsolete.

9.3.7 Based on the above discussion, the meeting formulated the following draft Conclusion:

Draft Conclusion 9/26 - Amendment of the OPMET related regional procedures in ASIA/PAC Basic ANP and FASID, Doc 9673

That, the ASIA/PAC Basic ANP and FASID (Doc 9673) be amended as indicated in Appendix Q to the report.

9.4 Issues related to TAF with extended period of validity

9.4.1 The meeting recalled that the APANPIRG/15 meeting formulated Conclusion 15/39 on the feasibility of extending the validity of TAF to 30 hours. The proposal for extending the validity of TAF was aimed at meeting the planning requirements for the very long haul flights (18 hours or more). It was also recalled that the CNS/MET SG/8 meeting requested Singapore and the US to perform trials on the issuance of 30-hour TAF in order to identify any operational problems.

9.4.2 The meeting was informed that the task of developing the necessary provisions for the extended TAF was undertaken by the Secretariat with the assistance of the Aerodrome Meteorological Observing Systems Study Group (AMOSSG). At its fifth meeting in Montreal during 11-14 April 2005, AMOSSG had developed a proposal for amending the relevant Annex 3 provisions to enable the issuance of TAF with validity period of up to 30 hours.

9.4.3 As regards the regional trials, Singapore presented to the meeting results from trials conducted in May 2005, in which forecasters were asked to issue a 6-hour forecast beyond the normal 24 hours, in addition to the normal 24-hoour TAF. The purpose of the trials was to determine whether

long TAF was subject to significant decrease in accuracy. Verification was carried out to determine the number of "hits", "misses" and "false-alarms" of forecasting short-duration thunderstorms/significant showers in the 6-hour blocks. A simple common-sense method of verification indicated an increase in percentage error of 5% (from 21% to 26%) for the extended 6-hour block as compared with the case when the same 6-hour block was forecast under the normal 24-hour TAF.

9.4.4 The meeting appreciated the efforts done by Singapore to provide assessment of the accuracy implications of the extension of TAF validity.

9.4.5 The expert from the USA informed about the plans to test the production, dissemination and utility of 30 hour TAF by 23 airports. More airports might be added as these ultra-long haul flights proliferated. The US National Weather Service would test the production of the 30 hour TAF in a format acceptable to the users and causing the least disruption to the dissemination and automation systems storage and use of the product. The US would report the results of the test to ICAO and consult with them on the appropriate way to proceed with the standard production and dissemination of the 30 hour TAF. It was expected that some software issues would be encountered with user systems. It was intended to proceed with testing until the least objectionable format was developed. It was critical that any changes caused by any new format be kept to a minimum so the cost to the users would be minimal.

9.4.6 In discussing the issues related to the introduction of the TAF with validity of up to 30 hours, a number of participants expressed concerns on the possible impact such a change could have on the meteorological offices and users. In particular, it was considered necessary that the introduction of the new provisions should be supported with the relevant changes to the TAF code; information for these changes should be made available well in advance of the applicability date in order to provide time for the necessary preparations.

9.4.7 The expert from IATA informed of the IATA position that in the future only one type of TAF should be prepared for every aerodrome. Several experts expressed disagreement with this position as it would limit the flexibility of the meteorological offices to provide an optimal TAF product tailored for different type of operations. It was also stressed that, in order to minimize the operational and financial implications for the meteorological offices and users, the introduction of the new provisions for TAF should not influence the current procedures for TAF issuance. Moreover, it was well understood that the 30-hour TAF would be required initially only for a small number of aerodromes operating ultra-long haul flights.

9.4.8 Based on the above discussion, the meeting requested the Secretariat to forward the opinions and concerns expressed in regard to the introduction of the TAF with extended validity to the Secretary of AMOSSG for consideration by the group in finalizing the corresponding proposal for Annex 3 amendment.

9.5 Migration to BUFR-coded aeronautical meteorological messages

9.5.1 The meeting recalled that APANPIRG Decision 15/40, *Planning for migration to BUFR-coded aeronautical meteorological messages*, had tasked the OPMET/M TF and the ATN Transition TF to address the issued related to the regional planning for the transition to BUFR coded OPMET information and that the two Task Forces should develop in coordination a regional plan for migration to BUFR-coded aeronautical meteorological information by the end of 2005.

9.5.2 The meeting was informed in this regard that the two task forces at their meetings in early 2005 discussed the BUFR transition and identified that due to the complexity of the issues the regional planning would take more time than initially envisaged by APANPIRG.

9.5.3 The group agreed that the findings and conclusions of the EUR BUFR Transition Assessment TF were to a great extent valid also for the ASIA/PAC Region. It was recognized that there were a number of operational and technical issues to be addressed, such as:

- Implementation of communication infrastructure capable of handling digital data;
- Development and implementation of TAC/BUFR and BUFR/TAC conversion software;
- Preparation/adaptation of national and regional OPMET exchange schemes/facilities to handle digital data, including a transition period of dual exchange (TAC and BUFR simultaneously).

9.5.4 The meeting was informed that the AMOSSG at its fifth meeting reviewed the progress with respect to the migration to BUFR coded OPMET messages. AMOSSG had been requested to provide guidance to achieve a uniform global approach to the implementation of binary universal form for the representation of meteorological data (BUFR) coded OPMET messages, including early advice on the likely time-frame for AMHS extended services to accommodate BUFR coded messages. The time frame for this transition is from 2007 to 2015. The ACP will be invited by the AMOSSG to develop a global plan for the introduction of BUFR coded OPMET messages.

9.5.5 An outline, proposed by the Secretariat, was as follows:

2007: Provision to allow BUFR coded messages between States under bilateral agreements

2010: Provision (as recommended practice) for the exchange of OPMET data in BUFR code between the international OPMET databanks in Brasilia, Brussels, Dakar, Pretoria, Vienna and Washington and regional OPMET data banks in Bangkok, Brisbane, Nadi, Singapore and Tokyo as well as SADIS and ISCS uplink sites.

2013: Provisions as indicated for 2010 become Standard; recommended practice for all States to issue OPMET data in BUFR to the appropriate OPMET data bank

2016: Provisions as indicated for 2013 become Standard.

9.5.6 AMOSSG recommended also that, although it would be the primary goal to transport these messages over the ATN, consideration could be given to use the public Internet as transport medium.

9.5.7 The seventh meeting of the ATN Transition Task Force of APANPIRG, held from 18 to 22 April 2005 in Shanghai, China, also discussed the transition to BUFR for OPMET information from ATN perspective. It was clarified that the current operational AMHS service was a basic AMHS, which processed AFTN messages and might not be able to support the extended service required for the BUFR code. It was confirmed that for the commissioned AMHSs software changes might be necessary to support the emerging requirement. Additional studies were required in order to determine the necessary changes enabling BUFR code support.

9.5.8 In order to provide a better understanding of the requirements for transition to BUFR code, which was a precondition for the effective regional planning of the transition, the ATN/T TF had assigned a task to its Working Group to study the capability of AMHS being introduced in the Region and detailed requirement for the BUFR code. The result of the study would be presented to the next OPMET/M Task Force meeting to be held in March 2006.

9.5.9 The CNS/MET SG/9 meeting was informed of the plan to conduct the OPMET/M TF/4 meeting in March 2006 jointly with the Working Group of the ATN/T TF in order to ensure the necessary expertise for the regional planning of the transition to BUFR coded OPMET information.

9.6 TOR and work programme of the OPMET Management Task Force

9.6.1 The meeting reviewed the terms of reference and the composition of the OPMET/M Task Force and agreed on the request by Viet Nam to become a member of the group. The regional planning for the transition to BUFR coded OPMET information was included in the work programme of the group. The meeting formulated the following Draft Decision:

Draft Decision 9/27 - Terms of reference and work programme of OPMET/M TF

That, the terms of reference, work programme and composition of the OPMET Management Task Force be amended as shown in Appendix R to the Report.

Agenda Item 10: ICAO Warning Systems

1) implementation of International Airways Volcano Watch (IAVW)
2) implementation of tropical cyclone watch

SIGMET Tests

10.1 The meeting recalled that APANPIRG/15 meeting, August 2004, Bangkok recognized that, in order to maintain the IAVW and TC watch systems ready-for-action, regular exercises involving the advisory centres and the MWOs under their areas of responsibility should be performed. The meeting endorsed Conclusion 15/42 on conducting SIGMET tests in the Asia/Pacific Region, which called for ICAO to invite all States in the Region to ensure the participation of their MWOs in the tests.

10.2 The Rapporteur of the Volcanic Ash/Tropical Cyclon Implementation Task Force (VA/TC/I TF) presented the results of SIGMET tests conducted in early 2005 as follow up of the above APANPIRG conclusion, as follows:

- test for SIGMET for volcanic ash - 18 January 2005;
- test for SIGMET for tropical cyclones – 18 February 2005.

10.3 The purpose of the tests was to check the awareness of the participating MWOs of the ICAO requirements for the issuance of VA and TC SIGMET, and the adequacy of the existing telecommunication procedures for dissemination of the advisories and SIGMETs. The test involved issuance of test advisories by the VAACs and TCACs in the region, which were disseminated to the corresponding MWOs and the RODBs. The MWOs were required to issue a test SIGMET on receipt of a test advisory from the responsible VAAC or TCAC, and disseminate it according to the distribution list used for normal (non-test) SIGMETs.

10.4 The RODBs were requested to record the reception of the test SIGMETs and the corresponding time and to provide a summary table to the Rapporteur of the VA/TC Implementation Task Force with a copy to the Regional Office.

10.5 Four RODBs monitored the test SIGMET messages and provided summaries for analysis by the Rapporteur of the VA/TC/I TF. The participation of the MWOs could be considered as satisfactory with the view that this was the first test of this kind for the region. The test results revealed some problems in the issuance and the dissemination of SIGMET by the ASIA/PAC States, as follows:

- The number of the test SIGMETs received was significantly lower than required;
- There were a number of bulletins with wrong format;
- Not all the issued test SIGMETs reached all RODBs.

10.6 The meeting was informed that, based on the test results, advice was provided to some States of different identified communication problems. Further advice would be provided to all participating States with guidance on eliminating formatting discrepancies and addressing errors. The States which failed to issue test SIGMETs during the first exercise would be invited to take part in the tests that would follow by the end of 2005.

10.7 The meeting concluded that the SIGMET tests were successful and provided very useful information which would be used in resolving the existing SIGMET deficiencies in the Region. The VA/TC/I TF was requested to continue with regular tests with a 6-month frequency and to expand the scope of the tests to cover all types of SIGMET. The meeting expressed appreciation to the Rapporteur of VA/TC/I TF for coordinating the tests and for providing comprehensive analysis of the test results. The full results of the test could be found on the ICAO website (WP/19) for CNS/MET SG/9 (http://www.icao.int/icao/en/ro/apac/2005/CNS_MET_SG9/wp19.pdf).

Update of ASIA/PAC Regional SIGMET Guide

10.8 It was recalled that to assist States, ICAO issued a new version of the *ASIA/PACIFIC Regional SIGMET Guide* in September 2003. It was agreed that, in order to be useful guidance material, the Guide should be kept up-to-date with the relevant ICAO documents and the regional developments. In view of this, the Secretariat prepared an amended version to reflect changes invoked by Amendment 73 of Annex 3, which became applicable in November 2004, as well as other necessary changes since September 2003.

10.9 The updated version of the ASIA/PACIFIC Regional SIGMET Guide is available in Attachment A to WP/24 for CNS/MET SG/9 (http://www.icao.int/icao/en/ro/apac/2005/CNS_MET_SG9/wp24.pdf). The main changes are related to:

- the restructuring of Annex 3 by Amendment 73;
- introduction of the location indicator of the FIR in the beginning of the SIGMET body;
- necessary editorial changes;
- updating the Appendices and related tables;
- new Appendix for the WMO abbreviated headings of the SIGMET bulletins;
- new Appendix for the WMO abbreviated headings of the advisory bulletins.

10.10 The meeting reviewed the changes and advised the Secretariat to issue the updated version as soon as possible.

Issues related to SIGMET format and procedures

10.11 The meeting reviewed a list of issues raised by some ASIA/PAC States related to the SIGMET procedures and format, which were creating difficulties in SIGMET issuance. It was felt that additional guidance and/or amendment of SIGMET related provisions were necessary to facilitate a harmonized implementation of the SIGMET requirements specified in Annex 3. The list of SIGMET related issues is provided in Appendix S to the report.

10.12 After reviewing the above list, the meeting agreed that these issues needed to be addressed by an appropriated ICAO body and that it was desirable to include additional guidance on SIGMET provisions in the Manual on Aeronautical Meteorological Practice, ICAO Doc 8896, and for some of the points raised it was necessary to consider some amendments to the respective Annex 3 provisions. Based on this, the meeting formulated the following draft Conclusion:

Draft Conclusion 9/28 - Facilitating the implementation of SIGMET provisions

That, ICAO be invited to consider further improvements of the SIGMET provisions, by providing additional guidance and/or amendments to the SIGMET related SARPs, as necessary, in order to resolve identified difficulties in implementing SIGMET, as shown in the Appendix S to the report.

Actions to improve SIGMET availability

10.13 Improving the implementation of the SIGMET service by the States had been a priority task pursued by the CNS/MET SG during the last few years. Though some progress had been achieved, the issuance of SIGMET was still one of the main MET deficiencies identified by

APANPIRG. The meeting discussed possible ways to provide assistance to States experiencing difficulties in providing the required meteorological services including SIGMET.

10.14 The expert from New Zealand emphasized that the existing ICAO provisions allowed for arrangements for services to be provided by one Contracting States on behalf of another Contracting State based on bilateral agreement. It was considered as a possibility to resolve problems such as lack of provision of SIGMET service by some States in the Region due to lack of capabilities to provide sufficient meteorological watch over their respective FIRs.

10.15 The expert from Australia recalled that in 2002, the Australian Bureau of Meteorology prepared a volcanic ash cloud awareness poster, designed to highlight volcanic issues in the region. ICAO and the aviation industry kindly assisted with distribution of the poster, which was generally well received. It was recognized that such visual reminders of meteorological issues affecting aviation were useful educational tools, especially when issued at regular intervals. Australia believed that, notwithstanding the excellent guidance available from the Handbook and Manual on the International Airways Volcano Watch and from Annex 3, an A3 or A2-sized poster describing the rules for VA SIGMET issuance and, in particular, showing the specific VA SIGMET usage for complex, cross-border events, would be a useful education tool in the region. In this regard, Australia proposed to draft such a poster.

10.16 The meeting appreciated the proposal by Australia and agreed that this would be a very useful tool to be used by the Meteorological Watch Offices in the region and possibly in other ICAO regions. It was felt that a similar poster should be produced for the other types of SIGMET: for tropical cyclones and thunderstorms. In response, Hong Kong, China informed that meeting that Hong Kong Observatory had the capability to prepare and produce such a poster.

10.17 The meeting welcomed the proposals from Australia and Hong Kong, China, which were also supported by New Zealand and Japan, who offered also their expertise in preparing the posters. It was confirmed that ICAO could assist by distributing the posters to the States and WMO would also be involved in the coordination of the content of the posters. It was agreed that the overall coordination of the preparation of the two SIGMET posters would be done by the VA/TC/I Task Force, as regards technical issues, such as:

a) Poster size and orientation,
b) Logos used (eg ICAO logo, WMO logo, logo of State donating poster),
c) Fonts and graphical styling.

10.18 The meeting expressed full support to the proposal for SIGMET posters and formulated the following draft Conclusion:

Draft Conclusion 9/29 - Production of SIGMET posters

That, in order to enhance the availability and quality of the SIGMET information, Australia and Hong Kong, China be invited to produce, in coordination with the VA/TC Implementation TF, and in consultation with ICAO, WMO and the TCAC and VAAC Provider States in ASIA/PAC Region, SIGMET posters describing the SIGMET procedures for volcanic ash clouds, tropical cyclones and other hazardous meteorological phenomena, to be used as training material and quick reference tools by the MWOs.

Implementation of IAVW

10.19 Proposals for amendment of FASID Table 3B, Volcanic Ash Advisory Centres, FASID Table MET 1B, Meteorological Watch Offices, and a new FASID Table MET 3C, Selected Volcano Observatories, prepared by the Secretariat, were presented. It was explained that the new

FASID Table MET 3 was based on States' response to an ICAO State letter, and that some States were yet to designate their volcano observatories for inclusion in the Regional Plan. However, in order to expedite the processing of the FASID amendment, the table was considered sufficient for starting the consultation process with the States and organizations. Therefore, the meeting agreed on the proposed draft amendments and formulated the following draft Conclusion:

Draft Conclusion 9/30 - Amendment of the regional procedures related to SIGMET and advisories in ASIA/PAC FASID

That, the ASIA/PAC FASID (Doc 9673) be amended as indicated in Appendix T to the Report.

10.20 The expert from Australia outlined the recent developments related to provision of advisory service by VAAC Darwin. The meeting noted that the operations of VAAC Darwin were being steadily improved as a result of a collaborative effort involving Australian and regional partners. However, the meeting was aware of ongoing issues affecting the implementation of the IAVW in the Region, and encouraged all participants to continue working on a number of outstanding problems as outlined below:

- The major eruptions in the Darwin VAAC area of responsibility came from Manam volcano, but there were many minor eruptions around the region. In all these eruptions, it had been evident that some SIGMETs were still not being issued or, if they were issued, were not being widely received. One possible approach to this problem was for the VAACs to provide, with prior agreement, draft SIGMETs on volcanic ash for issue by MWOs during volcanic events. However, this would only work as an MWO-initiated (rather than VAAC-imposed) initiative.

- Volcanological agencies in the region were still not able to monitor volcanoes to the extent demanded by the IAVW. It was emphasised that every opportunity should be sought to promote appropriate funding for volcanological agencies, and to seek to increase communication and goodwill between volcanological agencies and the meteorological and aviation communities.

- Despite some recent successes, pilot reporting of eruptions could still be significantly improved, and airlines should be urged to implement robust procedures to ensure that special air-reports for volcanic ash were issued. Pilots should also be pro-active in post-analysis of events that have significantly affected their operations and include the relevant VAACs and MWOs in their analysis of these events.

10.21 The meeting noted the concerns expressed above which would need to be continuously addressed by the VA/TC/I TF.

New Japanese geostationary satellite MTSAT – 1R

10.22 The meeting noted the information on the operation of the new geostationary satellite MTSAT-1R (Multi-functional Transport Satellite) successfully launched by Japan. The meteorological payload of the satellite had been in operation since 28 June 2005. The MTSAT-1R was the follow-on satellite of GMS-5 that had been backed up by GOES-9 of NOAA/NESDIS from May 2003 through 14 July 2005, and would cover the East Asia and the Western Pacific region for five years. MTSAT-1R provided cloud imagery for the Northern Hemisphere every 30 minutes, halving the previous hourly rate, to more intensively monitor typhoon and cloud movement. The satellite deployed a new high-resolution imager including a new infrared channel (IR4) that could detect low-level cloud/fog areas at night as well as volcanic ash clouds. The imager had enhanced brightness levels, enabling a never-before level of quality in imagery.

Change of responsibilities of MWOs in the USA

10.23 The meeting was informed of the decision by the U.S. to realign responsibilities for the provision of aviation services in the Pacific. Weather Forecast Office (WFO) Guam no longer had Meteorological Watch Office (MWO) responsibilities. The responsibility for the meteorological watch and provision of SIGMETs for the portion of the Oakland flight FIR previously provided by Weather Forecast Office (WFO) Guam had moved to WFO Honolulu (PHFO).

10.24 The current MWO responsibility for the FIR was shared by two MWOs provided by the United States:

- The MWO at the Aviation Weather Center (KKCI) would provide meteorological watch and SIGMETs for two adjacent areas in the Oakland Oceanic FIR, as follows:

  a) north of 30N degrees latitude and east of 165E degrees longitude, and
  b) north of 3.5N degrees latitude and east of 140W degrees longitude.

- The MWO at WFO Honolulu would be responsible for the remainder of the Oakland Oceanic FIR south of 30N latitude.

10.25 The meeting noted the above information and that it was reflected in the draft amendment proposals for FASID Table MET 1B.

Agenda Item 11: Quality assurance in the MET field

11.1 Under this agenda item the meeting was provided with an update on the status of preparation of the ASIA/PAC seminar on Quality Management Systems for the aeronautical meteorological services (QMS seminar). It was recalled that the organization of a QMS seminar was a follow-up of APANPIRG Conclusion 13/32 and that WMO was invited to arrange, in coordination with ICAO, the said training seminar. Following a kind invitation by Hong Kong, China, it was agreed that the seminar would be hosted by the Hong Kong Observatory (HKO) as the local organizer.

11.2 The meeting was informed about the preparations for the seminar. The draft programme, developed by HKO in coordination with the ICAO secretariat and the WMO CAeM Expert Team on Quality Management, is provided as Appendix U to this Report. Based on the experience with similar seminars conducted in other regions, it was proposed that the seminar would last 3 - 4 days.

11.3 The observer from WMO informed the meeting that the recent Session of the WMO Executive Council approved the proposal for the QMS seminar to be hosted by Honk Kong, China and stressed on the need to ensure as broad participation as possible, including emphasis on developing countries. Funds were made available by WMO to support the seminar and to assist participants, with high priority participants from developing countries.

11.4 The meeting expressed appreciation to the WMO for giving high priority on this aviation training event for the ASIA/PAC Region. It was stressed that the preparations for the seminar should be sped up and it was agreed tentatively to hold it during the second half of November 2005.

11.5 The meeting was informed also that, as a follow-up to the MET Divisional Meeting (2002) Recommendation 4/3, Hong Kong, China provided an expert to serve as the ICAO consultant to draft the guidance material on quality management systems. A draft Manual on Quality Management was completed in December 2004. The draft had subsequently been reviewed and commented by WMO. It was expected that the Manual on Quality Management would be published by ICAO by the end of 2005.

Agenda Item 12: MET support for operations at aerodromes and terminal areas

Aerodrome warnings

12.1 The expert from Hong Kong, China informed the meeting that a suggestion was recently made by the users to include the surface wind direction in the aerodrome warning of strong surface wind and gusts. The wind direction information was considered important to pilots since there was directional dependence of the turbulence intensity at HKIA due to effects of surrounding terrain under strong wind conditions. The information was also considered important to aerodrome operators for planning of ground operations of aircraft and cargoes at HKIA, especially during the passage of tropical cyclones when the surface wind speed and direction could change and affect different operators differently.

12.2 To address the users' feedback, it was proposed to revise the template for aerodrome warnings in Table A6-2 of Annex 3 to include the surface wind direction, in addition to the surface wind speed and gusts under the phenomenon section, in the form of "SFC WIND n[n] nn[n]KMH MAX nn[n]". A revised version of the Table A6-2 reflecting the proposed changes is included in Appendix V to the Report. Some participants considered that in certain weather conditions, e.g. thunderstorm downdraft, the wind direction could not always be specified. In view of this, the meeting agreed that it should be included as an optional parameter in the template and formulated the following draft Conclusion:

Draft Conclusion 9/31 - Revision to the Annex 3 Template for Aerodrome Warnings

That, ICAO be invited to consider including the surface wind direction, in addition to the surface wind speed and gusts, under the phenomenon section of the template for aerodrome warnings in Table A6-2 of Annex 3, as indicated in Appendix V to the Report.

Note: a possible way to include the surface wind direction information is in the form of "SFC WIND n[n] nn[n]KMH MAX nn[n]".

12.3 The meeting was informed of the outcome of the AMOSSG/5 meeting held in April 2005 and noted the proposals for amendment of the Annex 3 provisions related to:

- Specification of the vicinity of aerodrome;
- The use of automatic observing systems during non-operational and operational hours at international aerodromes;
- SPECI requirement when half-hourly METAR are issued;
- Alignment of TAF amendment criteria with the criteria used for the issuance of SPECIs;
- TAF – validity periods, 30 hours and short term.

Agenda Item 13: CNS/ATM systems implementation:
1) CNS
2) MET

CNS/ATM Implementation Matrix

13.1 The meeting reviewed and updated the CNS/ATM Implementation Matrix. The Matrix contains the planning and implementation status of CNS elements such as ATN, AIDC, CPDLC, GNSS and ADDS-C and ADS-B. The Matrix provides a good overview of the planning and implementation status and is used for monitoring the progress of implementation. The updated Matrix is at Appendix W

Amendment to the Regional Plan

13.2 The meeting in conducting the review of the Time Line for surveillance from the Asia/Pacific Implementation Plan for CNS/ATM noted that the plan was in need of significant revision. The meeting was also informed that the Global Air Navigation Plan for the CNS/ATM System is being amended to incorporate in the plan, relevant materials from the Industry Roadmap with an objective of transforming the Plan into the baseline for measurable achievements.

13.3 Considering the information that is now provided in the FASID, the need to achieve alignment with the Plan and the extensive revision necessary to the ASIA/PAC Regional Plan for the CNS/ATM system, the meeting considered the most appropriate action was eliminate the Regional Plan and to capture any specific regional information in a Supplement to the Global Air Navigation Plan for the CNS/ATM system. Implementation plans and forecast will be shown in the relevant FASID Table using the nomenclature available in the table to show future intention for implementation. In consideration of the foregoing the meeting formulated the following draft Decision.

Draft Decision 9/32 - Review of the Regional Plan for the CNS/ATM system

That, the CNS/MET, ATM/AIS /SAR Sub Groups and RASMAG be tasked to review the Global Air Navigation Plan for the CNS/ATM System and the ASIA/PAC Regional Plan for the CNS/ATM system and compile specific regional information as a Supplement to the Global Air navigation Plan for the CNS/ATM system and eliminate the Regional Plan in their respective fields. The work should commence immediately after issuance of amendment to the Global Plan.

Amendment to Regional Plan for the CNS/ATM System to include ADS-B

13.4 Under this agenda item, the meeting reviewed and endorsed the draft amendment proposal by the ADS-B SITF to the ASIA/PAC Regional Plan for CNS/ATM System to include ADS-B. The plan needs revision to include ADS-B related planning and description. The proposed changes are contained in the Chapter 3, 5, 6 and Chapter 9. The meeting also updated timing information of national trials and implementation of surveillance systems in the table 9-1 of the Plan.

13.5 The meeting agreed to replace the term of ADS used in the document with ADS-C especially in the two chapters and in the bar chart time table. Accordingly the meeting endorsed the following draft Decision developed by the ADS-B SITF:

Draft Decision 9/33 - Amendment to the Regional Plan for the CNS/ATM System to include ADS-B

That the ASIA/PAC Regional Plan for the CNS/ATM System be amended to include ADS-B element for the surveillance systems as indicated in the Appendix X to this report.

13.6 The chairman of METATM Task Force of the CNS/MET SG presented to the meeting the work of the task force since the CNS/MET SG/8 meeting in July 2004.

MET/ATM Coordination Seminar

13.7 The Chairman of MET/ATM TF informed the meeting that as a follow-up of APANPIRG Conclusion 14/45 the TF had been involved in the preparation of a MET/ATM coordination seminar. In particular, the TF had developed a tentative programme for the seminar (reproduced in Appendix Y), which was expected to last 3-4 days. Noting the importance of the METATM seminar in further developing of the MET component of the CNS/ATM systems in the Region, the meeting agreed that the seminar should be held at the ICAO Regional Office, Bangkok, in January-February 2006. The meeting was pleased to note that the US would consider ways to provide assistance in support of the seminar. It was stressed that the ATM should be adequately represented at the seminar to ensure successful exchange of views and ideas.

Promoting communications between the MET and ATM communities

13.8 The meeting was informed that a list of Annex 3 (Amendment 73) SARPs pertaining specifically to arrangements between the Meteorological Authorities and Air Traffic Service Authorities was prepared by the MET/ATM TF. This material was prepared to help facilitate discussion between the MET and ATM communities and the development of new MET products in support of ATM. The list could be found at Attachment 3 to the report of the METATM TF (WP/27) available at the ICAO ASIA/PAC Regional Office website (http://www.icao.int/icao/en/ro/apac/2005/CNS_MET_SG9/wp27.pdf).

MET developments in support of ATM

13.9 The meeting noted with interest the recent developments of MET products in support of ATM:

- Graphical depiction of forecast conditions critical to ATM operations (Japan)
- Terminal area thunderstorm information (Japan)
- Terminal meteorological (TerMET) forecast (Hong Kong, China)
- Terminal area convection information (Australia)
- Near real-time convective information in relation to aircraft position (US)

13.10 The expert from Russian Federation provided information on MET service enhancement in uniform ATM system with CNS/ATM concept in Russian Federation. In particular, ATC systems received information about storm and warnings, and meteorological data in support for decision-making. Existing and expecting weather conditions were displayed together with aeronautical information for controllers.

13.11 The meeting was informed about the development of the new Terminal Meteorological Forecast (TerMET) in support of ATM operations in Hong Kong, China. TerMET was a sequential hourly aerodrome forecast for MET variables (wind, visibility, cloud, significant weather) having aviation impact up to a period of four hours. Based on ATM requirement, the forecast MET variables would be displayed in a textual tabular format with red colour highlighting those forecast figures reaching thresholds that would affect ATM operations.

13.12 The meeting was also briefed by the expert from the US on their new MET products developed in support of air traffic flow management, in particular the collaborative convective forecast product (CCFP). Future products being planned include 8-hour TRACON weather forecasts (turbulence, icing, ceiling and visibility, tops, low level wind shear, winds aloft), traffic decision aids, and terminal forecasts in tabular format.

Future work of the MET/ATM TF

13.13 The meeting noted the MET/ATM TF planned to:

- assist with the planning of a MET/ATM coordination seminar in ASIA/PAC Region;
- further assist with the inclusion of ATM requirements for MET information in the CNS/ATM plan; and
- develop a range of sample products for MET information required in support of ATM for discussion between relevant MET and ATM authorities

Automated aircraft observations

13.14 The meeting reviewed a proposal to extend the provision of automated aircraft observations to also cover the approach phase of flight, in addition to the climb-out and en-route phases, and to increase the resolution of the observations during the climb-out and approach phases for wind shear warning application.

13.15 The meeting noted that while Annex 3 recommended that evidence of the existence of wind shear should be derived from, amongst other data sources, aircraft observations during the climb-out or approach phases of flight, the current there was currently no Annex 3 provision requiring routine aircraft observations during the approach phase of flight, no matter whether automatic data downlink or voice communications were used. The only means was thus through pilot reports of wind shear which was based on subjective assessment of the pilots and might be complicated by a number of factors (e.g. difference between airspeed change and headwind change, effects of flight control inputs). It was therefore considered highly desirable for the evidence of the existence of low-level wind shear to be derived from automated aircraft observations of the wind during both the climb-out or approach phases of flight.

13.16 As regards the resolution of the automated aircraft observations, the current specification of 30 seconds in Annex 3 was equivalent to approximately 2.5 km at typical aircraft approach speed. While this was within the typical spatial scale range of wind shear (400 m to 4 km), smaller-scale events such as terrain-induced wind shear would possibly be missed unless the resolution of the observations was increased to adequately cover the lower end of the scale range. Considering the typical aircraft approach speed, one suggestion was to increase the temporal resolution of automated aircraft observations from 30 seconds to 4 seconds when the aircraft was between runway level and 500 m above that level – the altitude range over which low-level wind shear warning was required by Annex 3.

13.17 Considering the benefits of the proposals to low-level wind shear warning, the meeting formulated the following draft Conclusion:

Draft Conclusion 9/34 - Extending the Provision of Automated Aircraft Observations for Wind Shear Warning Application

That, ICAO is invited to consider, for low-level wind shear warning application, extending the provision of automated aircraft observations to:

a) cover the approach phase of flight; and

b) increase the resolution during the climb-out and approach phases when the aircraft is between runway level and 500 m above that level.

Format of D-ATIS messages

13.18 The meeting noted the current status of D-ATIS and D-VOLMET implementation in Hong Kong, China. In particular, the number of uplink requests for D-ATIS messages was still growing, reaching 23,114 (16,428 for arrival D-ATIS and 6,686 for departure D-ATIS) in May 2005 – a four-fold increase in two years. On the other hand, in the first five months of this year, there were on average only around 100 uplink requests for D-VOLMET messages per month.

13.19 The meeting was informed about a feedback from airline users regarding duplication of numeric values and words for the same values in the D-ATIS messages provided by some ASIA/PAC airports. The meeting further noted that some work was taking place in drafting guidance material for the format of D-ATIS messages as part of the *ATS Planning Manual* (Doc 9426). In this draft guidance material, the format presented was similar to the template provided in Annex 3 in respect of the local routine and local special reports (Table A3-1 of Appendix 3 to Annex 3). In this connection, the above-mentioned duplication had been confirmed to be unnecessary. In view of the progressive implementation of D-ATIS in the ASIA/PAC Region and the user's need for guidance on the format of the messages, the meeting agreed to formulate the following draft Conclusion:

Draft Conclusion 9/35 - Guidance on implementation of D-ATIS

That, ICAO be invited to expedite the publication of the guidance material on the format of D-ATIS messages.

Note: The guidance material on the format of D-ATIS messages forms part of the ATS Planning Manual (Doc 9426).

Data link for uplinking graphical MET information

13.20 The meeting was informed that a number of developments in meteorological products for uplinking had been made. The METLINKSG/8 meeting held during 1-4 February 2005 had developed draft model templates for the graphical display of SIGMET information for volcanic ash, tropical cyclones and for all of the other required phenomena. Subject to finalization by WMO, the model templates for graphical SIGMET would be included in Appendix 1 to Annex 3 as part of Amendment 74, which would become applicable in 2007. Concurrently, further work was being progressed in the development of guidance material for the display of meteorological information in the cockpit, and development of draft model template for the graphical display of turbulence and windshear information. As regards the encoding/decoding of graphical meteorological products for uplink, the use of the BUFR code form had been specified in Annex 3 for uplinking graphical SIGMET information. At the same time, the possible use of the Weather Huffman (WH) code was also being explored by METLINKSG in coordination with WMO.

13.21 In view of the progress in enabling graphical MET information uplink, there remained an outstanding task to identify the appropriate data link to support future uplinking of graphical MET information in the ASIA/PAC Region. At present, MET information uplink applications, including D-ATIS and D-VOLMET, were exclusively implemented on the ACARS VHF data link which had significant constraints in the transmission of high-data-volume graphical information. On the other hand, VDL-Mode 2 had been supported by this meeting to be introduced in the near term (now to 10 years) in the ASIA/PAC Region as laid down in the draft strategy for implementation of the air-ground data link in the ASIA/PAC Region. In this connection, the meeting formulated the following draft Conclusion:

Draft Conclusion 9/36 – Air-Ground Data Link Supporting Graphical Meteorological Information Uplink

That, ICAO is invited to identify a data link to support future uplinking of graphical meteorological information and to develop relevant SARPs and guidance to facilitate implementation.

Use of Mode S extended squitter (ES) in automatic MET air-reporting

13.22 The meeting was informed that, arising from APANPIRG Conclusion 14/44, the METLINKSG had been invited to consider the application of the Mode S datalink in automatic air-reporting as an alternative to ADS over areas covered by surveillance radars and to consider ways to facilitate its implementation in the ASIA/PAC Region. This task was to address the problem of the lack of automated aircraft observations of MET elements – wind, temperature, turbulence (if available) and humidity (if available) – from ADS over areas covered by surveillance radars in the ASIA/PAC Region. In the 8th Meeting of the METLINKSG held during 1-4 February 2005, it was agreed that where Mode S was available there was a requirement for it to be considered for automatic MET air-reporting. The group agreed that the changes to Annex 3 to include the use of Mode S in automatic MET air-reporting should be submitted as a part of draft Amendment 74 following confirmation that the appropriate changes to the requirements for the MET data blocks of Mode S messages had been agreed.

13.23 On the other hand, the meeting noted that there was currently no intent to implement Mode S in the near term in the Region. Subject to confirmation, the meeting was advised that both SSR Mode S radar and 1090 MHz extended squitter (ES) ADS-B could be used for downlinking the contents of the MET data blocks. It therefore appeared that in the ASIA/PAC Region, ADS-B (using 1090 MHz ES) would be more likely to become widely implemented, and for that reason, it might be more suitable for automated MET air-reporting. The meeting agreed that it had always been the intent of using ADS-B for automated MET air-reporting but in view of the need to confirm the technical details on implementation, the meeting formulated the following Decision:

Decision 9/37 – Use of 1090 MHz extended squitter (ES) ADS-B for automatic air-reporting

That, the Automatic Dependent Surveillance-Broadcast (ADS-B) Study and Implementation Task Force be requested to study the use of 1090 MHz extended squitter (ES) ADS-B for automatic MET air-reporting in the ASIA/PAC Region.

Agenda Item 14: Review of deficiencies in the CNS and MET fields

14.1 It was noted that assisting States in resolving the safety related deficiencies is one of the most important tasks of the Planning and Implementation Regional Group (PIRGs). The APANPIRG maintains an up-to-date a List of Deficiencies in all air navigation fields. In order to assist the work of APANPIRG, the CNS/MET Sub-group regularly reviews the status of the deficiencies in the CNS and MET fields and provides the necessary updates.

14.2 The List of deficiencies in the CNS and MET fields, updated by the Secretariat, based on the information available as a result of follow up actions taken, was reviewed by the meeting. The updated List is provided in Appendix Z. The meeting noted the progress that have been achieved, as follows:

Deficiencies in the CNS field:

14.2.1 As a result of actions taken by Bangladesh, the long standing deficiency of lack of VHF coverage in Dhaka FIR has been resolved by delegating the responsibility for the provision of ATS over the Southern part of Dhaka FIR to Kolkata ACC to overcome operational problems. A formal notification has been received from Bangladesh. It is therefore proposed to remove the deficiency.

14.2.2 An ICAO mission was conducted to Myanmar to discuss the issue with the high level officials of the government. Urgent need to overcome the air-ground communication deficiency was brought to the attention of the government. An action plan was developed for implementation by the end of 2004. Action was taken by Myanmar to implement the action plan. The VHF systems were upgraded and put on trial operation on 9 May 2005. AIP Supplement 01/05 dated 28 April 2005 was issued to notify change in frequencies and the new VHF system was declared operational effective 9 June 2005.

14.2.3 Myanmar informed the meeting of the work done to improve the VHF air-ground communication in the Yangon FIR using the power point presentation showing the improvements made at different RCAG sites. It was stated that the facilities were put in test operation from 9 May to 8 June and was declared operational effective 9 June 2005.In view of the progress made in overcoming the deficiency Myanmar had proposed to remove the deficiency from the List.

14.2.4 IATA stated that the airlines had reported improvement in communication in Yangon FIR however some reports still continue to show some communication difficulties. In view of this IATA suggested that the operation would be closely monitored through pilot reports. The progress will be reviewed at APANPIRG/16 meeting to be held in Bangkok from 22 to 26 August 2005 and will then agree to the remove the deficiency from the List.

14.2.5 Myanmar stated that the pilot report if any, should be brought to the attention of the authorities in Myanmar as soon as possible so that the occurrence of such problem could be investigated and remedial action could be taken promptly.

Deficiencies in the MET field

14.2.6 The main progress identified was the elimination of the long standing problem with the lack of TAF for the two international airports in Cambodia: Phnom Penh (VDPP) and Siem Reap (VDSR). It should be noted that the elimination of this deficiency was possible due to the assistance provided to Cambodia by Viet Nam in terms of training and provision of operational help in preparing TAF (issuance of “draft TAF” for VDPP and VDSR by the meteorological office at Tan Son Nhat airport in Viet Nam);

14.2.7 Some improvement in the issuance of SIGMET for volcanic ash had been identified; however, the removal of this deficiency from the list would be subject to further validation.

14.2.8 Deficiencies identified for Cambodia and Myanmar for non-utilization of the WAFS products had not yet been resolved. However, both States sent participants to the second WAFS GRIB/BUFR training seminar held in Bangkok in January 2005, and indicated firm intentions to ensure reception and utilization of these products in the near future;

14.2.9 As regards the long-standing deficiencies related to the Pacific States, ICAO established a Special Implementation Project (SIP), *Enhancement of the meteorological service for aviation in the Pacific*, to be held in 2005. It was expected that through this SIP ICAO would assist in resolving some of the safety-related MET deficiencies in this Region.

Agenda Item 15: Regional Contingency Planning in the CNS and MET fields

Regional Contingency Planning in the CNS and MET fields

15.1 The meeting in the knowledge of the December 2004 Tsunami share ideas and experiences in developing and implementing contingency arrangements for the provision of CNS and MET services during crises situations, due to natural disasters or other causes, with the view of developing regional guidance.

15.2 A presentation of the effects on aviation of the Tsunami highlighted three main areas, these were:

- the direct impact and damage on airports and air navigation infrastructure;
- participation of aviation in the disaster relief operations-SAR, relocation/evacuation, delivery of humanitarian aid to affected areas; and
- effects on air travel related to reduced tourist flows.

15.3 Response actions in the CNS/MET field identified during discussion were:

- availability of specialist personnel to restore, operate and expand capacity of effected aerodromes, contingency aerodromes and supporting facilities. It was noted that many local personnel may be unavailable due to personal tragedy or already fully committed to the relief effect;
- Provision of specialist equipment such as deployable communications, navigation, surveillance, meteorology and control tower equipment; and
- In the recovery phase the expeditious provision of long lead time items, for example from project stock.

15.4 The meeting proposed the following suggestions for consideration in the development of an aviation response:

- The development of a catalogue of organisations with the ability to contribute to a response capability. The catalogue would be similar to the existing regional catalogue of flight inspection services maintained by the Regional Office and provide details contact points, general description of facilities and services available and arrangements under which services would be provided (ie government to government, commercial, humanitarian);
- The Regional Office acting as a facilitator; and
- The development of RNAV(GNSS) approaches to vulnerable aerodromes or aerodromes servicing vulnerable areas. These GNSS approaches would be designed and validated as part of a disaster preparedness program.

15.5 The meeting noted with admiration the role aviation played in the response to and the recovery from the December 2004 Tsunami.

Agenda Item 16: Future Work Programme

16.1 The Fifteenth Meeting of APANPIRG held in Bangkok from 23 to 27 August 2004 in its Decision 15/44 adopted the updated Subject/Tasks List as the Work Programme for CNS/MET Sub-group

16.2 The APANPIRG/15 while adopting the proposed changes to the Subject/Tasks List noted that of the 41 Tasks, 29 Tasks were completed and the completed Tasks were deleted from the List.

16.3 The meeting reviewed the TOR and Subject/Tasks List Tasks List in light of the work accomplished and the revised Key Priority items in the CNS/MET fields. The meeting proposed to add three items in the List to deal with the Tasks relating to the preparation for WRC 2007, implementation of data link and updating of Table CNS-2 of the ASIA/PAC FASID.

16.4 The meeting agreed to include three new tasks for consideration by APANPIRG. The updated List is provided in Appendix A1. In view of the foregoing the meeting formulated the draft Decision as follows:

Draft Decision 9/38 - Updated Subject/Tasks List of the CNS/MET Sub -Group

That, the Subject/Tasks List of the CNS/MET Sub-group presented in Appendix A1 be adopted.

Agenda Item 17: Any other business

Special Implementation Project (SIP) sub regional Seminars

17.1 The Secretariat informed the meeting that in accordance with Conclusion 13/23 of APANPIRG/13 three Special Implementation Project (SIP) Sub- Regional Seminars on Identification and Filing of Differences to ICAO Standards were held in Delhi, India from 4 to 6 October 2004, Beijing, China from 11 to 13 October 2004, and Bangkok, Thailand from 6 to 8 December 2004. The Seminars were attended by 87 participants from ASIA/PAC region. The Seminar was conducted by the Secretariat with the assistance of a database expert provided by Australia.

17.2 The Seminars dealt thoroughly with the following items:

a) organization and function of ICAO;
b) process involved in the development and adoption of SARPs;
c) State's responsibility with respect to Article 38 of the Convention on International Civil Aviation – "Notification of Differences";
d) need for the State to review and update Civil Aviation regulation, as required;
e) delegation of responsibility to different organizations involved in the implementation of concerned Annexes and establishment of reporting channels to ensure timely submission of differences;
f) use of IT as much as possible;
g) ensure that ICAO is notified of the differences and also publish differences in AIP;
h) difference between SARPs and deficiency was identified;
i) the use of database in identification and filing of differences; and
j) participants were made familiar wit the use of database.

17.3 The Seminars provided all the required information to participants to assist them in identifying and filing of differences. Participants were made thoroughly familiar with the use of a database developed to identify and file differences. States are expected to set up an appropriate process to ensure timely evaluation, verification and notification of difference to SAPRs with the assistance of the database. This process is expected to facilitate development of national legislation and also implementation of SARPs.

ATN Seminar

17.4 The meeting was informed that Aerothai is hosting an ATN Seminar in Chiang Mai from 6 to 9 December 2005 in coordination with ICAO. The meeting appreciated the initiative taken by Aerothai as it was in accordance with the item 7 of the Key Priority in which emphasis has been placed in sharing information and providing training opportunity to foster implementation.

Next Meeting of the CNS/MET Sub-group

17.5 It was proposed that the Tenth Meeting of the Sub-group be held in Bangkok from 10 to 14 July 2005.

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Concl. 8/3	Concl. 15/13		**Conclusion 15/13 - AMHS Naming Registration Form** That, a) the AMHS Naming Registration Form be reviewed and refined by the ATN Transition Task Force based on the result of trial operation; and b) ICAO be requested to circulate the form to Asia/Pacific States.	Action completed by ATN Transition Task Force/7 Meeting and Draft Conclusion 7/12 of the Task Force addresses this issue.	Completed Completed
D. Conclu. 8/4	Concl. 15/14	**ANC**	**Conclusion 15/14 -Use of AMHS over TCP/IP in the Asia/Pacific region** That, Administrations within the Asia/Pacific region willing to pursue the implementation of the TCP/IP subnet as part of ATN may do so on a bilateral basis on the understanding that they may be required to make changes to their subnet if and when the TCP/IP is developed as a part of the ATN SARPS. *Noted the conclusion and requested ACP to take relevant regional implementation activities into account in its current work on the subject, the outcome of which is expected by middle 2005.*	States were made aware of it.	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
	(para. 2.2.47)	**ANC**	**Development of a regional strategy for implementation of air-ground data link in the ASIA/PAC Regions.** *Noted the paragraph and that the strategy is expected to be developed by July 2005 and called upon the Secretary General to monitor its progress.*	Strategy was developed by the Task Force and presented to the CNS/MET SG/9 for endorsement.	Completed
	(para. 2.2.87)	**C**	**Preparation for World Radiocommunication Conference – 2007 (WRC-2007)** *Noted the paragraph and requested the Secretary General to continue encouraging the States to participate at various levels in different fora to provide support for the ICAO position at the forthcoming WRC-2007 so as to protect aeronautical frequency spectrum.*	First RPG Meeting was held in February 2005. Preliminary ICAO Position for WRC-2007 was presented at APG 2007-2 Meeting in February 2005.	On-going
D. Concl. 8/5	Concl. 15/15		**Conclusion 15/15 – A sia/Pacific regional ATN Implementation System Management Operational** That, the Asia/Pacific regional ATN Implementation System Management Operational Procedures be published to assist States in implementation of the ATN ground infrastructure in the Asia/Pacific region.	Considered premature due to lack of experience in operational aspect to develop a manual procedure. This task can be addressed only after gaining sufficient operational experience. Of AMHS.	Under study Ongoing

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D. Conclu. 8/6	Concl. 15/16		**Conclusion 15/16 – Table CNS-1D - AIDC** That, a) ICAO be requested to circulate Table CNS-1D provided in **Appendix A** to the Report on Agenda Item 2.2 to Asia/Pacific States to specify operational requirements for AIDC; and b) provide results to the next meeting of the ATN Transition Task Force for appropriate action.	Circulated Result provided to the Task Force and draft Conclusion developed for its adoption by the CNS/MET SG/9	Completed Completed
D. Concl. 8/7	Concl. 15/17		**Conclusion 15/17 – Amendment Table CNS-1C – ATSMHS Implementation Plan** That, the sample Table CNS-1C – ATSMHS Implementation Plan provided in ASIA/PAC FASID, Part IV CNS be replaced with the Table CNS-1C shown in Appendix B to the Report on Agenda Item 2.2 through the established procedure.	Amendment proposal circulated to States. States being notified of approval.	Completed
D. Concl. 8/8	Concl. 15/18		**Conclusion 15/18 – Amendment to Table CNS-1B – ATN Router Plan** That, the existing Table CNS-1B provided in ASIA/PAC FASID, Part IV CNS be replaced with an updated Table contained in **Appendix C** to the Report on Agenda Item 2.2.	Amendment proposal circulated. States being notified of approval.	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Concl. 8/9	Concl. 15/19		**Conclusion 15/19 – Amendment of the Table CNS-1A – AFTN Plan** That, the Table CNS-1A – AFTN Plan and Chart CNS-1 reflected in Part IV CNS of the ASIA/PAC FASID be replaced with an updated Plan provided in **Appendix D** to the Report on Agenda Item 2.2. in accordance with established procedure.	Amendment proposal circulated. States being notified of approval.	Completed
D. Concl. 8/10	Concl. 15/20		**Conclusion 15/20 – Procedure for calculation of AFTN circuit loading statistics** That, the guidelines for calculation of AFTN circuit loading statistics contained in Attachment A to ASIA/PAC FASID Part IV CNS be amended to add the maximum number of bytes transmitted/received on 9600 bps and 64 Kbps, X.25, AFTN circuits.	Amendment proposal circulated to States. States being notified of approval.	Completed
D. Deci. 8/11	Deci. 15/21		**Decision 15/21 – Subject/Tasks List of the ATN Transition Task Force** That, the updated Subject/Tasks List of the ATN Transition Task Force provided in **Appendix E** to the Report on Agenda Item 2.2.be adopted.	Task Force notified of the approval of the Tasks List.	Completed
D. Decision 8/ 13	Decision 15/22		**Decision 15/22 – Assignment of new tasks** That, the ATN Transition Task Force be tasked to: i) develop ATN/AMHS performance characteristics as soon as possible to meet the target date of implementation of 2005; and ii) establish a sunset date for AFTN service to be reflected in Part IV of the ASIA/PAC FASID.	The Seventh Meeting of the ATN Transition Task Force (ATNTTF/7) recognized that the AMHS description document and the performance document adopted by the Task Force would provide adequate guidance on performance. In its Conclusion 7/18 the Task Force has	Under study. Pending result of the work of ACP.

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				addressed this issue and has tasked its WG to review and consider development of such document. The ATNTTF/7 considered that it would be premature at this stage to establish the sunset date for AFTN in view of the current lack of maturity and operational experience of AMHS implementation.	Under study. Pending result of the work of ACP. Closed.
D. Concl. 8/14	Concl. 15/23		**Conclusion15/23- Revision of the Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific region** That, the updated Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the Asia/Pacific region provided in **Appendices F and G** respectively, to the Report on Agenda Item 2.2 be adopted.	Strategy adopted and posted.	Completed
D. Concl. 8/15	Concl. 15/24		**Conclusion 15/24 - Revision of FASID Table CNS-3 by States** That, States review and revise FASID Table CNS-3 to reflect comprehensive descriptions of the future provision of radio navigation aids and that the revised entries be provided to the Regional Office by the end of May 2005.	States were requested to review and update the Table CNS-3. Response received from States is consolidated and presented to the meeting for review.	Completed

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D. Concl. 8/16	Concl. 15/25		**Conclusion 15/25 - Airlines plan for the deployment of ADS-B** That, IATA be requested to conduct a survey of its member airlines' plan for the deployment of ADS-B in the Asia/Pacific region and provide result to the ADS-B Task Force Working Group to be held on 14-15 October 2004.	IATA provided information to the Task Force	Completed
D. Concl. 8/17	Concl. 15/26		**Conclusion 15/26 – Exchange of ADS-B surveillance data with neighbours** That, States be encouraged to share ADS-B surveillance data with neighbouring States and to develop mechanisms to achieve this as ADS-B ground infrastructure requirements are being identified during the design phase.	States were made aware of the need to exchange ADS-B data and are expected to consider data exchanges upon implementation of ADS-B.	Completed
D. Deci. 8/18	Deci. 15/27		**Decision 15/27 – Subject/Tasks List of ADS-B Study and Implementation Task Force** That, the Subject/Tasks List of the ADS-B Study and Implementation Task Force provided in Appendix H to the Report on Agenda Item 2.2 be adopted.	The updated Task List was brought to the attention of the Third meeting of the ADS-B Study and implementation Task Force.	Completed.
D. Concl. 8/19	Concl. 15/28		**Conclusion 15/28 – SADIS Internet-based FTP Service** That, in parallel with the satellite broadcast, the SADIS Provider State be invited, as of 1 July 2005, to make WAFS forecasts and OPMET data available, as a primary component of the SADIS service, in accordance with the SADIS User Guide, through the Internet-based FTP service.	Action taken by SADIS Provider State	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
		ANC	Note 1. - The development and management of this service will be overseen by the SADISOPSG and its work programme will be amended accordingly. Note 2. - The SADIS Cost Recovery Administrative Group (SCRAG) will be informed of the planned date of implementation. *Noted the conclusion and that the planned implementation date of the Internet-based FTP service, as a primary component of SADIS service, is on July 2005.*		
D. Concl. 8/20	Concl. 15/29		**Conclusion 15/29 – SADIS strategic assessment tables** That, the Asia/Pacific SADIS strategic assessment tables, as given in Appendix I to the report on this agenda item, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.	Tables forwarded to SADISOPSG	Completed
D. Concl. 8/21	Concl. 15/30		**Conclusion 15/30 - State's migration plans for the transition from 1G to 2G SADIS service** That, the SADIS user States in the Asia/Pacific region be encouraged to commence planning for transition from SADIS 1G to 2G to ensure that the transition can be achieved well within the agreed time scale, i.e. before the termination of the 1G service on 31 December 2008.	State letter sent to States	On-going

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
			Note: ICAO Regional Office to inform the SADIS user States by a State letter (4th quarter of 2004) and keep record of the progress of the transition to SADIS 2G.		
D. Concl. 8/22	Concl. 15/31		**Conclusion 15/31 - Annual survey of the ISCS/2 operational efficacy and nomination of ISCS Focal Points** That, a) the ISCS provider State be invited to conduct, in coordination with the ICAO Regional Office, annual surveys of the operational efficacy of the ISCS/2 in the Asia/Pacific region, starting with a survey for 2004-2005; and b) the ISCS user States in the Asia/Pacific region be invited to nominate operational personnel to act as an ISCS focal point to facilitate coordination of ISCS implementation matters. Notes: (1) The survey will be carried out through a survey questionnaire circulated to the ISCS user States by the ICAO Regional Office; the survey results will be analyzed by the ISCS provider State and reported to the CNS/MET Sub-group of APANPIRG. (2) The format of the annual survey questionnaire and summary report will be similar to those for SADIS operational efficacy in order to allow inter comparison.	Survey documentation has been prepared and coordinated with the ISCS Provider State First survey carried out in May/June 2005	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Concl. 8/23	Concl. 15/32		**Conclusion 15/32 – Limited extension of the availability of WAFS forecasts in chart form beyond 1 July 2005** That, the WAFSOPSG be requested to consider, as a matter of urgency, the continuation of the issuance of WAFS SIGWX forecasts in a chart form, for a limited period of time after 1 July 2005 to ensure that the WAFS users be prepared to operationally use BUFR-coded WAFS products in SIGWX chart production.	Action taken by WAFSOPSG/2 meeting with Conclusion 2/12; availability of SIGWX charts extended to 1 December 2006.	Closed
D. Concl. 8/24	Concl. 15/33		**Conclusion 15/33 – States' actions for the migration to the operational use of GRIB and BUFR coded WAFS products** That, the Asia/Pacific States (a) be urged to complete, as a matter of urgency, the necessary preparations for the migration to the operational use of GRIB and BUFR coded WAFS products, if they have not already done so, prior to the target date for final migration to GRIB and BUFR-coded WAFS products, 1 July 2005; (b) be urged to review the GRIB and BUFR visualization software evaluation results available on the WAFSOPSG and SADIS websites and ensure that software packages capable of producing WAFS forecast charts fully compliant with Annex 3 are acquired; and (c) arrange for appropriate personnel to attend the training on the operational production of WAFS charts from GRIB and BUFR coded WAFS products provided conjointly for the SADIS and ISCS user States to be held in the Asia/Pacific region in January 2005.	States have been advised. Second training seminar held in January 2005.	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Concl. 8/25	Concl. 15/34		**Conclusion 15/34 – Automatic depiction of SIGWX forecast in chart form from BUFR-coded WAFS products** That, the WAFSOPSG and SADISOPSG be invited to consider, as a matter of urgency, the requirement for eliminating the need for human intervention with regard to the depiction of SIGWX forecast in chart form from BUFR-coded WAFS products.	Action taken by WAFSOPSG/2 meeting with Conclusion 2/9	Closed
D. Deci. 8/27	Deci. 15/35		**Decision 15/35 – Terms of reference and work programme of OPMET/M TF** That, the terms of reference, work programme and composition of the OPMET management Task Force be amended as shown in Appendix J to this agenda item of the Report.	ToRs and work programme of OPMET/M TF have been updated	Completed
D. Concl. 8/28	Deci. 15/36		**Conclusion 15/36 – 12th edition of the ROBEX Handbook and 3rd edition of the ASIA/PAC ICD** That, ICAO Regional Office publishes the new 12th edition of the ROBEX Handbook and the new 3rd edition of the ASIA/PAC Interface Control Document for Access to the Regional OPMET Data Banks (RODB), in accordance with the established procedures.	ROBEX Handbook, 12th edition and ASIA/PAC ICD, 3rd edition published and disseminated in hard copy in November 2004; both documents available on ICAO APAC web site	Completed
D. Concl. 8/29	Concl. 15/37		**Conclusion 15/37 – Fostering the standardization of OPMET information in the Asia/Pacific region** That, the States in the Asia/Pacific region be urged to fully implement the provisions related to the format of the METAR, SPECI and TAF messages and	State letter circulated	Completed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
			bulletins specified in the Annex 3 and in WMO Manual on Codes (WMO No. 306).		
D. Concl. 8/30	Concl. 15/38	**C**	**Conclusion 15/38 – New data type designators for bulletins containing special air-reports** That, in order to facilitate the exchange of the special air-reports, WMO be invited to designate a new data type designators (T1T2) for the WMO abbreviated headings of the bulletins containing special air-reports and, in particular, for special air-reports for volcanic ash. *Noted the conclusion and called upon the Secretary General, to invite WMO to assign, at their earliest convenience, a new data-type designator to bulletins containing special air-reports in order to ensure their proper exchange.*	Matter forwarded to WMO as the organization responsible for the aeronautical meteorological codes	Closed
D. Concl. 8/31	Concl. 15/39	**C**	**Conclusion 15/39 – Feasibility of extending the validity of TAF to 30 hours** That, ICAO be invited to study, in coordination with the WMO, the feasibility of the introduction of a TAF with a period of validity of 30 hours in view of the new requirements for very long haul flights. *Noted the conclusion and called upon the Secretary General, to study, in coordination with the WMO, the feasibility of developing provisions for Annex 3 for the introduction of a TAF with a 30-hour period of validity in view of new requirements for very long haul flights.*	Report on the trials between USA and Singapore to be presented at CNS/MET SG/9 meeting	Closed

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Deci. 8/32	Deci. 15/40		**Decision 15/40 – Planning for migration to BUFR-coded aeronautical meteorological messages** That, a) the ATN Transition Task Force and the OPMET Management Task Force be tasked to address the issues related to the transition to BUFR-coded aeronautical meteorological messages by conducting studies, as necessary; b) the two Task Forces develop in coordination a regional plan for migration to BUFR-coded aeronautical meteorological information by the end of 2005.	The matter has been addressed by the OPMET/M TF/3 meeting, March 2005 and the ATN Transition TF meeting in April 2005; joint meeting of the two groups planned for 2006.	On-going
D. Concl. 8/33	Concl. 15/41		**Conclusion 15/41– Designation of State volcano observatories** That, the Asia/Pacific States that maintain monitoring of active volcanoes, be invited to designate, based on the principles formulated by the IAVWOPSG/1 meeting, selected volcano observatories for inclusion in the new FASID Table MET 3C of the ASIA/PAC FASID (Doc 9673).	State letter circulated. The new FASID table is to be finalized.	On-going

Report Ref. Deci./Concl. Of Sub-Group	Report Ref. Deci./Concl. No. APANPIRG	Action Taken by ANC/Council	Decision/Conclusion/ Action Taken	Action Taken by States/ICAO	Status
D. Concl. 8/34	Concl. 15/42		**Conclusion 15/42 – Conducting SIGMET tests in the Asia/Pacific region** That, ICAO Regional office invite all TCAC and VAAC Provider States in the Asia/Pacific region, and all Asia/Pacific States with MWOs responsible for issuance of SIGMET for volcanic ash and/or tropical cyclones, to take part in the SIGMET tests to be carried out according to procedures developed by the VA/TC Implementation Task Force.	Two separate SIGMET tests have been conducted. The results to be reported at CNS/MET SG/9 meeting.	Completed
D. Concl. 8/35	Concl. 15/43		**Conclusion 15/43 – Improvement of issuance of SIGMET for tropical cyclones** That, the Asia/Pacific States be urged: a) in preparing SIGMET for tropical cyclone to pay due attention to the TC advisories issued by the responsible TCACs; and b) to provide feedback on the availability and the quality of the TC advisories provided by the responsible TCACs in order to assist in eliminating any deficiencies.	Action to be taken by September 2005.	On-going
D. Deci. 8/36	Deci. 15/44		**Decision 15/44 - Updated Subject/Tasks List of the CNS/MET Sub-group** That, the updated Subject/Tasks List of the CNS/MET Sub-group presented in Appendix K to the Report on Agenda Item 2.2.be adopted.	Subject/Tasks List updated.	Completed

Key Priorities for CNS/ATM Implementation in the Asia/Pacific Region

KEY PRIORITIES FOR CNS/ATM IMPLEMENTATION IN THE ASIA/PACIFIC REGION

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
1	~~ATN Implementation~~	~~Implementation of Ground-to-Ground element of ATN is required.~~	~~2005~~	~~CNS/MET~~ ~~ATN Transition Task Force.~~	~~Implementation plan to be completed and implementation to commence in 2005~~	Implementation plan completed and proposal for the ATN TTF to be dissolved. TF to be replaced by ATN Implementation Coordination Group. ACTION: Remove item from KP List.
2	Incorporation of CNS/ATM Material into Regional ANP & FASID	Incorporation of CNS/ATM Material into Regional ANP & FASID	Report to APANPIRG	ATM/AIS/SAR	On-going	Regional ANP and FASID extensively reviewed and are now estenially up-to-date. No action required by CNS/MET SG. ACTION: Suggest to ATM/AIS/SAR SG that item be removed from KP List.
3	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)	ATM/AIS/SAR	Implementation is monitored at each meeting using the uniform format for the reporting of WGS-84 implementation.	Majority of States have implemented WGS-84. Non-compliant states are identified in the deficiency list. Deficiency process provide sufficient attention to have matter resolved. ACTION: Suggest to ATM/AIS/SAR SG that item be removed from KP List.

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
4	RVSM Implementation	To provide more efficient flight profiles and to increase airspace capacity in conjunction with the implementation of CNS/ATM.	Bay of Bengal – 27 November 2003 Domestic airspace of Tokyo and Naha FIRs and Incheon FIR – June 2005.	ATM/AIS/SAR	Completed On-going	ACTION: no comment
5	RNP/RNAV Implementation En-route RNP 10 & 4 Terminal RNP 4 & 1 Approach RNP 0.3	Implement RNP based navigation, operation and procedures to improve the efficiency and flexible use of airspace.	Report to APANPIRG	ATM/AIS/SAR	On-going Phased implementation.	ACTION: Change title to RNP/RNAV Implementation
6	***ADS-C***	The implementation of ADS in oceanic or remote areas in accordance with the Regional CNS/ATM Plan is required for the enhancement of safety and ATM.	Report to APANPIRG FIT-BOB reconvened September 2003. Bay of Bengal operational trial of ADS/CPDLC commenced February 2004 FIT-SEA inaugural meeting May 2004. South China Sea operational trial of ADS/CPDLC expected 2006/2007	ATM/AIS/SAR	Phased implementation. Revised Regional CNS/ATM Guidance Material developed containing ADS section. Implementation focus and timetable need to be developed. States are gaining experience in the use of ADS.	ACTION: no comment

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
7	~~Technical~~ Co-operation in Regional CNS/ATM Planning ~~&~~ , Implementation & Training	The continuation and enhancement of ICAO's co-ordinating role of technical co-operation in CNS/ATM planning and implementation, in close co-operation with all partners and taking into account the regional approach, is required.	Report to APANPIRG	All	Sub-Groups to identify requirements.	Emphasis needs to be on sharing information and training. Title 'Technical Co-operation" is confusing with assistance programs. Need to inform States of opportunities for training well in advance of scheduled date. Training opportunities should include ICAO programs as well as associated organisations programs. ACTION: Re-title to '~~Technical~~ Co-operation in Regional CNS/ATM Planning ~~&~~ , Implementation & Training' , Retain in KP List
8	Preparation for WRC-2007	The co-operative participation of States is required with their respective telecommunications regulatory authorities, regional groups, at the APT forums and at the WRC regional preparatory meetings for WRC-2007 to ensure that aviation spectrum requirements are fulfilled and protected.	WRC-2007 APT Feb 06	All	States are designating contact points responsible for preparation for WRC 2007 and are providing contact details for posting on the website to facilitate coordination.	High importance task. Spectrum must be available to enable CNS/ATM implementation. ACTION: Retain as KP, Add regional (eg APT) preparatory meetings as milestones.

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
9	GNSS Implementation • ~~ABAS~~ • ~~SBAS~~ • GBAS	~~To implement GNSS in accordance with the Asia Pacific Regional Strategy.~~ ~~Develop regional GNSS augmentation requirements~~ ~~Ensure region wide awareness of developing GNSS systems integrate into Regional Plan.~~ Facilitate market available GBAS ground system certified to Annex 10 SARPs	~~On Going.~~ ~~Report to APANPIRG~~ 2008	~~All~~ CNS/MET	~~SBAS – WAAS IOC announced on 10 July 2003~~ ~~SBAS receivers – (TSO C145/6) now available~~ ~~GBAS – FAA LAAS contract for delivery in 2009~~ Lead aircraft with certified GBAS avionics now in service~~.~~	To be read in conjunction with KP-15. Strategy for Approach, Landing and Departure identified GBAS as a preferred CAT I option. No ground equipment is available that is certified to Annex 10 SARPs. ACTION: Changes as marked Reassign to CNS/MET
10	ATS route implementation	To review and develop new requirements for ATS routes.	Report to APANPIRG APANPIRG/14 established the ATS Route Network Review Task Force (ARNR/TF). The first meeting is scheduled in September 2004.	ATM/AIS/SAR	On-going States to undertake review of current and future route requirements to submit to ARNR/TF	ACTION: no comment

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
~~11~~	~~Final phase of WAFS~~	~~To implement transition to the final phase of WAFS to support the CNS/ATM system.~~	~~2005~~	~~CNS/MET~~ ~~WAFS Implementation Task Force~~	~~•WAFS Plan and Procedures have been developed and are being successfully implemented.~~ ~~•Transfer of responsibility of RAFCs to WAFCs London and Washington has been implemented.~~ ~~•RAFCs have been closed.~~	Key priority 11 and 12 merged
12	MET ~~Chapter 11 of the ASIA/PAC Regional Plan~~support 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 To identify the ATM requirements for new MET products supporting CNS/ATM systems and update the plan accordingly.	2003 2004 ~~2005~~ 2006	CNS/MET with assistance of the METATM TF and WAFS Implementation Task Force ATM/AIS/SAR & ~~METATM TF~~	• ~~The first draft of MET Chapter of the Regional CNS/ATM Plan has been developed.~~ Completed ~~•MET Chapter 11 of the Regional CNS/ATM Plan incorporated in issue 6 of the Plan.~~ Completed —METATM TF has~~to~~ surveyed the new requirements and is preparing an update for the MET ~~components~~ chapter of the ASIA/PAC Regional Plan for the New CNS/ATM ~~Plan~~Systems. MET/ATM coordination seminar planned for early 2006	Key priority 12 encompasses activities related to the MET component of the CNS/ETM systems including the implementation of WAFS (former Key Priority 11)

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
		Implementation of WAFS – transition to GRIB and BUFR coded products	2006		GRIB coded products have been implemented.	
13	Data link Communications	Implementation of CPDLC. AIDC to be introduced where ATM automated systems are implemented.	On -going February 2004 CPDLC operational trial in the Bay of Bengal area. 2006/2007 CPDLC operational trial expected in the South China Sea area 2005	All All	Sub Groups to review progress of implementation. Implementation focus and time-table need to be developed.	Data link communications is part of normal implementation program. There is no inhibitor preventing the implementation of CNS/ATM ACTION:
14	ADS-B	Data Link Selection for ADS/B recommended by ADS B Task Force ADS B Task Force to develop implementation plan and sub-groups foster implementation. States, where appropriate, implement ADS B Air-	2003 2005 2006	CNS/MET ADS-B Task Force All	APANPIRG/14 adopted 1090 MHz ES as the data link for ADS B in ASIA/PAC region. On-going On-going Australia actively progressing wide implementation of	Focus on activities to enable successful ADS-B implementation. Roll-out of ADS-B considered an on-going activity. ACTION: Amend item as marked.

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
		~~Ground surveillance service on a sub-regional basis.~~ Operational Standards to support proposed separation standards Airline aircraft certificated to participate in ADS-B operations Avionic packages available to meet GA and low capacity operations.	 2006 2006 2008	 ADS-B Task Force ADS-B Task Force ADS-B Task Force	~~ADS-B.~~	
15	Implementation of APV and ~~RNP~~ ~~RNP~~ RNAV(GNSS) Approaches	Review applicability of APV and ~~RNP~~ RNAV GNSS) ~~RNP~~ Approach Design Standards, aircraft certification and augmentation system availability for Asia Pacific. Develop implementation strategy.	~~On Going. Report to APANPIRG~~ 2006 2007	~~ATM/AIS/SAR~~ CNS/MET	APV and ~~RNP~~ RNAV(GNSS) ~~RNP~~ Design standards now in PANS OPS. Aircraft certified for ~~RNP~~ RNAV(GNSS) ~~RNP~~ and APV approaches.	Navigation function. ACTION: Update terminology as shown Reassign to CNS/MET Extend applicability review

No.	KEY PRIORITIES	DESCRIPTION	MILESTONES	SUB-GROUP	STATUS	DISCUSSION/ACTION
16	Data Link Flight Information Services (DFIS) applications	To implement the following applications via request/response mode of data link in the Asia and Pacific Regions: a) Data link –automatic terminal information services (D-ATIS); b) VOLMET data link service (D-VOLMET); c) ~~c)~~ Pre-Departure Clearance (PDC) delivery via data-link; d) DCL	2008	~~All~~ ATM/AIS/SAR CNS/MET	Trials and demonstrations are conducted and some operational services are provided by States.	ACTION: Add DCL and Reassign to ATM/AIS/SAR and CNS/MET
17	Safety Management Systems	States to establish national safety management systems and effective application of safety programmes which are required for the provision of air traffic services. Required monitoring services available to support operational enhancements	~~APANPIRG/14 established the Regional Airspace Safety Monitoring Advisory Group (RASMAG).~~ ~~First RASMAG meeting held 26-30 April 2004~~	RASMAG RASMAG	Annex 11 provisions effective 27 November 2003. On-going RASMAG activities Operational enhances suspended where effective monitoring is not available	States without compliant SMS to be listed on deficiency list. ACTION: Amended as marked.

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PACIFIC
ATS Message Handling System (AMHS) Naming Plan

THIRD EDITION - APRIL 2005

EXECUTIVE SUMMARY

This document provides planning and technical guidance on the naming convention for the transition of ground Aeronautical Fixed Telecommunication Network (AFTN) services to the ATS Message Handling System (AMHS) within the ASIA/PAC Region.

Based upon the ATN SARPs as published in ICAO Annex 10 and ICAO Doc. 9705, naming and addressing plans are required to be developed by ICAO regions concerned. These Regional Plans will provide guidance to States in the assignment and registration of addresses and names to be used for the Aeronautical Telecommunication Network (ATN).

The ASIA/PAC ATN AMHS Naming Plan aligns itself with the global AMHS naming scheme.

To maintain compatibility within the region, the Common AMHS Addressing Scheme (CAAS) Address format should be adopted where States are about to start their AMHS implementation programmes. This will ensure compatibility with the proposed global AMHS naming scheme.

A formal registration authority is established within ICAO, which will maintain a register for registering all Private Management Domains (PRMDs).

This document was adopted by 12th Meeting of APANPIRG held in 2001 for distribution to States in the ASIA/PAC and adjacent regions. It was further updated in April 2005 to include a comprehensive elaboration on the Common AMHS Addressing Scheme (CAAS), in particular the Private Management Domain Name value for States in the ASIA/PAC region.

1. INTRODUCTION

This document presents the naming assignment conventions for allocating Originator/Recipient (O/R) names to be used for the ATS Message Handling System (AMHS) in the ASIA/PAC Region.

The information contained in this document is drawn from a number of developments from the third meeting of the ATN Panel and planning activities in Europe.

1.1 Objectives

The objective of the document is to provide guidance in the naming convention to be used for the AMHS in the ASIA/PAC Region.

1.2 Scope

The scope of the document includes:

- Describing the attributes of the AMHS address format, and
- Recommending the values for the relevant attributes that are to be used in the AMHS address.

The ASIA/PAC Regional ATN AMHS naming convention presented here will comply with the relevant formats as specified in ICAO Doc. 9705.

The ASIA/PAC Regional ATN AMHS Naming Plan defines the method for assigning values to each of the relevant attributes of the AMHS address. States may choose to assign their AMHS addresses based upon the recommendations made here.

1.3 References

Reference 1 Manual of Technical Provisions for the ATN (Doc 9705-AN/956) Third Edition

Reference 2 ICAO Location Indicators – Document 7910

1.4 Definitions

MF-Address (MHS-form address) is the Originator/Recipient name of an AMHS user.

CAAS-Address (Common AMHS Address Scheme) is a MF-Address of which the organization-name attribute identifying the user within an AMHS Management Domain is selected by the Management Domain itself and shall be supplied to ICAO for publication.

XF-Address (Translated-form address) is a particular MF-Address of which all attributes identifying the user within an AMHS Management Domain may be converted by an algorithmic method to and from an AFTN form address.

1.5 Abbreviations

The following abbreviations are used in this document:

ADMD	Administration Management Domain

AFTN	Aeronautical Fixed Telecommunication Network
AMHS	ATS Message Handling System
ATSMHS	ATS Message Handling Service
APANPIRG	Asia Pacific Air Navigation Planning and Implementation Regional Group
ATN	Aeronautical Telecommunication Network
ATNTTF	APANPIRG ATN Transition Task Force
ATS	Air Traffic Service
ATSO	Air Traffic Service Organizations
CAAS	Common AMHS Addressing Scheme
ICAO	International Civil Aviation Organization
ITU-T	International Telecommunication Union Telecommunication Standardization Sector
MHS	Message Handling Service
MF	MHS Form
MTA	Message Transfer Agent
O/R	Originator/Recipient
PRMD	Private Management Domain
SARP	Standards and Recommended Practices
XF	Translated Form

2. AMHS NAMING CONVENTION

The Asia Pacific AMHS naming convention is based on a number of factors that have arisen from the third meeting of the ATN Panel held in Montreal during the 7th to 18th of February 2000 and the results from other AMHS planning activities developed by other regions.

To ensure continuity and compatibility with other AMHS naming conventions, the AMHS naming convention for the ASIA/PAC Region was developed based upon the outcome of the European SPACE[1] Project.

2.1 MHS Addressing Scheme

There are four types of address form in CCITT X.400 Message Handling System. The addressing scheme of AMHS adopts the mnemonic form address and the attributes contain in this from are described in the table below:

[1] SPACE (Study and Planning of AMHS Communications in Europe) is a project supported by the European Commission and is the combined efforts of the participating countries and organizations from EUROCONTROL, France, Germany, Spain and the United Kingdom.

Table 2-1 Mnemonic form address attributes of MHS

Attribute	Notation	Maximum Length	Comment
Country-name	C	3	
ADMD	A	16	
PRMD	P	16	
Organization-name	O	64	
Organizational Unit name	OUn	4 x 32	n = 1 – 4
Common name	CN		
Personal name	S	40	Surname
	G	16	Given name
	I	5	Initials
	GQ	3	Generation Qualifier
Domain-defined-attributes	DDA	Varies	(DDA type) = (DDA Value), up to 4 attributes

2.2 MF-Addressing Scheme in AMHS

Each AMHS user within an AMHS Management Domain is assigned an Originator/Recipient (O/R) name, which is referred to as a MF-address (MHS-form address).

Two types of MF-address in AMHS are defined in Doc9705 (reference 1), namely Common AMHS Addressing Scheme (CAAS) and XF (Translated-form) Addressing Scheme. They differ in the number of attributes being selected from mnemonic form of MHS addressing scheme,

The MF-address of an AMHS user (no matter CAAS or XF) shall comprise:

a) a set of attributes identifying the AMHS Management Domain of which the AMHS user, either direct or indirect, is a service-user; and
b) a set of attributes identifying unique AMHS user within the AMHS Management Domain,

2.3 Naming Convention For CAAS Format

It is recommended that ICAO register with the ITU-T the ADMD name “ICAO” as an international ADMD under the “XX” country code. It was also recommended that ICAO establishes and maintains a register of PRMDs allocated by air traffic service providers according to the “XX” + “ICAO” address structure. The management of this register would be established and maintained in the same way as the Location Indicators (Doc 7910) and Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services (Doc 8585).

The Air Navigation Commission on the 1st of June 2000 approved these recommendations. On the basis of these recommendations, the ASIA/PAC Region accepted the format for the allocation of the first two attributes used in the O/R name. It was proposed that a common naming convention be used worldwide to help stream line the addressing scheme and to ensure compatibility and consistency with other neighboring

regions. This scheme would be based on the work that has been ongoing in Europe. It was also stressed that if States have not already started their implementation programmes for AMHS that when planning to do so they should adopt the CAAS-Address format and not the XF-Address format.

The ASIA/PAC Region will adopt the proposed worldwide CAAS-Address format, which uses the following attributes to define the O/R name during the transition phase from AFTN to AMHS:

1. Country-name;
2. ADMD;
3. PRMD;
4. Organization-name;
5. Organizational-unit-name 1; and
6. Common Name.

2.3.1 Country Name

The country name is a mandatory requirement and shall consist of the two alphanumeric ISO 3166 Country Code "XX" encoded as a Printable String. The country code "XX" has been adopted, as this is a special code registered by the ITU-T for the purpose of allocation to international organizations, which do not reside within any particular country.

2.3.2 ADMD

The administrative domain is a mandatory requirement and shall consist of the Printable String "ICAO". ICAO has registered "ICAO" as the ADMD with the ITU-T. By providing the "ICAO" ADMD will allow the addressing schemes to be independent of any constraints that may be imposed by management domains in the global MHS or national regulations that may vary from region to region.

2.3.3 PRMD

The private management domain is an optional requirement as documented in the relevant ITU-T Standards. However, this attribute is mandatory for implementation of AMHS by States in the ASIA/PAC Region as part of the worldwide CAAS-Address format scheme.

The contents of this field can include the ICAO Location Indicator specified in ICAO Document 7910 or the name of the Air Traffic Service Organization (ATSO) that has been registered with ICAO. Where an ATSO has not yet assigned their PRMD then a default value will be allocated, which will use either one or two letters of the ICAO Country Indicator specified in ICAO Document 7910. This has been chosen for its simplistic and non-ambiguous format, which is already managed by ICAO. Hence providing an easier management role for ICAO who will be responsible for maintaining the register of all PRMDs allocated under the ADMD of "ICAO".

2.3.4 Organization Name

The organization name is used to define the local or national geographical routing information. This information is to be assigned by the ATSO (for example can be based on the ICAO location indicator as specified in ICAO Document 7910 or some other value determined by an ATSO and published by ICAO). Figure 2 - 1 provides a pictorial view of how the organization name can be used in relation with the lower attribute structure.

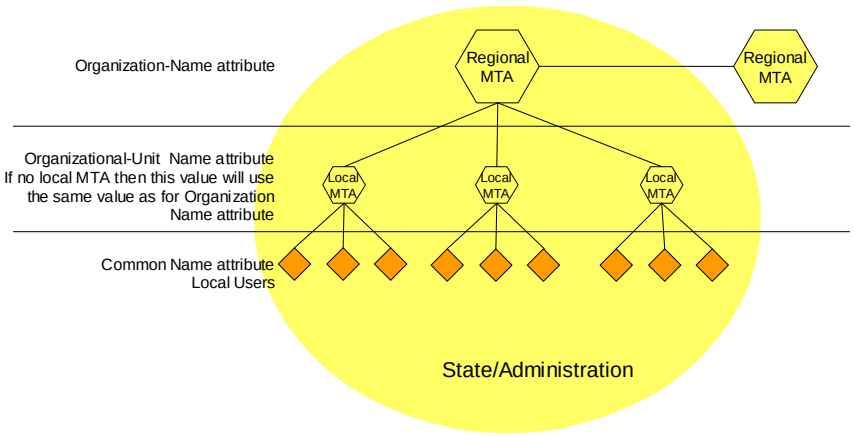


Figure 2 -1 Lower Attribute Structure

2.3.5 Organizational Unit Name OU1

Each State or organization is allocated a unique ATS message organizational name. As all States are familiar with the ICAO four character location indicator defined in ICAO document 7910. It is proposed that the organization unit name 1 use the location indicator to identify the Message Transfer Agent (MTA) site, encoded as a Printable String.

Note: The MTA site may be the MTA name of the server. However there are security issues that need to be addressed to ensure that this arrangement does not cause any unnecessary concerns with service providers that allow the MTA name to be broadcast in this fashion.

2.3.6 Common Name

It is proposed that during the AFTN transition to AMHS that the common name attribute be used to contain the 8-character alphabetical value of the AFTN address indicator of the user, encoded as a Printable String. This shall apply for AFTN users only. Possible example of an O/R address is shown in Table 2-2

Table 2- 2 Example of a CAAS-Address AMHS Naming Convention

Attribute	Assigned By	Value	Comment
Country-name (C)	ITU-T	XX	International Organization
ADMD (A)	ICAO	ICAO	ICAO Responsibility to register
PRMD (P)	ATSO	e.g. THAILAND	ATSO registered private domain with ICAO.
Organization name (O)	ATSO	e.g. VTBB	Local/national geographical information, which can be based on ICAO Location Indictors (Doc 7910)
Organizational-Unit name (OU1)	ATSO	e.g. VTBB	ICAO Location Indicator (Doc 7910)
Common Name (CN)	ATSO	e.g. VTBBYFYX	AFTN address

Note: It is proposed that for a direct AMHS user that an ATSO should be able to assign a suitable name to that user without being restricted to an AFTN address indicator.

2.4 Naming Convention For XF-Address Format

The attributes to be used for the XF-Address format are as described in ICAO Document 9705 and presented below as follows:

1. Country-name;
2. ADMD;
3. PRMD;
4. Organization-name; and
5. Organizational-unit-name 1.

2.4.1 Country Name

As proposed in Section 2.3.1

2.4.2 ADMD

As proposed in Section 2.3.2

2.4.3 PRMD

As proposed in Section 2.3.3

2.4.4 Organization Name

This field has already been defined by ICAO Document 9705. The value of this field contains the encoded printable string “AFTN”.

2.4.5 Organizational Unit Name OU1

The organizational unit name 1 attribute is used to contain the 8-character alphabetical value of the AFTN address indicator of the user, encoded as a Printable String.

Possible example of an O/R address is shown in Table 2-3

Table 2-3 Example of XF-Address AMHS Naming Convention

Attribute	Assigned By	Value	Comment
Country-name (C)	ITU-T	XX	International Organization
ADMD (A)	ICAO	ICAO	ICAO Responsibility to register
PRMD (P)	ATSO	e.g. Y	ICAO Country Indicator or ATSO registered private domain with ICAO
Organization-name (O)	ATSO	AFTN	AFTN name
Organizational-Unit name (OU1)	ATSO	e.g. YBBBYFYX	AFTN address indicator

2.5 General Use of X.400 O/R Addresses

Note: The address format of X.400 O/R address attributes for sending general non-operational AMHS traffic is a local matter for States/Administrations to implement if they wish to do so and no further advice is provided in this plan.

3. PRMD-name values and Address Scheme Registration

As it is important to have the proper address developed well before the AMHS implementation in the Region, a comprehensive draft of PRMD value and AMHS Addressing Scheme for each State/ATSO in the ASIA/PAC region are developed below. Examples and tables given would assist State/ATSO to understand XF and CAAS address scheme. State/ATSO are recommended to follow the proposal and register to deploy CAAS as early as possible.

3.1 XF Addressing Scheme

XF is only intended for transitional arrangement when both AFTN and AMHS systems co-exist during the initial implementation of AMHS. States/ATSOs declare the use of XF could still maintain an AFTN system for routing of messages to and from local and international AFTN users before the sunset date (to be decided by ICAO),whereas messages to and from the ATN are routed through the AFTN/AMHS gateway for format conversion.

The XF Addressing Scheme is simple to implement because the *organization-name* always takes the fixed value "AFTN" and the *organization-unit-name-1* is used to store the AFTN address. Hence, only the *PRMD-name* is required for AFTN to XF address translation and there are no more than 200 of such entries. The ATN SARPs Edition 2 provided the XF addressing requirements. However, the XF scheme does not support the addressing of multiple MTAs within a MD for more operational choice by States/ATSO. For example, having two MTAs as entry/exit points of a MD can serve the purpose of load balancing as well as providing a hot-backup site to enhance the performance and availability of the AMHS service. The drawback on the use of XF is that, unlike the CAAS that allows multiple *organization-name* values, XF supports only one value. Hence an AMHS initially using XF addressing will need to be changed back to CAAS addressing at a later time (when the system will be in operation delivering live traffic). With this in conjunction with the limited value (i.e. for simplicity) of XF addressing, the ATN SARPs Edition 3 encourages the direct use of CAAS addressing right in the beginning of AMHS implementation.

3.2 Common AMHS Addressing Scheme

CAAS supports both transitional (AFTN plus AMHS) and pure AMHS environment. In a pure AMHS environment, only CAAS addresses are used and the routing decision rests on the router and/or MTA depending on the MTA routing policy. No address conversion is needed and hence XF address does not play any role here.

The CAAS offers greater flexibility in assigning values to the *organization-unit-name-1 (OU1)* and *common-name (CN)* attributes. It opens up the possibility for the MD to select any desirable values on *OU1* and *CN* after the sunset date and hence give rise to a user-friendly address and more importantly, higher scalable service even down to personal level.

To facilitate smooth migration, *OU1* attribute is initially used to store 4-letter location indicator(s) categorized under *organization* attribute whereas *CN* is deployed to keep the existing AFTN address during the transition period. After the transition period, the values of *OU1* and *CN* could be changed or re-assigned by the respective MDs in accordance with the guidelines to be developed by ICAO.

The CAAS requires each AMHS MD to maintain and update the latest *organization-name* and additional *organization-unit-name-1* values declared by all AMHS MDs. The complexity of maintenance and updating of these values will grow with the size of AMHSs in use globally. To ease the problem on address resolution in CAAS, Directory Service (DIR), which is an Extended AMHS function, should be used. For information, DIR had been included as one of the optional elements in the ATN SARPs.

4. PRMD-name value

PRMD-name takes either ICAO Nationality Letters as specified in Doc7910 or values declared by respective AMHS MD. The Nationality Letters will be taken as the default values if States/ATSOs do not respond to ICAO's State Letter. Hence, values of the *PRMD-name* may take any one of the following three forms: -

(a) Value declared by AMHS MD which is different from Nationality Letter, e.g. Hong Kong, China declared

the value "HongKong" as *PRMD-name.*

(b) Value declared by AMHS MD but follows the Nationality Letter, e.g. New Zealand declared the value "NZ" as *PRMD-name.*

(c) Value from the default Nationality Letter assigned by ICAO when the AMHS MD does not respond to the ICAO State Letter, e.g. value "RP" is assigned to Philippine as *PRMD-name* by ICAO.

4.1 PRMD-name value for XF

In the XF Addressing Scheme, the *organization-name* value is fixed as "AFTN" and there is no *common-name* attribute. Therefore, only the *PRMD-name* is required by AMHS MD for AFTN/XF address translation. To streamline the choice of *PRMD-name* value and to simplify the conversion, it would be more convenient and logical to make use of the Nationality Letters in AFTN location indicator as the *PRMD-name* value. Table 1a gives the suggested values if States/ATSOs in ASIA/PAC choose to use XF for the time being.

4.2 PRMD-name value for CAAS

In CAAS, the *organization-name* value is not fixed. To minimize the influence of the legacy AFTN address structure on CAAS and to present explicitly the name of the States/ATSOs administering the AMHS MD, it would be advisable to use full name of the States/ATSOs as the *PRMD-name* value. This is given in Table 1b.

5. Defining *Organization-name* and *Organization-unit-name-1* for CAAS

On top of *PRMD-name*, *organization-name* is also required for AFTN to CAAS address resolution. It may take a value that represents a geographical unit or identifies an organization. The syntax and values are to be defined by the States/ATSOs. States/ATSOs selecting CAAS are required to provide at the same time a group of 4-letter location indicators associated to the selected *organization-name* value. These location indicators constitute the *organization-unit-name-1* values to facilitate address conversion and therefore shall also be provided to ICAO for publication. Examples on CAAS deployment in the Asia Pacific Region are given below:

Example 1 : CAAS with *organization-name* to identify an organization

State/ATSO: A

PRMD-name	B
Organization-name	*x*
Organization-unit-name-1	[XXXX]

B= name of State/ATSO in alphanumeric characters

x = name of the organization in alphanumeric characters. The syntax and value are to be defined by the considered State/ATSO.

[XXXX] = 4-letter AFTN location indicator(s) that is associated with the organization

e.g. COUNTRYABCD

PRMD-name	COUNTRYABCD
Organization-name	CAANAME
Organization-unit-name-1	VKKK VKKA VKSA VKSP

Example 2 : CAAS with *organization-name* to represent a geographical unit

State/ATSO: A

PRMD-name	B
Organization-name	[PPPP]
Organization-unit-name-1	n[XXXX]

[PPPP] = 4-letter AFTN location indicator representing a geographical unit

n[XXXX] = n number of 4-letter AFTN location indicator(s) that is associated with the unit

e.g. COUNTRYMNPQ

PRMD-name	COUNTRYMNPQ
Organization-name	VZSS
Organization-unit-name-1	VZAC VZAG VZAH VZAP VZAR VZAT VZJC VZSL VZSS

The above examples involve one single MTA. However, it is possible to deploy multiple MTAs within the AMHS MD when the area of the States/ATSOs or the size of the organizations is big enough for consideration of segregation. In this case, more than one *organization-name* value, each associated with a number of location indicators shall be defined and provided to ICAO for publication.

Example 3 : CAAS with *organization-name* to represent a geographical unit and more than one MTA within the MD

State/ATSO: A

PRMD-name	B
Organization-name	m[PPPP]
Organization-unit-name-1	n[XXXX] per [PPPP]

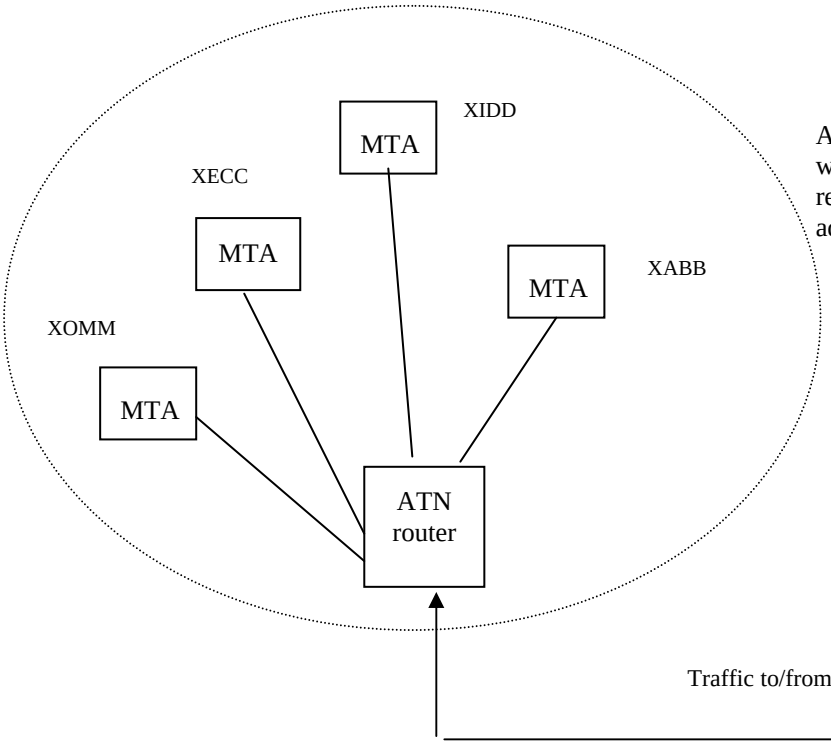
m[PPPP] = m number of 4-letter location indicator each representing different geographical unit

n[XXXX] = n number of 4-letter location indicator(s) that are associated with a particular geographical unit

e.g. COUNTRYXYZ

PRMD-name	COUNTRYXYZ			
Organization-name	XECC	XABB	XOMM	XIDD
Organization-unit-name-1	XE**	XA**	XO**	XI**

Wildcard.(*) may be used to reduce the number of entries in Organsiation-unit-name-1 field.



Note: 1. Each MTA, as an end system, should have its own NSAP address.

2. Traffic between MTAs within the domain is a local matter.

Table 2a provides suggested values for the CAAS for all States/ATSOs in the ASIA/PAC region assuming each State deploys one MTA. Table 2b provides examples of CAAS for some States/ATSOs in ASIA/PAC region assuming multiple MTAs are deployed. States/ATSOs shall refer to the examples given to develop their own CAAS address scheme for single or multiple MTAs option.

Table 1a

Suggested *PRMD-name* values of the AMHS MD in ASIA/PAC region assuming all States/ATSOs using XF

States	AMHS Address Specification			
	Nationality Letters or Designator	**Country-name attribute**	**ADMD-name attribute**	**PRMD-name attribute**
American Samoa	NST*	XX	ICAO	NST
Australia	Y*	XX	ICAO	Y
Bangladesh	VG	XX	ICAO	VG
Bhutan	VQ	XX	ICAO	VQ
Brunei Darussalam	WBSB, WBAK	XX	ICAO	WB
Cambodia	VD	XX	ICAO	VD
China	ZP, ZS, ZU, ZW, ZG,ZH,ZL, ZY, ZB	XX	ICAO	ZB
Cook Islands	NC	XX	ICAO	NC
Dem. People's Rep. Of Korea	ZK	XX	ICAO	ZK
Democratic Republic of Timor-Leste	WP	XX	ICAO	WP
Fiji	NF	XX	ICAO	NF
French Polynesia	NT	XX	ICAO	NT
Hong Kong (China)	VH	XX	ICAO	VH
Wallis and Futuna Island (France)	NL	XX	ICAO	NL
India	VA, VI, VO, VE	XX	ICAO	VA
Indonesia	WA,WI,WR	XX	ICAO	WA
Japan	RJ,RO	XX	ICAO	RJ
Kiribati	NG	XX	ICAO	NG
Lao People's Dem. Rep.	VL	XX	ICAO	VL
Macau (China)	VM	XX	ICAO	VM
Malaysia	WB	XX	ICAO	WB
Malaysia (Peninsular)	WM	XX	ICAO	WM
Maldives	VR	XX	ICAO	VR
Marshall Islands (U.S.)	PK	XX	ICAO	PK

Micronesia (Federated States of)	PT	XX	ICAO	PT
Mongolia	ZM	XX	ICAO	ZM
Myanmar	VY	XX	ICAO	VY
Nauru	AN	XX	ICAO	AN
Nepal	*VN*	XX	ICAO	VN
New Caledonia (France)	NW	XX	ICAO	NW
New Zealand	NZ	XX	ICAO	NZ
Niue Island (New Zealand)	NI	XX	ICAO	NI
Pakistan	OP	XX	ICAO	OP
Palau Islands (U.S.)	PTR*	XX	ICAO	PTR
Papua New Guinea	AY	XX	ICAO	AY
Philippines	RP	XX	ICAO	RP
Rep. Of Korea	RK	XX	ICAO	RK
Samoa	NS	XX	ICAO	NS
Singapore	WS	XX	ICAO	WS
Solomon Islands	AG	XX	ICAO	AG
Sri Lanka	VC	XX	ICAO	VC
Tai Wan (China)	RC	XX	ICAO	RC
Thailand	VT	XX	ICAO	VT
Tonga	NFT*	XX	ICAO	NFT
Tuvalu	NGF*	XX	ICAO	NGF
Vanuatu	NV	XX	ICAO	NV
Viet Nam	VV	XX	ICAO	VV

Table 1b

Suggested *PRMD-name* values of the AMHS MD in ASIA/PAC region assuming all States/ATSOs using CAAS

States	AMHS Address Specification			
	Nationality Letters or Designator	**Country-name attribute**	**ADMD-name attribute**	**PRMD-name attribute**
American Samoa	NST*	XX	ICAO	SAMOA-US
Australia	Y*	XX	ICAO	AUSTRALIA
Bangladesh	VG	XX	ICAO	BANGLADESH
Bhutan	VQ	XX	ICAO	BHUTAN
Brunei Darussalam	WBSB, WBAK	XX	ICAO	BRUNEI
Cambodia	VD	XX	ICAO	CAMBODIA
China	ZP, ZS, ZU, ZW, ZG,ZH,ZL, ZY, ZB	XX	ICAO	CHINA
Cook Islands	NC	XX	ICAO	COOK-IS
Dem. People's Rep. Of Korea	ZK	XX	ICAO	DP-REP-KOREA
Democratic Republic of Timor-Leste	WP	XX	ICAO	EAST-TIMOR
Fiji	NF	XX	ICAO	FIJI
French Polynesia	NT	XX	ICAO	POLYNESIA
Hong Kong (China)	VH	XX	ICAO	HONGKONG
Wallis and Futuna Island (France)	NL	XX	ICAO	WALLIS-IS
India	VI, VA, VO, VE	XX	ICAO	INDIA
Indonesia	WA,WI,WR	XX	ICAO	INDONESIA
Japan	RJ,RO	XX	ICAO	JAPAN
Kiribati	NG	XX	ICAO	KIRIBATI
Lao People's Dem. Rep.	VL	XX	ICAO	LAO
Macau (China)	VM	XX	ICAO	MACAU
Malaysia	WB	XX	ICAO	MALAYSIA
Malaysia (Peninsular)	WM	XX	ICAO	MALAYSIA-PENIN
Maldives	VR	XX	ICAO	MALDIVES
Marshall Islands (U.S.)	PK	XX	ICAO	MARSHALL

Micronesia (Federated States of)	PT	XX	ICAO	MICRONESIA
Mongolia	ZM	XX	ICAO	MONGOLIA
Myanmar	VY	XX	ICAO	MYANMAR
Nauru	AN	XX	ICAO	NAURU
Nepal	VN	XX	ICAO	NEPAL
New Caledonia (France)	NW	XX	ICAO	NEW-CALEDONIA
New Zealand	NZ	XX	ICAO	NEW-ZEALAND
Niue Island (New Zealand)	NI	XX	ICAO	NIUE-IS
Pakistan	OP	XX	ICAO	PAKISTAN
Palau Islands (U.S.)	PTR*	XX	ICAO	PALAU-IS
Papua New Guinea	AY	XX	ICAO	PAPUA-NG
Philippines	RP	XX	ICAO	PHILIPPINES
Rep. Of Korea	RK	XX	ICAO	REP-KOREA
Samoa	NS	XX	ICAO	SAMOA
Singapore	WS	XX	ICAO	SINGAPORE
Solomon Islands	AG	XX	ICAO	SOLOMON-IS
Sri Lanka	VC	XX	ICAO	SRI-LANKA
Tai Wan (China)	RC	XX	ICAO	TAIBEI
Thailand	VT	XX	ICAO	THAILAND
Tonga	NFT*	XX	ICAO	TONGA
Tuvalu	NGF*	XX	ICAO	TUVALU
Vanuatu	NV	XX	ICAO	VANUATU
Viet Nam	VV	XX	ICAO	VIETNAM

Table 2a

Suggested CAAS Addressing Scheme

assuming all States/ATSOs in ASIA/PAC deploy one MTA

States	AMHS Address Specification				
	Country-name attribute	**ADMD-name attribute**	**PRMD-Name attribute**	**Organization-name**	**Organisation-unit-name-1**
American Samoa	XX	ICAO	SAMOA-US	NSTU	All 4-letter location indicators of the State contained in Doc7910
Australia	XX	ICAO	AUSTRALIA	YSSY	Ditto
Bangladesh	XX	ICAO	BANGLADESH	VGZR	Ditto
Bhutan	XX	ICAO	BHUTAN	VQPR	Ditto
Brunei Darussalam	XX	ICAO	BRUNEI	WBSB	Ditto
Cambodia	XX	ICAO	CAMBODIA	VDPP	Ditto
China	XX	ICAO	CHINA	ZBBB	Ditto
Cook Islands	XX	ICAO	COOK-IS	NCRG	Ditto
Dem. People's Rep. Of Korea	XX	ICAO	DP-REP-KOREA	ZKKK	Ditto
Democratic Republic of Timor-Leste	XX	ICAO	EAST-TIMOR	WPAT	Ditto
Fiji	XX	ICAO	FIJI	NFFN	Ditto
French Polynesia	XX	ICAO	POLYNESIA	NTAA	Ditto
Hong Kong (China)	XX	ICAO	HONGKONG	HKGCAD	Ditto
Wallis and Futuna Island (France)	XX	ICAO	WALLIS-IS	NLWW	Ditto
India	XX	ICAO	INDIA	VABB	Ditto
Indonesia	XX	ICAO	INDONESIA	WAAA	Ditto
Japan	XX	ICAO	JAPAN	RJAA	Ditto
Kiribati	XX	ICAO	KIRIBATI	NGTA	Ditto
Lao People's Dem. Rep.	XX	ICAO	LAO	VLVT	Ditto
Macau (China)	XX	ICAO	MACAU	VMMC	Ditto
Malaysia	XX	ICAO	MALAYSIA	WBFC	Ditto
Malaysia (Peninsular)	XX	ICAO	MALAYSIA-PENIN	WMKK	Ditto
Maldives	XX	ICAO	MALDIVES	VRMM	Ditto

Marshall Islands (U.S.)	XX	ICAO	MARSHALL	PKMJ	Ditto
Micronesia (Federated States of)	XX	ICAO	MICRONESIA	PTKK	Ditto
Mongolia	XX	ICAO	MONGOLIA	ZMUB	Ditto
Myanmar	XX	ICAO	MYANMAR	VYYY	Ditto
Nauru	XX	ICAO	NAURU	ANAU	Ditto
Nepal	XX	ICAO	NEPAL	VNKT	Ditto
New Caledonia (France)	XX	ICAO	NEW-CALEDONIA	NWWW	Ditto
New Zealand	XX	ICAO	NEW-ZEALAND	NZAA	Ditto
Niue Island (New Zealand)	XX	ICAO	NIUE-IS	NIUE	Ditto
Pakistan	XX	ICAO	PAKISTAN	OPKC	Ditto
Palau Islands (U.S.)	XX	ICAO	PALAU-IS	PTRO	Ditto
Papua New Guinea	XX	ICAO	PAPUA-NG	AYPY	Ditto
Philippines	XX	ICAO	PHILIPPINES	RPLL	Ditto
Rep. Of Korea	XX	ICAO	REP-KOREA	RKSI	Ditto
Samoa	XX	ICAO	SAMOA	NSFA	Ditto
Singapore	XX	ICAO	SINGAPORE	WSSS	Ditto
Solomon Islands	XX	ICAO	SOLOMON-IS	AGGH	Ditto
Sri Lanka	XX	ICAO	SRI-LANKA	VCCC	Ditto
Tai Wan (China)	XX	ICAO	TAIBEI	RCTP	Ditto
Thailand	XX	ICAO	THAILAND	VTBB	Ditto
Tonga	XX	ICAO	TONGA	NFTF	Ditto
Tuvalu	XX	ICAO	TUVALU	NFGU	Ditto
Vanuatu	XX	ICAO	VANUATU	NVVV	Ditto
Viet Nam	XX	ICAO	VIETNAM	VVVV	Ditto

Table 2b

Suggested sample CAAS Addressing Scheme
for some States/ATSOs in ASIA/PAC deploying multiple MTAs

States	AMHS Address Specification				
	Country-name attribute	**ADMD-name attribute**	**PRMD-name attribute**	**Organization-name**	**Organisation-unit-name-1**
Australia	XX	ICAO	AUSTRALIA	YBBN	YA*, YB*, YC*, YD*,YE*,YF*, YH*, YI*, YJ*, YK*
				YSSY	YL*, YM*, YN*, YO*, YP*, YQ*, YR*, YS*, YT*, YU*, YV*,YW*, YY*
China	XX	ICAO	CHINA	ZBBB	ZB*, ZS*, ZW*, ZY*, ZU*
				ZGGG	ZG*, ZJ*, ZH*, ZL*, ZP*
Japan	XX	ICAO	JAPAN	RJAA	RJ*
				ROAH	RO*
Thailand	XX	ICAO	THAILAND	VTBB	VTB*, VTC*
				VTSS	VTP*, VTS*, VTU*

* * * * *

AMHS NAMING REGISTRATION FORM
Table 1a - AMHS MTA and User Agent Register

Explanation of the Table 1a

Legend:	
Contracting State :	Authority administering the MTA.
MTA ID :	Numbering scheme where each MTA is assigned with an ordinal number.
User Agent ID :	Sub-ordinate number assigned to the User Agent Name registered under a MTA.
Addressing scheme :	Addressing scheme recommended by ATN SARPS. Values are limited to XF or CAAS.
Country-name :	The “C” value of AMHS MD identifier.
Administration-domain-name :	The “A” value of AMHS MD identifier.
Private-domain-name :	The “P” value of AMHS MD identifier.
Organization name :	The “O” value of attributes identifying an geographical unit or an organization within MD. The value is fixed for XF addressing scheme. (O=AFTN)
Organization-unit-name-1 :	The “OU1” value of attributes identifies 4-letter location indicator within the organization “O”. Depending upon the prevailing condition, some letters can be represented by wildcard (*).
User Agent (Direct User only) :	The “CN” value (Common Name) of attributes identifies a User Agent (UA) i.e. direct user within MD. It is presented in 8-character AFTN address format to enable the UA to receive message from AFTN indirect user. This field will be blanked when the OU1 is not equipped with UA.
Description of user :	Brief description of the UA, the direct user. NOC = network operating centre

Legend:	
MTA Name :	The name of the MTA hosting the AMHS user. (Used in AMHS binds.)
NSAP address :	NSAP address of the MTA. The NSAP address assignments should follow the ICAO recommendation in ASIA/PAC ATN Network Service Access Point (NSAP) Addressing Plan
TSEL value :	TSEL value of the MTA.
Capability :	The type of services supported by the MTA and the edition of relevant document (the number in parenthesis). Basic Service =A, File Transfer Body Part =B, Directory Service =C, Security = D; System Management = F, AMHS/AFTN Gateway=H

Table 1a – AMHS MTA and User Agent Register

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Contracting State	**MTA ID**	**User Agent ID**	**Addressing scheme**	**Country-name**	**Administration - domain-name**	**Private-domain -name**	**Organization-name**	**Organization-unit-name-1**	**User Agent (Direct User only)**	**Description of user**	**MTA Name**	**NSAP address**	**TSEL value**	**Capability**
			CAAS/XF	**(C)**	**(A)**	**(P)**	**(O)**	**(OU1)**	**(CN)**					
China	**1**		**CAAS**	**XX**	**ICAO**	**China**	ZBBB	ZB*			**zbmta**	**47002781815A4200010101020202028002010001**	**MHS**	**A(2) C(2)**
CAAS with multiple MTA								ZS*						
								ZW*						
								ZY*						
								ZU*						
		1.1						ZBBB	ZBBBYFUA	NOC operator				
		1-2						ZBAA	ZBAAYMUA	MET UA				
		1.3						ZSSS	ZSSSYFUA	NOC operator				
	2		**CAAS**	**XX**	**ICAO**	**China**	ZGGG	ZG*			**zgmta**	**47002781815A4200010102020202028002010001**	**MHS**	**A(2), C(2)**
								ZH*						
								ZL*						
								ZP*						
								ZJ*						
		2.1						ZGGG	ZGGGYFUA	NOC Operator				
		2.2						ZJHK	ZJHKYFUA	NOC Operator				
Hong Kong, China	**3**		**CAAS**	**XX**	**ICAO**	**Hong Kong**	HKGCAD	VH*			**hkgmta**	**47002781815648000101010202020280020100 01**	**MHS**	**A(2), B(1), C(2)**
(CAAS with single MTA)		3.1						VHHH	VHHHYFUA	NOC operator				
		3.2						VHHH	VHHHYFUB	NOC operator				
		3.3						VHHH	VHHHCPAU	UA at CPA				

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Contracting State	**MTA ID**	**User Agent ID**	**Addressing scheme**	**Country-name**	**Administration - domain-name**	**Private-domain -name**	**Organization-name**	**Organization-unit-name-1**	**User Agent (Direct User only)**	**Description of user**	**MTA Name**	**NSAP address**	**TSEL value**	**Capability**
			CAAS/XF	**(C)**	**(A)**	**(P)**	**(O)**	**(OU1)**	**(CN)**					
Macau China	**4**		**XF**	**XX**	**ICAO**	**VM**	AFTN				**mcumta**	**47002781815648000101010202020280020100 01**	**MHS**	**A(2)**
Thailand	**5**		**XF**	**XX**	**ICAO**	**VT**	AFTN				**thmta**	**47002781815654000101010202020280020100 01**	**MHS**	**A(2)**
Philippines	**6**		**XF**	**XX**	**ICAO**	**RP**	AFTN				**phmta**	**47002781815651000101010202020280020100 01**	**MHS**	**A(2)**

Important Note: All data shown in the forms are for illustration only, not the actual data for operational use.

AMHS NAMING REGISTRATION FORM
Table 1b - AMHS MTA Administrator Contact List

Explanation of the Table 1b

Legend:	
Contracting State :	Authority administering the MTA.
MTA ID :	Numbering scheme where each MTA is assigned with an ordinal number.
MTA Name	The name of the MTA hosting the AMHS user. (Used in AMHS binds.)
Point of contact :	Name of person responsible for the administration of the MTA.
Contact e-mail address :	E-mail address of the Office or person responsible for the administration of the MTA.
Contact telephone number & Fax number:	Telephone number of the Office or person responsible for the administration of the MTA.
Contact mailing address	Official correspondence address of the Office or person responsible for the administration of the MTA.

Table 1b – AMHS MTA Administrator Contact List

a	b	c	d	e	f	g
Contracting State	**MTA ID**	**MTA Name**	**Point of contact**	**Contact e-mail address**	**Contact telephone number & Fax Number**	**Contact mailing address**
China	1	bjmta	Mr. LI Xin	Lixin@atmb.net.cn	861-0-87786912 861-0-87786014 (Fax)	12# East San-han Road middle, Chaoyang district, Beijing, China
	2	zjmta	Mr. Zhang sheng-zhi	Zhangsz@atmb.net.cn	862-0-86122803 862-0-86122310 (Fax)	Air Traffic Management Bureau of Middle & Southern Region of China, Bai Yun International Airport, Guangzhou, China
Hong Kong, China	3	hkgmta	Mr. Steven Chan	wmchan@cad.gov.hk	(852) 29106211 (852) 29101160 (Fax)	2/F., Telecommunications Unit, Air Traffic Control Complex, Hong Kong International Airport, Hong Kong, China
Macau China	4.	mcumta	Mr. Freeman V. T. Lo	Aacm@macau.ctm.net	(853) 511213 (853) 511200 (Fax)	Rue. Dr. Pedro José Lobo, 1-3 Edificio. Luso International, 26° andar, MACAO, China
Thailand	5	thmta	Mr. Somnuk Rongthong	somnuk@aerothai.co.th	66-0-2285 9904 66-0-2285 0240 (Fax)	102 Ngamduplee, Tungmahamek, Sathorn, Bangkok 10120, Thailand
Philippines	6	phmta	Mr. Jose. J. Luna	jet_luna@hotmail.com	632-8799191 632-8799110 (Fax)	Air Transportation Office, Manila AFS, 2/F AFC Building, Old MIA Road, Pasay City 1300, Philippines

Important Note: All data shown in the forms are for illustration only, not the actual data for operational use.

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

Considering that:

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

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

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

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

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

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

g) the lack of SARPs for an alternative TCP/IP protocol for immediate use and introduction of material on the use of TCP/IP for air-ground application, require significant technical work, which is not likely to be completed in the near future for amendment to Annex 10 SARPs and associated technical provisions in ATN documentations;

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

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

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

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

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

c) Strategically deploy the ATN infrastructure with a limited number of ATN Backbone routers to support other ground-to-ground and air-ground applications;

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

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

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

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

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

TITLE AND TERMS OF REFERENCE

TITLE: ATN Transition Task Force

TERMS OF REFERENCE:

Plan for implementation of the Aeronautical Telecommunication Network (ATN) in the ASIA/PAC region to meet performance and capacity requirements of CNS/ATM Systems. The planning also addresses the ongoing development of the AFS including digital speech communication.

SUBJECT/TASKS LIST 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.		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. System integrity - Performance - System Management	~~2004~~ (2006 Monitor development in ACP) ~~2004~~ Completed ~~2004~~ Completed
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.	Completed Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
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
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 for IDRP 3) A Routing policy for MTA 4) Directory of Service 5) An AMHS ICD 6) An AIDC ICD	Completed Completed ~~2004~~ Completed ~~2004~~ Completed Completed ~~2004~~ 2006 Monitor development in ACP
7		Subject: Use of the public Internet Task: Develop guidance material for the use of the public internet technology to support AFTN, where required.	A	Study the possibility of using the public Internet and develop guidance material for its use to support low speed AFTN stations, as an interim measure, with particular emphasis on security and reliability.	Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
8		Subject: Use of IP Task: Develop guidance material for the use of IP as a Sub-Network for ATN	B	In accordance with the work being performed by ACP, develop guidance material for the support of IP as a Sub-Network of the ATN, with particular emphasis on system compatibility between adjacent centers and security.	(2006 Monitor development in ACP)
9		Subject: AMHS Naming Registration Task: Develop registration forms for assigning AMHS address for the region	A	To develop an AMHS Naming Registration Form List of contact point To develop procedures for completing the Form. Establishment of an interim database for directory service	~~2004~~ Completed 2006 2006 (Monitor development in ACP for change in procedure at the Global Level)
10		Subject: AFTN/AMHS Transitional/Operational Procedures Tasks: Revise and develop transitional/operational procedures applicable to the use of the AMHS.	A	To review existing AFTN transitional/operational procedures and develop a new transitional and operational procedures applicable to the operation and use of the AMHS. Awaiting few more sites to be on line to proceed with development of operational procedures.	~~2004~~ 2006 (Monitor development in ACP)

TITLE AND TERMS OF REFERENCE

TITLE: ATN IMPLEMENTATION CO-ORDIANTION GROUP

TERMS OF REFERENCE:

Coordinate ATN implementation and transitional issues in the Asia and Pacific region and address relevant system management, operational procedures and emerging issues that may arise.

SUBJECT/TASKS LIST OF ATN IMPLEMENTATION COORDIANTION GROUP

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1		Subject: ATN Implementation coordination Task: Review of implementation problems and develop coordinated solutions	A	-States to report and share implementation and operational experience gained; -Analyze problems and develop coordinated solutions.	Continiues/2008
2		Subject: ATN Operational procedures Task: Develop appropriate ATN operational procedures.	A	To review existing AFTN transitional/operational procedures and develop a new transitional and operational procedures applicable to the operation and use of the AMHS. - To developed coordinated AFTN routing change with AMHS routing change procedures; - To coordinate AMHS MTA routing tables	2007
3		Subject: ATN Certification and validation process. Task: Development of ATN validation and certification procedure.	A	Develop ATN System integrity	Monitor development in ACP
4		Subject: ATN Documentation Task: Development of ATN ICDs.	A	Development of ATN Documents: - AIDC ICD	2007 Monitor development in ACP

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
5		Subject: Use of IP Task: Develop guidance material for the use of IP as a Sub-Network for ATN	B	In accordance with the work being performed by ACP, develop guidance material for the support of IP as a Sub-Network of the ATN, with particular emphasis on system compatibility between adjacent centers and security.	2007 Monitor development in ACP
6		Subject: AMHS operational management system Task: Development of interim database for directory services		To develop procedures for completing the Form	2007 Monitor development in ACP
7		AMHS performance			

STRATEGY FOR IMPLEMENTATION OF THE AIR-GROUND DATA LINK IN THE ASIA/PAC REGION

Considering:

a) the benefit of data communications to improve safety, efficiency and capacity through the reduction of voice communications and process automation to meet the operational requirement and consistent with the Air Traffic Management Operational Concept;

b) current operation application of data link to support CPDLC, ADS-C, PDC and D-FIS, the need to maintain the functional service of these applications;

c) current technology such as VHF ACARS, VDL-Mode 2 AoA (ACARS over Aviation VHF Link Control), VDL-Mode 2 ATN, Satellite datalink, HF data link being acceptable for operations and standardized in SARPs and/or industry standards;

d) availability of standardized VDL-Mode 3, VDL-Mode 4, Mode S data links and future standardized technology such as Universal Access Transceiver (UAT);

e) the future growth of data communications to improve operations and the exchange of information including graphical meteorological information; and

f) the need to assure global interoperability and harmonization.

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF THE AIR-GROUND DATA LINK INFRASTRUCTURE AND ASSOCIATED APPLICATIONS IN THE ASIA/PAC REGION SHOULD BE AS FOLLOWS:

a) maintain or ensure compatibility of existing data links to support all current ATM and meteorological applications without change to the application or application specific system.

b) new installation of VHF datalink systems should be capable of supporting VDL-Mode 2 and as an interim step provide the bridging application of AoA.

c) in the near term there is no intent to implement VDL-Mode 3, VDL-Mode 4 or Mode S.

d) undertake and monitor research and development of communications technology for the future evolution of data link services.

e) States should work co-operatively to assist each other on a multinational basis to implement the air-ground ATN compliant VDL-Mode 2 service and ensure system inter-operability.

Note:
Near-Term: now to 10 years
Long-Term 15+

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STRATEGY FOR THE IMPLEMENTATION OF GNSS NAVIGATION CAPABILITY IN THE ASIA/PACIFIC REGION

Considering that:

1) Safety is the highest priority;

2) Elements of Global Air Navigation Plan for CNS/ATM system on GNSS and requirements for the GNSS implementation have been incorporated into the CNS part of FASID;

3) GNSS SARPs, PANS and guidance material for GNSS implementation are available;

4) The availability of avionics including limitations of some receiver designs; the ability of aircraft to achieve RNP requirements and the level of user equipage;

5) Development of GNSS systems including satellite constellations and improvement in system performance;

6) Airworthiness and operational approvals allowing the current GNSS to be used for en-route and non precision approach phases of flight without the need for augmentation services external to the aircraft;

7) Development status of aircraft-based augmentation systems;

8) Regional augmentation systems include both satellite-based (SBAS) and ground-based systems (GBAS);

9) Human, environmental and economic factors will affect the implementation of GNSS;

10) The vulnerability of GNSS to radio interference and adverse effect of ionosphere; and

11) The regional navigation requirements are:

(a) RNP10/RNP4 for en-route;
(b) RNP4 for *transition to* terminal phase of flight;
(c) RNP1 for terminal phase of flight;
(d) ~~NPA/APV for~~ RNP/RNAV based arrivals ~~approaches~~ and departures; ~~and~~
(e) APV (with interim RNAV (GNSS) for approaches); and
~~(e)~~ (f) Precision approaches at selected airports.

The general strategy for the implementation of GNSS in the Asia/Pacific region is detailed below:

1) There should be an examination of the extent to which the GNSS system accessible in the Region can meet the navigational requirements of ATM service providers and aircraft operators in the Region;

2) Evolutionary introduction of GNSS Navigation Capability should be consistent with the Global Air Navigation Plan for CNS/ATM Systems;

3) During transition to GNSS, sufficient ground infrastructure for current navigation systems must remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip with GNSS to attain equivalent navigation service;

4) Implementation shall be in full compliance with ICAO SARPs and PANS;

5) Introduce the use of GNSS for en-route, terminal and approach navigation. States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition to GNSS-based navigation;

6) States are encouraged to implement future GNSS approvals based on SBAS receiver standards or equivalents;

7) To the extent possible, States should work co-operatively on a multinational basis to implement GNSS augmentation systems in order to facilitate seamless and inter-operable systems;

8) States consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance**,** taking due consideration of the need of State aircraft;

9) ~~As GNSS is introduced for en-route navigation, States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition to GNSS-based navigation;~~ The introduction of GNSS offers the possibility to remove conventional ground-based navigation aids. However States should approach this with caution to ensure that safety is not compromised, such as by performance of safety assessment and consultation with users through regional air navigation planning process;

~~10) The introduction of GNSS offers the possibility to remove conventional ground based navigation aids. However States should approach this with caution to ensure that safety is not compromised, such as by performance of safety assessment and consultation with users through regional air navigation planning process;~~

~~11)~~ 10) States undertake a co-coordinated R & D programme on GNSS implementation and operation;

~~12)~~11) ICAO and States should undertake education and training to provide necessary knowledge in GNSS theory and operational application, including RNP, and

~~13)~~ 12) States establish multidisciplinary GNSS implementation teams, using ~~section 6.10.2 of ICAO Circular 267, Guidelines for the Introduction and Operational Approval of the GNSS~~, Attachment A to Appendix C of Doc 9849 AN/457, the Global Navigation Satellite System (GNSS) Manual, as a guide.

Note1: Identified SBAS systems are EGNOS, MSAS and WAAS. The MSAS is expected to be available for providing augmentation for the Asia/Pacific region.

International Civil Aviatin Organization
Asia and Pacific Office

ADS-B Implementation and Operations Guidance Document

Edition 0.4

July 2005

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TABLE OF CONTENTS

1. INTRODUCTION

This ADS-B Implementation and Operations Guidance Document (AIGD) provides guidance material for the implementation and operational application of ADS-B technology in the Asia and Pacific Regions.

The procedures and requirements for ADS-B operations are detailed in the relevant States' AIP. The AIGD is intended to provide key information on ADS-B performance, integration, principles, procedures and collaboration mechanisms.

The content is based upon the work to date of the APANPIRG ADS-B Study and Implementation Task Force (SITF) and various ANC Panels developing provisions for the operational use of ADS-B. It should be noted that this edition of the document has been produced ahead of anticipated amendments to PANS-ATM (Doc 4444) and Annexes 2, 4, 11 and 15 to the convention. It is therefore likely that some amendment to the guidance material will be required as SARPs and PANS are published.

1.1 ARRANGEMENT OF THE AIGD

The AIGD consists of the following Parts:

Section 1	Introduction and Document Management
Section 2	Acronyms
Section 3	System Integrity and Monitoring
Section 4	ADS-B Data Message Set
Section 5	ADS-B Procedures
Section 6	Emergency and Non-Routine Procedures
Section 7	ADS-B Implementation
Section 8	Endnotes

1.2 DOCUMENT HISTORY AND MANAGEMENT

This document is managed by the APANPIRG. It was introduced as draft to the first Working Group meeting of the ADS-B SITF in Singapore in October 2004, at which it was agreed to develop the draft to an approved working document that provides implementation guidance for States. The first edition was presented to APANPIRG for adoption in August 2005. It is intended to supplement SARPs, PANS and relevant provisions contained in ICAO documentation and it will be regularly updated to reflect evolving provisions.

1.3 COPIES

Paper copies of this AIGD are not distributed. Controlled copies can be found at the following web site: http://www.icao.int//apac/edocs/

Copy may be freely downloaded from the web site, or by emailing APANPIRG through the ICAO Asia and Pacific Regional Office who will send a copy by return email.

1.4 CHANGES TO THE AIGD

Whenever a user identifies a need for a change to this document, a Request for Change (RFC) Form (see Section 1.6 below) should be completed and submitted to APANPIRG through the ICAO Asia and Pacific Regional Office.

When an RFC has been approved by a meeting of the ADS-B Study and Implementation Task Force then a new version of the AIGD will be published, with the changes marked by an "|" in the margin, and an endnote indicating the relevant RFC, so a reader can see the origin of the change. If the change is in a table cell, the outside edges of the table will be highlighted; e.g.:

In those cases where a change is initiated by the editor and relates to document format rather than functional content, the change may not have an associated RFC, but the change will be marked and annotated in the same way.

1.5 EDITING CONVENTIONS

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1.6 AIGD REQUEST FOR CHANGE FORM

RFC Nr:	

Please use this form when requesting a change to any part of this AIGD. This form may be photocopied as required, emailed, faxed or e-mailed to ICAO Asia and Pacific Regional Office (+66) 2 5378199 or icao_apac@bangkok.icao.int.

1. SUBJECT:			
2. REASON FOR CHANGE:			
3. DESCRIPTION OF PROPOSAL: [expand / attach additional pages if necessary]			
4. REFERENCE(S):			
5. PERSON INITIATING:		**DATE:**	
ORGANISATION:			
TEL/FAX/EMAIL:			

6. CONSULTATION	**RESPONSE DUE BY DATE:**		
Organization	**Name**	**Agree/Disagree**	**Date**
7. ACTION REQUIRED:			
8. AIGD EDITOR		**DATE REC'D:**	
9. FEEDBACK PASSED		**DATE:**	

1.7 AMENDMENT RECORD

Amendment Number	Date	Amended by	Comments
0.1	24 December 2004	W Blythe H Anderson	Modified draft following contributions from ADS-B SITF Working Group members. Incorporated to TF/3 Working paper #3.
0.2 (1.0)	24 March 2005	H Anderson	Final draft prepared at ADS-B SITF WG/3
0.3 (1.1)	03 June 2005	Nick King	Amendments following SASP WG/WHL meeting of May 2005.
0.4	15 July 2005	CNS/MET SG/9	Editorial changes made

2. ACRONYM LIST & GLOSSARY OF TERMS

2.1 ACRONYM LIST

ACID	Aircraft Identification
ADS-B	Automatic Dependent Surveillance - Broadcast
AIGD	ADS-B Implementation and Operations Guidance Document
AIP	Aeronautical Information Publication
AIT	ADS-B Implementation Team
AMSL	Above Mean Sea Level
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ARINC	Aeronautical Radio Incorporate
ATC	Air Traffic Control (or Air Traffic Controller)
ATM	Air Traffic Management
ATS	Air Traffic Services
ATSP	ATS Provider
ATSU	ATS unit
CNS	Communications, Navigation, Surveillance
CRC	Cyclic Redundancy Check
CDTI	Cockpit Display Traffic Information
DAIW	Danger Area Infringement Warning
FIR	Flight Information Region
FLTID	Flight Identification
FMS	Flight Management System
FOM	Figure of Merit used in ASTERIX messaging
GPS	Global Positioning System (USA)
HPL	Horizontal Protection Level
ICAO	International Civil Aviation Organization
MSAW	Minimum Safe Altitude Warning
MTBF	Mean Time Between Failures
MTCA	Medium Term Conflict Alert
MTTR	Mean Time To Restore
NAC	Navigation Accuracy Category
NIC	Navigation Integrity Category
PRS	Problem Reporting System
RAI	Restricted Area Intrusion
RAM	Route Adherence Monitoring
RAIM	Receiver Autonomous Integrity Monitoring
RFC	Request for Change
RNP	Required Navigation Performance
SIL	Surveillance Integrity Level
SITF	Study and Implementation Task Force
STCA	Short Term Conflict Alert

2.2 GLOSSARY OF TERMS

ADS-B In	An ADS-B system feature that enables the display of real time ADS-B tracks on a situation display in the aircraft cockpit.
ADS-B Out	An ADS-B system feature that enables the frequent broadcast of accurate aircraft position and vector data together with other information.
Asterix 21	Eurocontrol standard format for data message exchange
FOM (Figure of Merit)	A numeric value that is used to determine the accuracy and integrity of associated position data.
HPL (Horizontal Position Limit)	The containment radius within which the true position of the aircraft will be found for 95% of the time (See DO229c) .
NAC (Navigational Accuracy Category)	Subfield used to announce the 95% accuracy limits for the horizontal position data being broadcast.
NIC (Navigational Integrity Category)	Subfield used to specify the containment radius integrity associated with horizontal position data.
NUCp (Navigation Uncertainty Category)	A numeric value that announces the integrity of the associated horizontal position data being broadcast.
SIL (Surveillance Integrity Level)	Subfield used to specify the probability of the true position lying outside the containment radius defined by NIC without being alerted.

3. SYSTEM INTEGRITY AND MONITORING

3.1 INTRODUCTION

The Communications, Navigation, Surveillance and Air Traffic Management (CNS/ATM) environment is an integrated system including physical systems (hardware, software, and communication networks), human elements (pilots and controllers), and the procedures for use by pilots and controllers. ADS-B is a surveillance system that is may be integrated with other surveillance technologies or may also operate as an independent source for surveillance monitoring within the CNS/ATM system.

Because of the integrated nature of such system and the degree of interaction among its components, comprehensive system monitoring is recommended. The procedures described in this section aim to ensure system integrity by validation, identification, reporting and tracking of possible problems revealed during system monitoring.

These procedures do not replace the ATS incident reporting procedures and requirements, as specified in PANS-ATM (Doc 4444), Appendix 4; ICAO's Air Traffic Services Planning Manual (Doc 9426), Chapter 3; or applicable State regulations, affecting the reporting responsibilities of parties directly involved in a potential ATS incident.

3.2 PERSONNEL LICENSING AND TRAINING

Prior to operating any element of the ADS-B system operational and technical personnel shall undertake appropriate training as determined by the States, including compliance with the Convention on International Civil Aviation where applicable.

Notwithstanding the above requirement and for the purposes of undertaking limited trials of the ADS-B system, special arrangements may be agreed between the operator and an Air Traffic Services Unit (ATSU).

3.3 REFERENCE DOCUMENTS

Id	Name of the document	Reference	Date	Origin	Domain
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

3.4 SYSTEM PERFORMANCE CRITERIA FOR AN ATC SEPARATION SERVICE

A number of States have started to introduce ADS-B for the provision of Air Traffic Services, including 'radar-like' separation. The ICAO Separation and Airspace Safety Panel (SASP) has been assessing the suitability of ADS-B for various applications using a comparative assessment methodology and, together with the ICAO Operational Data Link Panel (OPLINKP), is drawing on the experience of early implementers to develop operational provisions. It is anticipated that PANS-ATM (Doc 4444) will be amended to include ADS-B separation minima in 2007.

States intending to introduce ADS-B separation minima not published in PANS-ATM or Regional Supplementary Procedures (Doc 7030) should comply with the provisions of Annex 11 paragraph 3.4.1. States should adopt the guidelines contained in this document unless conformance with PANS-ATM specifications requires change.

3.5 ATC SYSTEM VALIDATION

3.5.1 Safety Assessment Guidelines

To meet system integrity requirements, States should conduct a validation process that confirms the integrity of their equipment and procedures. Such processes shall include:

a) A system safety assessment for new implementations is the basis for definitions of system performance requirements. Where existing systems are being modified to utilize additional services, the assessment demonstrates that the ATS Provider's system will meet safety objectives.

b) Integration test results confirming interoperability for operational use of airborne and ground systems; and

c) Confirmation that the ATS Operation Manuals are compatible with those of adjacent providers where the system is used across a common boundary.

3.5.2 System safety assessment

The objective of the system safety assessment is to ensure the State that introduction and operation of ADS-B is safe. This can be achieved through application of the provisions of Annex 11 paragraph 2.26 and PANS-ATM Chapter 2. The safety assessment should be conducted for initial implementation as well as any future enhancements and should include:

a) Identifying failure conditions;
b) Assigning levels of criticality;
c) Determining risks/ probabilities for occurrence; and
d) Identifying mitigating measures.
e) Categorising the degree of acceptability of risks.
f) Operational hazard ID process

Following the safety assessment, States should institute measures to offset any identified failure conditions that are not already categorized as acceptable. This should be done to reduce the probability of their occurrence to an acceptable level. This could be accomplished through automation or procedures.

3.5.3 Integration test

States should conduct trials with suitably equipped aircraft to ensure they meet the operational and technical requirements. To provide an ATS alternatively, they may be satisfied by test results and analysis conducted by another State or organisation deemed competent to provide such service. Where this process is followed, the tests conducted by another State or organisation should be comparable (i.e. using similar equipment under similar conditions).Reference to Doc9689

3.5.4 ATS Operation Manuals

States should coordinate with adjacent States to confirm that their ATS Operation Manuals contain standard operating procedures to ensure harmonization of procedures that impact across common boundaries.

3.5.5 ATS System Integrity

With automated ATM control systems, data changes, software upgrades, and system failures can affect adjacent units. States shall ensure that:

a) A conservative approach is taken to manage any changes to the system.

b) Aircrew, aircraft operating companies and adjacent ATSU(s) are notified of any planned system changes in advance, where that system is used across a common boundary.

c) ATSUs have verification procedures in place to ensure that following any system changes, displayed data is both correct and accurate.

d) In cases of system failures or where upgrades (or downgrades) or other changes may impact surrounding ATS units, ATSUs should have a procedure in place for timely notification to adjacent units. Such notification procedures will normally be detailed in Letters of Agreement between adjacent units.

e) ADS-B surveillance data is provided with equal to or better level of protection and security than existing surveillance radar data.

3.6 SYSTEM MONITORING

During the initial period of implementation of ADS-B technology, routine collection of data is necessary in order to ensure that the system continues to meet or exceed its performance, safety and interoperability requirements, and that operational service delivery and procedures are working as intended. The monitoring program is a two-fold process. First, summarised statistical data should be produced periodically showing the performance of the system. This is accomplished through ADS-B Periodic Status Reports. In addition, as problems or abnormalities arise, they should be identified, tracked, analyzed and corrected and information disseminated as required, utilizing the ADS-B Problem Report.

3.6.1 Problem Reporting System (PRS)

The Problem Reporting System is tasked with the collection, storage and regular dissemination of data based on reports received from ADS-B SITF members. The PRS tracks problem reports and publish information from those reports to ADS-B SITF members. Problem resolution is the responsibility of the appropriate ADS-B SITF members.

The PRS Administrator shall:

a) prepare consolidated problem report summaries for each ADS-B SITF meeting;
b) collect and consolidate ADS-B Problem Reports; and
c) maintain a functional website (with controlled access) to manage the problem reporting function.

3.6.2 The monitoring process

When problems or abnormalities are discovered, the initial analysis should be performed by the organization(s) identifying the problem. In addition, a copy of the problem report should be entered in to the PRS which will assign a tracking number. As some problems or abnormalities may involve more than one organization, the originator should be responsible for follow-up action to rectify the problem and forward the information to the PRS. It is essential that all information relating to the problem is documented and recorded and resolved in a timely manner.

The following groups should be involved in the monitoring process and problem tracking to ensure a comprehensive review and analysis of the collected data:

a) ATS Providers;
b) Organizations responsible for ATS system maintenance (where different from the ATS provider);
c) Relevant State regulatory authorities;
d) Communication Service Providers being used;
e) Aircraft operators; and
f) Aircraft and avionics manufacturers.

3.6.3 Distribution of confidential information

It is important that information that may have an operational impact on other parties be distributed by the authorised investigator to all authorised groups that are likely to be affected, as soon as possible. In this way, each party is made aware of problems already encountered by others, and may be able to contribute further information to aid in the solution of these problems. The default position is that all states agree to provide the data which will be de-identified for reporting and record keeping purposes.

3.6.4 ADS-B problem reports

Problem reports may originate from many sources, but most will fall within two categories; reports based on observation of one or more specific events, or reports generated from the routine analysis of data. The user would document the problem, resolve it with the appropriate party and forward a copy of the report to the PRS for tracking and distribution. While one occurrence may appear to be an isolated case, the receipt of numerous similar reports by the PRS could indicate that an area needs more detailed analysis.

To effectively resolve problems and track progress, the problem reports should be sent to the nominated point of contact at the appropriate organisation and the PRS. The resolution of the identified problems may require:

a) Re-training of system operators, or revision of training procedures to ensure compliance with existing procedures;
b) Change to operating procedures;
c) Change to system requirements, including performance and interoperability; or
d) Change to system design.

3.6.5 ADS-B periodic status report

The ATS Providers should complete the ADS-B Periodic Status Report annually and deliver the report to the regional meeting of the ADS-B SITF. The Periodic Status Report should give an indication of system performance and identify any trend in system deficiencies, the resultant operational implications, and the proposed resolution, if applicable.

Communications Service Providers, if used, are also expected to submit Periodic Status Reports on the performance of the networks carrying ADS-B data at the annual regional meeting of the ADS-B SITF. These reports could also contain the details of planned or current upgrades to the network.

3.6.6 Processing of Reports

Each group in the monitoring process should nominate a single point of contact for receipt of problem reports and coordination with the other parties. This list will be distributed by the PRS Administrator to all parties to the monitoring process.

Each State should establish mechanisms within its ATS Provider and regulatory authority to:

a) Assess problem reports and refer them to the appropriate technical or operational expertise for investigation and resolution;
b) Coordinate with aircraft operators;
c) Develop interim operational procedures to mitigate the effects of problems until such time as the problem is resolved;
d) Monitor the progress of problem resolution;
e) Prepare a report on problems encountered and their operational implications and forward these to the PRS;
f) Prepare the ADS-B periodic status report at pre-determined times and forward these to the Secretary of the annual meeting of the ADS-B SITF; and
g) Coordinate with any Communication Service Providers used.

3.7 APANPIRG

APANPIRG shall oversee the monitoring process to ensure the ADS-B system continues to meet its performance and safety requirements, and that operational procedures are working as intended. The APANPIRG'S objectives are to:

a) review Periodic Status Reports and any significant Problem Reports;
b) highlight successful problem resolutions to ADS-B SITF members;
c) monitor the progress of outstanding problem resolutions;
d) prepare summaries of problems encountered and their operational implications; and
e) assess system performance based on information in the PRS and Periodic Status Reports.

3.8 LOCAL DATA RECORDING AND ANALYSIS

3.8.1 Data recording

It is recommended that ATS Providers and Communication Service Providers retain the records defined below for at least 30 days to allow for accident/incident investigation processes. These records should be made available on request to the relevant State safety authority. Where data is sought from an adjacent State, the usual State to State channels should be used.

These recordings shall be in a form that permits a replay of the situation and identification of the messages that were received by the ATS system.

3.8.2 Local data collection

ATS providers and communications service providers should identify and record ADS-B system component failures that have the potential to negatively impact the safety of controlled flights or compromise service continuity.

3.9 ADS-B PROBLEM REPORT

3.9.1 Report Form

			PRS #
Date UTC		**Time UTC**	
Registration		**Aircraft ID**	
Flight ID		**ICAO 24 Bit Code**	
Aircraft Type			
Flight Sector/ Location			
ATS Unit			
Description / additional information			
Originator		**Originator Reference**	
Organization			

3.9.2 Description of Fields

Field	Meaning
Number	A unique identification number assigned by the PRS Administrator to this problem report. Organizations writing problem reports are encouraged to maintain their own internal list of these problems for tracking purposes. Once the problems have been reported to the PRS and incorporated in the database, a number will be assigned by the PRS and used for tracking by the ADS-B SITF.
Date UTC	UTC date when the event occurred.
Time UTC	UTC time (or range of times) at which the event occurred.
Registration	Registration number (tail number) of the aircraft involved.
Aircraft ID (ACID)	Coded equivalent of voice call sign as entered in FPL Field 7.
ICAO 24 Bit Code	Unique aircraft address expressed in Hexadecimal form (e.g. 7432DB)
Flight ID (FLTID)	The identification transmitted by ADS-B for display on a controller situation display or a CDTI.
Flight Sector/Location	The departure airport and destination airport for the sector being flown by the aircraft involved in the event. These should be the ICAO identifiers of those airports. Or if more descriptive, the location of the aircraft during the event.
Originator	Point of contact at the originating organization for this report (usually the author).
Aircraft Type	The aircraft model involved.
Organization	The name of the organization (airline, ATS provider or communications service provider) that created the report.
ATS Unit	ICAO identifier of the ATC Center or Tower controlling the aircraft at the time of the event.
Description	This should provide as complete a description of the situation leading up to the problem as is possible. Where the organization reporting the problem is not able to provide all the information (e.g. the controller may not know everything that happens on the aircraft), it would be helpful if they would coordinate with the other parties to obtain the necessary information. The description should include: A complete description of the problem that is being reported The route contained in the FMS and flight plan Any flight deck indications Any indications provided to the controller when the problem occurred Any additional information that the originator of the problem report considers might be helpful but is not included on the list above If necessary to contain all the information, additional pages may be added. if the originator considers it might be helpful, diagrams and other additional information (such as printouts of message logs) may be appended to the report.

3.10 ADS-B PERFORMANCE REPORT FORM			
Originating Organization			
Date of submission		**Originator**	
Report Period			
TECHNICAL ISSUES			
OPERATIONAL ISSUES			
GENERAL COMMENTS			

4. ADS-B DATA

The Eleventh ICAO Air Navigation Planning Conference recommended that States recognize ADS-B as an enabler of the global ATM concept bringing substantial safety and capacity benefits; support the cost-effective early implementation of it; and ensuring it is harmonized, compatible and interoperable with operational procedures, data linking and ATM applications.

APANPIRG has decided to use 1090MHz Extended Squitter data link for ADS-B data exchange in the Asia and Pacific Regions. In the longer term an additional link type may be required.

ADS-B data requirements for aircraft transmissions are contained in Annex 10 Vol IV. ADS-B data requirements for ground-ground messaging shall be determined by States. International exchange of ground-ground messaging should use ASTERIX 21 Version 0.23 format.

5. ADS-B PROCEDURES

5.1 INTRODUCTION

ADS-B involves the transmission of specific data messages from aircraft and vehicle systems. These data messages are broadcast at approximately 0.5 second intervals and received at compatible ground stations that relay these messages to ATSU(s) for presentation on ATS situation displays. The following procedures relate to the use of ADS-B data in ATS ground surveillance applications.

The implementation of the ADS-B system will support the provision of high performance surveillance, enhancing flight safety, facilitating the reduction of separation minima and supporting user demands such as user-preferred trajectories.

5.2 FACTORS TO BE CONSIDERED WHEN USING ADS-B

5.2.1 Use of ADS-B Level data

The accuracy and integrity of pressure altitude derived level information provided by ADS-B are equivalent to Mode C level data provided through an SSR sensor and subject to the same operational procedures as those used in an SSR environment. Where the ATM system converts ADS-B level data to display metric equivalent level data, the displayed data should not be used to determine vertical separation until the data is verified by comparison with a pilot reported metric level.

5.2.2 Position Reporting Performance

The ADS-B data from the aircraft will include a NUC/NIC/SIL categorization of the accuracy and integrity of the horizontal position data. This figure is determined from NIC/ NAC/ SIL values for DO260A compliant avionics and NUC values for DO260/ED102 compliant avionics.

In general, if the NUC is less than 5 (or NIC is less than 6, or SIL is less than 2) the data is unlikely to be of comparable quality to that provided by a single monopulse SSR. ADS-B data should not be used for separation unless a suitable means of determining data integrity is used.

ADS-B reports with low integrity may be presented on situation displays, provided the controller is alerted (e.g. by a change in symbology and/or visual alert) to the change and the implications for the provision of separation. An ANS Provider may elect not to display ADS-B tracks that fail to meet a given position reporting performance criterion.

5.2.3 GNSS Integrity Prediction Service

Early implementations of ADS-B are expected to use GNSS for position determination. As such, availability of GNSS data has a direct influence on the provision of a surveillance service.

ATS Providers may elect to use a GNSS integrity prediction service to assist in determining the future availability of useable ADS-B data. The integrity prediction service alerts users to potential future loss or degradation of the ADS-B service in defined areas. When these alerts are displayed, the system is indicating to its users that at some time in the future the ADS-B positional data may be inadequate to support the application of ADS-B separation. It is recommended that the prediction service is made available to each ATSU that is employing ADS-B to provide a separation service, to ensure that air traffic controllers are alerted in

advance of any predicted degradation of the GNSS service and the associated reduction in their ability to provide ADS-B separation to flights that are within the affected area. This is similar to having advance warning of a planned radar outage for maintenance.

ADS-B should not be used to provide separation between aircraft that will be affected by an expected period of inadequate position reporting integrity.

If an unpredicted loss of integrity occurs (including a RAIM warning report from aircrew) then;

(a) ADS-B separation should not be applied by ATC to the particular aircraft reporting until the integrity has been assured; and

(b) The controller should check with other aircraft in the vicinity of the aircraft reporting the RAIM warning, to determine if they have also been affected and establish alternative forms of separation if necessary.

5.2.4 Sharing of ADS-B Data

Member States should consider the benefits of sharing ADS-B data received from aircraft operating in the proximity of their international airspace boundaries with adjacent States that have compatible technology in an effort to maximize the service benefits and promote operational safety. Any agreement on the sharing of surveillance data should be incorporated in Letters of Agreement between the States concerned.

5.3 Reporting Rates

5.3.1 General

The ADS-B system shall maintain a reporting rate that ensures at least an equivalent degree of accuracy, integrity and availability as for a radar system that is used to provide a similar ATC service. The standard reporting rate is approximately 0.5 second from the aircraft, but the rate of update provided to the ATM system (for the situation display) may be less frequent (e.g. 5 seconds), provided the equivalency with radar is preserved.

5.4 SEPARATION

5.4.1 General

ADS-B data may be used in combination with data obtained by other means of surveillance (such as radar, flight plan track, ADS-C) for the application of separation provided appropriate minima as determined by the State are applied. It should be noted that the quality of communications will have a bearing on the determination of appropriate minima.

All safety net features (MSAW, STCA, MTCA, RAM and DAIW/ RAI etc) should possess the same responsiveness as equivalent radar safety net features.

5.4.2 Identification Methods

Some of the methods approved by ICAO for establishing identification with radar, may be employed with ADS-B (see PANS-ATM chapter 8). One or more of the following identification procedures are suggested:

a) direct recognition of the aircraft identification in an ADS-B label;

b) transfer of ADS-B identification;
c) observation of compliance with an instruction to TRANSMIT ADS-B IDENT.

Note: In automated systems, the "IDENT" feature may be presented in different ways, e.g. as a flashing of all or part of the position indication and associated label.

5.4.3 ADS-B Separation

ADS-B Separation minima will be promulgated by ICAO in PANS-ATM (Doc 4444), or in Regional Supplementary Procedures (Doc 7030),

In a mixed surveillance environment, States should use the larger separation standard applicable between aircraft in the conflict pair being considered.

5.4.4 Vertical separation

5.4.4.1 Introduction

The ADS-B level data presented on the controllers situation display shall normally be derived from barometric pressure altitude. In the event that geometric altitude data is presented on the situation display, the controller should be alerted to the fact that this data should not be used for vertical separation.

5.4.4.2 Vertical tolerance standard

The vertical tolerances for ADS-B level information should be consistent with those applied to Mode C level information.

5.4.4.3 Verification of ADS-B level information

The verification procedures for ADS-B level information shall be the same as those employed for the verification of Mode C level data in a radar environment.

5.5 AIR TRAFFIC CONTROL CLEARANCE MONITORING

5.5.1 General

ADS-B track data can be used to monitor flight path conformance with air traffic control clearances.

5.5.2 Deviations from ATC clearances

The ATC requirements relating to monitoring of ADS-B traffic on the situation display should be similar to those contained in PANS-ATM Ch.8.

5.6 ALERTING SERVICE

For ADS-B equipped aircraft, the provision of an alerting service should be based on the same criteria as applied within a radar environment.

5.7 POSITION REPORTING

5.7.1 Pilot position reporting requirements in ADS-B coverage

States should establish voice and/or CPDLC position reporting procedures consistent with those applicable with radar for aircraft that have been identified by ATC.

5.7.2 Meteorological reporting requirements in ADS-B airspace

ATSUs may promulgate in the AIP meteorological reporting requirements that apply within the nominated FIR. The meteorological reporting data required and the transmission methods to be used by aircrew shall be specified in AIP.

5.8 PHRASEOLOGY

5.8.1 Phraseology Standard

States should note the requirement for ADS-B specific phraseology equivalent to radar specific phraseology as well as the opportunity to use generic phraseology applicable to multiple systems.

Until such time as PANS ATM Chapter 12 is amended to include ADS-B provisions, the following phraseology is recommended for consideration by States:

ADS-B EQUIPMENT DEGRADATION
ADS-B OUT OF SERVICE (appropriate information as necessary).

TO REQUEST THE CAPABILITY OF THE ADS-B EQUIPMENT
a) ADVISE ADS-B CAPABILITY;
*b) ADS-B TRANSMITTER (data link);
*c) ADS-B RECEIVER (data link);
*d) NEGATIVE ADS-B.
* Denotes pilot transmission.

TO REQUEST RESELECTION OF AIRCRAFT IDENTIFICATION
REENTER [ADS-B or MODE S] AIRCRAFT IDENTIFICATION.

TERMINATION OF RADAR AND/OR ADS-B SERVICE
IDENTIFICATION LOST [reasons] (instructions).

TO REQUEST THE OPERATION OF THE ADS-B IDENT FEATURE
TRANSMIT ADS-B IDENT.

TO REQUEST TERMINATION OF SSR TRANSPONDER AND/OR ADS-B TRANSMITTER OPERATION
a) STOP SQUAWK. [TRANSMIT ADS-B ONLY];
b) STOP ADS-B TRANSMISSION [SQUAWK (code) ONLY].

Note: In some cases the ADS-B transmitter cannot be operated independently of the SSR transponder and the loss of SSR and ACAS surveillance derived from the operation of the SSR transponder should be considered.

5.9 FLIGHT PLANNING

5.9.1 ADS-B Flight Planning Requirement – Flight Identity

The aircraft identification (ACID) must be accurately recorded in section 7 of the ICAO Flight Plan form as per the following instructions:

Aircraft Identification, not exceeding 7 characters is to be entered both in item 7 of the flight plan and replicated exactly when set in the aircraft (for transmission as Flight ID) as follows:
Either,

a) The ICAO three-letter designator for the aircraft operating agency followed by the flight identification (e.g. KLM511, BAW213, JTR25), when:

in radiotelephony the callsign used consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, SPEEDBIRD 213, HERBIE 25).

Or,

b) The registration marking of the aircraft (e.g. EIAKO, 4XBCD, OOTEK), when:

1) in radiotelephony the callsign used consists of the registration marking alone (e.g. EIAKO), or preceded by the ICAO telephony designator for the operating agency (e.g. SVENAIR EIAKO),

2) the aircraft is not equipped with radio.

Note 1 No zeros, dashes or spaces are to be added when the Aircraft Identification consists of less than 7 characters.

Note 2 Appendix 2 to PANS-ATM refers. ICAO designators and telephony designators for aircraft operating agencies are contained in ICAO Doc 8585.

5.9.2 ADS-B Flight Planning Requirements

5.9.2.1 Flight Notification

Until such time as amendments are made to the ICAO flight plan to incorporate ADS-B designators, a remark shall be entered in section 18 of the fight plan to indicate that the flight is capable of transmitting ADS-B messages via the Mode S Extended Squitter data link. The format of the remark should be:

RMK/ADSB

Note: Only flights with ADS-C capability should use the surveillance equipment indicator“D”and only flights with CPDLC capability should use the equipment indicator “J”.

5.9.2.2 Aircraft Address (24 Bit Code)

Where required, the aircraft address (in hexadecimal format)_may be recorded in section 18 of the ICAO flight plan as per the following example:

CODE/7C432B

States should note that use of hexadecimal code may be prone to human error and is less flexible in regard to airframe changes for a notified flight.

6. EMERGENCY PROCEDURES

ATC surveillance systems should provide for the display of safety-related alerts and warnings, including conflict alert, minimum safe altitude warning, conflict prediction and unintentionally duplicated SSR codes and aircraft identifications].

The ADS-B avionics may transmit emergency status messages to any ADS-B ground station within coverage. The controller receiving these messages should determine the nature of the emergency, acknowledge receipt if appropriate, and initiate any assistance required. An aircraft equipped with ADS-B might operate the emergency and/or urgency mode as follows:

a) emergency;
b) no communications;
c) unlawful interference;
d) minimum fuel; and/or
e) medical.

Executive control responsibility

The responsibility for control of the flight rests with the ATSU within whose airspace the aircraft is operating. However, if the pilot takes action contrary to a clearance that has already been coordinated with another sector or ATSU and further coordination is not possible in the time available, the responsibility for this action would rest with the pilot in command, and performed under the pilot's emergency authority.

Emergency procedures

The various circumstances surrounding each emergency situation preclude the establishment of exact detailed procedures to be followed. The procedures outlined in PANS-ATM Chapter 15 provide a general guide to air traffic services personnel and where necessary, should be adapted for the use of ADS-B.

7. ADS-B IMPLEMENTATION

7.1 INTRODUCTION

7.1.1 Planning

There are a range of activities needed to progress ADS-B implementation from initial concept level to operational use. This section addresses the issues of collaborative decision making, system compatibility and integration, while the second section of this chapter provides a checklist to assist States with the management of ADS-B implementation activities.

7.1.2 Implementation team to ensure international coordination

7.1.2.1 Any decision to implement ADS-B by a State should include consultation with the wider ATM community. Moreover, where ADS-B procedures or requirements will affect traffic transiting between states, the implementation should also be coordinated between States and Regions, in order to achieve maximum benefits for airspace users and service providers.

7.1.2.2 An effective means of coordinating the various demands of the affected organizations is to establish an implementation team. Team composition may vary by State or Region, but the core group responsible for ADS-B implementation planning should include members with multidiscipline operational expertise from affected aviation disciplines, with access to other specialists where required.

7.1.2.3 Ideally, such a team should comprise representatives from the ATS providers, regulators and airspace users, as well as other stakeholders likely to be influenced by the introduction of ADS-B, such as manufacturers and military authorities. All identified stakeholders should participate as early as possible in this process so that their requirements can be identified prior to the making of schedules or contracts.

7.1.2.4 The role of the implementation team is to consult widely with stakeholders, identify operational needs, resolve conflicting demands and make recommendations to the various stakeholders managing the implementation. To this end, the implementation team should have appropriate access to the decision-makers.

7.1.3 System compatibility

7.1.3.1 ADS-B has potential use in almost all environments and operations and is likely to become a mainstay of the future ATM system. In addition to traditional radar-like services, it is likely that ADS-B will also be used for niche application where radar surveillance is not available or possible. The isolated use of ADS-B has the potential to foster a variety of standards and practices that, once expanded to a wider environment, may prove to be incompatible with neighbouring areas.

7.1.3.2 Given the international nature of aviation, special efforts should be taken to ensure harmonization though compliance with ICAO Standards and Recommended Practices (SARPs). The choice of systems to support ADS-B should consider not only the required performance of individual components, but also their compatibility with other CNS systems.

7.1.3.3 The future concept of ATM encompasses the advantages of interoperable and seamless transition across flight information region (FIR) boundaries and, where necessary, ADS-B implementation teams should conduct simulations, trials and cost/benefit analysis to support these objectives.

7.1.4 Integration

7.1.4.1 ADS-B implementation plans should include the development of both business and safety cases. The adoption of any new CNS system has major implications for service providers, regulators and airspace users and special planning should be considered for the integration of ADS-B into the existing and foreseen CNS/ATM system. The following briefly discusses each element.

7.1.4.2 Communication system

7.1.4.2.1 The communication system is an essential element within CNS. An air traffic controller can now monitor an aircraft position in real time using ADS-B where previously only voice position reports were available. However, a communication system that will support the new services that result from the improved surveillance may be necessary. Consequently, there is an impact of the ongoing ADS-B related work on the communication infrastructure developments.

7.1.4.3 Navigation system infrastructure

7.1.4.3.1 ADS-B is dependent upon the data obtained from a navigation system (typically GNSS), in order to enable its functions and performance. Therefore, the navigation infrastructure should fulfill the corresponding requirements of the ADS-B application, in terms of:

a) Data items; and
b) Performance (e.g. accuracy, integrity, availability etc.).

7.1.4.3.2 This has an obvious impact on the navigation system development, which evolves in parallel with the development of the surveillance system.

7.1.4.4 Other surveillance infrastructure

7.1.4.4.1 ADS-B may be used to supplement existing surveillance systems or as the principal source of surveillance data. Ideally, surveillance systems will incorporate data from ADS-B and other sources to provide a coherent picture that improves both the amount and utility of surveillance data to the user. The choice of the optimal mix of data sources will be defined on the basis of operational demands, available technology, safety and cost-benefit considerations.

7.2 Implementation checklist

7.2.1 Introduction

The purpose of this implementation checklist is to document the range of activities that needs to be completed to bring an ADS-B application from an initial concept to operational use. This checklist

may form the basis of the terms of reference for an ADS-B implementation team, although some activities may be specific to individual stakeholders.

7.2.2 Activity Sequence

The activities are listed in an approximate sequential order. However, each activity does not have to be completed prior to starting the next activity. In many cases, a parallel and iterative process should be used to feed data and experience from one activity to another. It should be noted that not all activities will be required for all applications.

7.2.3 Concept Phase

a) construct operational concept:

1) purpose;
2) operational environment;
3) ATM functions; and
4) infrastructure;

b) identify benefits:

1) safety enhancements;
2) efficiency;
3) capacity;
4) environmental;
5) cost reductions;
6) access; and
7) other metrics (e.g. predictability, flexibility, usefulness);

c) identify constraints:

1) pair-wise equipage;
2) compatibility with non-equipped aircraft;
3) need for exclusive airspace;
4) required ground infrastructure;
5) RF spectrum;
6) integration with existing technology; and
7) technology availability;

d) prepare business case:

1) cost benefit analysis; and
2) demand and justification.

7.2.4 Design Phase

a) identify operational requirements:

1) security; and
2) systems interoperability;

b) identify human factors issues:

1) human-machine interfaces;
2) training development and validation;
3) workload demands;
4) role of automation vs. role of human;
5) crew coordination/pilot decision-making interactions; and
6) ATM collaborative decision-making;

c) identify technical requirements:

1) standards development;
2) data required;
3) functional processing;
4) functional performance; and
5) required certification levels;

d) equipment development, test, and evaluation:

1) prototype systems built to existing or draft standards/specifications;
2) developmental bench and flight tests; and
3) acceptance test parameters; and
4) select and procure technology;

e) develop procedures:

1) pilot and controller actions and responsibilities;
2) phraseologies;
3) separation/spacing criteria and requirements;
4) controller's responsibility to maintain a monitoring function, if appropriate;
5) contingency procedures;
6) emergency procedures; and
7) develop AIP and Information documentation

f) prepare design phase safety case:

1) safety rationale;
2) safety budget and allocation; and
3) functional hazard assessment.

7.2.5 Implementation phase

a) prepare implementation phase safety case;

b) conduct operational test and evaluation:

1) flight deck and ATC validation simulations; and
2) flight tests and operational trials;

c) obtain systems certification:

1) aircraft equipment; and
2) ground systems;

d) obtain regulatory approvals:

1) flight operations; and
2) air traffic certification of use;

e) implementation transition:

1) Promulgate procedures and deliver training
2) continue data collection and analysis;
3) resolve any unforeseen issues; and
4) continue feedback into standards development processes;

f) performance monitoring to ensure that the agreed performance is maintained.

7.2.5.1 Once the implementation project is complete, ongoing maintenance and upgrading of both ADS-B operations and infrastructure should continue to be monitored, through the appropriate forums.

**Proposed Amendment to the Statement of
Basic Operational Requirements and Planning Criteria (BORPC)
for Regional Air Navigation Planning**

(The proposed deletion in the paragraph 7.2 is indicated with strikethrough)

7. SURVEILLANCE

7.1 Surveillance systems should provide adequate support to all phases of flight and meet ATM requirements. A table of surveillance facilities/services (including radars, automatic dependent surveillance (ADS) and automatic dependent surveillance – broadcast (ADS-B)), together with an associated chart, is considered to be a useful tool in the planning and implementation of surveillance systems.

7.2 Surveillance should be provided as an integral part of air traffic control where practicable and desirable or necessary in the interest of safety, efficiency and economy of operations, in particular for those areas where traffic density and/or the multiplicity or complexity of ATS routes creates constraints. ~~Primary and/or secondary surveillance radar systems may be used to fulfill this requirement. Subject to availability and cost effectiveness and provided that the required level of safety is maintained, ADS and ADS-B may be used in airspace where surveillance by radar is impracticable or cannot be justified.~~

7.3 Provision should also be made for the use of surveillance systems for the purpose of monitoring air traffic and identifying civil aircraft in areas where they might otherwise be intercepted.

Note: *This requirement does not constitute a justification or operational requirement for installation of new radars. Since interceptions would normally only take place under existing military radar control, this should be interpreted as a requirement for a State to make better use of existing measures and to improve civil/military coordination.*

Subject Task List of the ADS-B Study and Implementation Task Force

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1	APANPIRG Concl.13/19 TOR	Subject: Selection of links for near term and long term Task: 1) Select near term link; 2) Select long tern link.	A	1) SSR Mode S 1090 ES has been selected for the near term 2) Additional data links may be specified as necessary	Completed TBD
2	APANPIRG Concl.14/21	Subject: Guidance material for implementation of ADS-B in Asia and Pacific regions Task: Develop a guidance package	A	1) Sample Business case component; 2) Based on OPLINK Concept of use and other ICAO Docs for ADS-B air-ground surveillance service	2006 Completed
3	APANPIRG Concl. 14/21	Subject: Report of ADS-B problem. Task: Establish a problem reporting system	A	Develop a database and a form of report	Completed
4		Subject: Draft amendment proposal to SUPPs 7030 Regional Supplemental Procedures Task: Prepare a draft for consideration by ATM/AIS/SAR Sub Group of APANPIRG	B	Prepare a draft for amendment to Doc7030 for implementation of ADS-B in the Asia and Pacific regions pending separation criteria developed by relevant ICAO panel.	2005/Australia

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
5	APANPIRG Concl.14/21	Subject: ASIA/PAC ADS-B operational manual Task: Develop operational procedure manual for using ADS-B.	A	Develop a draft operational manual (include material on NOTAM and available manual data)	Completed
6	APANPIRG Concl. 14/21	Subject: Coordination between States at planning level Task: Coordination for timing of implementation and designate focal point of contact, points of contact for regulators, airframes & ground systems.	A	1) Develop an coordinated implementation plan by cities pairs; 2) Inform ICAO regional office names of designated focal point of contact.	2005/States concerned Completed
7	APANPIRG Concl. 14/21	Subject: Regional implementation plan Task: Develop a Regional implementation plan taking into account the individual national plans in accordance with a coordinated plan between cities pairs.	B	1) States present their ADS-B plans (including any necessary associated air ground voice communication) as WPs to ADS-B study and implementation Task Force. 2) Implementation date, sites being considered and plans for mandates (if any) should be specified. 3) Develop optimal regional plan based on State inputs	2005
8		Subject: Number of airframes fitted Task: Report on number of airframes fitted	A	Collect and report to the Task Force information on types, operators (numbers of each) and NUC (NIC/NAC/SIL)	2005/USA

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MONGOLIA	Mr. Davaa Gombosuren Director, Policy and Foreign Relations Department Buyant-Ukhaa International Airport Ulaanbaatar-34 **MONGOLIA**	Tel:+976 (11) 982-020 Fax: +976 (11) 379-640	g_davaa@mcaa.gov.mn
MYANMAR			
NAURU			
NEPAL			
NEW ZEALAND	Mr. Len Wicks Aeronautical Services Officer ATS Civil Aviation Authority of New Zealand 10 Hutt Road, Petone P.O. Box 31-441 Lower Hutt **NEW ZEALAND**	Tel: +64 (4) 560-9454 Fax: +64 (4) 569-2024	wicksl@caa.gov.nz
PAKISTAN	General Manager (ATS)		gmats@caapakistan.com.pk
PALAU			
PAPUA NEW GUINEA			

State/ Organization	Name/Address	Telephone/Fax	E-mail address
PHILIPPINES	Mr. Andrew B. Basallote Acting Director I Airways Navigation Service Air Transportation Office MIA Road Passay City 1301 Metro Manila **PHILIPPINES**	Tel: +63 (2) 879-9189 Fax: +63 (2) 879-9165	-
	Mr. Inocencio T.Yncierto Officer-in-Charge Airways Navigation Service Air Transportation Office MIA Road Passay City 1301 Metro Manila **PHILIPPINES**	Tel: +63 (2) 879-9163 879-9164 Fax: +63 (2) 879-9165	-
REPUBIC OF KOREA	Mr. Kyun Do, Huh Deputy Director Airways Facilities Division Civil Aviation Safety Authority Ministry of Construction and Transportation 274 Gwahae-dong Gangseo-Gu Seoul 157-711 **REPUBLIC OF KOREA**	Tel: +82 (2) 2662-5263 Fax: +82 (2) 6342-7299	kdhuh@moct.go.kr
SAMOA			
SINGAPORE	CAAS: Mr. Yeo Cheng Nam (Technical) Senior Engineer (Surveillance) Civil Aviation Authority of Singapore Singapore Changi Airport P.O. Box 1 **SINGAPORE** 918141	Tel: +65 6541-2442 Fax: +65 6542-2447	Yeo_Cheng_Nam@caas.gov.sg
	Mr. Kwek Chin Lin (Operational) Project Officer (System) Singapore Air Traffic Control Centre 60, Biggin Hill Road **SINGAPORE** 509950	Tel: +65 6541-2664 Fax: +65 6545-6252	Kwek_Chin_Lin@caas.gov.sg

State/ Organization	Name/Address	Telephone/Fax	E-mail address
	SIA: Mr. Voon Yih Meng (Technical) Manager Technical Services Mr. Joseph Phua (Operational)	Tel: +65 6541-6031	YihMeng_Voon@singaporeair.com.sg
SOLOMON ISLANDS			
SRI LANKA	Mr. Parakrama Dissanayake Assistant Director/Aerodromes & Navigation Services Civil Aviation Authority of Sri Lanka 64 Galle Road Colombo 03 **SRI LANKA (REPUBLIC OF)**	Tel: +94 (1) 243-6324 Fax: +94 (1) 244 0231	parad@sri.lank.net
THAILAND	Mr. Choosit Kuptaviwat Director, Air Traffic Services Engineering Planning and Standards Department Aeronautical Radio of Thailand 102 Ngamduplee Tungmahamek, Sathorn Bangkok 10120 **THAILAND**	Tel: +66 (2) 285-9457 Fax: +66 (2) 287-8645	choosit.ku@aerothai.co.th
TONGA	Mr. Ahovaleamoemapa Faletau Secretary for Civil Aviation P.O. Box 845 Nuku'alofa **TONGA**	Tel: +676 24144 Fax: +676 24145	afaletau@mca.gov.to
USA			
VANUATU, REPBULIC OF			
VIET NAM			

Annex 1 - Guidance Material for Users Accessing the SADIS 2G Broadcast

What do I need to do to access SADIS 2G?

A) Existing SADIS customers who want to access SADIS 2G

1) Visit the SADIS web site - http://www.metoffice.gov.uk/sadis/index.html for the latest information. Review the hardware and software procurement guidelines available at - http://www.metoffice.gov.uk/sadis/news/sadis_s_h_procure.html
Note: the current SADIS service will be terminated on 31 December 2008.

2) Contact the Met Office (Richard Orrell: Telephone +44 (0)1392 884892; Fax +44 (0)1392 885681; Email richard.orrell@metoffice.gov.uk) to register your intent to move to the SADIS 2G service.

3) Contact the SADIS 2G hardware suppliers – see attachment for contact details - with a view to obtaining quotations for an upgrade to the 2G service. Users will need to purchase the following components:-

- a 2G compatible receiver; and
- a MegaPAC.

Note 1: L-Teq can provide a "one-box" solution for the 2G receiver and MegaPAC which incorporates the two components inside one physical unit. This unit can be supplied as a hardened case if required.

Note 2: Users located very close to the edge of the SADIS footprint may have to purchase a new low noise block (LNB) and/or antenna. Discuss this potential requirement with the hardware suppliers.

4) Please inform the Met Office (Contact: Richard Orrell) when complete migration to the SADIS 2G service has taken place.

B) New SADIS users wanting to access the SADIS 2G service

1) Visit the SADIS web site - http://www.metoffice.gov.uk/sadis/index.html for the latest information. Review the hardware and software procurement guidelines available at - http://www.metoffice.gov.uk/sadis/news/sadis_s_h_procure.html

2) Contact the Met Office (Richard Orrell: Telephone +44 (0)1392 884892; Fax +44 (0)1392 885681; Email richard.orrell@metoffice.gov.uk) to register your intent to access the SADIS 2G service.

3) Contact your State Meteorological Authority to seek written authorisation that a SADIS system can be operated by your organisation within your State. Please send copies of this authorisation to:-

- Bernard Perry, UK Met Authority, Civil Aviation Authority, CAA House., 45-59 Kingsway, London WC2B 6TE.
- Your regional ICAO office.
- Richard Orrell, Met Office, Fitzroy Road, Exeter, EX1 3PB, UK.

4) Contact the SADIS 2G hardware suppliers – see appendix for contact details– with a view to obtaining quotations for a full SADIS 2G VSAT (very small aperture terminal). Users will need to purchase, as a minimum, the following components:-

- a 2G compatible receiver;
- a MegaPAC;
- an LNB (low noise block);
- an antenna (2.4 metre is the standard diameter sizes); and
- appropriate low loss cable.

Note 1: L-Teq can provide a "one-box" solution for the 2G receiver and MegaPAC which incorporates the two components inside one physical unit. This unit can be supplied as a hardened case if required.

Note 2: Users located very close to the edge of the SADIS footprint may have to purchase a new low noise block (LNB) and/or antenna. Discuss this potential requirement with the hardware suppliers. Users located towards the centre of the satellite footprint may be able to use a smaller sized antenna. Seek guidance from the hardware suppliers prior to making your purchase.

5) Please inform the Met Office (Contact: Richard Orrell) when your system has been installed.

Contact Details for Supplier of SADIS 2G Hardware

Contact details for a second supplier and integrator will be published shortly on the SADIS web site at URL http://www.metoffice.gov.uk/sadis/hardware/suppliers/index.html

L-Teq

Services provided:-

- Provision of antennas, LNBs, 2G compatible receivers*, configured MegaPAC units.
- On-site installation and training.
- Support and maintenance.
- Hardware repair.
- General satellite communications provision and troubleshooting.

**Note: the 2G compatible receivers can be provided as standalone units, or incorporated into a single unit along with a MegaPAC.*

Contact Details:

Stuart Derricott
L-Teq
Lapwing 440, Frimley Business Park, Frimley, Surrey, GU16 7SZ, UK.
Telephone: +44 (0)1276 686566
Fax: +44 (0)1276 686550
E-mail sderricott@lteq.com
Web: www.lteq.com

SADIS STRATEGIC ASSESSMENT TABLES

ASIA— OPMET data volumes

OPMET data	*Current 2005*	*Projected 2006*	*Projected 2007*	*Projected 2008*	*Projected 2009*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	86	90	95	100	115
Average number of stations per FC bulletin	3	3	3	3	3
Number of **FT bulletins** issued per day	242	245	250	255	260
Average number of stations per FT bulletin	5	5	5	5	5
Number of **SA bulletins** issued per day	938	945	950	955	960
Average number of stations per SA bulletin	5	5	5	5	5
Number of **SP bulletins** issued per day	20	20	25	25	30
Number of **SIGMET** bulletins issued per day	9	10	10	10	10
Number of **FK/FV bulletins** issued per day	0	1	1	1	1
BINARY DATA					
Number of other bulletins issued per day	0	0	0	0	-
(please specify header(s))					
Average number of stations per bulletin	-	-	-	-	-
TOTALS					
Total number of OPMET bulletins per day	1295	1311	1331	1341	1366
Average size of OPMET bulletin (bytes)	434	434	434	434	434
Total estimated OPMET data volume per day (bytes)	562K	569K	578K	582K	593K

.

Note: These tables do not contain any provision for distribution of BUFR encoded OPMET data. Capacity for this data may need to be included depending on the time table that will be agreed within the region for production and promulgation of this new data.

ASIA — BUFR data volumes

Graphical information in the BUFR code form	*Current 2005*	*Projected 2006*	*Projected 2007*	*Projected 2008*	*Projected 2009*
WMO Header			**Not available**		
Time(s) of issue of data (UTC)			Misc.	Misc.	Misc.
Average size of message (bytes)			20K	20K	20K
Data level			Misc.	Misc.	Misc.
Validity times of data (in hours after the time of issuance)			6, 12, 18	6, 12, 18	6, 12, 18
TOTALS					
Total number of BUFR messages per day	0	0	2	2	2
Average size of messages (bytes)	-	-	20K	20K	20K
Total estimated volume of BUFR messages per day (bytes)	0K	0K	40K	40K	40K

Note.— Provision is made for the distribution of BUFR encoded VAGs starting from the year 2007.

ASIA — AIS data volumes

AIS	*Current 2005*	*Projected 2006*	*Projected 2007*	*Projected 2008*	*Projected 2009*
ALPHANUMERIC AIS DATA (e.g. NOTAMs, ASHTAMs)		**ASHTAMs and NOTAMs related to volcanic ash**			
Bulletin type		ASHTAM	ASHTAM	ASHTAM	ASHTAM
Number of bulletins issued per day		2	2	2	2
Average size of each bulletin (bytes)		5K	5K	5K	5K
Bulletin type		NOTAM	NOTAM	NOTAM	NOTAM
Number of bulletins issued per day		2	2	2	2
Average size of each bulletin (bytes)		5K	5K	5K	5K
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	0	4	4	4	4
Average size of AIS bulletin (byte)	-	5K	5K	5K	5K
Total number of AIS charts issued per day	0	0	0	0	0
Average size of AIS chart (byte)	-	-	-	-	-
Total estimated volume of AIS data per day (bytes)	0K	20K	20K	20K	20K

Note.— Provision is made for the distribution of ASHTAMs and NOTAMs related to volcanic ash starting from the year 2006.

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PAC WAFS Implementation Plan and Procedures

~~7~~8th Edition - July 200~~4~~5

ASIA/PAC WAFS Implementation Plan and Procedures

~~7~~8th Edition - July 200~~4~~5

Introduction

1. The Asia/Pacific WAFS Implementation Plan and Procedures has been revised to take account of progress already made and in recognition of the impact of the migration to GRIB and BUFR.

The Implementation of WAFS

2. This plan is based on the understanding that the implementation of WAFS in 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.

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. 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.

e. The production and distribution (via satellite broadcast) by the WAFCs of quality controlled SWM (FL 100 - 250) in BUFR format over limited geographical areas where required by PIRGs.

f. ~~f.~~ The capability of States to convert current BUFR and GRIB messages to graphical products on an operational basis.

g. Transition from SADIS 1G to SADIS 2G service.

SIGWX Charts

3. The table below shows the status of the SIGWX charts and responsible WAFCs.

Chart area & responsible WAFC
G London (SWH)
K London (SWH)
D London (SWH)
J Washington (SWH)

E	London (SWH)
F	Washington (SWH)
I	Washington (SWH)
M	Washington (SWH)

4. There will be an ongoing requirement for NMSs to monitor the quality of WAFC products.

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.

6. The SIGWX charts produced by WAFC Washington are also available on the US NWS Aviation Weather Center Internet site at: http://www.nws.noaa.gov/iscs. All WAFC London products are available on ~~a password controlled~~the internet-based SADIS FTP s~~ite~~erver, together with appropriate GRIB and BUFR decoding facilities (Note: not including the visualization software).

7. States are encouraged to send comments to the WAFCs about the quality and accuracy of SIGWX on a frequent and regular basis. Contact details for comments are:

WAFC Washington

i. NWS/Aviation Weather Center
Attention: Mr Larry Burch~~Mike Campbell~~
7220 NW 101st Terrace
Kansas City, Missouri
USA 64153-2371
ii. E-mail addressed to: ~~mike.campbell~~larry.burch@noaa.gov
iii. Fax number: 1 816 880 0650

WAFC London

i. The Met. Office
Attention: Mr. Nigel Gait
International Aviation Manager
Fitzroy Road
Exeter
Devon EX1 3PB
United Kingdom
ii. E-mail addressed to: nigel.gait@metoffice.com
iii. Fax number: +44 (1392) 885 681

Distribution of WAFS Products

8. Most States in the Asia/Pacific Regions are receiving wind, temperature and humidity 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 are available via the Internet and through bilateral arrangements with neighbouring national meteorological services.

9. ~~9.~~ The two WAFCs ~~will~~ distribute by satellite broadcast Global, quality controlled SWH and quality controlled SWM for limited geographical areas ~~(Note: WAFC London started the operational distribution of Global, quality controlled SWH by satellite broadcast in June 2003)~~. Once suitable decoding and visualization software has been acquired by 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 SIGWX charts will be eliminated from the satellite broadcasts (Note: the T4 facsimile format Wind/Temperature charts have been removed from the satellite broadcasts on 1 July 2005. It is planned that the T4 facsimile format SIGWX charts will be removed from the satellite broadcasts on 30 November 2006).

Transition from SADIS 1G to SADIS 2G service

10. On the 12 November 2004, WAFC London launched the SADIS 2G service that was required as a result of SADISOPSG Conclusion 9/15. This new service is available to new and current SADIS users. The current SADIS 1G service will continue to be available in addition to the SADIS 2G service until 31 December 2008. States should arrange for the procurement of the necessary hardware, and as necessary, compliant visualization software for transition to the SADIS 2G service in time. Guidance material for users accessing the SADIS 2G broadcast is available at the SADIS web site – http://www.metoffice.gov.uk/sadis/index.html.

Indicative Timetable for ~~Achieving the Final Phase~~Implementation of WAFS

11~~0~~. The table given in Attachment 1 provides an indicative timetable for the implementation of WAFS within the Asia/Pacific Regions.

Volcanic Ash Advisory Centres (VAACs)

12~~1~~. 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)

13~~2~~. 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 Implementation Plan and Procedures — Attachment 1

Indicative Timetable for Implementation of WAFS

Item	Task/Stage of Implementation of WAFS	Anticipated Date
1	WAFC London products on access controlled internet site	completed
2	The establishment of back-up distribution arrangements for WAFS products	completed
3	Training in the operational conversion of GRIB forecasts to Wind / Temp charts	~~late 2002 (SADIS)~~ ~~January 2005 (ISCS)~~completed
4	All states that receive GRIB products capable of converting GRIB forecasts to Wind / Temp charts	~~early 2005~~completed
5	Removal of T4 Facsimile Wind / Temp charts from the satellite broadcast	~~1 July 2005~~completed
6	Training in the operational conversion of BUFR to SIGWX charts	~~late 2002 (SADIS)~~ ~~January 2005 (ISCS)~~completed
7	States having the ability to operate the decoding software to convert BUFR SIGWX messages into graphical format	early 2006~~5~~
8	The satellite distribution by the two WAFCs of global SWH and of SWM for limited geographical areas in BUFR format	~~June 2003 (SADIS SWH)~~ ~~late 2004 (SADIS SWM)~~ ~~late 2004 (ISCS SWH & SWM)~~completed
9	Launch of SADIS 2G service	12 November 2004
10	SADIS 2G seminar for ASIA/PAC States	July 2006
11~~9~~	Removal of T4 Facsimile SIGWX products from the satellite broadcast	~~1~~30 November ~~July~~ 2006~~5~~
12	Procument of SADIS 2G hardware by SADIS user States	early 2008

13	Termination of the SADIS 1G service	1 January 2009

ASIA/PAC WAFS IMPLEMENTATION TASK FORCE
(updated by CNS/MET SG/9 meeting, 11 to 15 July2005)

1. Terms of Reference

Expedite the implementation of the World Area Forecast System (WAFS) in the Asia and Pacific Regions.

2. Work Programme

The work to be addressed by the ASIA/PAC WAFS Implementation Task Force (WAFS/I TF) includes:

(a) Coordinating the replacement of SIGWX charts in T4 facsimile format by BUFR encoded products in the Asia and Pacific Regions.

(b) Coordinating the migration of SADIS 1G service to 2G service in the Asia and Pacific Regions.

(c) Coordinating the provision of assistance to States to ensure that WAFS can be effectively implemented in the Asia and Pacific Regions.

(d) Providing inputs (via the CNS/MET SG) to APANPIRG on the regional planning and development of WAFS for coordination with the WAFSOPSG.

(e) Keeping the ASIA/PAC WAFS Implementation Plan and Procedures up to date.

The work is expected to be carried out primarily by correspondence.

3. Composition

The Task Force is composed by experts from:

Australia; Hong Kong, China (Chairman); India; Japan; New Zealand; Singapore; Thailand; United Kingdom; United States and IATA.

ASIA/PAC FASID **6-4A-1**

FASID TABLE MET 4A — REGIONAL OPMET BULLETIN EXCHANGE (ROBEX) SCHEME – ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

EXPLANATION OF THE TABLE

Column

1. Name of the ROBEX Centre
2. ICAO location indicator of ROBEX Centre
3. Name of aerodromes in the ROBEX Centre's area of responsibility
4. ICAO location indicator of the aerodromes in column 3
5. Indication of collection of METAR, SPECI and AIREP
6. Indication of collection of TAF

ASIA/PAC FASID **6-4A - 2**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Bangkok	**VTBB**	BANGKOK/Bangkok Intl	VTBD	x	x
		CHIANG MAI/Chiang Mai Intl	VTCC	x	x
		DANANG/Danang	VVDN	x	x
		DHAKA/Zia Intl	VGZR		x
		HANOI/Noibai	VVNB	x	x
		HO-CHI-MINH/Tan-Son Nhat	VVTS	x	x
		MANDALAY/Mandalay	VYMD	x	
		PHNOM PENH/Pochentong	VDPP	x	x
		PHUKET/Phuket Intl	VTSP	x	x
		RAYONG/U-Tapao Intl	VTBU	x	x
		SIEM REAP/Siem Reap	VDSR	x	
		SONGKHLA/Hat Yai Intl	VTSS	x	x
		VIENTIANE/Wattay	VLVT	x	x
		YANGON/ Yangon Intl	VYYY	x	x
Beijing	**ZBBB**	BEIJING/Capital	ZBAA	x	x
		CHANGCHUN/Dafangshen	ZYCC	x	x
		CHANGSHA/Huanghua	ZGHA	x	x
		CHENGDU/Shuangliu	ZUUU	x	x
		CHONGQING/Jiangbei	ZUCK	x	x
		DALIAN/Zhoushuzi	ZYTL	x	x
		GUANGZHOU/Baiyun	ZGGG	x	x
		GUILIN/Liangjang	ZGKL	x	x
		HAIKOU/Meilan	ZJHK	x	x
		HANGZHOU/Xiaoshan	ZSHC	x	x
		HARBIN/Yanjiangang	ZYHB	x	x
		HEFEI/Luogang	ZSOF	x	x
		HOHHOT/Baita	ZBHH	x	x
		KASHI	ZWSH	x	x
		KUNMING/Wujiaba	ZPPP	x	x
		LANZHOU/Zhongchuan	ZLLL	x	x
		NANJING/Lukou	ZSNJ	x	x
		NANNING/Wuxu	ZGNN	x	x
		QINGDAO/Liuting	ZSQD	x	x
		SANYA/Fenghuang	ZJSY	x	
		SHANGHAI/Hongqiao	ZSSS	x	x
		SHANGHAI/Pudong	ZSPD	x	x
		SHANTOU/Shantou	ZGOW	x	x
		SHENYANG/Taoxian	ZYTX	x	x
		SHENZHEN/Baoan	ZGSZ	x	x
		TAIYUAN/Wusu	ZBYN	x	x
		TIANJING/Binhai	ZBTJ	x	x
		ULAANBAATOR/Bryant-Ukhaa	ZMUB	x	x
		URUMQI/Diwopu	ZWWW	x	x
		WUHAN/Tianhe	ZHHH	x	x

ASIA/PAC FASID **6-4A- 3**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
		XIAMEN/Gaoqi	ZSAM	x	x
		XIAN/Xianyang	ZLXY	x	x
Brisbane	**YBBN**	SYDNEY/Kingsford Smith Intl	YSSY	x	x
		MELBOURNE/Melbourne Intl	YMML	x	x
		BRISBANE/Brisbane	YBBN	x	x
		ADELAIDE/Adelaide	YPAD	x	x
		DARWIN/Darwin	YPDN	x	x
		PERTH/Perth int	YPPH	x	x
		CAIRNS/Cairns	YBCS	x	x
		ALICE SPRINGS/Alice Springs	YBAS	x	x
		LEARMONTH/Learmonth	YPLM	x	x
		TOWNSVILLE/Townsville	YBTL	x	x
		COCOS ISLD/Cocos Isld	YPVV	x	x
		CHRISTMAS ISL/Cristms Isl	YPXM	x	x
		TINDAL /Tindal RAAF	YPTN	x	x
		KUNUNURRA/Kununurra	YPKU	x	
		CANBERRA/Canberra	YSCB	x	x
		COOLANGATTA/Coolangatta	YBCG	x	x
		AVALON/Avalon	YMAV	x	x
		ROCKHAMPTON/Rockhampton	YBRK	x	x
		KALGOORLIE/Kalgoorlie	YPKG	x	x
		PORT HEDLAND/Port Hedland	YPPD	x	x
		BROOME/Broome	YBRM	x	
		NORFOLK ILS/Norfolk Isl	YSNF	x	
		DUBBO/Dubbo	YSDU	x	
		RICHMOND/Richmond	YSRI	x	
		WILLIAMTOWN/Williamtown	YWLM	x	
		LAUNCESTON/Launceston	YMLT	x	
		HOBART/Hobart	YMHB	x	
		PEARCE/Pearce	YPEA	x	x
		CURTIN-DERBY/Curtin-Derby	YCIN	x	
		FORREST/Forrest	YFRT	x	
		GOVE/Gove	YPGV	x	
		AMBERLEY/Amberley RAAF	YAMB	x	
		HAMILTON ISLD/Hamilton Isld	YBHM	x	
		MOUNT ISA/Mount Isa	YBMA	x	
Colombo	**VCCC**	COLOMBO/Katunayake	VCBI	x	
		MALE/Male Intl	VRMM	x	
Delhi	**VIDP**	DELHI/Indira Gandhi Intl	VIDP	x	
		LUCKNOW	VILK	x	
		AMRITSAR/Amritsar	VIAR	x	
		VARANASI/Varanasi	VIBN	x	
		JAIPUR	VIJP	x	

ASIA/PAC FASID **6-4A - 4**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Hong Kong	**VHHH**	HONG KONG/Hong Kong Intl	VHHH	x	x
		TAIBEI/Taibei Intl	RCTP	x	x
		GAOXIONG/Gaoxiong	RCKH	x	x
		TAIBEI/Sungshan	RCSS	x	x
		MACAU/Macau Intl	VMMC	x	x
		MANILA/Ninoy Aquino Intl	RPLL	x	x
		LAPU LAPU/Mactan Cebu Intl	RPVM	x	x
		DAVAO/Francisco Bangoy Intl	RPMD	x	x
		SUBIC BAY/Subic Bay Intl	RPLB	x	x
		LAOAG/Laoag Intl	RPLI	x	x
		ZAMBOANGA/Zamboanga Intl	RPMZ	x	x
Incheon	**RKSI**	SEOUL/Incheon Intl	RKSI	x	x
		SEOUL/Gimpo Intl	RKSS	x	x
		JEJU/Jeju Intl	RKPC	x	x
		BUSAN/Gimhae Intl	RKPK	x	x
		CHEONGJU/Cheongju Intl	RKTU	x	x
		YANGYANG/Yangyang Intl	RKNY	x	x
		DAEGU/Daegu Intl	RKTN	x	x
Jakarta	**WIII**	UJUNG PANDANG/Hasanuddin	WAAA	x	
		BIAK/Frans Kaisieppo	WABB	x	
		JAKARTA/Halim	WIIH	x	
		JAKARTA/Soekarno-Hatta	WIII	x	
		BATAM/Hang Nadim	WIKB	x	
		MEDAN/Polonia	WIMM	x	
		DENPASARx	WRRR	x	
		SURABAYA/Juanda	WRSJ	x	
		MANADO/Sam Ratulangi	WAMM	x	
		PEKAN BARU/Simpangtiga	WIBB	x	
		TANJUNG PINNAG/Kijang	WIKN	x	
		PADANG/Tabing	WIMG	x	
		PONTIANAK/Supadio	WIOO	x	
		PALEMBANG/Sultan Mahmud Badaruddin II	WIPP	x	
		BANJARMASIN/Syamsudin Noor	WRBB	x	
		BALIKPAPAN/Sepinggan	WRLL	x	
		MATARAM/Selaparang	WRRA	x	
		TIMIKA/Tembegapura	WABP	x	
		JAYAPURA/Sentani	WAJJ	x	
		MERAUKE/Mopah	WAKK	x	
		AMBON/Pattimura	WAPP	x	
		SEMARANG/Achmad Yani	WIIS	x	
		BANDAR LAMPUNG/Branti	WIIT	x	
		KUPANG/El-Tari	WRKK	x	
		TARAKEN	WRLR	x	

ASIA/PAC FASID **6-4A- 5**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
Kolkata	**VECC**	KOLKATA/Netaji Subhash Chandra Bose Intl	VECC	x	
		PATNA/Patna	VEPT	x	
		DHAKA/Zia Intl	VGZR	x	
		CHITTAGONG/M. A. Hannan Intl	VGEG	x	
		KATHMANDU/Tribhuvan Intl	VNKT	x	
Karachi	**OPKC**	KARACHI/Quaid-E-Azam Intl	OPKC	x	x
		ISLAMABAD/Chaklala	OPRN	x	x
		LAHORE/Lahore	OPLA	x	x
		NAWABSHAH	OPNH	x	x
		GAWADAR	OPGD	x	x
		PESHAVAR	OPPS	x	x
Kuala Lumpur	**WMKK**	KUALA LUMPUR/Kuala Lumpur Intl	WMKK		x
		SINGAPORE/Changi	WSSS		x
		SINGAPORE/Paya Lebar	WSAP		x
		PENANG/Bayan Lepas	WMKP		x
		KOTA KINABALU/Kota Kinabalu Intl	WBKK		x
		KUCHING/Kuching	WBGG		x
		BANDAR SERI BEGAWAN /Brunei Intl	WBSB		x
Mumbai	**VABB**	AHMADABAD/Ahmadabad	VAAH	x	x
		MUMBAI/Jawaharlal Nehru Intl	VABB	x	x
		NAGPUR/Nagpur	VANP	x	x
		CALCUTTA/Calcutta	VECC		x
		PATNA/Patna	VEPT		x
		AMRITSAR/Amritsar	VIAR		x
		VARANASI/Varanasi	VIBN		x
		DELHI/Indira Gandhi Intl	VIDP		x
		JAIPUR/Jaipur	VIJP		x
		LUCKNOW/Lucknow	VILK		x
		COLOMBO/Katunayake	VCBI		x
		KATHMANDU/Tribhuvan Intl	VNKT		x
		COCHIN/Cochin Intl	VOCI		x
		CALICUT/Calicut	VOCL		x
		HYDERABAD/Hyderabad	VOHY	x	x
		CHENNAI/Chennai	VOMM	x	x
		TIRUCHCHIRAPALLI/Tiruchchirapalli	VOTR	x	x
		TRIVANDRUM/Trivandrum	VOTV	x	x
Nadi	**NFFN**	NADI/Intl	NFFN		x
		NOUMEA/La Tontouta	NWWW		x
		PAGO PAGO/Intl, Tutuila I.	NSTU		x
Port Moresby	**AYPY**	PORT MORESBY/Jacksons	AYPY	x	
		MADANG	AYMD	x	

ASIA/PAC FASID **6-4A - 6**

ROBEX CENTRES AND THEIR RESPONSIBILITIES FOR COLLECTION OF OPMET INFORMATION

Name	CCCC	Aerodrome	CCCC	SA/SP/UA*	FT
1	2	3	4	5	6
		WEWAK	AYWK	x	
Singapore	**WSSS**	SINGAPORE/Changi	WSSS		x
		SINGAPORE/Paya Lebar	WSAP		x
		KUALA LUMPUR/Kuala Lumpur Intl	WMKK		x
		DENPASAR/Ngurah Rai (Bali Intl)	WRRR		x
		JOHOR BAHRU/Sultan Ismail	WMKJ		x
		PENANG/Bayan Lepas	WMKP		x
		SURABAYA/Juanda	WRSJ		x
		JAKARTA/Halim	WIIH		x
		JAKARTA/Soekarno-Hatta	WIII		x
		SUBANG/Sultan Abdul Aziz Shah	WMSA		x
		SINGAPORE/Changi	WSSS		x
Tokyo	**RJTD**	TOKYO/Narita Intl	RJAA	x	x
		TOKYO/Tokyo Intl	RJTT	x	x
		NAHA/Naha	ROAH	x	x
		OSAKA/Osaka Intl	RJOO	x	x
		OSAKA/Kansai Intl	RJBB	x	x
		NAGOYA/Nagoya	RJNN	x	x
		SENDAI/Sendai	RJSS		x
		SAPPORO/New Chitose	RJCC	x	x
		HAKODATE/Hakodate	RJCH	x	
		FUKUOKA/Fukuoka	RJFF	x	x
		KAGOSHIMA/Kagoshima	RJFK	x	x
		OITA/Oita	RJFO		x
		KUMAMOTO/Kumamoto	RJFT		x
		NAGASAKI/Nagasaki	RJFU		x
		NAGASAKI/Nagasaki	RJFU	x	
		NAGOYA/Nagoya	RJNN		x
		HIROSHIMA/Hiroshima	RJOA		x
		OKAYAMA/Okayama	RJOB		x
		TAKAMATSU/Takamatsu	RJOT		x
		NIIGATA/Niigata	RJSN		x
Wellington	**NZKL**	WELLINGTON/Wellington Intl	NZWN	x	x
		AUCKLAND/Auckland Intl	NZAA	x	x
		CHRISTCHURCH/Christchurch Intl	NZCH	x	x

***Note:** UA bulletins are compiled by those aerodrome meteorological offices in Column 3, which are designated as MWOs according to FASID Table MET 1B.*

ASIA/PAC FASID **6-4B-1**

FASID TABLE MET 4B — OPMET DATA BANKS TO SUPPORT THE ROBEX SCHEME (ROBEX OPMET DATA BANKS – RODB)

EXPLANATION OF THE TABLE

Column

1. ROBEX Centres

2. ROBEX OPMET data bank responsible for collection and dissemination of METAR, SPECI, AIREP and TAF bulletins issued by ROBEX centres in column 1.

RODB RESPONSIBILITY FOR ROBEX BULLETINS

ROBEX centres	RODB responsible for collection and dissemination of bulletins (SA, SP, UA and FT)				
	Bangkok	**Brisbane**	**Singapore**	**Tokyo**	**Nadi**
1	2				
ASIA/PAC					
Bangkok	x				
Beijing				x	
Brisbane		x			
Colombo	x				
Delhi	x				
Hong Kong				x	
Incheon				x	
Jakarta			x		
Karachi	x				
Kolkata	x				
Kuala Lumpur			x		
Mumbai	x				
Nadi					x (FT)
Port Moresby		x			
Singapore			x (FT)		
Tokyo				x	
Wellington		x			
MID					
Baghdad	x				
Bahrain	x				
Beirut	x				

ASIA/PAC FASID **6-4B-3**

Jeddah	x				
Tehran	x				
OTHER REGIONS					
EUR Bulletins			x		
AMBEX TAF Bulletins	x				
SAM TAF Bulletins		x			
NAM TAF Bulletins				x	x

PART VI

METEOROLOGY (MET)

……

5. Exchange of operational meteorological information
(FASID Tables MET 2A, MET 2 B, MET 4A and ~~,~~ MET 4B ~~and MET 4C~~)

5.1 ~~International~~ OPMET data banks

5.1.1 The ~~international~~ OPMET data banks in Bangkok, Brisbane, Nadi, Singapore and Tokyo have been designated to serve States in the ASIA/PAC Regions to access OPMET information which is required but not received. FASID Tables MET 4B~~C~~ sets out the responsibilities of the ASIA/PAC OPMET data banks for collection and dissemination of OPMET bulletins to support the ROBEX Scheme.
[APANPIRG/7 Concl. 7/20]

*Note: A list of the OPMET information available at the ~~international~~ OPMET data banks to serve the ASIA/PAC Regions, together with the procedures to be used in communicating with the data banks are contained in the **ASIA/PAC Interface Control Document (ICD) for interrogation with the OPMET data banks,** published by the ICAO Regional Office, Bangkok.*

5.2-*Exchange of METAR, SPECI and TAF*

5.2.1 FASID Table~~s~~ MET 4A ~~and MET 4B~~ set~~s~~ out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the collection and dissemination of METAR, SPECI and TAF~~, respectively~~. This~~ese~~ table~~s~~ contain~~s~~ information regarding the designated ROBEX centres and their respective areas of responsibility.
[ASIA/PAC/3 Rec. 9/6, Rec. 9/8]
[APANPIRG/7 Concl. 7/20]

*Note.— Details of the ROBEX procedures regarding the exchange of OPMET information required under the scheme are given in the **ROBEX Handbook** published by the ICAO ASIA/PAC Office, Bangkok, in coordination with the ICAO MID Office, Cairo.*

5.2.2 FASID Table~~s~~ MET 4A ~~and MET 4B~~ should be updated, as necessary, by the ICAO Regional Office on the basis of changes in the pattern of aircraft operations, the Statement of Basic Operational Requirements and Planning Criteria, and in consultation with those States and international organizations directly concerned.
[ASIA/PAC/3 Rec. 9/8]

5.2.3 ~~Requirements for~~ METAR, SPECI and TAF from ASIA/PAC Regions ~~not carried on the ROBEX Scheme which~~ should be transmitted to the ~~international~~ ASIA/PAC OPMET data banks and to SADIS and ISCS uplink stations ~~available at meteorological offices are contained~~ in accordance with FASID Table MET 2A. This table should be updated, as necessary, by the ICAO Regional Office on the basis of changes in the pattern of aircraft operations, the Statement of Basic Operational Requirements and Planning Criteria, and consultation with those States and international organizations directly concerned.
[ASIA/PAC/3 Rec. 9/1, Rec. 9/8]

5.2.4 The exchanges indicated in FASID Table MET 2A should be implemented as soon as possible ~~, 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]~~

5.3 *Exchange of SIGMET information and air-reports*

5.3.1 ~~The exchange requirement for~~ SIGMET from ASIA/PAC regions should be transmitted ~~and special air reports~~to the ASIA/PAC OPMET data banks and to the SADIS and ISCS uplink stations in accordance with FASID Table MET 2 B. SIGMET should also be disseminated to other MWOs and ACCs as necessary to fulfill the requirements for availability set out in the Statement of Basic Operational Requirements and Planning Criteria. FASID Table MET 2B provides detail regarding the ASIA/PAC communication gateways to which SIGMET messages from all regions should be addressed. ~~are contained in FASID Table MET 2B.~~ This table should be updated, as necessary, by the ICAO Regional Office. ~~s 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]~~

Note: To avoid duplication in transmission, the inter-regional exchange of SIGMET should be via designated inter-regional gateways.

5.3.2 Each MWO should arrange for the transmission to all aerodrome meteorological offices within its associated FIR of its own SIGMET messages and relevant SIGMET messages for other FIR, as required for briefing and, where appropriate, for flight documentation.
[ASIA/PAC/3 Rec. 8/16]

5.3.3 Each MWO should arrange for the transmission to its associated ACC/FIC of SIGMET information and special air-reports received from other MWOs as necessary to fulfill the requirements for availability set out in the Statement of the Basic Operational Requirements and Planning Criteria.

5.3.4 Each MWO should arrange for the transmission of routine air-reports received by voice communication to all meteorological offices within its associated FIR. Special air-reports which do not warrant the issuance of a SIGMET should be disseminated by MWO in the same way as SIGMET messages~~, in accordance with FASID Table MET 2B~~.

PART VI

METEOROLOGY (MET)

…….

3. EXCHANGE OF OPERATIONAL METEOROLOGICAL INFORMATION
(FASID Tables MET 2A, 2B, 4A~~,~~ and 4B ~~and 4C~~)

3.1 ~~3.1~~ The requirements for ~~the exchange of~~ METAR, SPECI and TAF~~, not catered for by the ROBEX Scheme,~~ , which should be made available by the ASIA/PAC States, to meet the ~~requirement~~ needs of the global international flight operations ~~in the ASIA/PAC Region~~ are shown in FASID Table MET 2A.

Note: Requirements for METAR, SPECI and TAF from other regions, needed for the operations conducted to/from ASIA/PAC region, are contained in the FASID Table MET 2A of the respective regional ANPs.

3.2 FASID Table MET 2B contains ~~the exchange requirements in~~ information for the communication gateways in the ASIA/PAC Region ~~for~~ to which all SIGMET messages ~~including those for~~and volcanic ash and~~/or~~ tropical cyclones advisories should be addressed.

3.3 FASID Table~~s~~ MET 4A ~~and 4B~~ sets out the Regional OPMET Bulletin Exchange (ROBEX) Scheme for the ~~collection~~ exchange of ~~routine reports (~~METAR~~)~~, SPECI, 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 4B~~C~~ 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~~ Inter-regional OPMET ~~Data Regional Exchange Point~~Gateways (IROG) ~~(ODREP)~~ with responsibility of exchanging the OPMET information between stations within the ASIA/PAC Regions and in ~~adjacent~~ other 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.*

ASIA/PACIFIC (ASIA/PAC) REGIONS

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
AMERICAN SAMOA (United States)					
Pago Pago/Pago Pago Intl		NSTU	X	X	SA/FTPA32
AUSTRALIA					
Adelaide/Adelaide Intl		YPAD	X	X	
Alice Springs/Alice Springs		YBAS	X		
	Amberley	YAMB	X		FC: issued 6 hourly on Sat. and Sun.; 12-hour validity
	Avalon	YMAV	M	X	
Brisbane/Brisbane Intl		YBBN	X	X	
Broome/Broome Intl		YBRM	X		FC: issued 6 hourly; 12-hour validity
Cairns/Cairns Intl		YBCS	M	X	
	Canberra	YSCB	M	X	
Christmas I./Christmas I.		YPXM	X		FC: issued as required; 12-hour validity
Cocos I/Cocos I.		YPCC	M		
	Coolangatta	YBCG	M	X	
	Curtin-Derby	YCIN	X		FC: issued 6-hourly; 12-hour validity
Darwin/Darwin Intl		YPDN	X	X	
Dubbo/Dubbo		YSDU	X		FC: issued 6-hourly; 12-hour validity
	Forrest	YFRT	X		FC: issued 6-hourly; 12-hour validity
	Gove	YPGV	X		FC: issued 6-hourly; 12-hour validity
	Hamilton I.	YBHM	X		FC: issued 6-hourly; 12-hour validity
Hobart/Hobart		YMHB	X		FC: issued 6 hourly; 12-hour validity
	Kalgoorlie	YPKG	X		FC: issued 6 hourly; 12-hour validity
	Kununurra	YPKU	X		FC: issued three times a day; 12- or 6-hour validity
Learmonth		YPLM	M		
Melbourne/Melbourne Intl		YMML	X	X	
	Mount Isa	YBMA	X		FC: issued 6 hourly;

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
					12-hour validity
Norfolk I./Norfolk I.		YSNF	X		FC: issued three times a day; 12-hour validity
	Pearce	YPEA	X		FC: issued 6 hourly; 12-hour validity
Perth/Perth Intl		YPPH	X	X	
Port Hedland/Port Hedland		YPPD	X		
	Richmond, NSW	YSRI	X		FC: issued 6 hourly; 12-hour validity
Rockhampton/Rockhampton		YBRK	M		
Sydney/Kingsford Smith Intl		YSSY	X	X	
Tindal/Catherine		YPTN	M		
Townsville/Townsville Intl		YBTL	X	X	
	Williamtown	YWLM	M	X	FT: issued three times a day
BANGLADESH					
Chittagong/ Chitagong		VGEG	M	X	
Dhaka/Zia Intl		VGZR	X	X	
BHUTAN					
Paro/Paro Intl		VQPR	M		
BRUNEI DARUSSALAM					
Bander Seri Beegawan/Brunei Intl		WBSB	X	X	
CAMBODIA					
Phnom-Penh/Pochentong		VDPP	M	X	
Siem-Reap/Angkor		VDSR	M		
CHILE					
	Isla de Pascua/Mataveri	SCIP	M		SA: available as required; FT: twice a day
CHINA					
Beijing/Capital		ZBAA	X	X	
	Changchun/Dafangshen	ZYCC	M	X	
Changsha/Huanghua		ZGHA	X	X	
Chengdu/Shuangliu		ZUUU	X	X	
Chongqing/Jiangbei		ZUCK	M	X	
Dalian/Zhoushuzi		ZYTL	X	X	
Fuzhou/Changle		ZSFZ	M		
Gaoxiong/Gaoxiong		RCKH	M	X	
Guangzhou/Baiyun		ZGGG	M	X	

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
Guilin/Liangjiang		ZGKL	M		
	Haikou/Meilan	ZJHK	M	X	
Hangzhou/Jianqiao		ZSHC	X	X	
Harbin/Yanjiagang		ZYHB	X	X	
Hefei/Luogang		ZSOF	M	X	
Hohhot/Baita		ZBHH	X	X	
Jinan/Yaoqiang		ZSJN	M		
Kashi/Kashi		ZWSH	M		
Kunming/Wujiaba		ZPPP	X	X	
Lanzhou/Zhongchuan		ZLLL	X	X	
Nanjing/Lukou		ZSNJ	M	X	
Nanning/Wuxu		ZGNN	X	X	
Qingdao/Liuting		ZSQD	M	X	
Sanya/Fenghuang		ZJSY	M	X	temporarily not available
Shanghai/Hongqiao		ZSSS	M	X	
Shanghai/Pudong		ZSPD	X	X	
	Shantou/Shantou	ZGOW	M	X	
Shenyang/Taoxian		ZYTX	X	X	
Shenzhen/Huangtian		ZGSZ	M	X	
Taibei/Sungshan		RCSS	M	X	
Taibei/Taibei Intl		RCTP	M	X	
Taiyuan/Wusu		ZBYN	X	X	
Tianjin/Binhai		ZBTJ	X	X	
Urumqi/Diwopu		ZWWW	X	X	
Wuhan/Tianhe		ZHHH	X	X	
Xiamen/Gaoqi		ZSAM	X	X	
Xi'an/Xianyang		ZLXY	X	X	
Xichang/Qingshan		ZUXC	M		
Hong Kong, China					
Hong Kong/Hong Kong Intl		VHHH	X	X	
Macau, China					
Macau/Macau Intl		VMMC	M	X	
COOK ISLANDS					
Avarua/Rarotonga Intl		NCRG	M	X	
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA					
Pyongyang/Sunan		ZKPY	M	X	
FIJI					
Nadi/Nadi Intl		NFFN	X	X	

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
	Naousori/Naousori Intl	NFNA	M		
FRENCH POLYNESIA (France)					
Rangiroa/Rangiroa		NTTG	M		
Tahiti/Faaa		NTAA	X	X	
GUAM (United States)					
Guam I./Agana NAS		PGUM	M	X	SA/FTPA31
Guam I./Andersen AFB		PGUA	M	X	SA/FTPA31
INDIA					
Ahmadabad/Ahmadabad		VAAH	X	X	
Amritsar/Amritsar		VIAR	M	X	
	Bangalore	VOBG	M	X	
	Bhubaneshwar	VEBS	M	X	
Calicut/Calicut		VOCL	X	X	
Chennai/Chennai		VOMM	M	X	
Delhi/Indira Gandhi Intl		VIDP	X	X	
	Hyderabad	VOHY	M	X	
	Jaipur	VIJP	M	X	
Kolkata/Netaji Subhash Chandra Bose Intl		VECC	X	X	
	Lucknow	VILK	M	X	
Mumbai/Jawaharial Nehru Intl		VABB	X	X	
Nagpur/Nagpur		VANP	M	X	
	Pathankot	VIPK	M	X	
Patna/Patna		VEPT	M	X	
Tiruchchirappalli/ Tiruchchirappalli		VOTR	M	X	
Trivandrum/Trivandrum Intl		VOTV	M	X	
Varanasi/Varanasi		VIBN	M	X	
INDONESIA					
Ambon/Pattimura		WAPP	M		
Bali/Ngurah Rai		WADD	X	X	
Balikpapan/Sepinggan		WALL	M		
Banjarmasin/Syamsuddin Noor		WAOO	M		
Batam/Hang Nadim		WIDD	M		
Biak/Frans Kaisiepo		WABB	M	X	
Jakarta/Halim Perdana Kusuma		WIHH	X	X	
Jakarta/Soekarmo (Hatta Intl)		WIII	X	X	
Jayapura/Sentani		WAJJ	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	Not listed in the AOP Tables				
1	2	3	4	5	6
	Jogyakarta/Adisucipto	WARJ	M	X	
Kupang/Eltari		WATT	M		
Manado/Sam Ratulangi		WAMM	M		
	Mataram/Selaparang	WADA	M	X	
Medan/Polonia		WIMM	M	X	
Merauke/Mopah		WAKK	M		
Padang/Tabing		WIMG	M		
Palembang/Sultan M.B. II		WIPP	M		
Pekanbaru/Simpang Tiga		WIBB	M		
Pontianak/Supadio		WIOO	M		
	Solo/Adi Sumarmo	WARQ	M	X	
	Sorong/Jefman	WASS		X	
Surabaya/Juanda		WARR	M		
Tanjung Pinang/Kijang		WIDN	M		
Tarakan/Juwata		WALR	M		
Timika/Tembagapura		WABP	M		
Ujung Pandang/Hasanuddin		WAAA	M	X	
JAPAN					
Fukuoka/Fukuoka		RJFF	X	X	
Hakodate/Hakodate		RJCH	M	X	
Hiroshima/Hiroshima		RJOA	M	X	
Kagoshima/Kagoshima		RJFK	M	X	
Kumamoto/Kumamoto		RJFT	M	X	
Nagasaki/Nagasaki		RJFU	M	X	
Nagoya/Nagoya		RJNN	X	X	
Naha/Naha		ROAH	X	X	
Niigata/Niigata		RJSN	M	X	
Oita/Oita		RJFO	M	X	
Okayama/Okayama		RJOB	M	X	
Osaka/Kansai Intl		RJBB	M	X	
Osaka/Osaka Intl		RJOO	M	X	
Sapporo/New Chitose		RJCC	M	X	
Sendai/Sendai		RJSS	M	X	
Takamatsu/Takamatsu		RJOT	M	X	
Tokyo/New Tokyo Intl		RJAA	X	X	
Tokyo/Tokyo Intl		RJTT	X	X	
JOHNSTON I. (United States)					
Johnston I./Johnston Atoll		PJON	M	X	SA/FTPA31
KIRIBATI					
Kirimati/Christmas I.		PLCH	M	X	
Tarawa/Bonriki Intl		NGTA	M	X	FT: 12 to 15 hours
LAO PEOPLE'S DEMOCRATIC REPUBLIC					

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
Vientiane/Wattay		VLVT	M	X	
MALAYSIA					
	Alor Setar/Sultan Abdul Halim	WMKA	M	X	
	Bintulu	WBGB	X		
	Ipoh/Sultan Azlan Shaw	WMKI	M	X	
Johor Bharu/Sultan Ismail		WMKJ	M		
	Kota Bahru/Sultan Ismail Petra	WMKC	M		
Kota Kinabalu/Kota Kinabalu Intl		WBKK	X	X	
Kuala Lumpur/Sepang Intl		WMKK	M	X	
Kuala Lumpur/Subang Kuala Lumpur Intl		WMSA	X	X	
	Kuala Terengganu/Sultan Mahmud	WMKN	M	X	
Kuantan/Kuantan		WMKD	M		
Kuching/Kuching		WBGG	X	X	
	Kudat	WBKT	M		
	Labuan/Labuan	WBKL	X		FC: 12-hour validity
Malacca/Malacca		WMKM	M		
	Mersing	WMAU	M		
Miri/Miri		WBGR	M		FC: 12-hour validity
Penang/Bayan Lepas		WMKP	X	X	
Pulau Langkawi/Pulau Langkawi Intl		WMKL	M		
	Sandakan	WBKS	X		FC: 12-hour validity
Sibu/Sibu		WBGS	M		FC: 12-hour validity
	Simanggang	WBGY	M		
	Sitiawan	WMBA	M		
Tawau/Tawau		WBKW	M		FC: 12-hour validity
MALDIVES					
Gan/Gan		VRMG	M	X	
Male/Hulule		VRMM	M	X	
MARSHALL Is					
Majuro Atoll/Marshall I Intl		PKMJ	M	X	SA/FTPA31
	Kwajalein Atoll/Bucholz AAF, Kiribati	PKWA	M	X	
MICRONESIA, FEDERATED STATES OF					
	Kosrae I./Kosrae	PTSA	M	X	SA/FTPA31
Moen./Truk Intl		PTKK	M		SA/FTPA31
Ponape I./Ponape		PTPN	M	X	SA/FTPA31
Yap I./Yap Intl		PTYA	M		SA/FTPA31
MIDWAY Is (United States)					

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
	Sand I./Midway NAF.	PMDY	M	X	SA/FTPA31
MONGOLIA					
Ulaanbaator/Bryant-Ukhaa		ZMUB	M	X	
MYANMAR					
	Mondalay Intl	VYMD	M	X	
	Sittwe	VYSW	M	X	
Yangon/Mingaladon		VYYY	X	X	
NAURU					
Nauru I./Nauru		AUUU	M	X	
NEPAL					
Kathmandu/Tribhuran Intl		VNKT	M	X	
NEW CALEDONIA (France)					
Noumea/La Tontouta		NWWW	X	X	
NEW ZEALAND					
Auckland/Auckland Intl		NZAA	X	X	
Christchurch/Christchurch Intl		NZCH	X	X	
Wellington/Wellington Intl		NZWN	X	X	
NIUE I. (New Zealand)					
Alofi/Niue Intl		NIUE	M		FC: 9-hour validity
NORTHERN MARIANA Is (United States)					
Rota/Rota Intl		PGRO	M	X	
Saipan I. (Obyan)/Saipan I. (Obyan) Intl		PGSN	M	X	
PAKISTAN					
Gwadar/Gwadar		OPGD	M	X	
	Faisalabad	OPFA	M	X	
Islamabad/Chaklala		OPRN	X	X	
Karachi/Jinnah Intl		OPKC	X	X	
Lahore/Allama Iqbal Intl		OPLA	X	X	
	Multan	OPMT	M	X	
Nawabshah/Nawabshah		OPNH	M		
	Pasni	OPPI	M	X	
Peshawar/Peshawar		OPPS	M	X	
	Quetta/Samungli	OPQT	M	X	
	Sukkur	OPSK	M	X	
PALAU I. (United States)					
Koror/Koror (Babelthuap I.)		PTRO	M	X	SA/FTPA31

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
PAPUA NEW GUINEA					
	Daru	AYDU	X		
	Goroka	AYGA	X		
Kieta/Kieta		AYKT	M		
	Madang	AYMD	X		
	Momote	AYMO	X		
	Mount Hagen	AYMH	X		
	Nadzab	AYNZ	X		
Port Moresby/Jacksons		AYPY	M	X	
Vanimo/Vanimo		AYVN	M		
	Wewak	AYWK	M		
PHILIPPINES					
	Clark AB/Pampanga	RPLC	M	X	
Davao/Francisco Bangoy Intl		RPMD	M		
Laoag/Laoag Intl		RPLI	M		
Lapu-Lapu/Mactan Cebu Intl		RPVM	X		
Manila/Ninoy Aquino Intl		RPLL	X	X	
Olongapo/Cubi Intl		RPMB	M		
	Puerto Princesa/Palawan	RPVP	M	X	
Subic Bay/Subic Bay Intl		RPLB	M	X	
Zamboanga/Zamboanga Intl		RPMZ	M		
REPUBLIC OF KOREA					
Busan/Gimhae Intl		RKPK	M	X	
Cheongju/Cheongju Intl		RKTU	M		
Daegu/Daegu Intl		RKTN	M	X	
	Gunsan	RKJK	M	X	
	Gwangju	RKJJ	M	X	
Jeju/Jeju Intl		RKPC	M	X	
	Osan	RKSO	M	X	
Seoul/Gimpo Intl		RKSS	M	X	
Seoul/Incheon Intl		RKSI	M	X	
	Seoul/Sinchonri	RKSM	M	X	
Yangyang/Yangyang Intl		RKNY	M	X	
SAMOA					
Apia/Faleolo Intl		NSFA	M	X	SA/FTPA32
SINGAPORE					
	Seletar	WSSL	M		
Singapore/Changi		WSSS	X		
Singapore/Paya Lebar		WSAP	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
Singapore/Seletar		WSSL	M		
SOLOMON ISLANDS					
Honiara/Henderson		AGGH	M	X	
SRI LANKA					
Colombo/Katunayake		VCBI	X	X	
	Colombo/Ratmalana	VCCC	M	X	
	Kankesanturai/Jaffna	VCCJ	M	X	
Minnerya/Hingurakgoda		VCCH	M		
THAILAND					
Bangkok/Bangkok Intl		VTBD	X	X	
	Buri Ram	VTUO	M	X	
Chiang Mai/Chiang Mai Intl		VTCC	M	X	
Chiang Rai/Chiang Rai Intl		VTCT	M		
	Chumphon	VTSE	M	X	
Khon Kaen/Khon Kaen		VTUK	M		
	Krabi	VTSG	M	X	
	Lampang	VTCL	M	X	
	Loei	VTUL	M	X	
	Mae Hong Son	VTCH	M	X	
	Nakhon Phanom (West)	VTUW	M	X	
	Nakhon Ratchasima	VTUQ	M	X	
	Nakhonsi Thammarat	VTSF	M	X	
	Nakhon Si Thammarat/Chai-Ian	VTSN	M	X	
	Nan	VTCN	M	X	
	Narathiwat	VTSC	M	X	
	Pattani	VTSK	M	X	
Phitsanulok/Phitsanulok		VTPP	M		
	Phrae	VTCP	M	X	
	Phetchabun	VTPB	M	X	
Phuket/Phuket Intl		VTSP	M	X	.
	Prachuap Khiri Khan/Hua Hin	VTPH	M	X	
	Ranong	VTSR	M	X	
Rayong/Utaphao		VTBU	M		
	Roi Et	VTUV	M	X	
	Sakhon Nakhon/Ban Khai	VTUI	M	X	
Songkhla/Hat Yai Intl		VTSS	M	X	
Surat Thani/Surat Thani		VTSB	M		
	Surathani/Samui	VTSM	M	X	
	Tak/Mae Sot	VTPM	M	X	
	Trang	VTST	M	X	
Ubon Ratchathani/Ubon Ratchathani		VTUU	M		

CITY/AERODROME		Loc.Ind.	SA/SP or SA/SP/FC	FT	Remarks
Listed in the AOP Tables	**Not listed in the AOP Tables**				
1	**2**	**3**	**4**	**5**	**6**
	Udon Thani	VTUD	M	X	
TONGA					
Tongatapu/Fua'amotu Intl		NFTF	M	X	
Vava'u/Vava'u		NFTV	M	X	
TUVALU					
Funafuti/Funafuti Intl		NGFU	M	X	FT: 15-hour validity
VANUATU					
Port Vila/Bauerfield		NVVV	M	X	
Santo/Pekoa		NVSS	M	X	
VIET NAM					
	Cat Bi	VVCI	X		SA/FC issued during 2200-1100 UTC, as required
	Da Lat/Lien Khuong	VVDL	X		SA/FC issued during 2200-1100 UTC, as required
Danang/Danang		VVDN	M	X	
	Dien Bien Phu	VVDB	X		SA/FC issued during 2200-1100 UTC, as required
Hanoi/Noibai		VVNB	X	X	
Ho-Chi-Minh/Tan-Son-Nhat		VVTS	X	X	
	Hue/Phu Bai	VVPB	X		SA/FC issued during 2200-1100 UTC, as required
	Nha Trang	VVNT	X		SA/FC issued during 2200-1100 UTC, as required
WAKE Is ((United States					
Wake Island	*Wake Island*	PWAK	M	X	
WALLIS Is (France)					
Wallis/Hihifo		NLWW	M		

Table MET 2B

EXCHANGE REQUIREMENTS FOR SIGMET, AIRMET, VOLCANIC ASH AND TROPICAL CYCLONE ADVISORIES, AND SPECIAL AIR REPORTS FOR WHICH SIGMET HAS NOT BEEN ISSUED

ASIA/PAC Regions have a requirement for a global set of SIGMET, volcanic ash and tropical cyclone advisories, and special air reports for which SIGMET has not been issued.

To ensure availability in the ASIA/PAC Regions, all the foregoing information should be addressed as shown in the following table.

*Note: Detailed information on the exchange of SIGMET and advisories in the ASIA/PAC Regions is provided in the **ASIA/PAC Regional SIGMET Guide** and the **ROBEX Handbook**, issued by the ICAO Asia and Pacific Office.*

Source Region	Responsible ASIA/PAC Gateway	AFTN Address	Remark
AFI	Bangkok	VTBBYPYX	
ASIA	Bangkok Brisbane Singapore Tokyo	VTBBYPYX YBBBYPYX WSZZYPYM RJAAYPYX	
CAR	Brisbane	YBBBYPYX	
EUR	Singapore	WSZZYPYM	
NAM	Tokyo	RJAAYPYX	
NAT	Singapore	WSZZYPYM	
PAC	Brisbane Nadi	YBBBYPYX NFFNYPYX	
SAM	Brisbane	YBBBYPYX	

TERMS OF REFERENCE OF ASIA/PAC OPMET MANAGEMENT TASK FORCE

ASIA/PAC OPMET MANAGEMENT TASK FORCE (OPMET/M TF)

1. Terms of Reference

- Review the OPMET exchange schemes in the ASIA/PAC and MID Region and develop proposals for their optimization taking into account the requirements by the aviation users and the current trends for global OPMET exchange;

- Develop monitoring and management procedures related to ROBEX exchange and other exchanges of OPMET information;

- Regularly update the regional guidance material related to OPMET exchange;

- Liaise with other groups dealing with communication and/or management aspects of the OPMET exchange in ASIA/PAC and other ICAO Regions (ASIA/PAC ATN Transition TF, BMG EUR Region, CNS/MET SG MID Region, etc.).

2. Work Programme

The work to be addressed by the ASIA/PAC OPMET Management Task Force includes:

(a) to examine the existing and any new requirements for OPMET exchange in ASIA/PAC and MID regions and assess the feasibility of satisfying these requirements, taking into account the availability of the data;

(b) to keep under review the ROBEX scheme and other OPMET exchange schemes and prepare proposal for updating and optimizing of the schemes;

(c) to review and update the procedures for interregional OPMET exchange and ensure the availability of the required ASIA/PAC and MID OPMET data for the AFS satellite broadcasts (ISCS and SADIS);

(d) to keep under review and provide timely amendments of the regional guidance materials on the OPMET exchange; to ensure that guidance material covers procedures for the exchange of all required OPMET data types: SA, SP, FC, FT, WS, WC, WV, FK, FV, UA;

(e) ~~(e)~~ to conduct trials and develop procedures for monitoring and management of the OPMET exchange; to foster implementation of quality management of OPMET data by the ROBEX centres and the RODBs;

(f) to prepare regional plan for the transition to BUFR coded OPMET information in coordination with the relevant APANPIRG contributing bodies.

~~Note: It is recommended that the EUR OPMET quality control and management procedures be reviewed and utilized in developing similar procedure for the ASIA/PAC and MID Regions.~~

3. Composition

(a) The Task Force is composed by experts from:

Australia (Rapporteur); China; Fiji; Japan; Hong Kong, China; Indonesia, Singapore; Thailand; United Kingdom, ~~and~~ United States; and Viet Nam.

(b) Representatives of IATA, EUR BMG and MID OPMET Bulletin Board are invited to participate in the work of the Task Force

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List of issues related to the implementation of SIGMET provisions, identified by the CNS/MET SG/9 meeting, to be addressed by the appropriate ICAO body

1. **Clarify the provisions for updating SIGMET.**

Explanation: For VA and TC SIGMET it is specified that update should be made at least every 6 hours. However, for "normal" SIGMET there is no requirement for updating other than canceling the SIGMET. The case when a SIGMET issued for a "FCST" phenomenon should be eventually replaced by a SIGMET for "OBS" phenomenon, should be addressed.

2. **Provision for exclusion of the forecast part of the SIGMET in relation to VOLMET (and D-VOLMET).**

Explanation: It is logical that SIGMET should be reported by VOLMET only during its period of validity. Thus, SIGMETs issued in advance should not be included in VOLMET until the commencement of their period of validity. In this regarded it may be proposed to replace in Annex 3, App. 10, 4.2.1, the word "available" with "valid". Same applies for the OUTLOOK part of the VA and TC SIGMETs, which may need to be cut off when SIGMET is used for VOLMET.

3. **Issuance of SIGMET when the FIR concerned is affected by part of a tropical cyclone (e.g., the FIR is affected by one of the tropical cyclone cloud spirals).**

Explanation: The question here is whether the SIGMET should be issued as a SIGMET for tropical cyclone (WC SIGMET), or as SIGMET for thunderstorms (WS SIGMET). It should be noted in this regard, that the current format of WC SIGMET, as defined in Annex 3, App. 6, Table A6-1, assumes that the TC (as a weather phenomenon) should be described as a circle-shaped cloud system, e.g., "CB TOP FL500 WI 150 NM OF CENTRE". Difficulties arise when the centre of the TC is outside the FIR, but it is affected by part of the TC cloud system. It may be useful to impose some more detailed criteria in this regard, for instance:

- the MWO should issue a WC SIGMET when the TC centre is (or is expected to be) within the FIR concerned;

- otherwise, when the larger part of the TC lies outside, but the FIR is affected by one of the TC cloud spirals or other cloud formation which is part of the TC cloud system, so that the weather phenomenon actually affecting the flight safety is a TS formation, the MWO should issue a WS SIGMET for TS.

4. **Adding more examples in Table A6-1 describing non-trivial cases**

Explanation: Current examples in Table A6-1 do not cover some "difficult" cases that may be interpreted by the MWOs in different ways, e.g., SIGMET for a FIR affected by a part of a tropical cyclone (e.g., the FIR is affected by one of the tropical cyclone cloud spirals), or the use "geographical features well known internationally" in describing the location of the phenomenon. It is desirable to provide more examples to ensure harmonized implementation.

5. Consider the usefulness of "OBS AND FCST"

Explanation: Each SIGMET may contain some forecast part in indicating the movement and intensity change. Therefore, it would be clearer for the user to use either "OBS" or FCST" to indicate existence or expectation of the phenomenon concerned. The mixed type "OBS AND FCST", if necessary, should be explained by means of examples or in the related guidance material (e.g., Manual of the Aeronautical Meteorological Practice, Doc 8896).

ASIA/PAC FASID – MET **6-3-B-1**

FASID TABLE MET 3B — VOLCANIC ASH ADVISORY CENTRES

EXPLANATION OF THE TABLE

Column

1. Location of the volcanic ash advisory centre (VAAC).
2. ICAO location indicator of VAAC (for use in the WMO heading of advisory bulletin).
3. Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
4. MWOs to which the advisory information on volcanic ash should be sent.
5. ICAO location indicator of the MWOs in Column 4.
6. ACCs to which the advisory information on volcanic ash should be sent.
7. ICAO location indicator of the ACCs in Column 6.

Note: MWOs and ACCs in italics are situated outside the Asia/Pacific Region

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6-3B-2 **ASIA/PAC FASID - MET**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
Anchorage (United States)	PAWU	Anchorage Oceanic Anchorage Continental Anchorage Arctic and west to E150, north of N60	Anchorage	PAWU	Anchorage	PAZA
Darwin (Australia)	YDRM (ADRM)	Southward from N10 and from E100 to E160 and the Perth FIR between E100 and E75, Colombo FIR and those parts of the Kuala Lumpur, Bangkok, Chennai, Yangon and Kolkata FIRs lying within N10 E100 to N20 E100 to N20 E82 to N10 E82 to N6 E78 to S2 E78 to E6 E75	Adelaide Bangkok Brisbane Chennai Darwin Gia Lam Guam Hobart Honiara Jakarta Kota Kinabalu Kuala Lumpur Manila Melbourne Perth Port Moresby Singapore Sydney Townsville Ujung Pandang Yangon	YPRM VTBD YBRF VOMM YDRM VVGL PGUM YMHF AGGH WIII WBKK WMKK RPLL YMRF YPRF AYPY WSSS YSRF YBTL WAAA VYYY	Adelaide Bangkok Brisbane Cairns Chennai Darwin Hanoi Ho-Chi-Minh Hobart Honiara Jakarta Kota Kinabalu Kuala Lumpur Manila Melbourne Perth Port Moresby Singapore Sydney Townsville Ujung Pandang Yangon	YPAD VTBB YBBN YBCS VOMF YPDN VVNB VVTS AGGH WIIF WBFC WMFC RPHI YMMM YPPH AYPM WSJC YSSY YBTL WAAF VYYY
Tokyo (Japan)	RJTD	N60 to N10 – and from E90 to Oakland	Bangkok *Blagoveschensk*	VTBD *UHBB*	Bangkok *Blagoveschensk*	VTBB *UHBB*

ASIA/PAC FASID – MET **6-3-B-3**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
		Oceanic and Anchorage Oceanic and Continental FIR boundaries	Beijing	ZBAA	Beijing Huhhot Taiyuan	ZBPE ZBHH ZBYN
			Bratsk	*UIBB*	*Bratsk*	*UIBB*
			Chita	*UIAA*	*Chita*	*UIAA*
			Gia Lam	VGLL	Hanoi Ho-Chi-Minh	VVNB VVTS
			Guandzhou	ZGGG	Guandzhou Changsha Guilin Nanning Sanya	ZGZU ZGCS ZGKL ZGNN ZJSA
			Hong Kong	VHHH	Hong Kong	VHHH
			Incheon	RKSI		RKRR
			Irkutsk	*UIII*	*Irkutsk*	*UIII*
			Khabarovsk	*UHHH*	*Khabarovsk*	*UHHH*
			Kirensk	*UIKK*	*Kirensk*	*UIKK*
			Kunming	ZPPP	Kunming Chengdu Chongqing	ZPKM ZUDS ZUCK
			Lanzhou	ZLLL	Lanzhou Xi'an	ZLAN ZLSN
			Magadan	*UHMM*	*Magadan*	*UHMM*
			Magdagachi	*UHBI*	*Magdagachi*	*UHBI*
			Manila	RPLL	Manila	RPHI
			Nik.-na-Amure	*UHNN*	*Nik.-na-Amure*	*UHNN*
			Okha	*UHSH*	*Okha*	*UHSH*
			Okhotsk	*UHOO*	*Okhotsk*	*UHOO*
			Pet.-Kamchatsky	*UHPP*	*Pet.-Kamchatsky*	*UHPP*
			Phnom-Penh	VDPP	Phnom-Penh	VDPP
			Pyongyang	ZKPY	Pyongyang	ZKKK
			Shanghai	ZSSS	Shanghai Hefei Jinan Nanchang Nanjing Xiamen Qingdao	ZSHA ZSOF ZSTN ZSCN ZSNJ ZSAM ZSQD
			Shenyang	ZYTX	Shenyang Dalian Harbin	ZYSH ZYTL ZYHB

6-3B-4 **ASIA/PAC FASID - MET**

VOLCANIC ASH ADVISORY CENTRE	ICAO LOCATION INDICATOR	AREA OF RESPONSIBILITY	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT		ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT	
			Name	ICAO LOCATION INDICATOR	Name	ICAO LOCATION INDICATOR
1	2	3	4	5	6	7
			Taibei	RCTP	Taibei	RCTP
			Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
			Ulan-Bator	ZMUB	Ulan-Bator	ZMUB
			Urumqi	ZWWW	Urumqi	ZWWW
			Vientiane	VLVT	Vientiane	VLVT
			Vladivostok	*UHWW*	*Vladivostok*	*UHWW*
			Wuhan	ZHHH	Wuhan	ZHWH
			Yuzhnosakhalinsk	*UHSS*	*Yuzhnosakhalinsk*	*UHSS*
Washington (United States)	KNES	Oakland Oceanic FIR	Guam	PGUM	Oakland	KZOA
			Honolulu	PHFO	Honolulu	PHZH
			Kansas City	KMKC	Kansas City	KZKC
Wellington (New Zealand)	NZKL	Southward from the Equator and from E160 to W140*	Brisbane	YBRF	Brisbane	YBBN
			Honolulu	PHFO	Honolulu	PHZH
			Honiara	AGGH	Honiara	AGGH
			Melbourne	YMRF	Melbourne	YMMM
			Nadi	NFFN	Nadi	NFFF
			Nauru	ANAU	Nauru	ANAU
			Sydney	YSRF	Sydney	YSSY
			Tahiti	NTAA	Tahiti	NTTT
			Wellington	NZKL	Auckland Christchurch	NZZO NZZC

*Note. – Coverage south of 60°S latitude is currently not feasible.

ASIA/PAC FASID **6-3C-1**

FASID TABLE MET 3C

SELECTED STATE VOLCANO OBSERVATORIES

EXPLANATION OF THE TABLE

Column

1	Provider State of the volcano observatory.
2	Name of the volcano observatory.
3	Location of the VAAC to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
4	MWO to which the information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
5	ICAO location indicator assigned to the MWO in Column 4.
6	ACC to which information related to pre-eruption volcanic activity, a volcanic eruption and/or volcanic ash cloud should be sent.
7	ICAO location indicator assigned to the ACC in Column 6.

ASIA/PAC FASID **6-3C-2**

Provider State of volcano observatory	Volcano observatory	VAAC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	MWO to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent		ACC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	
			Name	ICAO Loc. Ind.	Name	ICAO Loc. Ind.
1	2	3	4	5	6	7
Japan	Sapporo Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Sendai Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Tokyo Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
	Fukuoka Volcano Observation and Information Centre Japan Meteorological Agency	Tokyo	Tokyo	RJAA	Tokyo Naha Fukuoka Osaka	RJTI ROAH RJDG RJOO
China	Heilongjiang Wudalianchi Volcano Observatory	Tokyo				
	Jilin Changbai Mountain Tianchi Volcano Observatory	Tokyo				
Philippines	Mayon Volcano Observatory	Tokyo Darwin	Manila	RPLL	Manila	RPHI
Papua New Guinea	Rabaul*	Darwin	Port Moresby	AYPY	Port Moresby	AYPM
Indonesia	Directorate of Volcanology and Geological Hazard Mitigation (DVGHM)	Darwin	Jakarta Ujung Pandang	WIII WAAA	Jakarta Ujung Pandang	WIIF WAAF
India	TBD	Darwin				
New Zealand	Wairakei Research Centre Institute of Geological and Nuclear Sciencies	Wellington				

ASIA/PAC FASID **6-3C-1**

Provider State of volcano observatory	Volcano observatory	VAAC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	MWO to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent		ACC to which the information related to pre-eruption activity/eruption/ volcanic ash cloud should be sent	
			Name	ICAO Loc. Ind.	Name	ICAO Loc. Ind.
1	2	3	4	5	6	7
Russian Federation	*KVERT***	*Tokyo Anchorage*				

* Required by the VAAC, but not confirmed by the Provider State

** To be coordinated with ICAO Office, Paris

TABLE MET 1B – METEOROLOGICAL WATCH OFFICES

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA				
PYONGYANG/Sunan	ZKPY	Pyongyang FIR and SRR	ZKKK	
FIJI				
NADI/Nadi Intl	NFFN	Nadi FIR and SRR	NFFF	
FRENCH POLYNESIA				
TAHITI/Faaa	NTAA	Tahiti FIR and SRR	NTTT	
INDIA				
KOLKATA/Kolkata	VECC	Calcutta FIR and SRR	VECF	
CHENNAI/Chennai	VOMM	Chennai FIR and SRR	VOMF	
DELHI/Indira Ghandi Intl	VIDP	Delhi FIR and SRR	VIDF	
MUMBAI/Jawaharlal Nehru Intl	VABB	Mumbai FIR and SRR	VABF	
INDONESIA				
JAKARTA/Soekarno-Hatta Intl	WIII	Jakarta FIR/UIR and SRR	WIIF	
UJUNG PANDANG/Hasanuddin	WAAA	Ujung Pandang FIR/UIR and SRR	WAAF	
JAPAN				
NAHA/Naha	ROAH	Naha FIR	RORG	
TOKYO/New Tokyo Intl	RJAA	Tokyo FIR/SRR	RJTG	
LAO PEOPLE'S DEMOCRATIC REPUBLIC				
VIENTIANE/Wattay	VLVT	Vientiane FIR and SRR	VLVT	
MALAYSIA				
KOTA KINABALU/Kota Kinabalu Intl	WBKK	Kota Kinabalu FIR and SRR	WBFC	
KUALA LUMPUR/Kuala Lumpur Intl	WMKK	Kuala Lumpur FIR and SRR	WMFC	
MALDIVES				
MALE/Hulule	VRMM	Male FIR and SRR	VRMM	

ASIA/PAC FASID 6-1B-2

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
MONGOLIA				
ULAN BATOR/Ulan Bator	ZMUB	Ulan Bator FIR and SRR	ZMUB	
MYANMAR				
YANGON/Yangon Intl	VYYY	Yangon FIR and SRR	VYYY	
NAURU				
NAURU I./Nauru	ANAU	Nauru FIR and SRR	ANAU	
NEPAL				
KATHMANDU/Tribhuvan Intl	VNKT	Kathmandu FIR and SRR	VNSM	
NEW ZEALAND				
NEW ZEALAND/Wellington ~~Intl~~ Kelburn	NZKL	Auckland Oceanic FIR and SRR	NZZO	Operational monitoring coverage south of 60°S is limited due to the lack of information
		New Zealand FIR AND SRR	NZZC	
NORTHERN MARIANA ISLANDS (United States)				
SAIPAN I. (OBYAN)/Saipan I.(Obyan) Intl	PGSN	Guam SRR		
PAKISTAN				
KARACHI/Quaid-E-Azam Intl	OPKC	Karachi FIR and SRR	OPKR	
LAHORE/Lahore	OPLA	Lahore FIR and SRR	OPLR	
PAPUA NEW GUINEA				
PORT MORESBY/Jacksons	AYPY	Port Moresby FIR and SRR	AYPY	
PHILIPPINES				
MANILA/Ninoy Aquino Intl	~~RPMM~~ RPLL	Manila FIR and SRR	~~RPMM~~ RPHI	

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
REPUBLIC OF KOREA				
INCHEON/Incheon Intl	RKSI	~~Daegu FIR and SRR~~ Incheon FIR and SRR	RKRR	
SINGAPORE				
SINGAPORE/Singapore Changi	WSSS	Singapore FIR and SRR	WSJC	
SOLOMON ISLANDS				
HONIARA/Henderson	AGGH	Honiara FIR and SRR	AGGG	
SRI LANKA				
COLOMBO/Katunayake	VCBI	Colombo FIR and SRR	VCBI	
THAILAND				
BANGKOK/Bangkok Intl	VTBD	Bangkok FIR and SRR	VTBB	
UNITED STATES				
ANCHORAGE/Anchorage Intl	PAWU	Anchorage ~~Oceanic~~ FIR; ~~portion of Anchorage Continental FIR South of a line between approximately 62N 141W and approximately 6230N 175W and West of a line between approximately 59N 13730W and approximately 5530N 145W; Juneau SRR.~~	PAZA	
~~FAIRBANKS/Fairbanks Intl~~	~~PAFA~~	~~Anchorage Arctic FIR; portion of Anchorage Continental FIR North of a line between approximately 62N 141W and approximately 6530N 175W; Honolulu SRR.~~	~~PZAN~~	
HONOLULU/Honolulu Intl	PHFO	Oakland Oceanic FIR South of 30N, East of 160E and West of 140W; Honolulu SRR.	KZOA	
~~(JUNEAU, Alaska)~~	~~PAJN~~	~~Portion of Anchorage Continental FIR East of a line between approximately 59N 13730W and approximately 5530N 145W.~~	~~PZAN~~	
(KANSAS CITY/Missouri) (National Aviation Weather Advisory Unit)	KMKC	Oakland Oceanic FIR North of 30N.	KZOA	
VIET NAM				
Gialam MWO	VVGL	Hanoi FIR and SRR	VVNB	
		Ho-Chi-Minh FIR and SRR	VVTS	

Quality Management System (QMS) Seminar Programme

Day 1	**Programme**
9:00 – 9:30	Registration
9:30 – 10:00	Welcoming Addresses by Hong Kong, China; WMO; and ICAO
10:00 – 10:30	Quality Assurance and Aviation Weather Services: A brief overview of the imperative for QA and its adoption in aviation weather services through Annex 3 / Technical Regulations (C.3.1)
10:30 – 11:00	Coffee break
11:00 – 12:30	Overview of QMS and the ISO 9000 series of quality assurance standards
12:30 – 14:00	Lunch break
14:00 – 15:00	What is ISO 9001:2000 (Session I) – 8 principles
15:00 – 15:30	Coffee break
15:30 – 17:00	Country/industry presentations on implementation experience / plan (Session I)
Day 2	
9:00 – 10:30	What is ISO 9001:2000 (Session II)
10:30 – 11:00	Coffee break
11:00 – 12:30	ISO 9001:2000 implementation (Session I) – Establishment of QMS documentation
12:30 – 14:00	Lunch break
14:00 – 17:00	Visit to the Airport Meteorological Office (AMO)
Day 3	
9:00 – 10:30	ISO 9001:2000 implementation (Session II) – Performance measurement
10:30 – 11:00	Coffee break
11:00 – 11:30	ISO 9001:2000 implementation (Session III) - Internal and Certification audits
11:30 – 12:30	Change management - Integrating a quality management system into the day-to-day “normal activities” of an aviation weather service
12:30 – 14:00	Lunch break
14:00 – 17:00	Country/industry presentations on implementation experience / plan (Session II)
Day 4	
9:00 – 10:00	Costs and benefits of implementing ISO 9001:2000 for aviation weather services
10:00 – 10:30	ISO 9000 and developing countries
10:30 – 11:00	Coffee break
11:00 – 12:00	Discussion session
12:00 – 12:30	Closing Address

Proposed Changes to
Table A6-2. Template for aerodrome warnings

Proposed changes are highlighted in bold

……

Element	*Detailed content*	*Template*	*Example*
Phenomenon (M)[2]	Description of phenomenon causing the issuance of the aerodrome warning	TC[3] nnnnnnnnnn or [HVY] TS or GR or [HVY] SN [nnCM][3] or [HVY] FZRA or [HVY] FZDZ or RIME[4] or [HVY] SS or [HVY] DS or SA or DU or SFC **WIND n[n]** [7] nn[n]KMH MAX nn[n] (SFC **WIND n[n]** [7] nn[n]KT MAX nn[n]) or SQ or FROST or VA or *Free text up to 32 characters*[5]	TC ANDREW HVY SN 25CM SFC **WIND NE** 80KMH MAX 120 VA

…….

Notes.—

1. Fictitious location.
2. One phenomenon or a combination thereof, in accordance with 5.1.2.
3. In accordance with 5.1.2.
4. Hoar frost or rime in accordance with 5.1.2.
5. In accordance with 5.1.3.
6. End of the message (as the aerodrome warning is being cancelled).
7. **Prevailing wind direction in eight-point compass.**

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
AUSTRALIA	ATN tests were conducted. BIS Router and Backbone BIS Router and AMHS will be implemented by 2006.	AFTN based AIDC Implemented between Brisbane and Auckland.	Implemented and integrated with ATM systems to support FANS1/A equipped aircraft.	Implemented.	Implemented.	ADS-B trial being conducted. 27 ground stations are expected to be operational during first half of 2006 for upper airspace which is not covered by radar.	FANS 1/A ADS-C implemented.	
BANGLADESH	BIS Router and AMHS planned for 2007.							
BHUTAN	ATN BIS Router and UA service 2008.			Procedures developed for NPA.				
BRUNEI DARUSSALAM	ATN BIS Router and AMSH planned 2007.							
CAMBODIA	BIS Router and AMHS planned for 2007							

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
CHINA	ATN BIS Router AMHS will be implemented from 2006. - Tripartite BBIS trial completed with Bangkok and Hong Kong, China in Jan. 2003. - ATN trial with Hong Kong, China conducted 2003/2004. - AMHS trial with Hong Kong, China planned for 2005. - AMHS trial with Macau is under planning.	AIDC between ACCs within China are being implemented.	Implemented to support ATS Route L888 and polar routes. Trial on HF data link conducted for use in western China.		Implemented in certain airspace.	ADS-B trial will be conducted in 2006.	FANS 1/A ADS-C implemented to support L888 and polar routes.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
HONG KONG, CHINA	- Tripartite BBIS trial with Beijing and Bangkok completed in Jan 2003; -64 Kbps ATN Link with Bangkok put into operational use in June 2004. -ATN trials with China and Japan conducted in 2003/04; -AMHS trials with Thailand, China and Japan planned in 2005. Implementation of AMHS with Japan in 2005/2006. - ATN/AMHS trials with Viet Nam, Philippines, Macao China planned in late 2005/2006.	Trial on the AFTN based AIDC with Guangzhou and Sanya, China commenced. Implementation planned for 2005.	FANS 1/A based CPDLC conducted. D-ATIS D-VOLMET and PDC implemented. VDL Mode-2 technical trial completed in Dec. 2002 and planning on further trials was in progress.	Pilot Programme on RNAV (GNSS) departure procedures implemented in July 2005.	Implemented in certain airspace.	ADS-B trial using "ASMGCS" trial system in 2004/2005.	FANS 1/A Trials for ADS-C conducted.	
MACAO, CHINA	ATN BIS router and AMHS planned for late 2005. AMHS trial with China and Hong Kong, China in planning stage.							ATZ within Hong Kong and Guangzhou FIRs. In ATZ full VHF coverage exist. Radar coverage for monitoring purposes.

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
COOK ISLANDS								
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA								
FIJI	AMHS in-house trials planned for 2003. AMHS trials with USA in 2004. ATN BIS Router and AMHS will be implemented in 2005.	Implementation of AFTN based AIDC with Brisbane and Auckland in 2003.	FANS-1. Implemented since 1997.	NPA procedures for (S) completed in Dec. 2002.	Implemented as (S).	ADS-B trials planned for 2004. Implementation in 2005/2006.	ADS-C implemented in oceanic airspace using EUROCAT 2000 X.	
FRANCE **French Polynesia** **Tahiti**		Implementation of limited message sets with adjacent centres under discussion.	FANS-1. Implemented since 1996.				FANS 1/A ADS-C implemented since March 1999.	
INDIA	ATN BBIS router and AMHS planned for implementation at Mumbai in 2007.		FANS-1 implemented at Kolkata and Chennai. Trial in progress in Mumbai and Delhi.		SBAS - Technical developments in 2007. - Implementation planed for 2009.	Trial planned for 2006.	FANS 1/A ADS-C implemented at Kolkata and Chennai. Trial in progress in Delhi and Mumbai.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
INDONESIA	ATN BIS Router and AMHS planned for trial in 2006.	AFTN based AIDC planned for implementation between Brisbane and Jakarta in 2006.	FANS-1/A. CPDLC in Jakarta, Ujung Pandang FIRs trial planned for 2005.	Procedure to be completed in 2006 for NPA.		Planning ADS-B ground stations at 5 locations in the eastern part of Indonesia as first stage of phase I.	FANS 1/A ADS-C trial planned at Jakarta and Ujung Pandang ACC in 2005.	
JAPAN	ATN BBIS already implemented. AMHS implemented between Japan and USA in 2005 and between Japan and Hong Kong, China planned for 2005/2006	AIDC based. AFTN procedure implemented with Oakland USA.	FANS1/A system Implemented in Tokyo FIR.	NPA implemented at 4 aerodromes in 2005.	SBAS operational in 2006.		FANS 1/A. ADS-C implemented in Tokyo FIR.	
KIRIBATI								
LAO PDR	ATN BIS Router and AMHS planned for implementation with Bangkok in 2006.	AIDC with Bangkok planned for 2007.	FANS-1/A Planned for Bay of Bengal and South China Sea areas. Equipment is under test operation.		Implemented.		FANS-1/A. ADS-C planned for Bay of Bengal and South China Sea areas. Equipment under test operation.	
MALAYSIA	ATN BIS Router and AMHS planned for 2006.		Planned for Bay of Bengal and South China Sea areas in 2006.	NPA at KLIA planned.			FANS 1/A ADS-C planned for Bay of Bengal and South China Sea areas in 2006.	
MALDIVES	BIS Router/AMHS planned for implementation in 2006.	Planned for 2006.	FANS1/A planned for 2006.		Trials planned for 2005-2008. Implementation in 2008.	Trials planned for 2005-2006. Implementation in 2006.		

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
MARSHALL ISLANDS				NPA implemented at Majuro Atoll.				
MICRONESIA FEDERATED STATES OF								
Chuuk				Implemented				
Kosrae				Implemented				
Pohnpei				Implemented				
Yap				Implemented				
MONGOLIA	ATN BIS Router and AMHS planned for 2005 and 2006. Trial with Bangkok conducted		Function available. Regular trials are conducted.	GPS procedures are being developed and implemented at 10 airports.	Implemented.	ADS-B trial in progress implementation planned for 2006.	FANS 1/A ADS-C implemented since August 1998.	
MYANMAR	Trial for ATN BIS Router with Thailand planned for 2006. Test with China planned for 2006.		Implemented since August 1998				Implemented since August 1998	
NAURU								
NEPAL	BIS Router and AMHS planned for 2007.			Development of arrival procedure and NPA completed. Departure procedure is being developed.	Implemented.			

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
NEW ZEALAND	BIS Router and AMHS implementation planned for 2008.	AFTN based AIDC implemented between New Zealand, Australia and USA. - Tests with Fiji planned. - Test with Tahiti started in 2005.	FANS/1A. Implemented	Implemented.	will be implemented as required.	Trials planned for 2005 will be operational in 2006. National coverage starts in 2008 to be completed by 2020.	FANS 1/A Implemented.	
PAKISTAN	Implementation of ATN considered for Phase II (2005-2010).	Implemented between Karachi and Lahore ACCs	Implementation planned from 2005-2010.	Arrival and departure NPA procedure are being developed.	Planned for 2005-2010.	Planned for 2005 – 2010.	Planned for 2005-2010	RADAR coverage provided in Karachi and Lahore FIRs.
PAPUA NEW GUINEA				Implemented at certain aerodromes.	Implemented.			
PHILIPPINES	ATN BIS Router planned for 2005. Implementation for AMHS in April 2007.		CPDLC Planned for 2008.				FANS 1/A ADS-C planned for 2008.	
REPUBLIC OF KOREA	ATN BIS Router/AMHS planned for 2005-2010.	AFTN based AIDC implemented between Incheon ACC and Seoul APP.	PDC & D-ATIS implemented 2003.			ADS-B trials planned for 2008.	Trial for FANS 1/A ADS-C implemented since 2003.	

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
SINGAPORE	ATN BBIS Router trial with Hong Kong conducted between April and June 2003. Planned for ATN and AMHS implementation in 2006.		Implemented since 1997. Integrated in the ATC system in 1999.	NPA procedure developed. RNAV (SID/STAR) in 2005	Implemented.	Trial planned for 2006.	FANS 1/A ADS-C implemented since 1997. Integrated with ATC system in 1999.	
SRI LANKA	ATN BIS Router Planned for 2006. AMHS planned along with BIS in 2006.		CPDLC in trial operation since November 2000.			2010	FANS 1 /A ADS-C trial since November 2000.	GPS based domestic route structure being developed.
THAILAND	ATN G/G system implemented for domestic services. BBIS/BIS Routers already implemented. Target date for AMHS in 2006.	ATN based AIDC Implemented in Domestic Sector. Trials with adjacent centres planned for 2006.	FANS-1/A Implemented.		Implemented.	Trial planned for 2005.	FANS 1/A ADS-C Implemented.	
TONGA	AMHS planned for 2008.			NPA planned for 2007.		Trial planned for 2010		CPDLC and ADS-C is not considered for lower airspace
UNITED STATES								
Anchorage			FANS1/A based CPDLC implemented.	Implemented.	Implemented.	ADS-B trials continuing.	FANS/1-ADS-C 2006.	
Fairbanks				Implemented.		Trials continuing		

CNS/ATM Implementation Planning Matrix								
State/ Organization	**ATN G/G Boundary Intermediate System (BIS) Router/AMHS**	**AIDC**	**CPDLC**	**GNSS**		**ADS-B**	**ADS-C**	**Remarks**
				RNAV (GNSS)	**En-route**			
Oakland		AFTN based AIDC implemented. ATN AIDC planned for 2007.	FANS-1/A based CPDLC implemented.	Implemented.	Implemented.		FANS-1/A ADS-C planned for Oct. 2005.	
Salt Lake City (Network Centre)	AMHS implemented between Japan and USA scheduled in 2005. USA/Fiji AMHS testing to be determined.							
VANUATU								
VIET NAM	ATN trials conducted with Bangkok in March/April 2005 for implementation of ATN BIS Router. AMHS in 2006.	Trial for ATN based AIDC planned in 2005 with Bangkok and implementation in 2006.	Planned for 2006.				FANS 1/A ADS-C planned for 2006.	Most of air space in Hanoi and Ho-Chi-Minh FIRs covered by RADAR.

Agreed draft for amendment Chapters 5, 6 and 9 of Regional Plan for CNS/ATM Systems

3.3 Asia/Pacific Regional CNS/ATM Planning and Implementation Structure

3.3.1 Within the Asia/Pacific Region APANPIRG is tasked with the planning and implementation for the new CNS/ATM systems and is supported by three sub-groups:

1) The ATM/AIS/SAR Sub-Group;
2) The COM/MET/NAV/SUR Sub-Group; and
3) ~~The CNS/ATM/IC Sub-Group.~~

3.3.2 While all these groups are responsible for CNS/ATM planning, it is the CNS/ATM/IC sub-group which has the responsibility within APANPIRG for the on-going co-ordination, development and maintenance for the regional CNS/ATM plan. Its current terms of reference are as follows: *(…….to be deleted)*

3.4 The Regional Process Description

3.4.1 The regional process for planning and implementation is described at Section 2.1.3, Chapter 2, Volume II of the global Plan and is at Appendix B to this chapter. This documentation provides the template for regional planning and is essential reading for those wishing to understand or participate in the regional planning process.

3.5 States' Plans

3.5.1 States have the responsibility for implementation of the new CNS/ATM systems within their areas of responsibility. It will however be necessary for each State within the Asia/Pacific Region to develop and publish its own CNS/ATM implementation plan after co-ordination with intra-regional plans.

3.6 Airlines' Plans

3.6.1 Airlines agree to incorporate the new CNS/ATM systems on an evolutionary basis. The path which airlines are taking in global planning follows the objective of achieving short and medium term goals, which provide improved airspace capacity and economy of operations. This path leads next to the operational use of existing CNS technology in aircraft and then to the evolution of new aircraft systems compatible with CNS/ATM global standards. During the transition phase to CNS systems, airlines plan to utilize developed datalink systems (ACARS) as the transitional means to enhance the development of operational ATN datalink systems in concert with the earliest implementation plans of ATC providers. This evolutionary approach to planning is accepted as providing the airlines and ATC providers with a financially viable programme for introducing the new CNS/ATM systems. The requirement to take advantage of new technologies and procedures as they become available to provide benefits to airspace users as soon as possible, is therefore a cornerstone of airline planning. IATA publishes User Driven CNS/ATM Implementation Plans, which are intended to complement the ICAO Regional Planning Process.

CHAPTER 5. CURRENT STATUS AND REGIONAL STRATEGY – CNS/ATM SYSTEMS

5.5 Surveillance

5.5.1 The Asia Pacific Region is characterised by the use of:

a) SSR Mode A/C and, in the near further, Mode S in some terminal and high-density continental airspace;

b) ADS in some parts of the Region; and

c) The diminishing use of primary radar; and

d) Early deployment of ADS-B for delivery of radar like services

5.5.1.1 Automatic Dependent Surveillance-Contract (ADS-C) is becoming available over the oceanic and continental airspace of the Asia and Pacific Regions. SSR (augmented as necessary with Mode S) will continue to be used in terminal areas and in some high density airspace. The use of primary radar will diminish.

5.5.1.2 The introduction of air-ground data links, together with sufficiently accurate and reliable aircraft navigation systems, present the opportunity to provide surveillance services in areas which lack such services in the present infrastructure, in particular oceanic areas and other areas where the current systems prove difficult, uneconomic, or even impossible, to implement. ADS is a function for use by ATS in which aircraft automatically transmit, via a data link, data derived from on-board navigation systems. As a minimum, the data should include the four-dimensional position. Additional data may be provided as appropriate. The ADS data would be used by the automated ATC system to present information to the controller. In addition to areas which are at present devoid of traffic position information other than pilot provided position reports, ADS will find beneficial application in other areas, including high-density areas, where ADS may serve as an adjunct and/or back-up for secondary surveillance radar and thereby reduce the need for primary radar. Also, in some circumstances, it may even substitute for secondary radar in the future. As with current surveillance systems, the full benefit of ADS requires supporting complementary two-way pilot-controller data and/or voice communication (voice for at least emergency and non-routine communication).

5.5.1.3 Automatic Dependent Surveillance Broadcast (ADS_B) is becoming available over the continental airspace of the Asia and Pacific Regions. SSR (augmented as necessary with Mode S) will continue to be used in terminal areas and in some high density airspace. ADS-B offers the potential to provide ATC surveillance where none is available today. Furthermore, some states are considering the future decommissioning of existing enroute SSR only radar systems to be replaced by ADS-B.

5.6 CNS System Evolution

5.6.1 The new CNS concept is very flexible in that each State has the choice of implementing specific system elements to meet its individual requirement for forming a complete, operable CNS/ATM system. Thus, the communication elements can be implemented using any or all or any combination of satellite, VHF or SSR Mode S. States with high traffic

density airspace would probably use all of these, but small States with continental airspace could implement the CNS/ATM concept by communications and ADS on VHF alone.

Chapter 6 ..

Airspace organization and management

……

Air traffic services

- The implementation and application of automation and other advanced technologies, while necessary to increase efficiency and regularity, should maintain and where possible, improve the controller's work environment.

- The implementation of an improved air navigation system should be supported by improvements in the communication, navigation and surveillance systems and by advanced automation functions.

- Airspace capacity increases should not cause a concurrent increase in controller workload.

- Automation aids such as conflict prediction and resolution advisory functions should be introduced to assist the controller where practicable. The accuracy of these systems must be assured.

- As the use of automation increases, full advantage should be taken of the ensuing safety benefits.

- Automation aids which improve planning data accuracy and reduce the necessity for controller interventions to resolve conflicting situations, must contain provisions which allow for required controller awareness in relation to the traffic situation.

- The ATM system will allow for a transfer of responsibility of some separation functions from ground to airborne systems under specific circumstances. The trend may continue based on advancements in cockpit situational awareness, however, the ground system should remain as the overriding authority in all cases where arbitration is required.

- Data link application should take place in an early stage of the transition phase based on the availability of any of the foreseen data link systems.

- Application of data link should aim for a reduction of voice communication load and also for an improvement in the provision of flight data (short-term intent and four-dimensional profile data for the entire flight route) by providing flight management system (FMS) data to the ground ATC system.

- Communications networks between ATM facilities within a State and ATM facilities in adjacent States should be established if they do not already exist.

- States and/or regions should co-ordinate to ensure that where ATC applications supported by aeronautical mobile-satellite service (AMSS) such as automatic dependent surveillance (ADS-C) are to be introduced, they should be introduced approximately simultaneously in adjacent fight information regions (FIRs) through which there are major traffic flows.

- States should develop operational procedures, in collaboration with neighbouring FIRs for the implementation of new systems such as ADS-C and ADS-B within airspace under their control, where such application would be advantageous.

- Rules and procedures should facilitate the operation of aircraft with different equipment in the same ATM environment.

- States and/or regions may consider segregating traffic according to CNS capability, and granting preferred routes/flight levels to aircraft with improved capabilities.

- States and/or regions should co-ordinate to ensure that separation standards and procedures for appropriately equipped aircraft are introduced approximately simultaneously in each FIR through which major traffic passes.

- Systems or other provisions must allow the controller to ensure safe separation in the event of system failures.

- Implementation of new functions should be maintained or improve existing or basic functions rather than just replace them and should relieve rather than worsen controller functions.

- Rules and procedures should be developed to facilitate the transfer of aircraft between adjacent systems which provide different levels of services.

- Rules and procedures for the sharing of responsibility between the ground ATC system and the flight management system for calculating and maintaining flight profiles should be clearly defined prior to implementation.

- All the future automation specifications for ATC systems should provide for functional coherence between air traffic flow management and air traffic control systems.

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CHAPTER 9. SURVEILLANCE

9.1 General

9.1.1 The surveillance systems presently in use can be divided into two main types: dependent surveillance and independent surveillance. In dependent surveillance systems, aircraft position is determined on board and then transmitted to ATC. The current voice position reporting is a dependent surveillance system in which the position of the aircraft is determined from on-board navigation equipment and then conveyed by the pilot to ATC by radiotelephony. Independent surveillance is a system which measures aircraft position from the ground. Current surveillance is either based on voice position reporting or based on radar (primary surveillance radar (PSR) or secondary surveillance radar (SSR)) which measures range and azimuth of aircraft from the ground station.

9.1.2 The surveillance systems of the new CNS/ATM systems include not only those above but also Automated Dependant Surveillance (ADS), its derivative ADS-broadcast (ADS-B) and the Airborne Collision Avoidance System (ACAS).

9.1.3 Detailed information regarding the surveillance elements of CNS/ATM systems is provided at Chapter 7 of the Global Plan.

9.2 Transition Guidelines

9.2.1 Guidelines for transition to the future systems encourage equipage by users for the earliest possible accrual of systems benefits. Although a transition period of dual equipage, both airborne and ground, is often necessary to ensure the reliability and availability of a new system, the guidelines are aimed at minimizing this period to the extent practicable. The Global Plan, Vol. I, Chapter 7, Appendix B lists the guidelines that States, regions, users, service providers and manufacturers should consider when developing CNS/ATM systems or planning for implementation of such systems. These guidelines are reproduced below for ease of reference and is support of regional planning:

GUIDELINES FOR TRANSITION TO SURVEILLANCE SYSTEMS

- States should, as necessary, develop operational procedures, in accordance with ICAO SARPs, procedures and guidelines, for the implementation of ADS within airspace under their control.

- Transition to ADS-C should initially begin in oceanic airspace and in continental en-route airspace with low-density traffic.

- Transition to ADS-B should initially begin in en-route airspace with low-density traffic.

- Development of ADS-B plans should attempt to optimise coverage using the minimum number of necessary ground stations. States should attempt to share the data from ADS-B ground stations and perhaps share the costs of establishing and maintaining these ground stations in cases where that is appropriate. States should consider the deployment of ADS-B to provide surveillance coverage at FIR boundaries to maximise FIR crossing coordination and safety for both FIRs

- States and/or regions should ensure that ADS is introduced in a co-ordinated fashion in adjacent FIRs traversed by major traffic flows.

- Where different surveillance methods are employed in adjacent FIRs, commonality or compatibility of systems should be ensured to enable a service which is transparent to the user.

- During the transition period in which ADS position reporting is introduced, the current levels of integrity, reliability and availability of existing position reporting systems must be maintained.

- States and/or regions should take action within the ICAO framework to ensure that implementation of changes due to ADS-C and ADS-B and other systems result in more efficient use of airspace.

- During the transition to ADS, suitably-equipped aircraft should be able to derive benefits from the use of preferred routes without penalizing non-ADS-equipped aircraft.

- ADS should be introduced in incremental phases.

- ADS equipment should be implemented in accordance with standards and procedures in such a way as to permit the use of ADS as a backup for other surveillance methods.

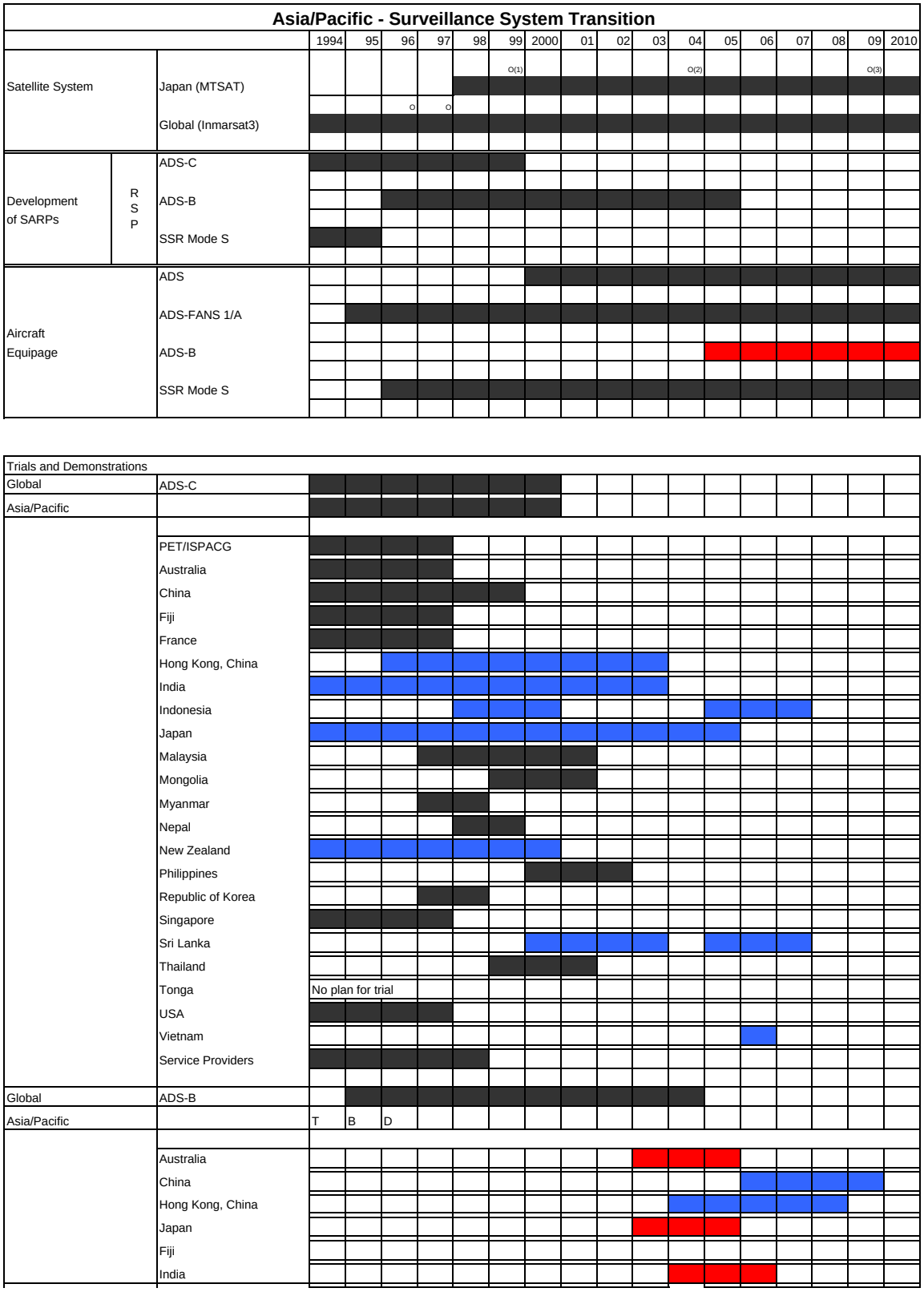
9.3 Asia/Pacific Transition Timescale

9.3.1 The key Global and Asia/Pacific events in the transition to the new surveillance systems are shown in Table 9-1. The timescales for the occurrence of the key events are based on currently available information from States and international organisations and will be revised as updated information becomes available.

9.3.2 The table is formatted in the same style as the Global Plan, Volume II, Chapter 8, for ease of reference, standardization and amendment action as is required from time to time. It is essentially divided into three sections. The first section provides detail regarding the **Satellite System**, the **Development of SARPs** and **Aircraft Equipage**. The last two sections detail, respectively, generic global and specific regional information on **Trials and Demonstrations** and **Implementation and Operational Use**.

9.3.3 The single minor variation from the Global Plan is the inclusion of satellite system information relevant to the Asia/Pacific in the first section.

(Refers to Excel file for the timelines)


Asia/Pacific - Surveillance System Transition
1994
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2000
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02
03
04
05
06
07
08
09
2010
Satellite System
Japan (MTSAT)
O(1)
O(2)
O(3)
Global (Inmarsat3)
O
O
Development of SARPs
RSP
ADS-C
ADS-B
SSR Mode S
Aircraft Equipage
ADS
ADS-FANS 1/A
ADS-B
SSR Mode S
Trials and Demonstrations
Global
ADS-C
Asia/Pacific
PET/ISPACG
Australia
China
Fiji
France
Hong Kong, China
India
Indonesia
Japan
Malaysia
Mongolia
Myanmar
Nepal
New Zealand
Philippines
Republic of Korea
Singapore
Sri Lanka
Thailand
Tonga
No plan for trial
USA
Vietnam
Service Providers
Global
ADS-B
Asia/Pacific
T
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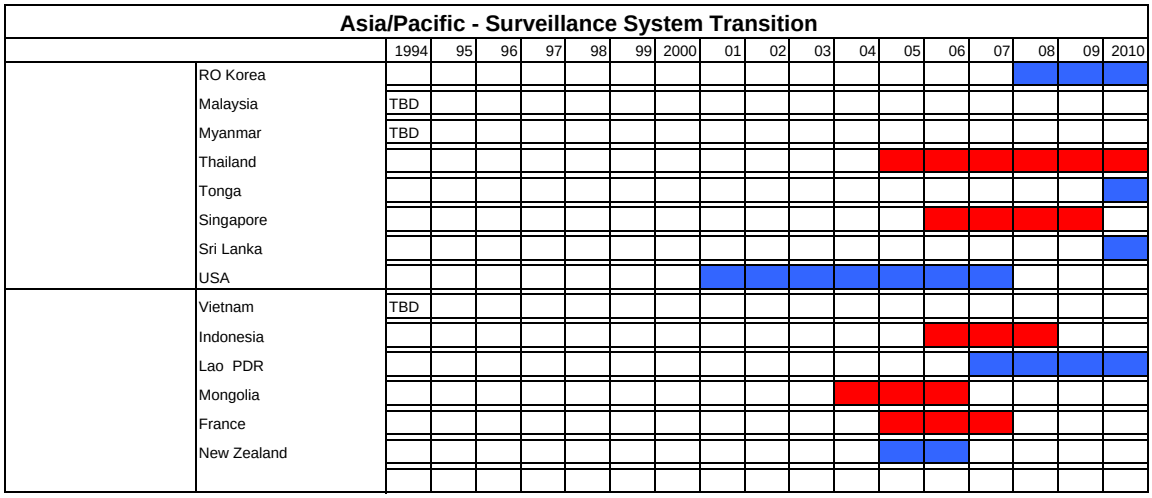
D
Australia
China
Hong Kong, China
Japan
Fiji
India


Asia/Pacific - Surveillance System Transition
1994
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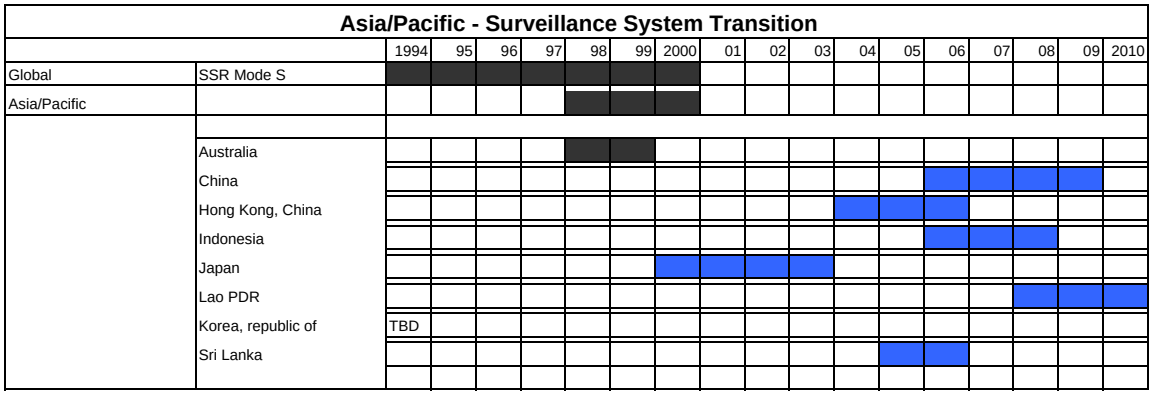
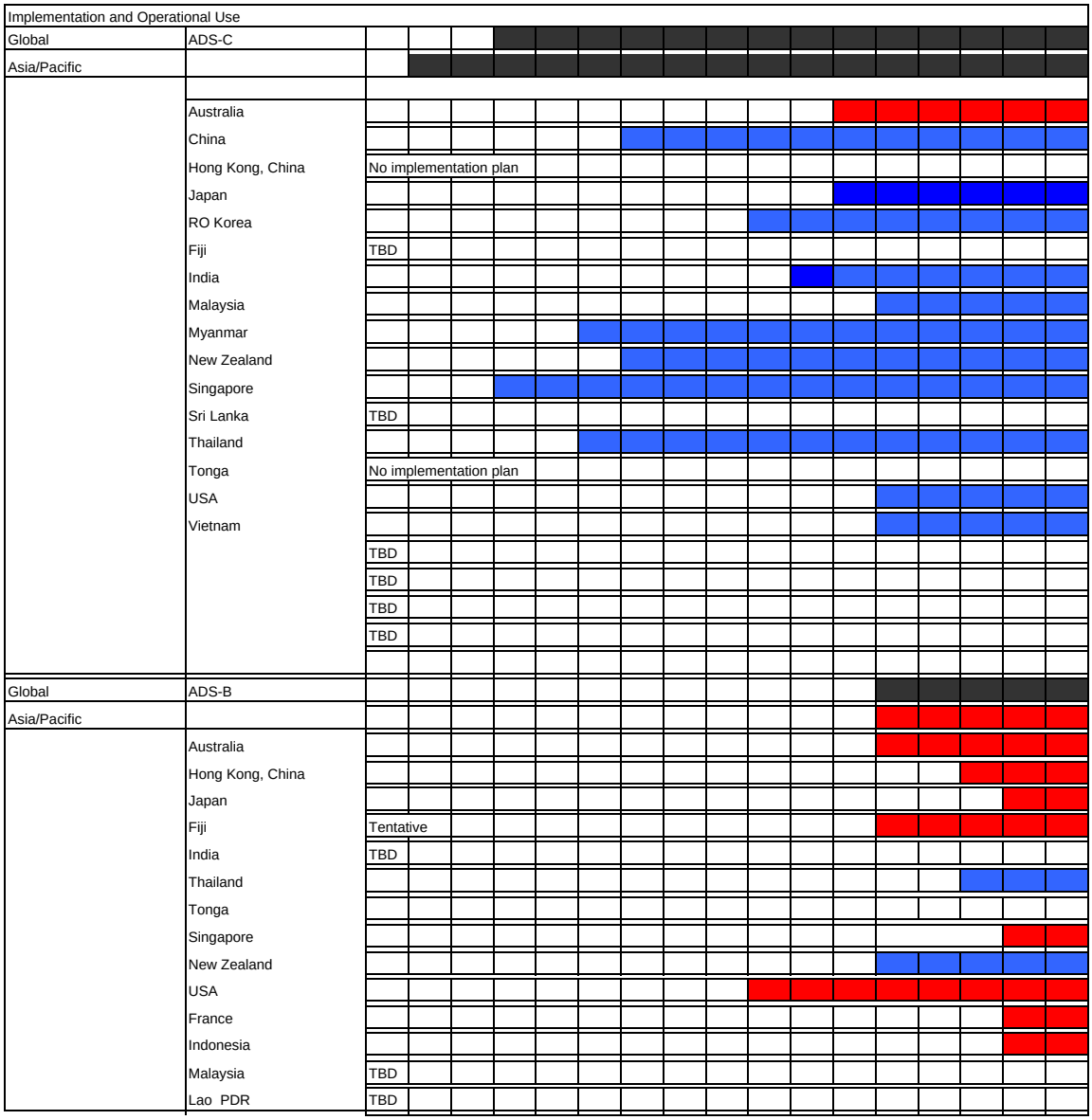
2010
RO Korea
Malaysia
TBD
Myanmar
TBD
Thailand
Tonga
Singapore
Sri Lanka
USA
Vietnam
TBD
Indonesia
Lao PDR
Mongolia
France
New Zealand

Asia/Pacific - Surveillance System Transition



Note: The following states indicate no trial is planned for Mode S: Malaysia, Singapore, Thailand, Tonga, USA, Vietnam



Asia/Pacific - Surveillance System Transition

		1994	95	96	97	98	99	2000	01	02	03	04	05	06	07	08	09	2010
	Mongolia																	
	Korea, Republic of																	
	Vietnam	TBD																
	New Zealand																	
Global	SSR Mode S																	
Asia/Pacific																		
	Australia																	
	China	TBD																
	Hong Kong, China																	
	India																	
	Indonesia																	
	Japan																	
	Malaysia																	
	New Zealand																	
	RO Korea																	
	Sri Lanka																	
	Thailand																	
	USA																	
	Vietnam	TBD																

Regional Seminar on MET/ATM Coordination
Xx to xx February, 2006, ICAO Regional Office, Bangkok

Provisional Agenda

Agenda Item 1: Organisation of Air Traffic Management and Meteorological services by the States:

1) Authorities and Providers
2) Current and proposed organisational frameworks and consultative mechanisms

Agenda Item 2: ICAO Annexes and guidance materials relating to MET and ATM coordination arrangements

1) Annex 3 SARPS relating to ATM
2) Annex 11 SARPS and PANS-ATM (Doc 4444) relating to MET
3) Doc 9377 (Manual on Coordination between ATS, AIS and Aeronautical MET services)

Agenda Item 3: Meteorological Impacts on ATM:

1) En-route – Large-scale Weather Deviations
2) Terminal Area
   MET information for Air Traffic Flow Management

Agenda Item 4: Use of MET by ATM:

1) Current practices
2) Limitations of MET information (uncertainty) and the resources required to provide a particular level of service

Agenda Item 5: Future requirements – MET component of the CNS/ATM systems:

1) ATM developments requiring additional MET information
2) Tailored products
3) Products under development

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE ASIA/PACIIC REGION

Identification		Deficiencies			Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
~~VHF coverage to be provided in the Southern Part of Dhaka FIR and withdrawal of HF~~	~~Bangladesh~~	~~No requirement for HF except for smaller portion of FIR.~~	~~1992~~	~~Relevant sector of ATS routes has been delegated to adjacent ACC at Kolkata.~~	~~An action item was developed by a COM coordination meeting held in June 03 to expedite implementation of RCAGs included in a Project. An interim arrangement has been made for implementation of one RCAG site in the southern part of Dhaka FIR.~~	~~Civil Aviation Authority of Bangladesh~~	~~Target date is set by the end of 2006 for implementation of RCAG. There is neither operational problem nor any impact on flight safety as ATS is provided in the delegated airspace by adjacent ACC. This arrangement will continue until full VHF coverage is provided in Dhaka~~	~~A formal notification has been received starting that Kolkata ACC is providing ATS in the Southern part of Dhaka FIR including ATS Route L507.~~
Adequate and reliable VHF COM	Myanmar	Quality and reliability of RCAG VHF inadequate and unavailability of required coverage	1998	Improvements in the quality of link to RCAG stations and power supply system are required.	Action should be taken to provide reliable links between the RCAG stations and Yangon ACC. Power supply to the RCAG sites needs improvement. High level ICAO mission was conducted. An action plan was developed to upgrade equipment at RCAG stations, provide VSAT link at all RCAG stations, to improve power supply system and to shift ACC to the new location.			

Identification		Deficiencies			Corrective action			
Requirements	**States/facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
					DCA Myanmar has replaced equipments at all 6 RCAG sites with digital VHF system and has provided VSAT links and solar power supply system at all sites. After a trial period of one month the facilities were formally implemented effective 9 June 2005 using new frequencies in place of old frequencies affected by interference.	DCA Myanmar	Revised target date is end of 2004.	This deficiency will be removed from the list upon receipt of official report providing full details of action taken by Myanmar and confirmation by the users.

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Meteorological observations and reports. (Annex 3, Chapter 4)	Solomon I.	Weather information is inadequate and not provided on a regular basis	1996	Reported by airlines operating to Solomon I.	Equipment to be upgraded and arrangements to be made for regular observations	Ministry of Transport, Works and Aviation, Solomon I. *Note: OPMET/M TF to carry out survey*	TBD	A
~~b)~~Meteorological observations and reports. (Annex 3, Chapter 4)	Kiribati	~~b)~~METAR from Kiribati not available on regular basis.	1998	Reported by airlines	State's MET authority to consider urgent action to be taken for providing regular observations and reports	Directorate of Civil Aviation, Kiribati. *Note: OPMET/M TF to carry out survey*	TBD	A
~~a)~~Reporting of information on volcanic eruptions to civil aviation units. (Annex 3 p. 4.14 (recom.)) ~~b)~~	Indonesia	Information on volcanic activity not provided regularly to ATS units and MWOs.	1995 ICAO SIP mission Dec 2003	a) Observed by States concerned. b) Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	~~c)~~Three-party LOA to be signed between the MGA, DGCA and DVGHM	DGCA, MGA Indonesia ~~b)~~*Note: ICAO Regional Office to monitor*	2004	A
	~~Philippines~~		~~1995~~ ~~ICAO SIP mission May 2003~~		~~Three-party LOA to be signed between the ATO, PAGASA and PHIVOLCS~~	~~a)PAGASA, ATO Philippines~~ ~~*Note: ICAO Regional Office to monitor*~~		

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
	Papua New Guinea		1995 ICAO SIP mission Dec 2003		~~c)~~Procedures to be set up for exchange of data between NWS, ATS and Rabaul Observatory and a LOA to be signed	~~a)~~NWS, ATS Papua New Guinea *Note: ICAO Regional Office to monitor*		
Provision of SIGMET information including SIGMETs for volcanic ash (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Indonesia Philippines Papua New Guinea	Requirements for issuance and proper dissemination of SIGMET, including SIGMET for volcanic ash, have not been fully implemented	2000	a) Reported by airlines b) Noted by Volcanic Ash Advisory Centres	a) ICAO to carry out a Special Implementation Project (SIP) with the primary objective to improve implementation of SIGMET procedures, especially for VA. b) State to take urgent actions to implement the SIGMET procedures.	a) State's Met authorities b) ICAO to implement the SIP. c) ICAO Regional Office to co-ordinate and monitor. *Note: ICAO SIP carried out in 2003; progress in issuance of SIGMET for VA is noted; the outstanding problems to be resolved within 1-year time*	2005	U

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
a) Service for operators and flight crew members. (Annex 3, Chapter 9). b) WAFS products for flight documentation. (ASIA/PAC FASID Table MET 1A).	Cambodia Myanmar	Briefing and flight documentation not provided as required. WAFS products not available	1999	Airlines do not receive the required flight documentation including WAFS forecasts.	States consider urgent action to be taken for installation of SADIS VSAT for receiving WAFS products and OPMET information. Action plan proposed by ICAO MET mission 2003	State's MET authorities	TBD	A
a) ~~TAF for VDPP~~ (ASIA/PAC FASID Table MET 1A) b) MWO for Phnom Penh FIR and SIGMET (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	Cambodia	~~TAF not issued for VDPP~~ Requirements for meteorological watch office (MWO) to be established at Phnom-Penh international airport have not been met.	~~1992~~ ICAO MET mission 2003	~~Lack of trained forecasters for regular TAF service. Serious problems for all airlines flying to VDPP~~ MWO not established due to lack of trained personnel and technical facilities. No SIGMET service for Phnom Penh FIR – serious safety issue.	Action plan proposed by ICAO MET mission 2003 Training of forecasters for issuing TAF urgently required Establishment of MWO currently not feasible. Urgent need for bi-lateral agreement for SIGMET service by a neighboring State.	SSCA, Cambodia *Note: Initial 2-week training for two forecasters from SSCA carried out at the Thai MET Department in coordination with the ICAO regional Office* *Note: TAF for VDPP introduced in May 2005 with assistance from Viet Nam*	TBD	U

Identification		Deficiencies			Corrective action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information (Annex 3, Chapter 7; ASIA/PAC FASID Table MET 1B)	~~Bangladesh~~ India Lao PDR Myanmar Nepal	Requirements for issuance and proper dissemination of SIGMET have not been fully implemented.	2000	SIGMET frequently not available Reported by airlines	State's MET authority to take urgent actions to implement the SIGMET procedures. ICAO issued new version of ASIA/PAC Regional SIGMET Guide in September 2003	State's MET authorities *Note: ICAO Regional Office to enquire action plans with fixed target dates from the listed States*	2005	U
~~a) Annex 3 provisions for Tropical Cyclone Advisory Centres (TCAC) and for the format of tropical cyclone advisories for aviation~~ ~~b) ASIA/PAC Basic ANP (p.6.2) and FASID Table MET 3A~~	~~India~~	~~TCAC New Delhi does not issue tropical cyclone advisories for aviation~~	~~2003~~	~~Reported by airlines and identified during ICAO attendance to ESCAP/WMO Panel on Tropical Cyclones, 2002 and 2003~~	~~The Authority concerned to take urgent actions to meet requirements of Annex 3 and ASIA/PAC BANP and FASID for provision of tropical cyclone advisory for aviation.~~	~~India Directorate General of Civil Aviation; India Meteorological Department~~ ~~*Note: TC Advisory Service has been implemented by IMD since the beginning of 2004*~~	~~2004~~	~~A~~

SUBJECT/TASKS LIST IN THE CNS/MET FIELDS

The priorities assigned in the list have the following connotation:
A = Tasks of a high priority on which work should be expedited;
B = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of Priority "A tasks; and
C = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of priority "A" and "B" tasks.
TOR = Terms of Reference of the Sub-Group

TASKS NO. 1-29 HAVE BEEN COMPLETED AND REMOVED FROM THE LIST

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
30	RAN/3 C.11/10 (TOR 1)	Subject: Ensure effective transition to satellite communications. Task: Planning for the implementation of satellite communications.	B	In planning for the implementation of CNS/ATM take into account: 1) Requirements for an effective transition, 2) Time frame for implementing changes, 3) HF requirements after implementation of satellite communications, 4) Human factors (staffing, retraining).	CNS/MET SG	On-going
~~31~~	~~RAN/3 C.11/11~~ ~~(TOR 1)~~	~~Subject: Need for data link to access VOLMET broadcast stations by aircraft.~~ ~~Task: Automation of meteorological information for aircraft in flight (VOLMET) broadcasts.~~	~~B~~	~~In planning CNS/ATM implementation consider automation of VOLMET broadcast and introduction of D-VOLMET by VOLMET broadcast stations specified in the FASID.~~	~~CNS/MET SG~~	~~2008~~ Note: Superseded by Task No. 43
32	RAN/3 C.8/14 APANPIRG/ 14 (TOR 3)	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash and tropical cyclones Task: Monitoring of the implementation of international airways volcano watch (IAVW) and tropical cyclone advisories and SIGMETs	A	Monitor and provide assistance in the implementation of volcanic ash and tropical cyclone advisories and SIGMETs procedures to ensure provision of timely information on volcanic ash and tropical cyclones to aircraft.	CNS/MET SG Task Force on the implementation of Volcanic Ash and Tropical Cyclone advisories and SIGMETs (VA/TC/I TF)	On going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
~~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~~ Note: Routine task for CNS/MET SG
~~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~~	~~CNS/MET~~ ~~New Zealand~~	~~Completed~~
35	(TOR 3)	Subject: To facilitate regional implementation of CNS/ATM Tasks: a) coordinate training/workshops to allow States to develop and implement new CNS/ATM procedures b) encourage States to participate in the evaluation and training of new CNS/ATM systems c) progress the adoption of WGS-84 co-ordinate system and introduction of high integrity systems for the management of the co-ordinate data	A	1) Identify topics for training, develop syllabi and plan training programme 2) Encourage States in the evaluation and training of new CNS/ATM systems 3) Co-ordinate with States and monitor progress 4) Collect information and suggest methods of resolving problems commonly faced by States	 CNS/MET SG CNS/ATM IC SG	On-going On-going On-going On-going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
36	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3 (TOR 3)	Subject: Provision of adequate CNS/MET services Task: Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States.	A	1) Encourage States to conduct R&D, trials & demonstrations of new CNS/MET services 2) Monitor global developments that may have beneficial consequences on regional planning activities 3) Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action 4) Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET 5) Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations	CNS/MET	On-going
37	C 12/24	Subject : Transition to the GRIB and BUFR coded WAFS products Task : Implementation of the transition to the GRIB and BUFR coded WAFS products	A	1) Development of guidelines for the use of BUFR and GRIB codes for the production of WAFS products. 2) Planning and coordinating the transfer of SIGWX and WIND/TEMP charts from the current T4 facsimile format to BUFR and GRIB format. 3) Development of a regional training programme for the operational use of BUFR and GRIB. 4) Participate in the development and implementation of an adequate WAFS back-up system for dissemination of WAFS products in the ASIA/PAC Region.	CNS/MET SG WAFS Implementation Task Force (WAFS/I TF)	Completed GRIB: Completed 1 July 2005 BUFR: Nov 2006 Closed
38	C12/36 APANPIRG C14/45	Subject : Lack of ATM requirements for MET components of the ASIA/PAC CNS/ATM Plan. Task : Developing the MET Chapter for the ASIA/PAC CNS/ATM Plan.	A	1) Development of the initial draft of the MET Chapter. 2) Development of the MET components of the CNS/ATM concept/ strategy. 3) Inclusion of ATM requirements for MET information in the CNS/ ATM Plan. 4) MET/ATM Coordination Seminar – February 2006	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG METATM TF	Completed Completed ~~2005~~ 2006

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
39	APANPIRG /13 D 13/28	Subject: To improve the efficiency of the regional and inter-regional OPMET exchange and the availability of OPMET information from the ASIA/PAC Region Task: Review and optimize the ROBEX scheme and other OPMET exchanges; introduce monitoring and management procedures for the ROBEX centres and Regional OPMET data banks	A	1) Review and update regional ROBEX tables and relevant documents 2) Propose optimization changes to the ROBEX scheme 3) Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB) 4) Improve the availability of OPMET information from the Pacific States 5) Introduce monitoring and management procedures	CNS/MET SG OPMET Management Task Force (OPMET/M TF)	~~2003~~Completed ~~2004~~Completed on-going on-going on-going
40	APANPIRG /13 C 13/32	Subject: Quality Management of the meteorological service for the international air navigation Task: Foster the development and implementation of quality management systems by the States' MET authorities/providers in the ASIA/PAC Region	B	1) Review the status of implementation of the quality management system in the region 2) Assist in the organization of regional seminars/workshops to foster exchange of information between the States on the matters of quality management systems Note: ASIA/PAC Seminar on QMS for MET services to be held in November 2005.	CNS/MET SG	On-going Nov 2005
41		Subject: Regional Strategy for air-ground data communication Task: Develop regional strategy for the implementation of air-ground communication data link	B	Development of AMS data link	CNS/MET SG	~~2005~~ Completed

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
42		Subject: Radio Spectrum Tasks: Facilitate State preparation for WRC-2007	A	Update the list of focal point of contact person Prepare for presentation of ICAO position at third APT meeting Inform State aviation contact persons of APT and ITU meeting schedule to assist in representatives participating in State delegation.	CNS/MET SG	2006
43		Subject: Implementation of data link Task: Encourage implementation	A	Encourage States to implement CPDLC, D-ATIS, D-VOLMET, PDC and DPC	CNS/MET SG	2008
44		Subject: FASID Task: Updating of Table CNS-2	A	Seek State revisions of Table CNS-2 prior to May 2006. Review and update Table CNS-2 with the assistance of the Secretariat	CNS/MET SG	2006
45	APANPIRG List of deficiencies	Subject: Implementation of SIGMET Task: Improve regional procedures and availability of SIGMET from ASIA/PAC States	A	1) Assist States in implementing SIGMET requirements 2) Conduct regular SIGMET tests 3) Produce training and guidance material 4) Regular monitoring on the availability and quality of SIGMET and advisories	CNS/MET SG VA/TC/I TF	2007

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Ninth Meeting of the Communications/Navigation/Surveillance and Meteorology Sub-Group of APANPIRG (CNS/MET SG/9)
Bangkok, Thailand, 11-15 July 2005

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Attachment 2

International Civil Aviation Organization

NINTH MEETING OF THE COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND METEOROLOGY SUB-GROUP (CNS/MET SG/9) OF APANPIRG

Bangkok, Thailand, 11–15 July 2005.

LIST OF INFORMATION PAPERS

Remark: Paper intended for:
A: All groups
M: MET
C: CNS

IP No.	Agenda Item	Title	Presented by	Remark
IP/1	-	Meeting bulletin	Secretariat	A
IP/2	8 (1)	Executive Summary of WAFSOPSG/2 Meeting	Secretariat	M
IP/3	8 (1)	Executive Summary of SADISOPSG/10 Meeting	Secretariat	M
IP/4	5	Use of Global Positioning System Precise Positioning Service in Domestic and International Airspace	USA	C
IP/5	3	South Pacific Aeronautical Fixed Service Network Implementation	USA	C
IP/6	5	Status of the US Wide Area Augmentation System (WAAS)	USA	C
IP/7	6	Status of the US Deployment of Automatic Dependent Surveillance – Contract (ADS-C) Capability	USA	C
IP/8	6	Status of Safe Flight 21	USA	C
IP/9	12	Change in the Area of Responsibility of Meteorological Watch Office	USA	M
IP/10	12	Thirty-Hour Aerodrome Forecast (TAF)	USA	M
IP/11	8	GRIB and BUFR Training	Secretariat	M
IP/12	9	Survey of Pacific States – OPMET Data Exchange	Rapp. of OPMET/M TF (Australia)	M

IP No.	Agenda Item	Title	Presented by	Remark
IP/13	12	MET Observations and Reports – Issues Addressed by AMOSSG	Australia	M
IP/14	10	Volcanic Ash Issues in the Region Over 2004-2005	Australia	M
IP/15	9	Asia/Pacific ROBEX Database	Rapp. of OPMET M/TF (Australia)	M
IP/16	10	Operational Requirements for Volcanic Ash	USA	M
IP/17	4 (2)	HF and VHF Air-Ground Communications Systems Upgrade in Australia	Australia	C
IP/18	5	Plan for Transition to GNSS	Australia	C
IP/19	17	Special Implementation Project (SIP) Seminar on Identification and Differences to ICAO SARPs	Secretariat	A
IP/20	14 (2)	MET Special Implementation Project for the Pacific	Secretariat	M
IP/21	12	Changes in MET Procedures in Japan	Japan	M
IP/22	10	A New Meteorological Satellite MTSAT-1R is Fully Operational	Japan	M
IP/23	-	List of Working Papers	Secretariat	A
IP/24	-	List of Information Papers	Secretariat	A
IP/25	3	Information MTSAT Lunch ad Separation Minimum in the North and Central Pacific	Japan	C
IP/26	6	Discussion on Airbus View Regarding Proposed Annex 10, Vol. III Amendments	Japan	C
IP/27	13	MET Strategy in Supporting the CNS/ATM Concept	Russian Federation	A
IP/28	4	Current Status of PDC Implementation in Hong Kong, China	Hong Kong, China	C
IP/29	13 (2)	Terminal Meteorological Forecast (TerMET)	Hong Kong, China	M

Attachment 2

LIST OF WORKING PAPERS

WP No.	Agenda Item	Title	Presented by	Remark
1	-	Provisional agenda	Secretariat	A
2	2 (1)	Actions on Decisions/Conclusions of CNS/MET SG/8 and APANPIRG/15 Meetings	Secretariat	A
3	2, 7	Action Items of the 41st DGCA Conference	Secretariat	A
4	2	Key Priorities for CNS/ATM Implementation	Secretariat	A
5	3	Seventh ATN Transition Task Force Meeting	Secretariat	C
6	4	Air-ground Communications Strategy	Secretariat	C
7	5	Review of Strategies for Implementation of GNSS Air Navigation Capability and the Provision of Precision Approach and Landing Guidance Systems	Secretariat	C
8	5	Review and Update FASID Table CNS-3 Navigation System	Secretariat	C
9	6	Third Meeting of Automatic Dependent Surveillance-Broadcast (ADS-B) Study and Implementation Task Force	Secretariat	C
10	8 (2)	Regional Progress of WAFS Implementation	Hong Kong, China	M
11	13 (2)	Provision of Automated Aircraft Observations	Hong Kong, China	M
12	13 (2)	Identification of a Data Link for Uplinking Graphical Meteorological Information	Hong Kong, China	A
13	12	Annex 3 Template for Aerodrome Warnings	Hong Kong, China	M
14	13 (2)	Current Status of D-ATIS and D-VOLMET Implementation	Hong Kong, China	A
15	8	Summary of Recent Changes to the WAFS and SADIS	United Kingdom	M
16	11 (1)	Preparation for QMS Seminar	Hong Kong, China	M

WP No.	Agenda Item	Title	Presented by	Remark
17	10	Ensuring Provision of Annex 3 Warning Service for Flight Information Regions	New Zealand	M
18	9, 12	Issues Arising from the Changing Demands on the Production and Dissemination of Aerodrome Forecasts	New Zealand	M
19	10	Progress with SIGMET Tests – WC and WV	Rapp. of VA/TC TF (Japan)	M
20	10	Asia-Pacific OPMET Performance Indices	Singapore	M
21	10	An Assessment on Accuracy of Extended TAF	Singapore	M
22	8 (1)	SADIS Strategy Assessment Tables 2006-2009	Secretariat	M
23	7 (1)	Future Spectrum Needs and Proposed WRC-2007 Actions	USA	C
24	10	Matters Related to SIGMET Implementation	Secretariat	M
25	9	Third OPMET Management Task Force Meeting	Rapp. Of OPMET M/TF (Australia)	M
26	7 (1)	Preparations for World Radiocommunication Conference 2007 – (WRC 07)	Australia	C
27	13 (2,3)	Report of METATM Task Force	Chairman of TF (Australia)	M
28	9	ASIA/PAC AIREP Survey	Rapp. Of OPMET M/ TF (Australia)	M
29	13	CNS/ATM Implementation and Planning Matrix	Secretariat	C
30	4, 14	Improvement of Communication in Yangon FIR	Myanmar	C
31	5 (3)	Review of GNSS APV Approach Standards and Implementation	Australia	C
32	10	A Proposed Co-ordinated Effort for SIGMET Education	Australia	M
33	7	Regional preparatory activities and result of Second APT Conference Preparatory Group Meeting for WRC-2007	Secretariat	C

Attachment 2

WP No.	Agenda Item	Title	Presented by	Remark
34	9	Proposal for Amendment of Basic ANP and FASID procedures related to OPMET exchange	Secretariat	M
35	10	Amendments to the IAVW Related Provisions in ASIA/PAC ANP	Secretariat	M
36	14 (1, 2)	Status of Noted Deficiencies in the CNS and MET Fields	Secretariat	A
37	9	Planning for Transition to BUFR – Coded OPMET Information	Secretariat	A
38	3	Relocation of Tokyo AFTN COM Centre to Fukuoka	Japan	C
39	16	Terms of Reference and Tasks List of the CNS/MET Sub-Group	Secretariat	A