**AGENDA ITEM 2.2:    CNS/MET MATTERS**

**2.2**         **CNS/MET Matters**

2.2.1         The meeting reviewed the report of the Sixth Meeting of the CNS/MET Sub-Group (CNS/MET/SG/6) held in Bangkok from 15 to 19 July 2002.  The contents of the report of the Sub-Group were noted with appreciation.  The meeting also noted with satisfaction actions taken on all Decisions and Conclusions of APANPIRG/12 in the CNS/MET fields. The meeting took the following actions on the report of the CNS/MET/SG/6.

**AFTN Improvements**

2.2.2         The meeting noted the implementation status of AFTN circuits in the ASIA/PAC region based on the reports of the CNS/MET/SG/6 meeting and the COM coordination meeting. The main highlights of the AFTN communication improvements during 2001 and 2002 were as follows:

- Guangzhou/Sanya 2400 bps circuit was established on 9 August 2001;

- Hong Kong/Sanya 2400 bps circuit was established on 9 August 2001;

- Singapore/Jakarta circuit was upgraded to 2400 bps on 10 October 2001;

- Singapore/Manila circuits was upgraded from 75 baud to 300 baud on 30 October 2001;

- Christchurch/Papeete circuit was upgraded from 300 baud to 2400 bps in November 2001;

- Hong Kong/Manila circuit was upgraded from dual 75 baud to 300 baud on 21 December 2001;

- Brisbane/Singapore circuit was upgraded from 600 baud to 2400 bps in February 2002;

- Hong Kong/Ho Chi Minh circuit was upgraded from 300 baud to 2400 bps in July 2002;

- Apia/USA circuit was implemented with 2400 bps and X.25 protocol on 15 July 2002.

- Singapore/Brunei circuit was upgraded from 75 baud to 2400 bps using X.25 protocol on 22 August 2002.

**Message Switching System**

2.2.3         An Unified Message Switching System (UMSS) was commissioned at the new Nadi ATM Centre, Fiji in August 2001.

**Requirements for new AFTN circuits**

2.2.4         It was noted that based on the proposal for amendment of the ICAO ASIA/PAC Air Navigation Plan APAC 98/8, which was approved by the ICAO Council on 27 November 2001, a requirement of AFTN connection between Tonga and New Zealand was identified. The meeting agreed to incorporate this requirement in the AFTN Plan.  The meeting also noted New Zealand's

plan to establish a new ATS direct speech circuit between Auckland and Oakland and a 9600 bps data channel would be used for an AFTN circuit between Christchurch and USA.

2.2.5        In view of the several AFTN communication centers involved in relaying of AFTN messages between Hanoi and adjacent ACCs in China causing transit delays, China and Vietnam agreed to establish a new direct AFTN circuit between Hanoi and Guangzhou which would also satisfy the printed communications requirements between Hanoi and Sanya, Nanning and Kunming. In view of the above, it was agreed to specify requirement for the Guangzhou/Hanoi circuit in the AFTN Plan.

2.2.6        In light of several changes and new requirements proposed, the meeting agreed to replace the existing Table CNS 1A with the updated Table provided in Appendix A to the report on Agenda Item 2.2 and adopted the following conclusion:

### Conclusion 13/11 – Amendment to the Table CNS-1A - AFTN Plan

That, the Table CNS 1A contained in ASIA/PAC FASID be replaced with an updated Table CNS-1A provided in Appendix A to the Report on Agenda Item 2.2 in accordance with established procedure.

### AFTN Circuit Performance

2.2.7        On the basis of the review of AFTN circuit loading statistics, the meeting identified the need to closely monitor loading and to upgrade capacity some of the AFTN circuits. It was noted that the tests were being conducted to upgrade the Colombo/Mumbai circuit. The existing signaling speed for the Mumbai/Nairobi circuit was considered adequate by Kenya. However, being an inter-regional circuit, its capability was required to be closely monitored. Accordingly, the meeting endorsed the following conclusion:

### Conclusion 13/12  - Need to monitor AFTN circuit performance

That, States concerned closely monitor performance of the following AFTN circuits and coordinate upgrading the circuit capacity within the target date established in the AFTN Plan.

1.  Colombo/Male                    5.  Kuala Lumpur/Chennai
2.  Colombo/Singapore               6.  Tokyo/Singapore
3.  Mumbai/Colombo                  7.   Tokyo/Moscow
4.  Mumbai/Nairobi

2.2.8        The meeting also noted that Mumbai/Paro circuit would be implemented upon commissioning of the new AFTN switch at Paro by the end of 2002.

2.2.9        It was also noted that Japan and the Russian Federation were exchanging information on cost of leased landline and satellite channel and other technical details for upgrading the Tokyo/Moscow AFTN circuit to 2400 bps by the end of 2003.

2.2.10        The meeting noted that the Thirteenth African Planning and Implementation Regional Group (APIRG/13) Meeting in its Conclusion 13/9 had proposed to change in the AFI-ASIA/PAC entry/exit point from Mauritius to Johannesburg. The meeting reviewed the request for designation of correspondent location for the entry/exit point in the ASIA/PAC Region. Recognizing that Brisbane is one of two entry/exit points between AFI and the ASIA/PAC Region linking Mauritius in AFI region. Australia informed the meeting that the proposal is under study to determine financial implication. It is expected that a decision would be made by the end of 2002.

**Delivery of AFTN Traffic over the public Internet**

2.2.11        The meeting noted that Internet had been used for AFTN traffic between Australia and a number of small Island States for which the use of dedicated AFTN facilities are neither available nor are economical. Current alternative method to provide AFTN traffic to such locations has been via the use of manual faxing or telephone. Replacement with dedicated digital connections required leasing bandwidth far in excess of requirements made many of these services uneconomical to provide the standard AFTN service.   The use of available public Internet to provide an alternative communications medium for AFTN connectivity to sites of low traffic requirements was the only viable action as an interim solution.

2.2.12        The meeting recognized public Internet is a practical and economically feasible vehicle for distributing aeronautical information and is increasingly considered to be a fundamental communication tool that may be used to help support the AFTN where dedicated leased channels do not justify handling low volume message traffic. However, concerns on the security, reliability, data integrity and timeliness aspects were raised. It was considered that without adequate protection against security risk it would not be advisable to use this option as an interim solution.

2.2.13        It was also noted that the United States had informed, during discussion on this issue, at the ATN Transition Task Force meeting that exchange of AFTN messages will not be permitted with those stations which use such kind of public service communication means. In some other States, security and certification processes were required before introduction of such kind of public service for operational use.  New Zealand informed that in certain cases Internet with necessary security protection is used as an alternative means to deliver AFTN messages.

2.2.14        It was noted that the ATN Transition Task Force had reviewed this issue and concluded that further study and discussion for using Public Internet and developing some policies as guidance to the States were required. Subsequently, a task to develop guidance material was included in the Task List of the Task Force.

**COM Co-ordination Meeting**

2.2.15        The meeting noted that a COM Co-ordination Meeting was held in Kunming, China from 18-20 June 2002.  The meeting was hosted by the Air Traffic Management Bureau of CAAC.

2.2.16        The objectives of the meeting were to review status of implementation of the required AFTN/ATS direct speech circuits and to develop a coordinated action plan to implement and upgrade those concerned circuits to satisfy the established operational requirements.

2.2.17        The meeting noted that the unreliable AFS communications between Dhaka and Kolkata FIRs are listed as long standing deficiencies in the deficiency list in the CNS filed in the ASIA/PAC region. The target date for completion of the proposed corrective action was June 2002 but the status remained unchanged.

2.2.18        It was recognized that in absence of upgrading of the circuit, for the provision of an alternate routing via Bangkok and Mumbai should be considered for implementation.

2.2.19        The meeting also noted that the VSAT link used for ATS direct speech circuit between Kunming and Yangon had been out of order due to technical and other problems at Yangon site. The reactivation of the ATS direct speech circuits was discussed during the meeting. China and Myanmar have reached an agreement to reactivate the VSAT link as well as establishment of the new AFTN circuit between Beijing and Yangon by the end of 2002 in accordance with the updated AFTN Plan.

2.2.20        China had proposed to upgrade the Beijing/Karachi AFTN circuit capacity. It was noted that the AFTN circuit between Beijing and Karachi is running at 50 baud. It was further noted that such capacity could not meet the need to cater for potential AFTN diversion traffic. It was considered cost effective to establish a higher speed circuit using VSAT technology. China was requested to coordinate with Pakistan to work out a practical action plan for implementation of a VSAT link to upgrade the circuit.

**VSAT technology used for AFS communications**

2.2.21        China and Thailand informed the meeting of their experiences of using VSAT technology supporting AFS and AMS communications within their own country and with neighbouring countries. India informed the meeting that VSAT is used extensively to support AFS communication and to enhance coverage of VHF within India. The meeting also noted that VSAT technology was widely used in the ASIA/PAC region to support AFS communication with exception in the Bay of Bengal area where some States have experienced difficulty in establishing VSAT link with neighbouring States due to regulatory restrictions.

2.2.22        The meeting therefore concluded that VSAT technology is identified as an appropriate solution to the last mile (local lead between airport and downtown PTT) problem in the area. In the interest of efficiency and economy, States were encouraged to take urgent actions to overcome regulatory restrictions for the use of VSAT technology especially for integrated data and voice requirements where two separate data/voice circuits have been implemented or planned. There was a strong support by the meeting to encourage States to use VSAT technology to improve quality and reliability of AFS, remote control air-ground (RCAG) VHF communications. Accordingly, the meeting formulated the following conclusion:

**Conclusion 13/13  - Use of VSAT Technology for AFS**

That, States in the Bay of Bengal area, implement AFS circuits using VSAT technology as a matter of high priority to enhance safety and efficiency of aircraft operations and to meet AFS communication requirements for data/voice communications.

**ATN transition planning**

2.2.23        The meeting reviewed the work accomplished by the Fourth Meeting of the ATN Transition Task Force which was held in Mumbai, India from 8 to 12 April 2002.

2.2.24        It was recognized that the next edition of the ATN Planning Document should be published in loose leaf to enable incorporation of future amendments in the document. The meeting then reviewed a new document called the ATN Documentation Tree that provides an index and hierarchy on relevant ATN documents that are available to assist States in their ATN planning and implementation programmes. The meeting agreed that this document would be of value and recommended that the document, shown in Appendix B be considered for inclusion in the Second Edition of the ATN Planning Document. In view of the foregoing the meeting endorsed the conclusion as follows:

**Conclusion: 13/14 - ATN Documentation Tree**

That,

a)   the ATN Planning Document be published in a loose-leaf form to include future amendments to the Document; and

b) the ATN Documentation Tree provided in Appendix B to the report on Agenda Item 2.2 be adopted and included in the ATN Planning Document.

2.2.25        The meeting reviewed the ATS Message Handling System (AMHS) Interface Control Document (ICD). The meeting adopted the AMHS ICD contained in the report of CNS/MET/SG/6 to be published as Issue 1. The meeting endorsed the following conclusion:

**Conclusion 13/15 - ASIA/PAC Interface Control Document (ICD) for ATS Message Handling System (AMHS)**

That, the ASIA/PAC ICD for AMHS be adopted and published as Issue 1.

2.2.26        A checklist for implementation of ATN ground-to-ground network was prepared with a view to assist States in the implementation of the ground/ground network infrastructure. It was, therefore, agreed to adopt the checklist for circulation to States for their use. The meeting endorsed the conclusion as follows:

**Conclusion 13/16 - Checklist for Implementation of Ground to Ground ATN Infrastructure**

That, the Checklist provided in Appendix C to the report on Agenda Item 2.2 be adopted and circulated to States to assist in implementation of the Ground-to-Ground ATN infrastructure.

**Review the Subject/Tasks List of the ATN Transition Task Force**

2.2.27        The meeting reviewed the Terms of Reference (TOR) of the Task Force. The meeting carried out a review of the Subject/Tasks List taking into account ATN related subject contained in the Key Priorities for CNS/ATM Implementation in the ASIA/PAC region.

2.2.28        The meeting recognized the need to address, as a matter of urgency, an additional Task for the development of technical guidance material relating the use of public Internet to support AFTN with particular emphasis on security. In addition, it was proposed to undertake a task of developing guidance material for Internet Protocol (IP) as a sub-network of ATN in accordance with the work performed by the ATN Panel. The meeting, therefore, agreed that the proposed tasks be added as No. 7 and No. 8 Tasks respectively, in the Subject/Tasks List.

2.2.29        The meeting updated the Subject/Tasks List in light of the above and reached the following decision:

**Decision 13/17  - Revision of the Subject/Tasks List of the ATN Transition Task Force**

That, the updated Subject/Tasks List of the ATN Transition Task Force provided in the Appendix D to the report on Agenda Item 2.2 be adopted.

**Required Communication Performance**

2.2.30        The meeting noted that a paper was presented by Japan regarding ATN Performance on the air/ground communications at the Fourth Meeting of ATN Transition Task Force. The paper was also presented for comments to the ATS/AIS/SAR/SG/12 meeting in June and to the CNS/MET/SG/6 meeting in July 2002. Required Communications Performance (RCP) was seen as set of parameters, the values of which would determine the operational requirements for communication

system in the various phases of flight. There was a need to assess the various technical options of communication systems against such a set of parameters including cost and benefits analysis.

2.2.31          In this connection, the meeting noted that a State letter SP52/4-01/85 on development of an operational concept of required communication performance (RCP) was sent to States and international organizations for comments by ICAO Secretary General dated 10 August 2001. The replies from States and international organizations were substantive and a majority of them indicated broad support for the operational concept of RCP.  While acknowledging that further work would be required to provide States with the necessary detail for applying an RCP type in support of specific air traffic services functions, the APANPIRG noted that the Commission has tasked OPLINK Panel:

a)  to review the comments from  States and develop as appropriate Standards and Recommended Practices  (SARPs), procedures and guidance material, relating to the use of required communication performance (RCP) in the provision of air traffic services;

b)  develop a manual as a guidance materials; and

c)   develop a sample application.

2.2.32          The meeting was informed that at the moment there are no operational requirements established in the Asia and Pacific region for the air-ground data communications.  It was, therefore, noted that at this stage the current requirements were satisfied by the existing provisions contained in relevant documents.

### Communication function of MTSAT

2.2.33          It was informed that MTSAT system is constructed with highly reliable hot stand-by satellite. Due to the importance of AMSS,  redundancy has been designed into the space and earth segments to ensure that the operational system satisfies reliability requirements. GES or satellites switchover is activated automatically within 6 seconds in case of failure.  MTSAT 1-R is scheduled for launch in the summer 2003 and the Ground Earth Stations (GES) dedicated for the satellite at Kobe and Hitachi-Ota Satellite Centers have been ready for operation use since 1999.  MTSAT 2 is scheduled for launch in 2004 and the dedicated GESs are under construction at the existing Satellite Centers. The first satellite will become operational nine month after the launch. MTSAT will contribute to improve both safety and communication capacity in ASIA/PAC region by providing coverage via global and spot beams.

2.2.34          It was noted that  four satellites would be available in ASIA/PAC region for air-ground communication after MTSATs are operational. However, this may not result in increasing availability of AMSS for the AESs because a satellite or a GES can only be useful when an AES registers it in its owner's preference table. According to the AMSS SARPs, AES has a programmable owner preference table by which aircraft may choose from certain selectable systems, satellites, and/or GESs.  Therefore, each AES is required to register all satellites and GESs available.

2.2.35          The meeting recognized that MTSAT would increase the availability of AMSS in ASIA/PAC region. However, conditions and procedures for using MTSAT air-ground communication functions should be made available to users and service providers for their considerations.

### Satellite Voice Communication

2.2.36          It was noted that the current satellite voice services called SITA Enhanced Ground to Air Voice (EGtA). This service allows use of existing satellite voice for SATCOM equipped aircraft. The presentation stated the current serviceability of satellite voice for airline applications and

compliance to the supporting ICAO AMSS SARPs. It was informed that a "Statement of Needs" for satellite voice has been developed by airlines and selected ATS Providers and that this has been the basis of operational evaluation for the use of satellite voice for ATS air-ground communication by ATS providers and pilots. It was suggested that States evaluate the suitability of satellite voice as an alternative to HF voice.

2.2.37          The meeting noted the availability of SITA air-ground data link and planned transition to VDL Mode 2 and Satellite based services. SITA begun deployment of the VGS in 2000 and demonstrated the VDL Mode 2 capability with full avionics qualification and demonstration. The transition accommodates the functional capabilities of aircraft using air-ground data link.

2.2.38          The meeting noted that airlines and airframe manufacturers are undertaking significant discussion on airframe capabilities in the migration to ATN. The meeting concluded that air-ground transition plans need to take account for the differing aircraft capabilities and related avionics.

### Radio Navigation Aids Maintenance of conventional systems

2.2.39          It was noted that the continued operation of conventional navigation aids is required to support current operations. The issue of maintenance, refurbishment and replacement of aids was discussed together with consideration of radiation of hazardous and misleading information from an ILS during maintenance.

### Extending Life and Maintaining Conventional Navaid Systems

2.2.40          The meeting noted that availability of the current conventional navigation aid network in Australia and provided details of issues being addressed in maintaining services until transition to a GNSS based system can be accomplished. The issues identified were: equipment age, spare and replacement parts, sourcing new equipment, technician skills, site constraints, flight inspection, maintenance tracking, performance analysis and test equipment.

2.2.41          The meeting noted the benefit of sharing information on capabilities particularly with older equipment where the support of the original equipment manufacturer is no longer available. It was considered appropriate to establish an index of organizations within the region with the knowledge and capability of providing on going support of equipment and also organizations with specialist skill, such as flight inspection. The information would be provided in a similar manner to the existing register of regional flight inspection units and allow for direct contact in addressing support requirements. The publication of an index on the Internet and using links to the listed organizations own pages was considered the most suitable arrangement.

### Strategies for the Provision of Precision Approach and Landing Guidance Systems and Strategy for Implementation of GNSS Navigation Capability in the ASIA/PAC region

2.2.42          The meeting reviewed the Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC region. The meeting noted that the Strategies should be considered as living documents and they had to be reviewed and updated regularly.

2.2.43          The meeting reviewed and agreed to the changes proposed to the Strategy for the Provision of Precision Approach and Landing Guidance System. With regard to the Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC region, the meeting discussed the need to retain RNP4 in para b) of the Strategy for en-route and specify RNP 1.0 for terminal phase of flight.  Since the Strategy was developed by an experts group, it was agreed, after a considerable

discussion, to refer it back to the Sub-Group for comments. The Strategy with the amendments proposed by the Sub-Group was adopted without any change. In view of the foregoing, the meeting adopted the following conclusion:

**Conclusion 13/18 - 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/PAC region provided in Appendices E and F respectively, to the report on Agenda Item 2.2 be adopted and provided to States.

2.2.44    The meeting noted the findings of an ICAO Regional GNSS Measurement Campaign, as initiated by the 11th APANPIRG meeting, for determination of GPS accuracy over the ASIA/PAC region. Australia, China, India, Singapore and the United States participated in the Measurement Campaign, which was carried out on 3 days, namely 11 and 25 September, and 9 October 2001. The mean horizontal and vertical errors measured in this campaign were found to be low, generally less than 5 m with Position Dilution of Precision (PDOP) of less than 3, thus GPS without Selective Availability and augmentation could satisfy ICAO's accuracy requirements for en-route flight as well as non-precision approach.

2.2.45    The meeting expressed appreciation to Singapore and all the participating States for successfully completing the task.

**GPS and GEO Augmented Navigation in India**

2.2.46    It was informed that based on a cost benefit analysis, India decided to go for a Satellite Based Augmentation System called GAGAN (GPS And Geo Augmented Navigation) for supporting Air Navigation services over Indian Airspace. A Memorandum of Understanding had been signed between Airport Authority of India (AAI) and Indian Space Research Organisation (ISRO) for implementation of a Technology Demonstration System (TDS), which could be upgraded to a full operational capability system. Project Management Council and Project Management boards had been formed with senior executives for effective decision taking for smooth progress of the project.   The TDS phase would have eight Reference Stations (INRES), a Master Control Center (INMCC) and an Uplink Station (INLUS). The Message formats and timing will be according to WAAS Functional and Performance specification No. FAA-E-2892.  The first satellite carrying Indian navigation payload, which would provide the Geo Overlay, is likely to be GSAT3. A string of TEC measurement stations would be established to take Ionospheric measurements for Ionospheric modelling. The TDS phase is targeted for completion by 2005. Testing and validation of the TDS will be carried out for compliance to ICAO SARPs. Inter-operability of the system with other such systems like WAAS, EGNOS, MSAS etc. will be ensured.  There is also a plan to utilize the INMARSAT 3 navigational transponder in the initial phases. TEC receivers have been procured and are expected to installed by November 2002 and ionospheric data collection started thereafter.

**Flight Inspection**

2.2.47    The meeting noted a prepublication draft of Volume 2 of the Manual on the Testing of Radio Navigation Aids (Doc. 8071). The manual has been prepared by the Testing of Radio Navaids Study Group (TRNSG). General description of GNSS element is contained in Chapter 1. Flight inspection of GNSS non-precision approaches supported by ABAS is provided in Chapter 2.

Additional chapters are in preparation for the volume, which will describe ground, and flight inspection procedures based on GBAS and SBAS which are expected to be completed in 2003.

2.2.48          The meeting noted the issue of interference as described in the manual as well as the requirement for periodic flight-testing of NPAs.

**Ground Based Augmentation System (GRAS)**

2.2.49          The meeting noted that information on the development of SARPs for the Ground Based Regional Augmentation System (GRAS) was provided by Australia. The GNSSP has received the operational concept for GRAS and is expected to consider the SARPs at the Fourth Meeting of the Panel in March 2003.

2.2.50          Details were provided on continued testing of GRAS in Australia, concentrating on the validation of this system. Test results show the trouble free transition between common frequency and slot different ground stations.

2.2.51          The meeting was also informed that a memorandum of cooperation between Airservices Australia and Aerothai cover the development of a GRAS test bed in Thailand.

**Ultra Wide Band (UWB)**

2.2.52          The meeting was informed of potential interference problem for UWB systems to the radio navigation systems.  The GPS was among the systems that have been analyzed and tested to be potential for interference.  It was suggested that States should carefully determine whether or not the implementation of UWB technology would cause interference to system operated in radio spectrum used for aeronautical safety services. The more information regarding UWB systems is provided in the FCC First Report and Order (FCC-02-48) at web page:
http://www.fcc.gov/Document_Indexes/Engineering_Technology/2002_Index_OET_Order.html

**Automatic Dependent Surveillance (ADS) developments**

2.2.53          The meeting was informed of Automatic Dependent Surveillance Broadcast (ADS-B) systems trials being conducted and implemented within the Region.  The meeting noted potential benefits and low cost of ATC surveillance provided by ADS-B technology.

2.2.54          Australia informed the meeting that the implementation and application of ADS-B offers considerable benefits in terms of services that are currently only provided in radar environments. It was further informed that decisions have been taken in Europe and North America on the selection of technology for ADS-B. It is appropriate that the Asia Pacific Region address these considerations in the immediate future.  Australia indicated its support to the establishment of an ADS-B Study and Implementation Task Force and offered to host its first meeting of the task force in Brisbane Australia during November 2002.

2.2.55          Australia provided an information paper in which stated ADS-B would offer potential for Asia Pacific region to significantly increase ATC surveillance capabilities at a low cost. An approximation of current ATC surveillance radar coverage based upon data extracted from FASID and an indicative example of coverage that could be achieved by ADS-B were presented.  It was informed that ATC coverage in excess of 250 nautical miles has already been demonstrated at an Australia's ADS-B ground station.  It is estimated that an ADS-B ground station could be deployed for less than 15% of the cost of radar. An indicative cost for deployment of a high quality duplicated ADS-B ground station is between US$300,000 USD and  $600,000.-  each including project management and data communications feeding back to an ATC centre. Lower cost alternatives also exist. It was estimated that 33 new ADS-B ground stations with estimated cost less than US$20 M

would be required for ATC coverage for South East Asia and 21 new ADS-B ground stations at cost less than US$13 M would be required for the South Pacific area.  Data feeds from ADS-B could use the Eurocontrol Category 21 ASTERIX data exchange format. The benefits that could be obtained for equipped aircraft in areas of ADS-B coverage includes:

a) Improvements in safety
- Short term conflict alert;
- Danger area infringement warning;
- Cleared level adherence monitoring;
- Route adherence monitoring;
- Minimum safe altitude monitoring.

b) Improvements in FIR crossing coordination
- Improved situational awareness;
- Ability to detect coordination failures eg: mismatches between actual aircraft level and coordination level.

c) Improvements in efficiency
- Potentially the ability to use ADS-B radar like separation standards in lieu of existing procedural standards;
- Ability to detect that aircraft have "passed" and hence issuance of preferred cleared levels;
- Increase probability of states being able to offer user preferred routes.

2.2.56          Fiji informed the meeting of its studies and plans for ADS-B.  It has been identified that the use of radar is not an option for the domestic airspace surveillance covering 120 NM and 300 islands spread over the seas due to the number that would be required together with the prohibitive costs (capital and operational). The lessons learnt and experiences gained enabled Fiji to move forward in search for a long-term solution for ADS in its domestic airspace as well as share those experiences with member states in the Regions. Fiji is currently undertaking a Cost Benefit Analysis (CBA) study in partnership with suppliers of the EUROCAT system (Thales ATM) on the integration of ADS-B information into the Eurocat system.   The study is expected to be completed by October 2002. Following CBA, further discussions with Stakeholders (CAAFI, Airports Fiji Ltd, Airline operators, Government) who are also part of the National CNS/ATM Planning team would continue so that trials may be conducted in 2003. Fiji supported the establishment of the Task Force and expressed willingness to participate in its activities.

### ADS-B/ADS-C in Mongolia

2.2.57           Mongolia made a visual presentation of a successful combined ADS-B/ADS-C demonstration conducted in Ulaanbaatar from 25 to 26 September 2001. ICAO standardized technology VDL Mode 4 was employed for the demonstration. The demonstration consisted of an MIAT AN-24 aircraft equipped with ADS-B avionics + CDTI and one Mil-8 helicopter with ADS-B avionics, one airport vehicle with ADS-B unit and ADS-B ground station with ADS-B, FIS-B and DGNSS functions.   ADS is seen as having great potential for Mongolia for reducing infrastructure costs, as Mongolia has no civil radars but a modern ATC system and supporting infrastructure. ADS-B is considered for domestic use and ADS-C for international operations in the near-term plan. The current ATM automation system (AutoTrac 2100) was capable of integrating ADS-B information with ADS-C data.  Mongolia also expressed interest in the Task Force and expressed willingness to contribute to its work.

### Selection of ADS-B technology

2.2.58          The meeting noted following ADS-B activities, decisions and meetings, which have contributed towards the deployment of ADS-B as a surveillance tool.

- The United States of America has formally announced that it will use 1090MHz extended squitter as the ADS-B link technology for Air Transport category aircraft.

- The USA had also selected UAT ADS-B link for the general aviation users.

- ICAO's Separation and Airspace Safety Panel (SASP), First Meeting of the Working Group of the Whole, agreed that an ICAO separation standard be developed for ADS-B using radar surveillance characteristics as a reference system.

- The June 2002 Joint User Requirement Group (JURG) of Association of European Airlines and IATA concluded that 1090 MHz extended squitter ADS-B was the interoperable link.

- Airbus has indicated that it will make ADS-B out capability; using 1090 MHz extended squitter, available on all aircraft produced after early 2003. Airbus also States that retrofit kits will also be made available at that time.

- Some Boeing aircraft are already equipped with ADS-B (eg some British Airways B747 and B757). Boeing is expected to consider ADS-B 1090MHz squitter implementation together with other transponder changes required for Europe's enhanced surveillance and the FAA's anticipated transponder rules regarding security enhancements.

2.2.59          The upgrading of existing Mode S transponders required the implementation of a link between the navigation system and the transponder. Due to the technical simplicity, the provision of Extended Squitter from most aircraft already equipped with TCAS is expected to be inexpensive. This is totally consistent with the existing ICAO Annex 10 provisions and the development path of Mode S and TCAS.

2.2.60          Operational benefits may be made available to ADS-B equipped aircraft operating in airspace served by ADS-B ground stations. These benefits could include the following depending on the capabilities of the Air Traffic Control system:

- Provision of radar like separation services allowing decreased separation minima compared to procedural control

- Increased likelihood of preferred levels and in some increased likelihood of preferred routes and hence decreased fuel burn and lower operating costs

- Reduced pilot and controller workload by removal of routine position reporting and management

- Increased safety through provision of ground based safety alert protection including short-term conflict alert, minimum safe altitude warning, danger area infringement warning, cleared level adherence monitoring and route adherence monitoring.

2.2.61          The meeting review the Terms of Reference of the Task Force particularly with a view to avoid any duplication of efforts with the activities undertaken by ICAO Panels. The proposed Terms of Reference was revised accordingly to incorporate views expressed during the discussion.

2.2.62          The meeting noted support expressed by several States for the establishment of Task Force and the inclusion of ADS-B as a new item in the Key Priority. In view of the foregoing, the meeting adopted the following conclusion:

**Conclusion 13/19 – ADS-B Study and Implementation Task Force**

That,

a)  a multidisciplinary Task Force be established consisting of members from Australia, China, Hong Kong China, Fiji, India, Japan, Mongolia, Singapore, United States, IATA, IFALPA, IFATCA and SITA with the Term of Reference provided in Appendix G to the report on Agenda Item 2.2;  and

b)  the result of the study to be presented to APANPIRG/14 meeting in 2003.

2.2.63          As a result of observation carried out by Japan, the meeting was informed of difficulties in ensuring 24 bit aircraft addresses while aircraft ownership was changed but the address remained unchanged.  This was particularly difficult for "wet-lease" aircraft on comparative short-term deployments. It was also considered that lack of adherence to the 24bit aircraft address allocation procedures might have been an important factor causing this problem.  With a view to resolve this problem, the meeting formulated the following conclusion:

**Conclusion 13/20 – 24 bit aircraft address**

That,
a)  the ICAO issue a State Letter reminding States of the requirement to maintain aircraft address allocations in accordance with provisions laid down in Annex 10, Volume III and provide 24bit address allocation procedure;

b)  Japan be encouraged to undertake additional monitoring in the twelve-month period after the issue of State letter to observe changes in the level of compliance; and

c)  the need to enforce the procedure a working paper  be presented to the 39th DGCA Conference.

**Preparation for World Radiocommunication Conference 2003 (WRC-2003)**

2.2.64          The meeting noted ICAO Position on the WRC-2003 agenda items of interest to aviation, which will be discussed at the ITU World Radiocommunication Conference (WRC-2003) to be held from 9 June to 4 July 2003 in Geneva, Switzerland.

**Elements of the ICAO Position for the ITU WRC-2003**

2.2.65        The agenda for the WRC-2003 includes a number of items of a technical nature with implications for aviation.  The most critical WRC 2003 agenda items are as follows:

Agenda Item 1.4            allocations in the band 5091-5150 MHz;

Agenda Item 1.14           harmful interference to maritime mobile and aeronautical mobile (R) services;

Agenda Item 1.15           studies concerning RNSS relating to protection of the existing services DME/RADAR in the bands 1164-1215 and 1215-1300 MHz, respectively by prescribing epfd limits;

Agenda Item 1.17           upgrading of allocation to the radio location services in the 2.9-3.1 GHz band and

Agenda Item 1.28           differential correction using the 108-117.975 MHz band.

2.2.66        It was noted that the 38th Conference of the Directors General of Civil Aviation, Asia and Pacific Region in its Action Item 38/4 strongly urged States to provide support to the ICAO Position for WRC 2003. Follow up action was taken in accordance with the above action item.

2.2.67        ICAO Position for WRC 2003 was presented at the Fourth APT Conference Preparatory Group meeting for WRC 2003 (APG2003-4) held in Busan, Republic of Korea from 26 to 31 August 2002. The Fifth and the last APT APG 2003-5 meeting will be held in Tokyo, Japan from 19 to 25 February, 2003.

2.2.68        With a view to ensure concerted efforts to support ICAO position at the last APT Preparatory Group Meeting for WRC 2003 to be held in Tokyo in February 2003, the meeting recommended that a meeting of the Designated Contact Persons should be held in Bangkok towards the end of 2002 on early 2003 to review the APT Provisional Views developed by the fourth APG meeting and finalize their input to their respective telecommunication regulators for consideration and submission to the last APG meeting in Tokyo. It was also recognized that the List of Contact Persons designated by Civil Aviation authorities should be posted in the ICAO webpage to facilitate better coordination. In view of the above the meeting formulated the following conclusion:

**Conclusion 13/21 - Preparation for World Radiocommunication
Conference – 2003 (WRC 2003)**

That States,

a)    assign high priority to the aeronautical spectrum management;

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

c)    ensure, to the extent possible, aviation representatives are included in States delegation to the Asia-Pacific Telecommunity (APT) Conference Preparatory Group meetings and at WRC-2003; and

d)     ICAO convene a meeting of designated contact persons before the end of 2002 or early 2003 to review the result of the fourth APT Preparatory Group meeting and to finalize input to the fifth and the last APT Preparatory Group meeting for WRC 2003.

e)     publish the list of contact persons at the ICAO APAC webpage.

2.2.69          Australia informed the meeting of the action taken by them for the preparation of WRC 2003 and identified critical areas to be considered and suggested that State should consider various aspects such as requirements for radionavigation and other services in the 5 GHz band and adopt positions to ensure the protection of this spectrum for aviation use; protection of incumbent DME and aviation radar systems as proposed in the RNSS sharing studies while ensuring judicious selection of sharing criteria; and participation and support at WRC to aeronautical spectrum issues through national and international fora including the APT WRC Preparatory Group Meetings APG-2003 and WRC-2003.

### Runway Incursion

2.2.70          IATA stated that the band 5091 to 5150 MHz which at the present time is allocated to ARNS and up-links to non-geostationery satellite. A requirement for Runway Incursion Prevention (RIP) system had already been identified.  Further work was on going in the US and Japan.  It was, therefore, necessary that State take due note of the need to implement RIP system at busy International Airports in the future and refrain from allocating this band to non- ARNS usage.  States were requested to support the continued use of the 5 GHz band for emerging ARNS technologies at the WRC-2003.

### Protection of spectrum for Aeronautical Mobile (R) Satellite Service

2.2.71          The meeting was informed that an agenda has been proposed by Japan for WRC-2006 to discuss the need to ensure the availability and protection of spectrum for the aeronautical and mobile (R) satellite service in the band 1 545 – 1 555 MHz and 1 646.5 – 1 656.5 MHz.  The proposal for the agenda was presented at the fourth APT Preparatory Group Meeting held in Busan, Republic of Korea in August 2002.

2.2.72          It was noted that the proposal made by Japan is broadly in line with the elements of ICAO Position in WRC-2003 Agenda Item 7.2 which supports the inclusion in the agenda of WRC-2006 of an item addressing protection of AMS(R) S allocation in the 1.5-1.6 GHz band.

### Consideration of training needs for engineering/technical staff

2.2.73          States have a requirement to ensure competent and qualified persons to undertake key roles in the operation and maintenance of airways systems. Australia presented a paper, which discussed the development of competency standards for engineers, related professionals and engineering officers to enable the demonstration of competency against national and international benchmarks.

2.2.74          The programme has been developed based on National Generic Competency Standards published by the Institution of Engineers, Australia. The program provides for entry-level academic qualification, the achievement of competency in the workplace and the requirement for ongoing professional development. The competencies are being tailored to represent the particular skill required in the design, construction and operation of airways systems.

2.2.75        The Asia-Pacific Economic Cooperation (APEC) Engineer Register is an international scheme, which has been developed in cooperation with the engineering councils and institutions of the Economies. The scheme also incorporates entry-level academic qualification, the achievement of competency in the workplace and the requirement for ongoing professional development. The APEC Engineer Register is currently operating in the economies of New Zealand, Australia, Malaysia, Hong Kong China, Japan, Republic of Korea and Canada. Other Economies are participating in the project but have not as yet had their assessment statements approved.

2.2.76        A third schedule is the Engineers Mobility Forum (EMF). The EMF is similar in nature to the Australian national and APEC schemes. The recognition of competency under one program is recognized by the other programs.

2.2.77        The States were requested to consider the development of competency criteria for engineers, related professionals and engineering officer engaged in the design, operation and maintenance of airways systems. Such competency criteria could be implemented through the APEC scheme. Once in place, it would provide assurance that appropriately qualified and competent persons were engaged either on a local basis or across State boundaries.

### Amendment to the CNS Part of ASIA/PAC Basic ANP and FASID

2.2.78        The meeting noted the proposed changes to be incorporated into Part IV of the Basic ANP and the introduction to the Part IV of FASID. Accordingly, the meeting endorsed the following conclusion:

### Conclusion 13/22 - ATN related procedures for Basic ANP and FASID

That, the amendments proposed to the regional procedures contained in the Part IV-CNS of the ASIA/PAC Basic ANP and FASID relating to ATN materials provided in Appendix H and Appendix I, respectively to be report on Agenda Item 2.2 be adopted and incorporated in the respective documents in accordance with the established procedure.

### Notification of Differences to Annexes and Review Process

2.2.79        The meeting noted with interest a good practice in reviewing States' compliance with ICAO Annexes. Contracting States are obligated by Article 38 of the Convention to notify ICAO of any differences between their national regulations and practices and the International Standards contained in the Annexes to the Convention. The ICAO Universal Safety Oversight Audits have considered States' compliance with the selected Annexes in light of the differences notified by the State. In numerous cases unnotified differences have been identified and reported as part of the audit programme. Australian, aware of its obligation, has completed a full review of compliance with all Annexes. The identified differences have been forwarded to ICAO and also published in the Australian AIP.

2.2.80        The ICAO Annexes contain SARPs that may go across several organisations in support of the provision of aviation related services. In order to address compliance to the SARPs, the involvement of each of these organizations and coordination was required. Details of each SARP were put into a database, for ease of comment input and management.

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2.2.81          Australia has a database containing the SARPs and necessary information for the continued review and tracking for compliance.  Australia also offered that the database could be made available to assist States in the region for their use.

2.2.82          Australia expressed difficulties with the extraction of text from the web published documents. On occasions the parameters set when generating the PDF or DjVu prevents the extraction of text to copy and paste to the database. It is considered prudent to inhibit changes to the published documents but it is recommended that the parameter always be set to allow extraction of text and graphics.

2.2.83          Concern was also expressed regarding the need for an identification of changes to Annexes. State Letters with amendment proposals clearly identify changes by the shading and strikeout. In the final publication, changes are not identified by change-bar or similar marking. It is acknowledged that the use of change-bar or similar marking is not an ideal solution but it would readily identify the change. Perhaps an electronic version of a change bar could be optionally selected in web published documents.

2.2.84          States expressed difficulties in understanding requirements for filing differences due to various factors such as lack of clear understanding of the ICAO provision in relation to the national practice due to the language problem and complexity of ICAO provisions.  Views were also expressed that a Special Implementation Project (SIP) could be considered to provide some assistance to States in enabling them to review international standards with national regulations and also make use of the database for review of SARPs.

2.2.85          The meeting appreciated the practice followed by Australia in reviewing Annexes and considered that States should be encouraged to follow similar practice and adopted the following conclusion:

> **Conclusion 13/23  -  Process of review and Notification of difference**
>
> That, States establish a procedure with assistance of a database for review of SARPs and notification of differences to Annexes in a timely and comprehensive manner.

**Progress in implementation of the ISCS and SADIS**

2.2.86          The meeting was invited to review and update FASID Table MET 7 of the ASIA/PAC ANP concerning the implementation of the ISCS/2 and SADIS in the ASIA/PAC Region. It was agreed that FASID Table MET 7 would be amended as shown in Appendix J to the report.

2.2.87          The CNS/MET SG/6 reviewed the executive summary of the report of the seventh meeting of SADISOPSG, held at the ICAO MID Office, Cairo, 9 to 13 June 2002. The meeting noted with appreciation the implementation by the UK of an internet ftp back-up service available to States and users authorized to receive SADIS or ISCS broadcasts at no additional cost to States.  All user States in the region will be advised by UK how to obtain a password and how to use the ftp service. In addition a "premium" http service was planned to become operational by the end of 2002.

2.2.88          The meeting was advised that  information to States would be distributed through ICAO on the need for software upgrade by SADIS users in order to be able to display SIGWX forecasts in the BUFR code. Information on the types of SADIS receiving stations which have become or will soon become obsolete would be provided as well.

### SADIS Strategic Assessment Tables

2.2.89          The meeting reviewed the SADIS Strategic Assessment Tables, as drafted by the CNS/MET SG/6, and agreed with entries regarding the current and projected data volumes for 2002-2006.  The significant increase (49%) in OPMET data volumes since 2001 was noted.  It has been proposed that the Volcanic Ash (FV) and Tropical Cyclone (FK) advisory messages be included in the tables since their number has been growing. The following conclusion was formulated by the meeting:

### Conclusion 13/24 -  SADIS strategic assessment tables

That,

a)      the ASIA/PAC SADIS strategic assessment tables, as given in Appendix K to the report, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements; and

b)      the SADISOPSG be invited to consider amendment to the format of the SADIS Strategic Assessment Tables so as to include explicitly the requirements for the Volcanic Ash (FV) and Tropical Cyclone (FK) advisory messages.

### Replacement of ISCS STAR4 workstation

2.2.90          The meeting noted the information provided to the CNS/MET SG/6 by the United States on the plans for replacement of the STAR4 workstation used by the majority of ISCS user States in the region.  The replacement was necessary due to the fact that the STAR4 manufacturer was no longer in business, and software upgrades were no longer supported.  It was determined that the STAR4 had no capability to produce SIGWX graphics and to handle BUFR code, as well as to produce wind/temperature charts in polar stereographic projection. It was stressed that the States that were currently using this workstation must replace it by early 2004 in order to be capable of producing all graphical products required by the Annex 3 SARPs by late 2004 when both WAFCs are scheduled to terminate issuance of products in T4 format.

2.2.91          As a result of the above, WAFC Washington has decided to delay removal of the wind/temperature charts from the ISCS broadcast originally scheduled for mid 2003, and to remove both wind/temperature and SIGWX charts simultaneously in late 2004.  It was emphasized that the replacement of STAR4 workstations with current technology WAFS workstations would improve significantly the capability to process WAFS data received through ISCS and would allow for production of products tailored to individual users such as charts covering specific routes rather than the standard ICAO Areas. The meeting was advised that STAR4 replacement WAFS workstation funding may be made available from the United States on a case-by-case basis through the WMO VCP.

### Transition to the final phase of WAFS

2.2.92          A comprehensive analysis of the status of the transition to the final phase of WAFS in the ASIA/PAC Region has been carried out by the CNS/MET SG/6.  The following issues have been addressed:

2.2.92.1          **Lead time of SIGWX chart broadcasts.**  To ensure that SIGWX charts were available in time to support long haul flights between Asia and Europe WAFC London planned to increase the lead-time by 3 hours and to make available SIGWX charts about 13 hours before validity time.  It was expected the completion of this task will take place in November 2002, but this was still to be confirmed by the UK.

2.2.92.2        **SIGWX charts area.** With regard to the follow-up action on the APANPIRG conclusions 12/23, the CNS/MET SG expressed its appreciation to UK for the prompt action on extending the WAFS chart area "E" by 5 degrees to the north (viz. from 40°N to 45°N) to cover the northern part of Japan that became operational in November 2001. The meeting addressed also the need for a new SIGWX chart area "L" for the new polar routes over the North Pole.

2.2.92.3        **WAFS backup arrangements.** It was noted that the internet based ftp back-up of the SADIS broadcast became operational in May 2002. WAFC Washington made all WAFS charts from both centres available on internet but it was noted that this service was not yet considered operational as the provision of aviation meteorological data was subject to the internet policy being developed by ICAO. In regard to the back-up between the two WAFCs, the meeting was informed that they were able to provide back-up of all SWH charts. The CNS/MET SG/6 meeting was satisfied with the back-up arrangements implemented and agreed to consider this task as completed in the ASIA/PAC WAFS Transition Plan and Procedures.

2.2.92.4        **Medium-level SIGWX charts.** The meeting noted the IATA position on this subject that there was no operational requirement for additional SWM charts in the region.

2.2.92.5        **WAFS products for turbulence and icing forecast.** The CNS/MET SG/6 considered the need for development of specialized WAFS products for turbulence and icing for the Asia and Pacific Regions. It was noted that this issue would be discussed at the MET Divisional Meeting in September 2002. IATA expressed the view that these products would be very useful but it was likely they would be global products rather than regional. The issue was also to be addressed by the IATA MET Group in order to specify better the operational requirements.

### Migration to BUFR

2.2.93        The meeting noted the in depth discussion held at the CNS/MET SG/6 on the transition of the SIGWX charts from the pictorial (T4) format to BUFR code products. This was considered the most important outstanding issue for the successful implementation of the final phase of the WAFS. It was recognized that the SADIS users would need software upgrade in order to decode and visualize BUFR products. For ISCS users transition to BUFR would be in parallel with the replacement of the existing STAR4 workstations used by the majority of the ISCS users.

2.2.94        It was noted that due to the different workstations being used to process WAFS products it would not be possible to develop a single software for operational conversion of BUFR products into SIGWX charts. With this clarification the CNS/MET SG/6 meeting agreed to remove the task of "provision to States in the Region of suitable BUFR decoding software" from ASIA/PAC WAFS Transition Plan and Procedures.

2.2.95        Concern was expressed about the standardization of the future SIGWX products based on BUFR code. In this regard the meeting noted the IATA requirement that all SIGWX information, as required by ICAO Annex 3, must be present on SIGWX charts in accordance with the SARPs. IATA was not concerned if there were minor variations in presentation format such as color.

2.2.96        As regards to the provision of SWM information in BUFR it was clarified that the United States would provide SWM in BUFR, quality controlled by a forecaster, only for those limited geographical areas identified in Regional ANPs; the UK would provide global SWM in BUFR, but would only quality control the data over those limited geographical areas identified in Regional ANPs. It was noted that the non-quality controlled SWM forecasts were not subject to a stated aeronautical requirement and would therefore be provided outside WAFS.

2.2.97          Based on the information provided by UK and United States and taking into account that the States should be prepared to handle WAFS data, as of November 2004, in the GRIB and BUFR code forms, it was agreed that the States should be requested to provide information on their plans for upgrading or replacing the equipment used for receiving and processing the WAFS data through the SADIS and ISCS.  In this context, the following conclusion was formulated:

**Conclusion 13/25 -  Regional survey on the States' plans for transition to GRIB and BUFR coded WAFS products**

That, ICAO carry out a regional survey to assess the plans of the SADIS and ISCS user States in the ASIA/PAC Regions to upgrade/replace their workstations and software used for handling WAFS data, and the dates the new equipment and the software capability to decode and display GRIB and BUFR data is expected to be operational.

*Note. - The survey would be undertaken by the WAFS/T TF of the CNS/MET SG*

**Training in GRIB and BUFR**

2.2.98          The meeting was informed that as a follow up of the APANPIRG Conclusion 12/27 ICAO coordinated with the UK and WMO that a GRIB Training Workshop for the ASIA/PAC SADIS user States would be held in November 2002 at the ICAO Regional Office, Bangkok.

2.2.99          As regards to BUFR it was expected that nearly all States would need training. The meeting was informed that the UK planned to provide training events in all regions concerned, whilst the United States decided most of the training to be done by the vendors of the new WAFS workstations. However, if this training was considered insufficient, the United States planned to provide financial support through the WMO VCP to the States that may need it.

2.2.100          Taking into account the short time left to the target date of the final phase of WAFS the meeting felt that the training in BUFR should be considered as a high priority task. The meeting agreed that the SADIS Provider State be requested to arrange training in the Asia/Pacific Region in co-ordination with ICAO and WMO as early as possible. The UK was on the opinion that the BUFR training would be done separately of the GRIB training due to the fact that the BUFR software for the SADIS workstations had not yet been completed.

2.2.101          Further co-ordination between ICAO and the UK took place on the above subject after the CNS/MET SG/6 meeting. It has been clarified that the advancement in the development of the BUFR modules for the SADIS workstations by the software vendors would make it possible to provide BUFR training along with the GRIB training during the planned Asia/Pacific Training workshop to be held from 18 to 20 November 2002 at the ICAO Bangkok Office. The meeting agreed that the combined GRIB-BUFR workshop would be more efficient in terms of costs to the States and would ensure timely preparation for the implementation of the binary codes.

**ASIA/PAC WAFS Transition Plan and Procedures**

2.2.102          The meeting reviewed the ASIA/PAC Transition Plan and Procedures as drafted by the CNS/MET SG/6. It was noted that the Plan has been updated to reflect the new developments in the WAFS. Changes were also made regarding the timetable for achieving the final phase of WAFS, based on the information provided by the two WAFCs. The meeting adopted the Plan and formulated the following conclusion:

**Conclusion 13/26  -  Amended ASIA/PAC WAFS Transition Plan
and Procedures**

That, the ASIA/PAC WAFS Transition Plan and Procedures be amended as shown in Appendix L to the report to reflect the changes in the plans and schedules of the two WAFCs in transition to the final phase of WAFS.

**Future Work Programme for the WAFS Transition Task Force**

2.2.103        The meeting noted appreciation expressed by the CNS/MET SG/6 to the WAFS Transition Task Force for the work done and re-iterated the requirements for the Task Force to continue its work until the final phase of the WAFS is implemented in the Asia/Pacific Region. The meeting adopted the updated terms of reference and work programme of the Task Force and formulated the following decision:

**Decision 13/27  -  TORs of ASIA/PAC WAFS Transition Task Force**

That, the TORs and Work Programme for the ASIA/PAC WAFS Transition Task Force be agreed as given in Appendix M to this report.

**Exchange of OPMET information**

2.2.104        The CNS/MET SG/6 addressed a number of issues related to the OPMET exchange in the Asia/Pacific region and agreed that they needed to be addressed as a high priority matter. It was recalled that the ROBEX scheme was established 30 years ago anb has been successfully applied in the Region throughout the years. A major improvement of the scheme was the establishment of the five regional OPMET data banks: Bangkok, Brisbane, Nadi, Singapore and Tokyo. However, the current trends in the global OPMET exchange required that the scheme be reviewed and updated in order to become adequate to the new communication environment and to overcome the existing deficiencies.

2.2.105        The meeting agreed on the need for extensive changes in the ROBEX scheme and other OPMET regional and interregional exchanges as well as for updating of the regional guidance materials, i.e., the ROBEX Handbook and the ASIA/PAC Regional Interface Control Document (ICD) OPMET Data Bank Access Procedures.  This should be done with account to a number of factors like the increased capacity of communication links, availability of satellite broadcast of OPMET data, new requirements for interregional exchange and for monitoring and management of the OPMET data exchange.

2.2.106        Based on the expected volume and complexity of the work to be done on the tasks above the it was proposed to establish under the CNS/MET SG and OPMET Exchange Task Force (OPMET/E TF) with the terms of reference as given in Appendix N.  This proposal was supported by the meeting and the following decision was formulated:

**Decision 13/28  –    ASIA/PAC OPMET Exchange Task Force
(OPMET/E TF)**

That, an OPMET Exchange Task Force (OPMET/E TF) be established with the terms of reference, work programme and composition as given in the Appendix N to the Report.

2.2.107        It was stressed that a close working relationship with the similar groups from other ICAO Regions should be established in order to plan and implement a seamless OPMET exchange between the Regions according to the stated requirements. In particular, the SADIS Gateway and the EUR Bulletin Management Group (BMG) should be requested to provide assistance based on the rich experience in the OPMET exchange management in the EUR Region.

### SIGMET in VOLMET

2.2.108        The meeting noted the discussion during the CNS/MET SG/6 on the possible approaches to include the SIGMET information in VOLMET and the corresponding difficulties. It was emphasized that the introduction of D-VOLMET through a VHF data link would be the most appropriate way to overcome the capacity problem of the voice VOLMET.  The meeting recalled that this issue has been discussed several times during the last few years and has also been addressed by the ATS/AIS/SAR SG without specific recommendation. Taking into account the existing requirements for the inclusion of the SIGMET in VOLMET and the possible technical solutions the meeting agreed that the use of the D-VOLMET would eliminate the capacity problem of the voice-VOLMET and formulated the following conclusion:

### Conclusion 13/29 -  Inclusion of SIGMET in VOLMET

That, States be encouraged to fully implement D-VOLMET to permit suitably equipped aircraft to receive timely SIGMET information amongst other requisite meteorological information.

### Uplink/Downlink of OPMET information

2.2.109        The meeting noted the information about the experience of New Zealand in handling aircraft reports by means of ADS and AMDAR systems (a WMO system not subject to a stated aeronautical requirement).  The meteorological components of the ADS reports have been stripped out and sent to the meteorological service provider (MetService).  The MetService has been forwarding the ADS and manual aircraft reports in the same routine hourly bulletins to the WAFCs via the WMO Global Telecommunications System (GTS).  It was reported that currently on average over 300 aircraft reports were received within any given 24 hours and about 150 of these reports were derived from ADS data streams.

2.2.110        The meeting was also informed about further trials in early 2002 at Hong Kong, China with ADS and CPDLC datalinks for automatic weather reporting. During these trials, 57 in-flight weather reports from B777 aircraft and 18 reports from Airbus aircraft were received and analyzed by the Hong Kong Observatory.  Analysis of the quality of the meteorological data received was presented to the CNS/MET SG/6. Concern was expressed on the additional telecommunication charges incurred when using FANS-1/A systems and airline company datalinks. The meeting noted that the Hong Kong, China has been exploring the use of SSR Mode-S as alternative datalink for weather reporting.

2.2.111        The CNS/MET SG/6 meeting felt that further information should be made available on the plans of the States to use the datalink applications and to forward the data to the WAFCs since the uplink/downlink of meteorological information was a very important part of the MET component of the CNS/ATM concept. The meeting agreed on the proposal by the CNS/MET SG/6 that it was necessary to carry out a regional survey on this subject and formulated the following conclusion:

**Conclusion 13/30 -  Regional survey on the current status and future plans of States to process the MET component of ADS Reports**

That, ICAO carry out a regional survey to assess the current status and future plans of the States in the ASIA/PAC Regions to process the MET component of the ADS message and forward the data to the WAFCs and to assess if the data is quality controlled.

*Note. - The survey would be undertaken by the METATM TF of the CNS/MET SG*

**Implementation of International Airway Volcano Watch (IAVW)**

2.2.112        The meeting was informed on the follow up actions taken on the APANPIRG conclusions 12/30 and 12/32. The proposals made by APANPIRG/12 for a new requirement for 24-hour operations of the Volcanic Ash Advisory Centres (VAACs) and for improvement of the format of the graphical volcanic ash advisories were considered by the ICAO Secretariat and included in the draft proposal for Amendment 73 to Annex 3.

2.2.113        It was recalled that the APANPIRG/12 conclusion 12/31 called for changes in the areas of responsibility of VAACs. The FASID Table MET 3, Part II, renamed as FASID Table MET 3B, was amended accordingly and included in proposed amendment of the ICAO Asia/PAC FASID, Serial No. APAC 02/5-MET that was sent for comments to States.  The proposal for the extension of the area of responsibility of the Wellington VAAC south of 60ºS to the Pole has been commented by New Zealand. While it was the intention of New Zealand to endeavour to fulfil its assigned VAAC responsibilities over this area, the maintaining an effective advisory service south of 60ºS was considered not currently feasible.

2.2.114        The meeting expressed concern about the delay in the action on APANPIRG conclusion 11/33, calling for a Special Implementation Project (SIP) for Asia/Pacific Region with an objective to identify and propose solutions to deficiencies related to the implementation of the SIGMET messages for volcanic ash clouds.  The ICAO Secretariat advised that the proposal for this SIP had been developed and submitted to the ICAO Headquarters in 2001, however, the Council Standing Group on Implementation did not approve it for the year 2002 due to the high budget of the project.  Therefore the SIP proposal was to be revised and submitted again for approval for 2003.

2.2.115        The meeting noted with appreciation informations presented by Australia and Japan on the actions taken to improve the operational performance of the Darwin and Tokyo VAACs and hence the IAVW.

2.2.116        The meeting was advised on a new product issued by Tokyo VAAC for low-level volcanic ash events.  It was clarified that Tokyo VAAC has been issuing VA advisories for international air navigation only when a volcanic ash plume raised above 5000 m (16500 ft) and the low-level VA advisories have been issued for the domestic traffic only. The CNS/MET SG/6 meeting agreed that this operational practice was not in accordance with the Annex 3 provisions and that advisory information was required internationally notwithstanding the height of the ash plume. Japan took note on the meeting's advice.

2.2.117        The meeting noted the appreciation expressed by the CNS/MET SG/6 on the work done by the "ad-hoc" Volcanic Ash warning WG, that was created as early as 1994. Taking into account the importance of the tasks, related to the IAVW for the Region, it was proposed to establish under the CNS/MET SG a Volcanic ash Task Force to replace the Volcanic ash ad-hoc WG. Having agreed on this proposal the meeting formulated the following decision:

### Decision 13/31 –    ASIA/PAC Volcanic ash Task Force (VA TF)

That, a Volcanic ash Task Force (VA TF) be established with terms of reference and work programme as given in the Appendix O to the Report.

2.2.118        The observer from IATA supported the idea that Indonesia and Philippines be invited to participate in this TF. He also stressed on the importance of the volcanic ash warnings and on the need for better understanding of this information by the ATS units that are responsible for its timely and correct delivery to the pilots.

### Quality Assurance/Performance Monitoring in MET Field

2.2.119        The CNS/MET SG/6 meeting included this issue for the first time in its agenda. Information on the State's activities in quality assurance (QA) was presented showed that Australia, Hong Kong, China, New Zealand, Singapore, Malaysia, UK and the United States have already introduced or were on a development stage of introducing of quality systems for their aviation MET Services. However, it was recognized that the majority of the States in the Region have not yet started action on this subject.

2.2.120        As a specific part of QA system in the MET field the meeting agreed that TAF verification was very important element of the quality management and expressed concern on the lack of a unified TAF verification methodology. IATA stressed that TAF verification results when provided to the users would contribute to the operational risk analysis. The meeting was informed also about TAF verification activities by WMO Commission of Aeronautical Meteorology (CAeM), which is the body responsible for developing the methods and techniques to be used in TAF verification. The appropriateness of the Attachment E of Annex 3, Operationally Desirable Accuracy of Forecasts, for the purposes of the forecast verification was also addressed. The meeting felt that this table has not been reviewed for a long period and that it should be updated in view of the introduction of the QA requirements in the Annex 3. It was noted that this issue has already been considered by the ICAO Secretariat within the ANC Task No. MET-0101: Aeronautical MET data representation and codes.

2.2.121        The meeting was informed about the first MET Quality Assurance Workshop for the EUR Region that was held in 2002.  The workshop was organized by ICAO with the support of Eurocontrol as a part of the work programme of the Meteorology Group of the EANPG.  The meeting agreed that QA training for MET personnel was a very important step in the implementation of the new provisions of Annex 3 and formulated the following conclusion:

### Conclusion 13/32 –  QA MET seminar for ASIA/PAC Region

That ICAO, in coordination with WMO, organizes a seminar on the quality assurance in the provision of meteorological services to aviation in the ASIA/PAC Region during 2003.

2.2.122        In connection with the above training the ICAO Secretariat advised that it was planned that WMO would be included on a permanent basis in the invitation list for the CNS/MET SG meetings in order to provide basis for a better coordination and collaboration on the matters of common interest and in particular on training-related issues.

**Tropical Cyclone advisories and SIGMETs**

2.2.123        It was recalled that the APANPIRG/12 adopted conclusion 12/26, that the ASIA/PAC TCACs Honolulu, Miami, New Delhi, Darwin, Nadi and Tokyo use the "FK" data designator in the TC advisories and ensure the routing of these bulletins to London for uplink via SADIS. As a follow-up of this conclusion ICAO addressed the issue through WMO Tropical Cyclone groups in the ASIA/PAC Region. However, the Secretariat has been notified that only Tokyo TCAC has been using the "FK" data designator. The meeting noted with appreciation the information provided by the United States that the TCACs Miami and Honolulu have recently implemented the "FK" designator for TC advisories. IATA pointed out that the advisories from TCAC Tokyo, although with a correct data type designator FK, differ significantly to the Annex 3 standard format.

2.2.124        The meeting was informed on the concern expressed by the WMO Tropical cyclone groups in regard to the lack of 6-hour forecast for the position of the TC center in the TC advisories. The lack of information about the maximum surface wind in the outlook part of the TC SIGMETs was also addressed by the WMO members. The CNS/MET SG/6 felt that these issues needed to be addressed further and agreed that the tropical cyclone related issues would be discussed under a separate agenda item at the next CNS/MET SG meeting.

**Report on the progress of the METATM Task Force on CNS/ATM**

2.2.125        The main findings of this TF so far were that information required in support of ATM could essentially be classified into three types of information  - (i) planning, (ii) en-route, and (iii) terminal information. These requirements were broadly covered by Annex 3, however most states were supplementing the Annex 3 products with more detailed information tailored to specific user needs, as well as providing information such as satellite and weather radar data to ATM units. The Task Force has found the requirement for MET information was highly dependent on the ATM systems and procedures in place, which vary widely from State to State. The final report on the subject would be presented at the CNS/MET SG/7.

**Terms of Reference and subject Tasks List of the CNS/MET Sub-Group**

2.2.126        The meeting reviewed the Terms of Reference (TOR) of the CNS/MET Sub-Group. To be consistent with new definition of deficiency which was approved by the ICAO Council, the meeting proposed to delete the words "shortcoming and" from the TOR.  The meeting reviewed Subject/Tasks List and note that of the 38 Tasks 28 Tasks were completed.  The subject/Tasks List was updated to indicate the progress of work accomplished by the Sub-Group.

2.2.127        An updated TOR and the Subject/Tasks List are provided in Appendix P to the report on Agenda Item 2.2.  The meeting adopted the proposed amendments to the TOR and Tasks List and reached the following decision.

**Decision 13/33 -        Amendments to the Terms of Reference and the
                            Subject/Tasks List of the CNS/MET Sub-Group**

That, the term of reference and subject/Tasks List of the CNS/MET Sub-Group presented in Appendix P to the report on Agenda Item 2.2 be adopted.

**TABLE CNS 1A - AFTN PLAN**

*Explanation of the Table*

*Column*

1   The AFS station or facility of individual State, listed alphabetically.  Each circuit appears twice in the Table.

2   Category of circuit

   M  -  Main trunk circuit connecting Main AFTN communication centres.
   T - Tributary circuit connecting Main AFTN communication centre and AFTN stations to relay or retransmit AFTN traffic.
   S - AFTN circuit which is used to transmit and receive AFTN traffic to and from a Main or Tributary AFTN communication centre directly connected to it and does not relay AFTN traffic except for the purpose of serving national station(s).

3 and 7   Type of circuit provided:

   HF   High frequency radio teletype
   LTT/a  landline teletypewriter, analogue (eg. cable, microwave)
   LTT/d   landline teletypewriter, digital (eg. cable, microwave)
   LDD/a landline data circuit, analogue (eg. cable, microwave)
   LDD/d landline data circuit, digital (eg. cable, microwave)
   SAT/n/a/d satellite link, the number indicates the number of hops in the circuit:  Also use/a for analogue or/d for digital appropriate to the tail circuit.

4 and 8   Circuit signalling speed, current or planned.

5 and 9   Circuit protocols, current or planned.

6 and 10   Data transfer code (syntax), current or planned.

   ITA-2   International Telegraph Alphabet No. 2 (Baudot code).
   IA-5   International Alphabet No. 5 (ICAO 7 - unit code).
   CBI   Code and Byte Independent (ATN compliant).

11   Target date of implementation

12   Remarks

   Note 1:  Circuit is required for alternate routing and for national routing for international traffic.
   Note 2:  Requirements exist for speech and data (S + DX) communication.

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **AMERICAN SAMOA** PAGO PAGO - S/NSTU | | | | | | | | | | | |
| United States/KSLC | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| **AUSTRALIA** BRISBANE - M/YBBB | | | | | | | | | | | |
| Christchurch/NZCH | T | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Honiara/AGGG | S | | | | | LTT | 75 baud | None | IA-5 | | internet as interim measure |
| Jakarta/WIII | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | Note 1,2 |
| Mauritius/FIMP | S | LTT | 50 baud | None | ITA-2 | | | | | | |
| Nadi/NFFN | M | LDD/d | 2400 bps | IA-5 | IA-5 | | | | | | Note 2 |
| Nauru/ANAU | S | | | | | SAT/d | 2400 bps | X.25 | IA-5 | | internet as interim measure |
| Port Moresby/AYPM | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | Note 2 |
| Port Vila/NVVV | S | LTT | 300 baud | None | ITA-2 | | | | | | SITA |
| Santiago/SCSC | M | | | | | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | Current routing |
| Singapore/WSSS | M | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| United States/KSLC | M | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | |
| **BANGLADESH** DHAKA - S/VGZR | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 300 baud | None | IA-5 | | | | | | |
| Kolkata/VECC | S | HF RTT | 50 baud | None | ITA-2 | LTT | 2400 bps | None | IA-5 | 12/02 | Routing to be proposed via VTBB/VABB |
| **BHUTAN** PARO - S/VQPR | | | | | | | | | | | |
| Mumbai/VABB | S | | | | | SAT/a | 50 baud | None | ITA-2 | 12/02 | Dial-up |
| **BRUNEI DARUSSALAM** BRUNEI - S/WBSB | | | | | | | | | | | |
| Singapore/WSSS | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Kuala Lumpur/WMKK | S | LTT | 75 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | Note 1,2 |
| **CAMBODIA** PHNOM PENH - S/VDPP | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 300 baud | None | ITA-2 | | | | | | Note 2 |
| **CHINA** BEIJING - M/ZBBB | | | | | | | | | | | |
| Guangzhou/ZGGG | S | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Karachi/OPKC | M | LTT | 50 baud | None | ITA-2 | LDD/a | 300 baud | None | IA-5 | 05/03 | |
| Kathmandu/VNKT | S | SAT/d | 300 baud | None | IA-5 | | | | | | |
| Russian Fedration/UHHH | M | SAT/d | 2400 bps | None | IA-5 | | | | | | via Khabarovsk |
| Pyongyang/ZKKK | S | SAT/d | 300 baud | None | IA-5 | | | | | | |
| Seoul/RKSS | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | AMSS Connection 12/01 |
| Tokyo/RJAA | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Ulaan Baatar/ZMUB | S | SAT/d | 300 baud | None | IA-5 | | | | | | Note 2 |
| Yangon/VYYY | S | | | | | SAT/d | 300 baud | None | IA-5 | 12/02 | |

... 

# TABLE  CNS 1A -  AFTN PLAN

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| GUANGZHOU-M/ZGGG | | | | | | | | | | | |
| Beijing/ZBBB | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Hanoi/VVNB | S | | | | | SAT/d | 2400 bps | None | IA-5 | 06/03 | |
| Hong Kong/VHHH | M | LDD/d | 2400 bps | None | IA-5 | | | | | | Note 1 |
| Macau/VMMC | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| Sanya/ZJSY | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| SANYA-S/ZJSY | | | | | | | | | | | |
| Guangzhou/ZGGG | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| Hong Kong/VHHH | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| TAIBEI - S/RCTP | | | | | | | | | | | |
| Hong Kong/VHHH | S | LDD/d | 4800 bps | X.25 | IA-5 | | | | | | |
| Manila/RPLL | S | LTT | 75 baud | None | ITA-2 | LDD/d | 300 baud | None | ITA-2 | 12/02 | Note 1, 2 |
| Naha/ROAH | S | LDD/d | 4800 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **HONG KONG, CHINA** | | | | | | | | | | | |
| HONG KONG-M/VHHH | | | | | | | | | | | |
| Bangkok/VTBB | M | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Guangzhou/ZGGG | S | LDD/d | 2400 bps | None | IA-5 | | | | | | Note 1 |
| Ho-Chi-Minh/VVTS | S | SAT/d | 2400 bps | None | IA-5 | | | | | | |
| Macau/VMMC | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| Manila/RPLL | S | LDD/d | 300 baud | None | ITA-2 | | | | | | |
| Sanya/ZJSY | S | LDD/d | 2400 bps | None | IA-5 | | | | | | Note 1 |
| Taibei/RCTP | S | LDD/d | 4800 bps | X.25 | IA-5 | | | | | | |
| Tokyo/RJAA | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **MACAU, CHINA** | | | | | | | | | | | |
| MACAU - S/VMMC | | | | | | | | | | | |
| Hong Kong/VHHH | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| Guangzhou/ZGGG | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **COOK ISLAND** | | | | | | | | | | | |
| RAROTONGA-S/NCRG | | | | | | | | | | | |
| Christchurch/NZCH | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **DPR KOREA** | | | | | | | | | | | |
| PYONGYANG-S/ZKKK | | | | | | | | | | | |
| Beijing/ZBBB | S | SAT/d | 300 baud | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **FIJI** | | | | | | | | | | | |
| NADI - M/NFFN | | | | | | | | | | | |
| Brisbane/YBBB | M | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Christchurch/NZCH | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Funafuti/NGFU | S | | | | | LDD/d | 2400 bps | None | IA-5 | | dial-up |
| Noumea/NWWW | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Tarawa/NGTT | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| United States/KSLC | MS | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Wallis Is./NLWW | S | | | | | LDD/a | 2400 bps | None | IA-5 | when traffic justifies | Current routing via Noumea |
| **FRENCH POLYNESIA (FRANCE)** PAPEETE/NTAA | | | | | | | | | | | |
| Christchurch/NZCH | S | LDD/d | 2400 bps | X.24 | IA-5 | | | | | | |
| **INDIA** MUMBAI - M/VABB | | | | | | | | | | | |
| Bangkok/VTBB | M | SAT/a | 2400 bps | X.25 | IA-5 | | | | | | |
| Kolkata/VECC | S | LTT | 2x50 | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| Colombo/VCCC | M | SAT/a | 50 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| Karachi/OPKC | M | SAT/a | 200 baud | None | ITA-2 | | | | | | Note 2 |
| Kathmandu/VNKT | S | SAT/a | 50 baud | None | ITA-2 | | | | | | |
| Muscat Seeb/OOMS | M | SAT/a | 300 baud | None | ITA-2 | SAT | 2400 bps | X.25 | IA-5 | 12/02 | Note 2 |
| Nairobi/HKNC | M | SAT/a | 50 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| Paro/VQPR | S | | | | | SAT/a | 50 baud | None | ITA-2 | 12/02 | Dial-up |
| KOLKATA - S/VECC | | | | | | | | | | | |
| Dhaka/VGZR | S | RTT | 50 baud | None | ITA-2 | LTT | 2400 bps | None | ITA-2 | 12/02 | Routing to be proposed via VTBB/VABB |
| Mumbai/VABB | S | LTT | 2x50 | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| DELHI - S/VIDD | | | | | | | | | | | |
| Tashkent/UTTT | S | SAT/a | 50 baud | None | ITA-2 | | | | | | |
| CHENNAI - S/VOMM | | | | | | | | | | | |
| Kuala Lumpur/WMKK | S | LTT | 50 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | Note 1, 2 |
| **INDONESIA** JAKARTA - S/WIII | | | | | | | | | | | |
| Brisbane/YBBB | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | Note1,2 |
| Singapore/WSSS | S | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| **JAPAN** TOKYO - M/RJAA | | | | | | | | | | | |
| Beijing/ZBBB | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Hong Kong/VHHH | M | LDD/a | 9600 bps | X.25 | IA-5 | | | | | | |
| Russian Federation/UHHH | M | LTT | 2400 bps | None | IA-5 | | | | | | |
| Russian Federation/UUUU | M | LTT | 200 baud | None | IA-5 | LDD | 2400 bps | None | IA-5 | 12/03 | (Moscow) |
| Naha/ROAH | S | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Seoul/RKSS | S | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | Note 2 |
| Singapore/WSSS | M | LDD/a | 1200 bps | COP-B | IA-5 | LDD/d | 9600 bps | X.25 | IA-5 | 12/02 | |
| United States/KSLC | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| NAHA - S/ROAH | | | | | | | | | | | |
| Taibei/RCTP | S | LDD/d | 4800 bps | X.25 | IA-5 | | | | | | |
| Tokyo/RJAA | S | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **KIRIBATI** | | | | | | | | | | | |
| TARAWA - S/NGTT | | | | | | | | | | | |
| Nadi/NFFN | S | LDD/d | 2400 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **LAO PDR** | | | | | | | | | | | |
| VIENTIANE - S/VLVT | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 300 baud | COP-B | IA-5 | | | | | | Note 2 |
| Hanoi/VVNB | S | SAT/d | 9600 bps | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **MALAYSIA** | | | | | | | | | | | |
| KUALA LUMPUR-S/WMKK | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | Note 1, 2 |
| Brunei/WBSB | S | LTT | 75 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | Note 1, 2 |
| Chennai/VOMM | S | LTT | 50 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | Note 1, 2 |
| Singapore/WSSS | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | Note 2 |
| | | | | | | | | | | | |
| **MALDIVES** | | | | | | | | | | | |
| MALE - S/VRMM | | | | | | | | | | | |
| Colombo/VCCC | S | LTT | 50 baud | None | ITA-2 | SAT/d | 2400 bps | X.25 | IA-5 | 12/02 | Note 2 |
| | | | | | | | | | | | |
| **MARSHAL ISLAND** | | | | | | | | | | | |
| MAJURO - S/PKMJ | | | | | | | | | | | |
| United States/KSLC | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **MICRONESIA FEDERATED STATE OF** | | | | | | | | | | | |
| CHUUK - S/PTKK | | | | | | | | | | | |
| United States/KSLC | S | SAT/a | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| KOSRAE - S/PTSA | | | | | | | | | | | |
| United States/KSLC | S | SAT/a | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| PONAPEI - S/PTPN | | | | | | | | | | | |
| United States/KSLC | S | SAT/a | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| YAP - S/PTYA | | | | | | | | | | | |
| United States/KSLC | S | SAT/a | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **MONGOLIA** | | | | | | | | | | | |
| ULAANBAATAR-S/ZMUB | | | | | | | | | | | |
| Beijing/ZBBB | S | SAT/d | 300 baud | None | IA-5 | | | | | | Note 2 |
| Russian Federation/UIII | S | LTT | 50 baud | None | ITA-2 | | | | | | (Irkutsk) |
| | | | | | | | | | | | |
| **MYANMAR** | | | | | | | | | | | |
| YANGON - S/VYYY | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 300 baud | COP-B | IA-5 | | | | | | Note 2 |
| Beijing/ZBBB | S | | | | | SAT/d | 300 baud | None | IA-5 | 12/02 | Note 1,2 |

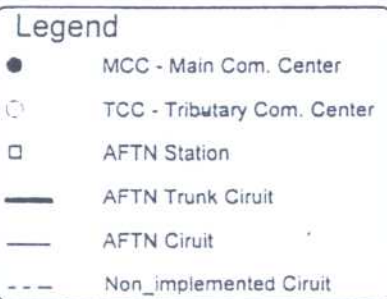| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **NAURU**<br>NAURU - S/ANAU<br>Brisbane/YBBB | S | | | | | SAT/d | 2400 bps | X.25 | IA-5 | | VIA Internet as interium measure |
| **NEPAL**<br>KATHMANDU - S/VNKT<br>Beijing/ZBBB<br>Mumbai/VABB | S<br>S | SAT/d<br>SAT/a | 300 baud<br>50 baud | None<br>None | IA-5<br>ITA-2 | | | | | | |
| **NEW CALEDONIA (FRANCE)**<br>NOUMEA - S/NWWW<br>Nadi/NFFN | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| **NEW ZEALAND**<br>CHRISTCHURCH-T/NZCH<br>Brisbane/YBBB<br>Nadi/NFFN<br>Niue/NIUE<br>Papeete/NTAA<br>Rarotonga/NCRG<br>Tongatapu/NFTF<br>USA/KSLC | T<br>S<br>S<br>S<br>S<br>S<br>S | LDD/d<br>LDD/d<br><br>SAT/d<br>LDD/d | 2400 bps<br>2400 bps<br><br>2400 bps<br>2400 bps | X.25<br>X.25<br><br>X.25<br>None | IA-5<br>IA-5<br><br>IA-5<br>IA-5 | <br><br><br><br><br>LDD/d<br>LDD/d | <br><br><br><br><br>2400 bps<br>9600 bps | <br><br><br><br><br>None<br>X.25 | <br><br><br><br><br>IA-5<br>IA-5 | <br><br><br><br><br>12/02<br>11/02 | Note 2<br>Note 1, 2<br>Currently by FAX |
| **NIUE IS**<br>NIUE - S/NIUE<br>Christchurch/NZCH | S | | | | | | | | | | Currently by FAX |
| **PAKISTAN**<br>KARACHI - M/OPKC<br>Beijing/ZBBB<br>Mumbai/VABB<br>Kabul/OAKB<br>Kuwait/OKBK | M<br>M<br>S<br>M | LTT<br>SAT/a<br>SAT/d<br>SAT/a | 50 baud<br>200 baud<br>300 baud<br>50 baud | None<br>None<br>None<br>None | ITA-2<br>ITA-2<br>IA-5<br>ITA-2 | LDD/a | 300 baud | None | IA-5 | 05/03 | Note 2<br>Note 2 |
| **PALAU**<br>KOROR - S/PTRO<br>United States/KSLC | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| **PAPUA NEW GUINEA**<br>PORT MORESBY-S/AYPM<br>Brisbane/YBBB | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | Note 2 |
| **PHILIPPINES**<br>MANILA - S/RPLL<br>Hong Kong/VHHH<br>Singapore/WSSS<br>Taibei/RCTP | S<br>S<br>S | LDD/d<br>LDD/d<br>LTT | 300 baud<br>300 baud<br>75 baud | None<br>None<br>None | ITA-2<br>ITA-2<br>ITA-2 | <br><br>LDD/d | <br><br>300 baud | <br><br>None | <br><br>ITA-2 | <br><br>12/02 | Note 2<br>Note 1, 2<br>Note 1, 2 |

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **REPUBLIC OF KOREA** | | | | | | | | | | | |
| SEOUL - S/RKSS | | | | | | | | | | | |
| Beijing/ZBBB | S | SAT/d | 9600 bps | X.25 | IA-5 | | | | | | AMSS Connection 12/01 |
| Tokyo/RJAA | S | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | Note 2 |
| | | | | | | | | | | | |
| **SAMOA** | | | | | | | | | | | |
| APIA - S/NSFA | | | | | | | | | | | |
| USA/KSLC | S | LDD/d | 2400 | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **SINGAPORE** | | | | | | | | | | | |
| SINGAPORE-M/WSSS | | | | | | | | | | | |
| Bahrain/OBBI | M | LTT | 200 baud | None | ITA-2 | SAT/a | 2400 bps | X.25 | IA-5 | 12/02 | |
| Bangkok/VTBB | M | LDD/d | 1200 bps | X.25 | IA-5 | | | | | | Note 2 |
| Brisbane/YBBB | M | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Brunei/WBSB | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Colombo/VCCC | M | LTT | 75 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| Ho-Chi-Minh/VVTS | S | SAT/a | 300 baud | None | IA-5 | | | | | | |
| Jakarta/WIII | S | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | Note 2 |
| Kuala Lumpur/WMKK | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | Note 1,2 |
| London/EGGG | M | LDD/d | 1200 bps | X.25 | IA-5 | | | | | | |
| Manila/RPLL | S | LDD/d | 300 baud | None | ITA-2 | | | | IA-5 | | |
| Tokyo/RJAA | M | LDD/a | 1200 bps | COP-B | IA-5 | LDD/d | 9600 bps | X.25 | IA-5 | 12/02 | |
| **SOLOMON IS.** | | | | | | | | | | | |
| HONIARA - S/AGGG | | | | | | | | | | | |
| Brisbane/YBBB | S | | | | | LTT | 75 baud | None | IA-5 | 12/02 | VIA Internet as intermedium measure |
| **SRI LANKA** | | | | | | | | | | | |
| COLOMBO - M/VCCC | | | | | | | | | | | |
| Mumbai/VABB | M | SAT/a | 50 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| Male/VRMM | S | LTT | 50 baud | None | ITA-2 | SAT/d | 2400 bps | X.25 | IA-5 | 12/02 | Note2 |
| Singapore/WSSS | M | LTT | 75 baud | None | ITA-2 | LDD/d | 2400 bps | X.25 | IA-5 | 12/02 | |
| **THAILAND** | | | | | | | | | | | |
| BANGKOK - M/VTBB | | | | | | | | | | | |
| Mumbai/VABB | M | SAT/a | 2400 bps | X.25 | IA-5 | | | | | | |
| Dhaka/VGZR | S | SAT/d | 300 baud | None | IA-5 | | | | | | |
| Ho-Chi-Minh/VVTS | S | SAT/d | 2400 bps | None | IA-5 | | | | | | |
| Hong Kong/VHHH | M | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Kuala Lumpur/WMKK | S | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | Note 1, 2 |
| Phnom Penh/VDPP | S | SAT/d | 300 baud | None | ITA-2 | | | | | | Note 2 |
| Rome/LIII | M | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Singapore/WSSS | M | LDD/d | 1200 bps | X.25 | IA-5 | | | | | | Note 2 |
| Vientiane/VLVT | S | SAT/d | 300 baud | COP-B | IA-5 | | | | | | |
| Yangon/VYYY | S | SAT/d | 300 baud | COP-B | IA-5 | | | | | | Note 2 |
| **TONGA** | | | | | | | | | | | |
| TONGATAPU - S/NFTF | S | | | | | | | | | | |
| Cristchurch/NZCH | | | | | | LDD/d | 2400 bps | None | IA-5 | 12/02 | |

# TABLE  CNS 1A -  AFTN PLAN

| State/Station | Cat. | CURRENT | | | | PLANNED | | | | Target date of implemen-tation | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Type | Signalling Speed | Protocol | Code | Type | Signalling Speed | Protocol | Code | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **TUVALU** | | | | | | | | | | | |
| FUNAFUTI - S/NGFU | | | | | | | | | | | |
| Nadi/NFFN | S | | | | | LDD/d | 2400 bps | None | IA-5 | | Dial-up, When traffic justify,  Note 2 |
| | | | | | | | | | | | |
| **UNITED STATES** | | | | | | | | | | | |
| USA-M/KSLC | | | | | | | | | | | |
| Apia/NSFA | S | LDD/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Brisbane/YBBB | M | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Christchurch | S | | | | | LDD/d | 9600 bps | X.25 | IA-5 | 11/02 | |
| Chuuk/PTKK | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| Koror/PTRO | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| Kosrae/PTSA | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| Majuro/PKMJ | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| Nadi/NFFN | M | SAT/d | 2400 bps | X.25 | IA-5 | LDD/d | | | | 12/02 | |
| Pago Pago/NSTU | S | SAT/d | 2400 bps | X.25 | IA-5 | | | | | | |
| Ponapei/PTPN | S | SAT/a | 1200 bps | X.25 | IA-5 | | | | | | |
| Tokyo/RJAA | M | LDD/d | 9600 bps | X.25 | IA-5 | | | | | | |
| Yap/PTYA | S | SAT/d | 1200 bps | X.25 | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **VANUATU** | | | | | | | | | | | |
| PORT VILA - S/NVVV | | | | | | | | | | | |
| Brisbane/YBBB | S | LTT | 300 baud | None | ITA-2 | | | | | | SITA |
| **VIET NAM** | | | | | | | | | | | |
| HANOI-S/VVNB | | | | | | | | | | | |
| Vientiane/VLVT | S | SAT/d | 9600 bps | None | IA-5 | | | | | | |
| Ho-Chi-Minh/VVTS | S | SAT/d | 9600 bps | None | IA-5 | | | | | | |
| Guangzhou/ZGGG | S | | | | | SAT/d | 2400 bps | None | IA-5 | 06/03 | |
| | | | | | | | | | | | |
| HO-CHI-MINH - S/VVTS | | | | | | | | | | | |
| Bangkok/VTBB | S | SAT/d | 2400 bps | None | IA-5 | | | | | | |
| Hanoi/VVNB | | SAT/d | 9600 bps | None | IA-5 | | | | | | |
| Hong Kong/VHHH | S | SAT/d | 2400 bps | None | IA-5 | | | | | | |
| Singapore/WSSS | S | SAT/a | 300 baud | None | IA-5 | | | | | | |
| | | | | | | | | | | | |
| **WALLIS IS. (FRANCE)** | | | | | | | | | | | |
| WALLIS - S/NLWW | | | | | | | | | | | |
| Nadi/NFFN | S | | | | | LDD/A | 2400 bps | None | IA-5 | | Current routing via Noumea |

CHART CNS 1

AFTN PLAN - ASIA/PAC

20/09/2002

**Legend**

- ● MCC - Main Com. Center
- ○ TCC - Tributary Com. Center
- □ AFTN Station
- ▬ AFTN Trunk Ciruit
- — AFTN Ciruit
- --- Non_implemented Ciruit

INTERNATIONAL CIVIL AVIATION ORGANISATION

ASIA PACIFIC OFFICE

ATN DOCUMENTATION TREE

April 2002

Version 1.0

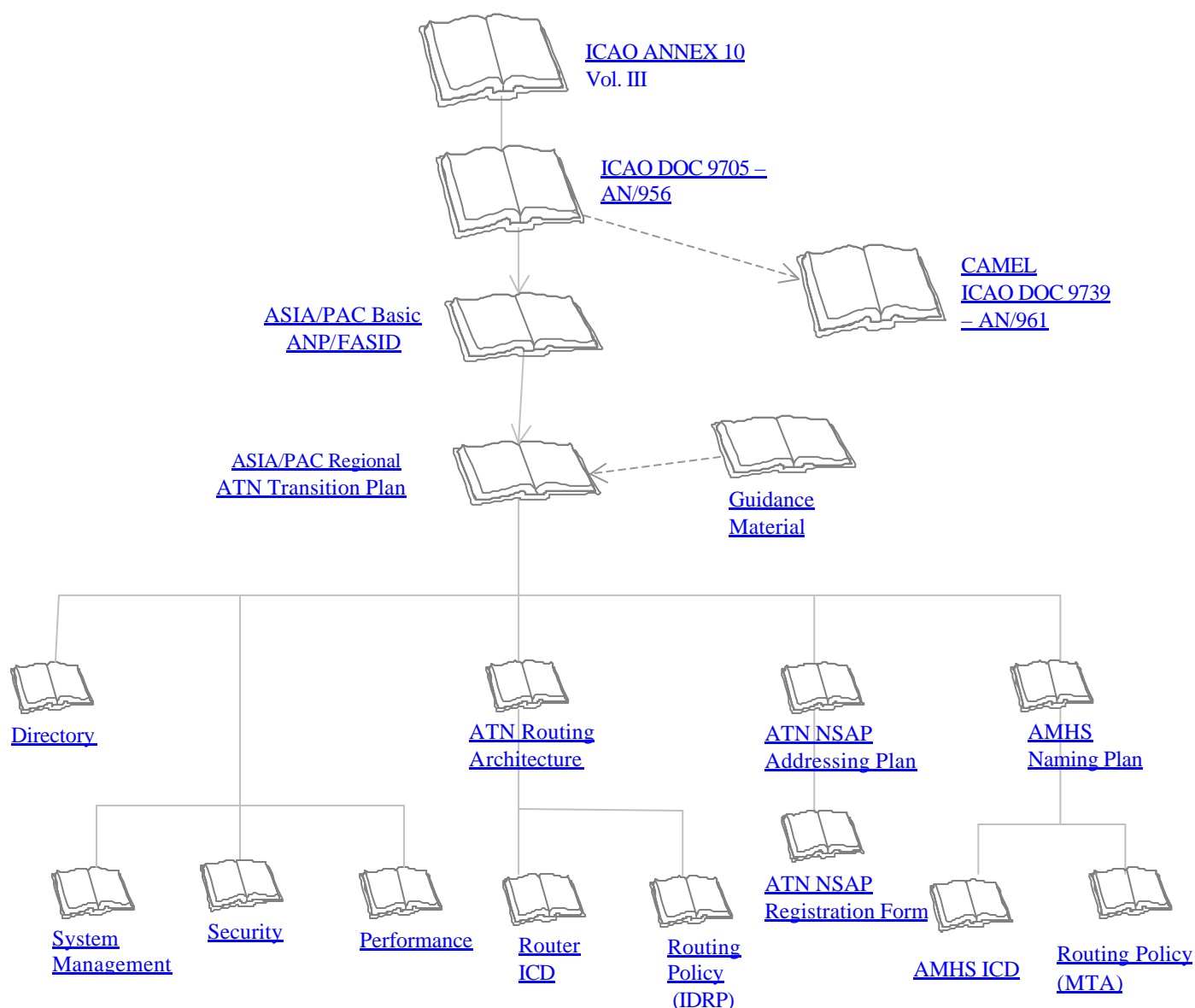Published by the ICAO Asia and the Pacific Regional Office Bangkok

# Table of Contents

# 1  Scope

This document has been developed to serve as index and hierarchy of all documentations associated with the ATN in the Asia Pacific Region.  A hierarchical representation of the relationships between the various documents is presented in section 2 "Documentation Tree", with associated document descriptions located in section 3 "Documentation Profiles".

# 2  Documentation Tree

ICAO ANNEX 10
Vol. III

ICAO DOC 9705 –
AN/956

CAMEL
ICAO DOC 9739
– AN/961

ASIA/PAC Basic
ANP/FASID

ASIA/PAC Regional
ATN Transition Plan

Guidance
Material

Directory

ATN Routing
Architecture

ATN NSAP
Addressing Plan

AMHS
Naming Plan

ATN NSAP
Registration Form

System
Management

Security

Performance

Router
ICD

Routing
Policy
(IDRP)

AMHS ICD

Routing Policy
(MTA)

# 3   Documentation Profiles

## 3.1   ICAO Annex10 Vol. III

**Title:**

International Standards and Recommended Practices, Aeronautical Telecommunications, Annex 10 Volume III.

**Latest Version:**   March 2001

**Purpose:**

This ICAO document defines the Standards and Recommended Practices (SARPs) for the Aeronautical Telecommunications Network (ATN).

**Contents:**

Subjects covered by the document:
- Part I – Digital Data communication Systems.
  - Chapter 1 – Definitions.
  - Chapter 3 – Aeronautical Telecommunication Network.
  - Chapter 4 – Aeronautical Mobile-Satellite Service.
  - Chapter 6 – VHF Air-Ground Digital Link (VDL).
  - Chapter 8 – AFTN.
- Part II – Voice Communication Systems.
  - Chapter 2 – Aeronautical Mobile Service.
  - Chapter 4 – Aeronautical Speech Circuits.
  - Chapter 5 – Emergency Locator Transmitter (ELT) for search and rescue.

## 3.2   Manual of Technical Provisions for the Aeronautical Telecommunication Network - ICAO DOC 9705 – AN/956

**Title:**

Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN).

**Latest Version:**   3$^{rd}$ Edition

**Purpose:**

This ICAO manual contains detailed technical information and serves to further elaborate on the ATN standards as defined in Chapter 3 of Annex 10, Volume III, Part I.

**Contents:**

Subjects covered by the document:
- Sub-Volume I – Introduction and System Level Requirements.
- Sub-Volume II – Air-Ground Applications.
- Sub-Volume III – Ground-Ground Applications.
- Sub-Volume IV – Upper Layer Communications Services (ULCS).
- Sub-Volume V – Internet Communications Services (ICS).
- Sub-Volume VI – ATN Systems Management Provisions.
- Sub-Volume VII – ATN Directory Service.
- Sub-Volume VIII – ATN Security Service.
- Sub-Volume IX – ATN Identifier Registration.

## 3.3 Comprehensive Aeronautical Telecommunications Network Manual (CAMEL) - ICAO DOC 9739 – AN/961

**Title:**

Comprehensive Aeronautical Telecommunications Network (ATN) Manual.

**Latest Version:** 1st Edition - 2000

**Purpose:**

This document provides guidance material in support of the ATN SARPS as defined in Annex 10, Vol. III and Doc. 9705.

**Contents:**

Subjects covered by the document:
- Components, functionality and concepts of the ATN.
- ATN Internet lower layer routing protocols.
- ATN Upper layer application protocols.
- ATN subnetworks and corresponding SNDCF's layers.
- Air-ground applications, ADS, CPDLC, CM, FIS.
- Ground-Ground applications ATSMHS, AIDC.

## 3.4 Routing Policy (IDRP)

To be developed.

## 3.5 Routing Policy (MTA)

To be developed.

## 3.6 Directory

To be developed.

## 3.7 System Management

To be developed.

## 3.8 Performance

To be developed.

## 3.9 Security

To be developed.

## *3.10  Router ICD*

To be developed.

## *3.11  ATN Ground-Ground Transition Plan*

**Title:**
>    ASIA/PAC ATN Transition Plan.

**Latest Version:**   1.0

**Purpose:**
>    This document describes the transition activities that are to be performed by States in the region for a
>    coordinated migration from AFTN to the new ATN environment.

**Contents:**
>    Subjects covered by the document:
>    - Existing ground infrastructure.
>    - ATN End system applications.
>    - ATN Traffic, both ground-ground and air-ground communication paths.
>    - ATN routing architecture.
>    - ATN backbone trunks.
>    - Interconnection of ATN routers.
>    - Transition activities.

**Remarks:**
>    Subsequent to discussions stemming from the CNS/MET SG/5 meeting much of the document's contents
>    has been included into the CNS FASID. This document will under go no further revisions.

## *3.12  ATN Routing Architecture*

**Title:**
>    ASIA/PAC ATN Routing Architecture.

**Latest Version:**   1.0

**Purpose:**
>    This document presents the routing architecture for the ground-ground infrastructure to eventually replace
>    the existing AFTN.  It is intended that this architecture will also be suitable for the accommodation of the
>    air-ground communications traffic at some later time.

**Contents:**
>    Subjects covered by the document:
>    - Routing Domain Fundamentals.
>    - Router Fundamentals.
>    - ASIA/Pacific regional routing architecture.
>    - Routing domains.
>    - ATN Transition.

### 3.13 ATN NSAP Addressing Plan

**Title:**

ASIA/PAC ATN Addressing Plan.

**Latest Version:** 1.0

**Purpose:**

This document presents recommendations for the assignment of ATN NSAP addresses within the region. It also defines the methods by which values are assigned to each field of the NSAP Address and specifies the assumptions upon which the addressing format has been defined.

**Contents:**

Subjects covered by the document:
- NSAP Address structure adopted by states of the ASIA/PAC Region.
- Recommendations for the values of each field of the NSAP address.
- Authority responsible for NSAP field assignments.

### 3.14 AMHS Naming Plan

**Title:**

ASIA/PAC AMHS Naming Plan.

**Latest Version:** 1.0

**Purpose:**

This document presents recommendations for the AMHS naming conventions to be adopted by AMHS users within the region.

**Contents:**

Subjects covered by the document:
- MF-Addressing scheme.
- XF-Addressing scheme.
- Conventions for use of MF-Addressing Format.
- Conventions for use of XF-Addressing Format.
- General use of X.400 O/R Addresses.

### 3.15 ATN NSAP Registration Form

**Title:**

ASIA/PAC ATN NSAP Registration Form.

**Latest Version:** 1.0

**Purpose:**

This document specifies the information that is required for registration of devices that are to connect to the ATN environment within the Region.

**Contents:**

Subjects covered by the document:
- Registration of NSAP Addresses for ATN Routers and ATN End-System.
- Registration of Communication Circuits for ATN Routers and ATN End-Systems.

### 3.16 Guidance Material for Ground Elements in ATN Transition

**Title:**

Guidance Material for Ground Elements in ATN Transition.

**Latest Version:**   2.0

**Purpose:**

This document contains guidance material for ATN transition planning within the ASIA/PAC region.

**Contents:**

Subjects covered by the document:
- ATN overview
  - Ground-ground service components.
  - Air-ground service components.
  - ATN security service.
  - ATN system management.
  - ATN directory.
- Planning Issues to be considered
  - ATM operational concept.
  - Transition planning.
  - Implementation planning.
  - Proposed regional planning activities for transition.
  - Proposed State planning activities for transition.
- Guidance material for ground based elements
  - Integration of new and existing infrastructure.
  - Message service definition, benefit and procedure in inter-domain operation.
  - Guidance for administrative domain definition.
  - Guidance for architectural design of ATN ground elements.
  - Connection for inter-domain operation and guidance material.
  - Identification of traffic type, quality of service with respect to inter-domain operation.
  - Performance issues of reliability, maintainability, and reliability with respect to inter-domain operation.
  - Transition paths and transitional procedure in inter-domain operation.
  - Cost analysis of ATN ground elements in transitional development for inter-domain operation.
  - ATN security solution.

### 3.17 AMHS ICD

**Title:**

ICD for ATS Message Handling System (AMHS) in Asia/Pacific Region

**Latest Version:**   1.0

**Purpose:**

This ICD has been developed in order to facilitate interoperability between States in the deployment of AMHS within the ASIA/PAC region.

**Contents:**
> Subjects covered by the document:
> - AMHS functions.
> - Network configuration.
> - Protocol specification overview.
> - AMHS specifications.
> - Upper layer specifications.
> - Lower layer specifications.
> - AHMS PICS.

## 3.18 Facilities and Services Implementation Document (FASID)

**Title:**
> Facilities and Services Implementation Document.

**Latest Version:**   To be advised.

**Purpose:**
> This document contains elements of Part IV, CNS of the ASIA/PAC FASID.

**Contents:**
> Subjects covered by the document:
> - Table 1A, AFTN/Data Circuit Plan.
> - Table 1B, ATN Router Plan.
> - Table 1C, ATSMHS Routing Plan.
> - Table 1D, AIDC Circuit Plan.

**Checklist for Implementation of Ground/Ground ATN Network Infrastructure[1]**
**Phase I: Initial Network Deployment for Ground/Ground Applications**

| No. | Items to check | References | Remarks |
|---|---|---|---|
| 1. | **Establish ATN Implementation Team (AIT).** Designation of Programme/Project Manager and required staff. Secure funding support. | | AIT membership may include representatives from: <br> - CAA/ATS Service provider(s); <br> - Operations and engineering units; <br> - Industry; <br> - Airlines; <br> - Aeronautical communication service provider(s); <br> - Telecommunication service providers |
| 2. | **State Plan.** Develop a phase plan with target date for the implementation of ATN infrastructure based on the regional planning documents and the ATN Standards and Recommended Practices (SARPs) and Guidance Material. <br><br> Secure budget to support: <br> - Trials/demonstrations, <br> - Phased implementation, <br> - Human resources and training. | ANNEX 10 Vol. III <br> - Doc. 9705-AN/956 *Manual of Technical Provisions for the ATN*; <br> - Doc. 9739-AN/961 *Comprehensive Aeronautical Telecommunication Network Manual*; <br><br> Table CNS –1B of ASIA/PAC FASID <br><br> ASIA/PAC Region ATN Transition Plan. | Second Edition of Doc. 9705. |

| No. | Items to check | References | Remarks |
|---|---|---|---|
| 3. | **Determine network architecture, policy.**<br><br>Consider factors such as:<br>(a) Redundancy (no single point of failure);<br><br>(b) Status and position within the regional ATN network;<br>(c) Number and type of intra-State facilities to be connected (ATS, AOC, *etc.*);<br>(d) Site geographical locations;<br><br>(e) Security, availability, integrity (Quality of Service) requirements (depending on application type);<br>(f) Projected circuit loadings *vs.* capacity of existing circuits;<br>(g) Router loading;<br><br><br>which will determine:<br>- network topology, type and media,<br>- network infrastructure requirements,<br>- intra-State routing domains (AOC, ATS *etc.*) and routing policies | Interface Control Documents (ICDs) for ATN End Systems.<br><br>Asia/Pacific Regional ICD: ATN Ground-Ground BIS Router.<br><br>Asia/Pacific ATN Routing Architecture Plan.<br><br>Asia/Pacific ATN Addressing Plan<br><br>Table CNS –1B of ASIA/PAC FASID<br><br>ASIA/PAC Region ATN Transition Plan. | (a) May require multiple routers at each network node and divers connectivity between nodes.<br>(b) Backbone sites have greater requirements for availability and throughput.<br>(c) Will AOCs be permitted access to the ATN backbone through ATS routers?<br>(d) Affects network topology, choice of subnetwork, physical communications medium/media.<br>(e) QoS and Security issues influence use of communications service provider, public network/leased line *vs.* dedicated private connection, *etc.*<br>(f) Determine bandwidth requirement, including growth capacity<br><br>(g) Avoid "choke points" that place excessive load on a single node.<br><br><br>Local network deployment may use ATN BIS, ATN IS or OSI IS routers. Choice of router type depends on cost, capability, suitability for application requirements (aeronautical grade *vs.* commercial communications grade) *etc.*<br><br>Commercial network simulation packages can help analysis of network performance under normal and abnormal conditions |
| | Develop ATN address allocation plan.<br>Designate responsible agent for administering address allocation and registration of addresses with ICAO. | | |

| No. | Items to check | References | Remarks |
|---|---|---|---|
| 4. | **Equipment Acquisition and Evaluation.** Conduct laboratory tests with proposed BIS, IS and ES to ensure connectivity and performance.<br><br>Begin deployment at different network sites as tests proceed, and pre-operational testing. | ICDs. | Equipment Protocol Implementation Conformance Statements (PICS) can help evaluation of equipment compatibility and can assist in creating ICDs.<br><br>Verify network performance: throughput, effects of failures *etc.* |
| 5. | **Inter-State ATN router inter-connection.** Coordination with States concerned for agreement on implementation of inter/intra regional connections including technical interface, routing policy and target dates.<br><br>The following aspects should be considered:<br>- Applications to be supported.<br>- Capability to support air/ground applications.<br>- Use of existing circuits.<br>- Connectivity and integrity.<br>- Security.<br>- Alternate routing capability.<br>- System reliability.<br>- QoS.<br>Capacity and predicted load demand. | Asia/Pacific Region ATN Transition Plan.<br><br>Asia/Pacific ATN Routing Architecture Plan.<br><br>Asia/Pacific ATN Addressing Plan<br><br>Asia/Pacific Regional BIS Router ICD.<br><br>Applicable ES ICDs. | For AMHS, there is no need to provide two separate physical lines to support existing AFTN service and to introduce new AMHS circuit, as both requirements can be satisfied using one physical link given adequate capacity and QoS. |
| 6. | **AMHS inter-connection.**<br>- Provide AMHS/AFTN gateway while transitioning between ATFN and AMHS;<br>- Follow the ASIA/PAC AMHS naming convention, detail arrangements for AMHS naming plan for MF-Addressing and XF-Addressing Scheme;<br>- Register all PRMDs with ICAO Regional Office;<br>- Conduct close coordination with States concerned.<br>Establish date for phasing out of AFTN connections, once sufficient route diversity has been established in ATN network. | - PRMD value shall be selected as prescribed in Doc. 9705. | Inter- and intra-regional connections should be based on bilateral agreements and in compliance with AMHS SARPs, technical specification and ICD. |

## List of Abbreviations:

| | |
|---|---|
| AFTN | Aeronautical Fixed Telecommunication Network |
| AMHS (ATSMHS) | ATS Message Handling System |
| ATN | Aeronautical Telecommunication Network |
| ATS | Air Traffic Service |
| BIS | Boundary Intermediate System |
| ES | End System |
| FASID | Facilities and Services Implementation Document |
| ICD | Interface Control Document |
| IS | Intermediate System |
| PICS | Protocol Implementation Conformance Statements |
| SARPs | Standards and Recommended Practices |

## List of References:

| [1] | ICAO Annex 10 Volume III, DOC. 9705-AN/956 *Manual of Technical Provisions for the Aeronautical Telecommunications Network* | Second Edition of 9705. |
|---|---|---|
| [2] | ICAO Annex 10 Volume III, DOC. 9739-AN/961 *Comprehensive Aeronautical Telecommunication Network Manual* | |
| [3] | Asia/Pacific Regional Interface Control Document (ICD): ATN Ground-Ground Boundary Intermediate System (BIS) Router | Draft rev. 1.1 (not yet approved) |
| [4] | Asia/Pacific FASID | |
| [5] | Asia/Pacific Region ATN Transition Plan. | |
| [6] | Asia/Pacific ATN Addressing Plan | |
| [7] | ATN Routing Policy for Asia/Pacific Region. | Draft (not yet approved) |
| [8] | Asia/Pacific ATN Routing Architecture Plan. | |
| [9] | AMHS ICD in Asia/Pacific Region | |

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[1] This document comprises a checklist for the deployment of an ATN Ground Network to support initial ground-ground ATN applications, notably ATSMHS/AMHS, based on the Standards and Recommended Practices (SARPs) specified by Edition 2 of ICAO Doc. 9705-AN/956.

**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 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<br><br>Task: Develop Regional ATN Transition Guidance Material. | | 1) Development of detailed guidance material. | Completed |
| 2 | RAN/3 C 10/11d | Subject: ATN Transition Plan<br><br>Task: Develop an ATN Transition Plan to provide seamless transition to ATN. | A | 1) Develop Ground Transition Plan taking into account Air-to-Ground aspects.<br><br>2) Develop a set of planning documents covering:<br>i) ATN Regional Routing Architecture<br>ii) ATN Naming and Addressing Conventions, and<br>iii) Documentation of the Assigned ATN Names and Addresses. | Completed |
| 3 | | Subject: ATN major elements.<br><br>Task: Provide performance and functional requirements of ATN. | A | 1) Develop ATN Technical Documents.<br>- Security<br>- Performance<br>- System Management | ~~2003~~ 2003<br>2003<br>2003 |
| 4 | RAN/3 C 10/11b | Subject: AFTN related issues<br><br>Task: Review operation of AFTN. | B | 1) Evaluate and review the effect of increases or decreases in capacity and network changes, on circuit loading.<br><br>2) Plan network changes for support of OPMET and AIS databases, automated VOLMET broadcast. | On-going<br><br><br>2003 |
| 5 | | Subject: Planning and implementation information in ANP.<br><br>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.<br><br>1) Table CNS 1B – ATN Router Plan<br>2) Table CNS 1C – ATS MHS<br>3) Table CNS 1D – AIDC Routing Plan | <br><br><br>Completed<br>~~2002~~ 2003<br>~~2002~~ 2003 |

| No. | Ref. | Task | Priority | Action Proposed/In Progress | Target |
|---|---|---|---|---|---|
| 6 | | Subject: ATN Documentation<br><br>Task: Development of ATN Routing Documentations and ICDs. | A | Development of ATN Documents:<br>1) A Router ICD<br>2) A Routing Policies (IDRP/MTA)<br>3) Directory of Service<br>4) An AMHS ICD<br>5) An AIDC ICD | ~~2002~~ 2003<br>~~2002~~ 2003<br>~~2002~~ 2003<br>Completed<br>~~2005~~ 2004 |
| 7 | | Subject: Use of the public Internet<br><br>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. | 2003 |
| 8 | | Subject: Use of IP<br><br>Task: Develop guidance material for the use of IP as a Sub-Network for ATN | B | In accordance with the work being performed by ATNP, 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 | 2005 |

## STRATEGY FOR THE PROVISION OF PRECISION APPROACH
## AND LANDING GUIDANCE SYSTEMS

**Considering**:

a)  that, in the ASIA/PAC Region, ILS is capable of meeting the majority of requirements for precision approach and landing;

b)  that, requirements for provision of terrestrial-based navigation facilities, non-precision and precision approach and landing  have been implemented in most cases;

c)  the availability of a proven and standardized MLS to meet all weather operations requirements;

d)  the  availability of  ICAO GNSS SARPs and guidance material;

e)  feasibility of GBAS systems to support category II and  III  operations in  2006;

f)  the  development and deployment of multimode receivers;

g)  the definition of Required Navigation Performance for  approach, landing and departure operations;

h)  the knowledge that GNSS without augmentation can support non-precision approaches and  that augmented GNSS- based systems will be available to support Category I operations from end of  year  2004;

i)  the need to maintain aircraft interoperability both within the region and between the ASIA/PAC region and other ICAO regions and to provide flexibility for future aircraft equipage.

**The strategy for ASIA/PAC Region in the provision of precision approach  and landing guidance is:**

a)  ILS be retained as an ICAO standard system for as long as it is operationally acceptable and economically beneficial;

b)  Implement GNSS with  GBAS to support Category I operations where appropriate;

c)  Conduct studies for the implementation of GNSS ground- based augmentation systems and GNSS avionics equipment for Category II and III operations;

d)  Introduce applicable  Required Navigation Performance (RNP) for approach, landing and departure operations in accordance with ICAO provisions.

e)    Conduct necessary on-going GNSS and RNP education and training for
      operational personnel to ensure safe operations.

f)    Implement MLS where operational requirements cannot be satisfied by
      implementation of ILS or GNSS.


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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) Augmentation systems include both satellite-based (SBAS) and ground-based systems (local and regional) augmentation;

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

**The general strategy for the implementation of GNSS in the Asia/Pacific Region is detailed below**. This strategy is based on the regional navigation requirements of:

(a) RNP10 for en-route in remote/oceanic areas;
(b) RNP4 for en-route and terminal phases of flight;
(c) NPA/APV for approaches and departures; and
(d) Precision approaches at selected airports.

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

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

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

4) Introduce the use of GNSS as primary means of navigation in remote/oceanic areas;

5) Introduce the use of GNSS as a supplementary means of en-route navigation and non-precision approach;

6) States are encouraged to implement future GNSS approvals based on TSO C145/146 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 with the exception of State aircraft;

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

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

11) States establish multidisciplinary GNSS implementation teams, using section 6.10.2 of ICAO Circular 267, Guidelines for the Introduction and Operational Approval of the GNSS , as a guide.

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

**ADS-B STUDY AND IMPLEMENTATION TASK FORCE**

**Terms of Reference**

Conduct a study for the selection of ADS-B link for use in the Asia/Pacific Region. The work to be addressed should include:

- review the available link technology* for ADS-B and recommend the most suitable technology for selection as a preferred link for implementation in the   Asia/Pacific Region in the near term and long term taking into account cost /benefit studies;

- identify and quantify  near term and long term benefits of ADS-B;

- develop a recommended implementation plan including a recommended target date of implementation taking into account availability of SARPs and readiness of airspace users and ATS providers for a coordinated implementation of service and benefits.

**Note:**

1.        The Task Force, while undertaking the task, should take into account of the work being undertaken by OPLINK, SAS and AMC Panels with a view to avoid any duplication.

2.        The Task Force should complete its work and present the result to the ATS/AIS/ SAR/ SG, CNS/MET/ SG and to the APANPIRG/14 meetings to be held in 2003.

3.        In assessing the readiness of airspace users, take into account business aviation usage

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* The link to be considered are SSR-Mode S ES1090 MHz, VDL Mode 4 and UAT.

**PART IV**
**COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)**

**1.      INTRODUCTION**

1.1      This part of the Asia and Pacific Basic Air Navigation Plan (ANP) contains elements of the existing system and the basic planning principles, operational requirements and planning criteria related to Communications, Navigation and Surveillance (CNS) system and are considered to be minimum necessary for effective planning of CNS facilities and services in the ASIA/PAC region.   A detailed description of the facilities and services to be provided by States in order to fulfill the requirements of the Basic ANP is contained in the ASIA/PAC Facilities and Services Implementation Document (FASID).   During the transition and pending full implementation of the CNS/ATM system, it is expected that the existing requirements will gradually be replaced by new CNS/ATM system requirements. Furthermore, it is expected that some elements of the CNS/ATM system will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

1.2      This Standards, Recommended Practices and Procedures to be applied are contained in:

           a)        Annex 10 – *Aeronautical*
                     *Telecommunications and*

           b)        *Regional Supplementary*
                     *Procedures – Communications*
                     (MID/ASIA and PAC SUPPS,
                     Part 2 of Doc. 7030)

1.3      Background information which is of importance in the understanding and effective application of the plan, is contained in the Report of the Third Asia/Pacific Regional Air Navigation Meeting (Doc. 9614, ASIA/PAC/3 (1993)) on Agenda Items 10, 11 and 12.

1.4      Relevant    Recommendations    and/or Conclusions of ASIA/PAC/3 RAN Meeting and

Regional Planning Groups, where applicable, are shown within brackets to indicate the source.

**2.      COMMUNICATIONS**

2.1      *General*

2.1.1      The plan and details of the operational requirements for communications are contained in the Tables CNS-1A, CNS-1B, CNS-1C, CNS-1D, CNS-IE and CNS-2 and associated Charts of Part IV of ASIA/PAC FASID.

2.2      The Aeronautical Fixed Service comprises:

           a)   the          Aeronautical          Fixed
                Telecommunication Network (AFTN);

           b)   Ground elements of the Aeronautical
                Telecommunication    Network    (ATN).
                The data communications sub-networks
                and associated systems supporting the
                ground-ground    applications    of    the
                aeronautical          telecommunication
                network    (ATN),    namely    the    ATS
                message handling services (ATS MHS)
                and       ATS       Inter-Facility       Data
                Communication (AIDC);

           c)   gateways that will allow inter-operation
                between AFTN and ATS MHS.

           d)   ATS direct speech circuits; and

           e)   Meteorological    operational    circuits,
                networks and broadcast systems.

2.2.1      *Aeronautical   Fixed   Telecommunication*
           *Network (AFTN)*

2.2.1.1   States should ensure that telecommunication agencies engaged in providing aeronautical circuits be impressed of the need for:
           a)        high    reliability    terrestrial    links
                     connecting aeronautical facilities and

common carrier terminals inclusive of priority restoration of service commensurate with the requirements of a safety service; and

b)    rapid restoration of circuits in the event of breakdown.

[ASIA/PAC/3, Conc. 10/1]

2.2.1.2   States operating AFTN circuits which do not function satisfactorily 97 per cent of the time during which the circuit is scheduled to be in operation, should exchange monthly circuit performance charts on the form provided in Appendix A of Agenda Item 10 of ICAO Doc. 9614, ASIA/PAC/3 (1993). Where a circuit consistently achieves 97 per cent reliability, the exchange of performance charts may cease. The circuit performance charts should be exchanged directly between the correspondent stations, with copies to the Administrations concerned and to the ICAO Regional Office.  States should also identify the causes for inadequate circuit performance and take necessary remedial measures.
[ASIA/PAC/3, Con. 10/2]

2.2.1.3   States responsible for the operation of AFTN circuits which are not adequately meeting transit time requirements should record transit time statistics on the 23$^{rd}$ day of each third month (January, April, July and October) of each year, in accordance with the existing practices, for the AFTN circuits and terminals under their jurisdiction which do not meet the specified transit time criteria. The data recorded should be exchanged directly between the correspondent stations, with copies to Administration concerned and to the ICAO Regional Office.
[ASIA/PAC/3 Conc. 10/3]

2.2.1.4   States operating AFTN circuits should:

a)    record AFTN statistics in the form contained in Appendix B of Agenda Item 10 of ICAO Doc. 9614, ASIA/PAC (1993) from 23 to 25 April and October each year;

b)    exchange the circuit loading data for each circuit with each correspondent

station, provide a copy to ICAO Regional Office; and

c)    evaluate circuit loading and take appropriate remedial action when occupancy level exceeds permissible levels specified in the *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunications Network,* Doc. 8259-An/936)

[ASIA/PAC/3, Conc. 10/4]

2.2.1.5   States concerned should take positive measures to ensure system reliability and provide adequate management and supervision of facilities to eliminate system failure, and to ensure data integrity and timely delivery of messages.
[ASIA/PAC/3, Concl. 10/5]

2.2.1.6   The AFTN entry/exit points:

a)    between ASIA/PAC and AFI should be Brisbane and Mumbai;

b)    between ASIA/PAC and EUR should be Bangkok, Singapore and Tokyo;

c)    between ASIA/PAC and MID should be Karachi, Mumbai and Singapore;

d)    between ASIA/PAC and NAM should be Brisbane, Nadi and Tokyo;

e)    between ASIA/PAC and SAM should be Brisbane.

[APANPIRG/11 Conc. 11/6]

2.2.1.7   *Technical aspects of Aeronautical Fixed Telecommunications Network (AFTN) rationalization.*

2.2.1.7.1 The main trunk circuits interconnecting main AFTN communication centers should be provided by LTT facilities, operate at a modulation rate commensurate with operational requirement, and employ international alphabet number 5 (IA-5) and character-oriented data link control procedures – system category B, or bit-oriented data link control

procedures as defined in Annex 10, Volume III, Part I, Chapter 8.

2.2.1.7.2   Also the tributary circuits interconnecting tributary AFTN communication centers with main AFTN communication centers, with other tributary AFTN communication centers, or with AFTN stations should be provided with LTT facilities where available and feasible, and preferably operate at a modulation rate commensurate with operational requirement and employ IA-5 code and procedures and an appropriate controlled circuit protocol.
[ASIA/PAC AFS RPG/3, Rec. 3/1]

2.2.1.8   To   support   data   communication requirements and to provide needed data integrity and minimal transit time, the CCITT X.25 protocol should be used between AFTN COM Centres and Main Tributary COM Centres in the ASIA/PAC Region.
[APANPIRG/4, Conc. 4/27 and
APANPIRG/7, Conc. 7/14]

2.2.1.9   States   consider   implementing   digital communication networks or circuits in a co-ordinated manner   in   order   to   meet   current   and   future Aeronautical Fixed Service (AFS) communication requirements for data/voice communications and to facilitate the introduction of ATN.
(APANPIRG Concl. 11/14)

*2.2.2   ATN   Infrastructure   Transition   and Implementation*

2.2.2.1   The ATN Transition Plan outlines the requirements to increase bandwidth and upgrade protocols for those trunk circuits that will support main data flow of traffic in the ASIA/PAC region. The   plan   also   provides   target   dates   for implementation of Backbone Boundary Intermediate Systems (BBIS) and Boundary Intermediate System (BIS) in the ASIA/PAC region.
(APANPIRG, Concl. 12/14)

2.2.2.2   ATN development should be introduced in an evolutionary and cost-effective manner based on available ICAO SARPs materials and regional ATN technical   and   planning   documents.   The ATN

infrastructure   transition   is   expected   to   be implemented in three phases as follows:

-   Phase 1, Upgrade of existing AFTN circuits where necessary to support the introduction of the ATN BBISs;

-   Phase 2, Implementation of the ATN Regional BBISs; and

-   Phase 3, Implementation of supporting ATN BISs.

2.2.3   *ATS Direct Speech Circuits*

2.2.3.1   *ATS direct speech communications*
[ASIA/PAC/3, Conc. 5/21]

States concerned should assign a high priority to the establishment, in accordance with Annex 11, 3.6.1.1, of efficient direct-speech communications between ATS units serving adjacent areas in order to permit proper use of air-ground frequencies and further implementation of the air traffic control service.

2.2.3.2   Voice switching centers should be provided at the following locations:

| | |
|---|---|
| 1)   Auckland | 2) Bangkok |
| 3)   Beijing | 4) Mumbai |
| 5)   Calcutta | 6) Guangzhou |
| 7)   Jakarta | 8) Karachi |
| 9)   Lahore | 10) Kuala Lumpur |
| 11) Chennai | 12) Nadi |
| 13) Tokyo | 14) Brisbane |

[ASIA/PAC/3, Rec. 10/15]

2.2.3.3   Dissemination of World Area Forecast System (WAFS) products in the ASIA/PAC region will be accomplished by satellite broadcast.
[ASIA/PAC/3, Rec. 10/19]

2.2.4   *ATS Inter-facility Data Communication (AIDC) Circuits*

State   consider   implementing   the   ATN application ATS Interfacility Data Communication (AIDC) in order to enable the exchange of ATS messages   for   active   flights   related   to   flight

notification, flight coordination, transfer of control, surveillance data and free (unstructured) text data.

*2.3      Air/ground communications*

2.3.1    *Aeronautical    Mobile    Service    and Aeronautical Mobile Satellite Service*

2.3.2    *Frequency utilization list*

2.3.2.1    States in the ASIA/PAC region should co-ordinate, as necessary, with the ICAO Asia and Pacific    Regional    Office    all    radio    frequency assignments for both national and international facilities in the 190-526.50 kHz, 108-117.975 MHz, 960-1215 MHz and 117.975-137 MHz bands. The ICAO Asia and Pacific Regional Office, based on the information provided for this purpose by States, will issue, frequency lists No. 1, 2 and 3 at periodic intervals.
[ASIA/PAC/3, Conc. 11/4, 11/15 and 12/9]

2.3.3    *HF en-route communications*

2.3.3.1    States should be urged to co-ordinate on a national    basis    with    the    appropriate    interested authorities, a programme directed towards achieving the elimination of the interference currently being experienced on some of the frequencies allocated to the Aeronautical Mobile (R) Service in the Region. When reviewing methods for developing such a national programme, consideration should be given to the procedures in Article S15 of the ITU Radio Regulations.

2.3.3.2    In the case of an unidentified interfering station, States should notify the Regional Office concerned, utilizing the procedure and the Report Form* developed by the Fifth Session of the Communications Division (1954) updated by the Communications Divisional Meeting (1978), Doc. 9239, Agenda Item 5. However, in the case of persistent harmful interference to an aeronautical service which may affect safety, it should be immediately reported to ICAO, and to the ITU using the prescribed format, for appropriate action.
[ASIA/PAC/3, Concl. 11/6]

* The harmful Interference Report Form is provided in Attachment B to CNS part IV of FASID.

2.3.4    *Air-Ground elements of ATN*

2.3.4.1    With the implementation of the air-ground applications of ATN, it is important to ensure that transit response times are kept to a minimum level so as not to affect the overall response time that it takes for traffic such as ADS reports and CPDLC messages to be delivered to their final destination. This also reflects the need to ensure that critical ground links within the Region are capable of handling this information efficiently.

2.3.4.2    One important factor with air-ground traffic is the generation of routing information caused by aircraft that will move between various ATN routing domains. As aircraft move through various coverage media    and    FIR    boundaries    the    ATN    Routing Backbone will be notified of the changing routing data for each mobile aircraft in the region. To allow this routing information to be propagated within the region will require a minimum number of backbone routers to be implemented which protect all other ATN routers from being inundated with routing information.
[ASIA/PAC ATN Transition Plan]

3.      **NAVIGATION**

3.1      *General*

3.1.1    The    plan    and    details    of    operational requirements for radio navigation aids are contained in the Table CNS-3 and associated of Part IV of ASIA/PAC FASID.

3.1.2    States should continue to provide ICAO with information on their flight inspection activities for inclusion in the ASIA/PAC Catalogue of Flight Inspection Units and circulation to States in the Regions    and    to    the    ASIA/PAC    Air    Navigation Planning    and    Implementation    Regional    Group (APANPIRG).
[ASIA/PAC/3, Conc. 12/8]

3.1.3    The development of the radio navigation aids plan, and its subsequent documentation in relevant air navigation plan (ANP) publications, defines    the    respective    radio    navigation    aid

requirements at each location without reference to discrete frequency assignments. The ICAO Regional Office will continue to maintain its frequency selection and co-ordination role, including the maintenance and promulgation of Frequency List Nos. 1 and 2 in a timely and periodic manner.
[ASIA/PAC/3, Conc. 12/9]

3.2     *Radio navigation aid requirements*

3.2.1     States which have not yet done so should install VHF omni directional radio range (VOR) supplemented by distance measuring equipment (DME) as the primary aid for en-route navigation and, except in specified circumstances, delete any parallel requirement for a non-directional radio beacon (NDB) from the air navigation plan.
[ASIA/PAC/3, Rec. 5/22]

4.     **SURVEILLANCE**

4.1     *General*

4.1.1     The plan and details of operational requirements for surveillance are contained in Table CNS 4 of ASIA/PAC FASID.

4.1.2     Surveillance systems for terminal and en-route air traffic control purposes should be installed, maintained and operated at those international aerodromes and en-route area control centers, whenever it is necessary to improve the safe and expeditious handling of air traffic and where the traffic density and associated complexity of operation, system delays, meteorological conditions and/or transition from oceanic to continental airspace would justify these installations.
[ASIA/PAC/3, Rec. 5/28]

4.1.3     Where different systems are used for navigation and position determination within the same controlled airspace, the ground facilities involved should be collocated and/or oriented so as to provide compatible fight paths and to ensure, as far as practicable, a fully integrated air traffic control pattern.
[ASIA/PAC, Rec. 7/14]

4.1.4     The Asia and Pacific region is characterized by use of:

a)     SSR Mode A/C and, in the near future, 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.

4.1.5     Automatic Dependent Surveillance (ADS) 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.

4.2     *Automatic Dependent Surveillance (ADS)*

4.2.1     *Co-ordination of activities related to the implementation of ADS*

4.2.1.1     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 circumstance, 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).

4.2.1.2     States should closely co-operate in the development of procedures for the implementation of

ADS in the Region and participate to the extent possible in trials and demonstration related to the implementation of ADS.
[ASIA/PAC/3, Conc. 14/21]

4.3      *Secondary Surveillance Radar (SSR)*

4.3.1    *Implementation of surveillance systems*

4.3.1.1. Implementation of surveillance systems should be pursued as an enhancement to air traffic services where so required and the use of secondary surveillance radar (SSR) alone, in accordance with the *Regional Supplementary Procedures* (Doc. 7030), should be considered as a cost-effective alternative to primary surveillance radar.
[ASIA/PAC/3, Rec. 14/20]

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# PART IV
# COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS) SERVICES

## INTRODUCTION

1.        The standards, Recommended Practices and Procedures to be applied are listed in paragraph 1.2, Part IV – CNS of the ASIA/PAC Basic ANP.  The material in this Part comp lements that contained in Part I – BORPC of the ASIA/PAC Basic ANP and should be taken into consideration in the overall planning process for the ASIA/PAC region.

2.        This Part contains a detailed description/list of the facilities and/or services to be provided to fulfill the basic requirements of the Plan and are as agreed between the provider and user States concerned.  Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement (s) specified.   The element of the ASIA/PAC Facilities and Services Implementation Document (FASID), in conjunction with the ASIA/PAC Basic ANP, is kept under constant review by the Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO Asia and Pacific Office.

## AERONAUTICAL FIXED SERVICE (AFS)
(FASID Tables CNS-1A, 1B, 1C, 1D and IE
Charts CNS-1, 2 and 3)

3.        Table CNS-1A, 1B and Charts CNS-1, CNS-2 show the requirements and implementation status for AFTN circuits and ATN Router connection plan.  ATS message handling system (AMHS) and ATS inter-facility data communication (AIDC) routing plans in the ASIA/PAC region are show in Table CNS-1C and 1D.   The requirement and implementation status of ATS direct speech circuits is shown in Table CNS-1E and Chart CNS-3

3.1        Inter-regional and intra-regional routing of AFTN messages is contained in the ASIA/PAC AFTN Routing Directory.  ICAO Asia and Pacific Office continues to maintain its coordinating role for amendments to the Directory and publish updated editions.   States are required to co-ordinate any change in the routing with the ICAO Asia and Pacific Office well in advance to allow sufficient time to examine the proposal and finalize required details.

3.2        The regional Interface Control Documents (ICDs) are published by the ICAO Asia and Pacific Office, as required, to ensure standardization of controlled circuit protocols used for AFTN and ATS direct speech circuit signaling system.   The ICDs published are as follows:

1)  Character Oriented Data Link control Procedures    System    Category-B (APANPIRG, Concl. 5/14);

2)  X.25 protocol for AFTN (APANPIRG, Concl. 7/14;

3)  PSS1 Signaling System for digital ATS speech circuit network (APANPIRG, Concl. 8/17; and

4)  Radar Data Exchanges (APANPIRG, Concl. 9/17);

5)  AMHS ICD;

6)  Router ICD.

3.3        Aeronautical Telecommunication Network

3.3.1        The Guidance Material for ATN Transition adopted by APANPIRG provides technical guidance for regional transition planning, primarily focusing on ATN initial ground-to-ground applications .

(APANPIRG, Concl. 10/11 and 11/18)

### ATN Transition Plan

3.3.2    The ATN Transition Plan outlines the requirements to increase bandwidth and upgrade protocols for those trunk circuits that will support main data flow of traffic in the ASIA/PAC region. The plan also provides target dates for implementation of Backbone Boundary Intermediate Systems (BBIS) and Boundary Intermediate System (BIS) in the ASIA/PAC region.
(APANPIRG, Concl. 12/14)

### Regional ATN Planning Documents

3.3.3    The ASIA/PAC ATN ATS Message Handling System Addressing Plan; ATN Network Service Access Point (NSAP); NSAP Address Registration Form and ATN Routing Architecture Plan provide guidance to States.
(APANPIRG, Concl. 12/13)

3.3.3.1    The ATN ATS Message Handling System Addressing Plan provides planning and technical guidance to States in the assignment and registration of addresses and names for transition of ground Aeronautical Fixed Telecommunication network (AFTN) services to the ATS Message Handling System (AMHS) within the ASIA/PAC region. The ASIA/PAC ATN AMHS Naming Plan aligns itself with the global AMHS naming scheme.

3.3.3.2    The ATN Network Service Access Point (NSAP) Addressing Plan and NSAP Address Registration Form provide guidance for States to assign regional NSAP addresses in a consistent manner within the ASIA/PAC region. Each field of the NSAP address is described with the recommended method of assigning value. This is important so that consistency in the use of NSAP addresses is obtained and efficiency in routing is maintained. Fields with purely local State matter are identified. ICAO ASIA/PAC Regional Office is the temporary allocation authority of the ADM field.

3.3.3.3    The regional ATN Routing Architecture is based upon the need for ground-ground infrastructure to eventually replace the existing AFTN infrastructure. For this reason, the routing architecture uses the existing AFTN infrastructure as a guideline for the positioning of ATN equipment. The ATN routing architecture is designed primarily for the ground-ground environment. However, it is intended that the architecture will also be suitable as the routing architecture for the introduction of the air-ground communication requirements.

3.3.4    Until a formal registration authority is established within ICAO, the ICAO ASIA/PAC Regional Office will maintain a local register within the region for registering all Private Management Domains (PRMDs).

3.4    A Form for recording AFTN circuit loading statistics with the instruction for use of the Form, is provided in Attachment A (APANPIRG, Concl. 4/23)

**AERONAUTICAL MOBILE SERVICE (AMS) AND AERONAUTICAL MOBILE SATELLITE SERVICE (AMSS)**
(FASID Table CNS-2, Chart CNS-4)

4.    Table CNS-2 shows the requirements and implementation status of aeronautical mobile services (AMS) and aeronautical mobile satellite service (AMSS) for HF VHF and satellite data links in the ASIA/PAC region. Chart CNS-4 shows radio telephony networks and the Appendix to Chart CNS-4 shows HF allotment areas and specific frequencies allocated to each network.

4.1    The ICAO Asia and Pacific Office continues to maintain its frequency selection and co-ordination role including the maintenance and promulgation of VHF frequency list (List No. 3) in the band 118 to 137 MHz, at appropriate periodic intervals. (ASIA/PAC/3 Concl. 11/4)

4.2    HF interference reporting Form specified in Conclusion 11/6 of ASIA/PAC/3RAN Meeting is provided in Attachment B.

4.3    A list of frequency designators to be included in HF air-ground communication log in accordance with provision of para 5.2.3.3 of Annex 10 Vol. II is provided in Attachment C.

**AERONAUTICAL RADIO**
**NAVIGATION SERVICE**

(FASID Table CNS-3, Charts CNS-5A, 5B,
6A and 6B)

5.      Table CNS-3 lists, State-by-State in alphabetical order, requirements for ground based and satellite based radio navigation aids for various functions.   Charts CNS-5A and CNS-5B provide locations where radio navigation aids are located in the Asia and Pacific regions, respectively.   Chart CNS-6A and CNS-6B p provide locations where radio navigation aids for final approach and landing functions are located in the Asia and Pacific regions, respectively.

5.1      The ICAO Asia and Pacific Office, continues to maintain its frequency selection and coordination role including maintenance and promulgation of frequencies in the bands 108 to 137 MHz and 960 – 1215 MHz bands, assigned to national and international aeronautical radio navigation facilities.   Updated Frequency Lists No. 1 and 2 of radio navigation aids are published at periodic intervals (ASIA/PAC/3, Concl. 11/5 and 12/9).

5.2      The detailed description of flight inspection units available in the ASIA/PAC region is contained in the Catalogue of Flight Inspection Units published by the ICAO Asia and Pacific Office.

**SURVEILLANCE SERVICE**
**(FASID Table CNS-4 )**

6.      Table CNS-4 contains information on the radar, facilities and ADS workstations that required for en-route and terminal surveillance in the ASIA/PAC region.

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## FASID TABLE MET 7 – IMPLEMENTATION OF THE ISCS/2 AND SADIS IN THE ASIA/PAC REGIONS

| International Satellite Communication System (ISCS/2) | | | | | |
|---|---|---|---|---|---|
| **State/Territory** | **WAFS User** | **Location of VSAT** | **Access Approved** | **Equipment Installed** | **Equipment Operational** |
| American Samoa (United States) | | Information received from the US NWS, Honolulu via a dedicated circuit | | | |
| Australia | Bureau of Meteorology | Melbourne | X | X | X |
| China | China Meteorological Administration (CMA) | National MET Centre, Beijing | X | | |
| | Civil Aviation Administration | Beijing Intl. Airport | X | X | X |
| | Civil Aviation Administration | Shanghai Intl. Airport | X | X | X |
| | Hong Kong Observatory | Hong Kong Intl. Airport | X | X | X |
| | Chinese Aeronautical Meteorology Association | Taibei | X | | |
| Cook I. | Meteorological Service | | | | |
| Fiji | Meteorological Service | Nadi Intl. Airport | X | X | X |
| French Polynesia (France) | Meteo France | Information received from France via satellite | X | | |
| Indonesia | Meteorological and Geophysical Agency | Soekarno – Hatta International Airport | X | X | X |
| Japan | Japan Meteorological Agency | Kokusai Denshin Denwa Co. | X | X | X |
| Kiribati | | | | | |
| Malaysia | | | X | | |
| Mongolia | Civil Aviation Authority | Ulaanbaatar | X | | |
| Nauru | | | | | |
| New Caledonia (France) | Meteo France | | X | X | X |
| New Zealand | MET Service of New Zealand, Ltd. | Auckland | X | Backup only | |
| | | Wellington | X | X | X |
| Niue | | | | | |
| Papua New Guinea | Meteorological Department | Port Moresby Intl. Airport | X | X | X |
| Philippines | Department of Meteorology | Manila | X | X | X |
| Republic of Korea | Meteorological Services | Seoul Intl. Airport | X | X | X |
| Samoa | | | | | |
| Singapore | Singapore MET Service | Singapore/Changi Intl. Airport | X | X | X |
| Thailand | Meteorological Department | Bangkok Intl. Airport | X | | |
| Tonga | | | | | |
| Tuvalu | | | | | |
| Vanuatu | Meteorological Service | Port Vila | X | | |
| Viet Nam | Meteorological Service | Hanoi City | X | X | X |
| United States | National Weather Service | Guam | X | | |
| | | Hawaii | X | X | X |
| Wallis I. (France) | Meteo France | Wallis | X | X | X |

| Satellite Distribution System (SADIS) | | | | | |
|---|---|---|---|---|---|
| **State/Territory** | **WAFS User** | **Location of VSAT** | **Access Approved** | **Equipment Installed** | **Equipment Operational** |
| ~~Australia~~ | ~~Bureau of Meteorology~~ | ~~Perth~~ | ~~X~~ | ~~X~~ | |
| Bangladesh | Department of Meteorology | Dhaka | X | X | X |
| Brunei | Department of Civil Aviation | Brunei Intl. Airport | X | X | X |
| China | China Meteorological Administration (CMA) | National MET Centre, Beijing | X | | |
| | Civil Aviation Administration | Beijing Intl. Airport | X | X | X |
| | Civil Aviation Administration | Shanghai Intl. Airport | X | X | X |
| | Hong Kong Observatory | Hong Kong Intl. Airport | X | X | X |
| | Chinese Aeronautical Meteorology Association | Taibei | X | | |
| | Civil Aviation Administration | Macau Intl. Airport | X | X | X |
| DPR of Korea | General Administration of Civil Aviation | Pyongyang Intl. Airport | X | X | X |
| India | Meteorological Department | New Delhi | X | X | X |
| Indonesia | Meteorological and Geophysical Agency | Headquarters | X | X | |
| Lao PDR | Department of Meteorology | Vientiane, Watty | X | X | X |
| Malaysia | Department of Meteorology | Kuala Lumpur Intl. Airport | X | X | X |
| Maldives | Department of Meteorology | Male Intl. Airport | X | X | X |
| Mongolia | Civil Aviation Authority | Ulaanbaatar Intl. Airport | X | X | X |
| Nepal | Department of Meteorology | Kathmandu Intl. Airport | X | X | X |
| Pakistan | Meteorological Department | Karachi Intl Airport | X | X | X |
| Republic of Korea | Korea Meteorological Administration | Incheon Intl. Airport | X | X | X |
| ~~Singapore~~ | ~~Meteorological Service~~ | ~~Singapore/Changi Intl. Airport~~ | ~~X~~ | ~~X~~ | ~~X~~ |
| Sri Lanka | Department of Meteorology | Colombo | X | X | X |
| Thailand | Thai Meteorological Department | Bangkok Intl. Airport | X | X | X |
| Vietnam | Civil Aviation Administration | Gialam Airport, Hanoi | X | X | X |
| | Civil Aviation Administration | Tan-Son-Nhat Intl. Airport, Ho Chi Minh | X | X | |

**SADIS STRATEGIC ASSESSMENT TABLES
CURRENT AND PROJECTED OPMET DATA VOLUMES 2002-2006**

**TABLE 1**

**ICAO REGION: ASIA
MAIN ROUTING(S): AFTN, Direct Line (GTS)** (E.G CAPSIN AND AFTN/GTS)

| | Current 2002 | Projected 2003 | Projected 2004 | Projected 2005 | Projected 2006 |
|---|---|---|---|---|---|
| ALPHANUMERIC OPMET DATA | | | | | |
| Number of **FC bulletins** issued per day | 298 | 300 | 300 | 310 | 310 |
| Average number of stations per FC bulletin | 6 | 6 | 6 | 6 | 6 |
| Number of **FT bulletins** issued per day ** | 372 | 375 | 375 | 380 | 380 |
| Average number of stations per FT bulletin | 6 | 6 | 6 | 6 | 6 |
| Number of **SA bulletins** issued per day | 1643 | 1650 | 1670 | 1700 | 1700 |
| Average number of stations per SA bulletin | 6 | 6 | 6 | 6 | 6 |
| Number of **SP bulletins** issued per day | 0 | 50 | 50 | 50 | 50 |
| Number of **SIGMET bulletins** issued per day | 16 | 50 | 50 | 50 | 50 |
| (WS, WV and WC) for relevant FIRS | | | | | |
| | | | | | |
| *OTHER OPMET DATA* | | | | | |
| Number of other bulletins issued per day | - | - | - | - | - |
| (please specify header(s)) | | | | | - |
| Average number of stations per bulletin | - | - | - | - | - |
| *TOTALS* | | | | | - |
| **Total number of OPMET bulletins per day** | **2329** | **2425** | **2445** | **2490** | **2490** |
| **Average size of OPMET bulletin (bytes)** | **312** | **350** | **350** | **350** | **350** |
| **TOTAL ESTIMATED OPMET DATA VOLUME PER DAY (BYTES)** | **727K** | **849K** | **856K** | **872K** | **872K** |

**CURRENT AND PROJECTED T4 FACSIMILE CHART VOLUMES 2002-2006**

**TABLE 2**

**ICAO REGION: ASIA**
**MAIN ROUTING(S):GTS**

(E.G CAPSIN AND AFTN/GTS)

| T4 FACSIMILE CHART INVENTORY | **Current 2002** | **Projected 2003** | **Projected 2004** | **Projected 2005** | **Projected 2006** |
|---|---|---|---|---|---|
| WMO Header/Chart name | | | | | |
| Time of issue of chart (UTC) | **No Requirement** | **No Requirement** | **No Requirement** | **No Requirement** | **No Requirement** |
| Average size of chart (bytes) | | | | | |
| Chart type (e.g. wind/temp/SIGWX) | | | | | |
| Chart level (FL range or medium/high level) | | | | | |
| Validity time of chart VT (UTC) | | | | | |
| WMO Header/Chart name | | | | | |
| Time of issue of chart (UTC) | | | | | |
| Average size of chart (bytes) | | | | | |
| Chart type (e.g. wind/temp/SIGWX) | | | | | |
| Chart level (FL range or medium/high level) | | | | | |
| Validity time of chart VT (UTC) | | | | | |
| *TOTALS* | | | | | |
| **Total number of T4 charts issued per day** | | | | | |
| **Average size of each chart (bytes)** | | | | | |
| **TOTAL ESTIMATED T4 CHART DATA VOLUME PER DAY (BYTES)** | | | | | |

(Levels: medium FL 100-250, high>FL250)

(*1 octet = 8 byte = 1 character)

**CURRENT AND PROJECTED BUFR DATA VOLUMES 2002 -2006**
**TABLE 3**

ICAO REGION: ASIA
**MAIN ROUTING(S):GTS**          (E.G CAPSIN AND AFTN/GTS)

| BUFR SIGWX MESSAGES | Current 2002 | Projected 2003 | Projected 2004 | Projected 2005 | Projected 2006 |
|---|---|---|---|---|---|
| WMO Header | | | | | |
| Time(s) of issue of data (UTC) | **No Requirement** | **No Requirement** | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 |
| Average size of message (bytes) | | | 15K | 15K | 15K |
| Data level (e.g. FL range or low/medium/high level) | | | SWL/SWM* | SWL/SWM* | SWL/SWM* |
| Validity time(s) of data VT (UTC) | | | 1200, 1800, 0000, 0600 | 1200, 1800, 0000, 0600 | 1200, 1800, 0000, 0600 |
| | | | | | |
| *WMO Header* | | | | | |
| Time(s) of issue of data (UTC) | | | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 |
| Average size of message (bytes) | | | 15K | 15K | 15K |
| Data level (e.g. FL range or low/medium/high level) | | | SWL/SWM* | SWL/SWM* | SWL/SWM* |
| Validity time(s) of data VT (UTC) | | | 1200, 1800, 0000, 0600 | 1200, 1800, 0000, 0600 | 1200, 1800, 0000, 0600 |
| *WMO Header* | | | | | |
| Time(s) of issue of data (UTC) | | | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 | 0700, 1300, 1900, 0100 |
| Average size of message (bytes) | | | 15K | 15K | 15K |
| Data level (e.g. FL range or low/medium/high level) | | | SWL/SWM* | SWL/SWM* | SWL/SWM* |
| Validity time(s) of data VT (UTC) | | | 1200,1800,0000, 0600 | 1200,1800,0000, 0600 | 1200,1800,0000, 0600 |
| *TOTALS* | | | | | |
| **Total number of BUFR messages per day** | | | **12** | **12** | **12** |
| **Average size of messages (bytes*)** | | | **15K** | **15K** | **15K** |
| **TOTAL ESTIMATED VOLUME OF BUFR MESSAGES PER DAY (BYTES)** | | | **180K** | **180K** | **180K** |

(*1 octet = 8 byte = 1 character) (low  level <FL 100, medium level: FL100 – 250, high level. FL 250)

**CURRENT AND PROJECTED AIS DATA  VOLUMES 2002 – 2006(Subject to statement of an operational requirement)**

**ICAO REGION: ASIA**                                                    **TABLE 4**
**MAIN ROUTING(S): AFTN**                 (E.G CAPSIN AND AFTN/GTS)

| AIS<br>(Subject to statement of an operational requirement) | **Current 2002** | **Projected 2003** | **Projected 2004** | **Projected 2005** | **Projected 2006** |
|---|---|---|---|---|---|
| **ALPHANUMERIC AIS DATA (e.g. NOTAMs)** | | | | | |
| **Bulletin type:** | **No requirement** | **No requirement** | **No requirement** | **No requirement** | **No requirement** |
| Number of bulletins issued per day | | | | | |
| Average size of each bulletin (byte*) | | | | | |
| | | | | | |
| **Bulletin type:** | | | | | |
| Number of bulletins issued per day | | | | | |
| Average size of each bulletin (byte*) | | | | | |
| | | | | | |
| **CHART AIS DATA (e.g. AIP CHARTS)** | | | | | |
| **Header number/Chart type (e.g. AIP)** | | | | | |
| Time(S) of issue of chart (UTC) | | | | | |
| Average size of chart (bytes*) | | | | | |
| Validity time of chart VT(UTC) | | | | | |
| | | | | | |
| **Header number/Chart type (e.g. AIP)** | | | | | |
| Time(S) of issue of chart (UTC) | | | | | |
| Average size of chart (bytes*) | | | | | |
| Validity time of chart VT(UTC) | | | | | |
| | | | | | |
| **TOTALS** | | | | | |
| **Total number of AIS bulletins per day** | | | | | |
| **Average size of AIS bulletin (bytes)** | | | | | |
| **Total number of AIS charts issued per day** | | | | | |
| **Average size of AIS chart (bytes)** | | | | | |
| **TOTAL ESTIMATED VOLUME OF AIS DATA PER DAY (bytes)** | | | | | |

# ASIA/PAC WAFS Transition Plan and Procedures

5th Edition - July 2002

# ASIA/PAC WAFS Transition Plan and Procedures

## 5th Edition - July 2002

**Introduction**

1.       The Asia/Pacific WAFS Transition Plan and Procedures has been revised to take account of progress already made and in recognition of the impact of the final phase of WAFS.

**The Final Phase of WAFS**

2.       This plan is based on the understanding that the Final Phase of WAFS, as it will apply to the Asia/Pacific Regions involves:

a.       Production and dissemination by the WAFCs of global forecast winds, temperatures, tropopause height, tropopause temperature and humidity in GRIB format.

b.       The transfer of responsibility for the production for SWH from RAFCs to the two WAFCs, and hence the closing down of the RAFCs.

c.       The implementation of a communication system/s for the distribution of WAFS products in the Asia/Pacific Regions, to all the States that require the products in support of international air navigation.  The final phase envisages this will be achieved via satellite broadcast (SADIS and ISCS/2).  States may need to use an alternative distribution system.

d.       The production and distribution (via satellite broadcast) by the WAFCs, of Global, quality controlled SWH (FL 250 - 630) in BUFR format.

e.       The production and distribution (via satellite broadcast) by WAFC London of Global SWM in BUFR format (in raw form, i.e. not quality controlled except over limited  geographical areas where required by PIRGS), and the production and distribution (via satellite broadcast) by WAFC Washington of quality controlled SWM in BUFR format over limited geographical areas where required by PIRGs.

f.       The capability of States to convert BUFR and GRIB messages to graphical products on an operational basis.

**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) |
| London (Asia South medium & high) |
| 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, at least until the Final Phase of WAFS.

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 internet-based FTP site, together with appropriate GRIB and BUFR decoding facilities.

7.     States are encouraged to send comments to the WAFCs about the quality and accuracy of SIGWX on a frequent and regular basis during the transition period to the Final Phase.  Contact details for comments are:

**WAFC Washington**

i.      NWS/Aviation Weather Center
        Attention: Mr Ronald Olson
        7220 NW 101$^{st}$ Terrace
        Kansas City, Missouri
        USA 64153-2371
ii.     E-mail addressed to: ronald.olson@noaa.gov
iii.    Fax number: 1 816 880 0650

**WAFC London**

i.      The Met. Office
        Attention: Mr. Nigel Gait
        Civil Aviation Branch
        Sutton House
        London Road Bracknell
        Berkshire RG12 2SY, United Kingdom
ii.     E-mail addressed to: nigel.gait@metoffice.com
iii.    Fax number: +44 (1344) 854 156

**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.      In the Final Phase of WAFS, the two WAFCs will distribute by satellite broadcast Global, quality controlled SWH, and quality controlled SWM for limited geographical areas (Note: WAFC London will also distribute by satellite broadcast SWM in raw form, i.e. not quality controlled, outside the limited geographical areas). 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 charts will be eliminated from the satellite broadcasts.

> *Note: It shall be noted, that the non-quality controlled SWM data is not subject to a stated operational requirement and would be distributed outside WAFS.*

**Indicative Timetable for Achieving the Final Phase of WAFS**

10.      The table given in Attachment 1 provides an indicative timetable for the implementation of the Final Phase of WAFS within the Asia/Pacific Regions.

**Volcanic Ash Advisory Centres (VAACs)**

11.      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)**

12.      The TCACs will have an ongoing role of monitoring WAFS SIGWX charts that cover their areas of responsibility, and advising the appropriate WAFC to ensure the accurate inclusion of the tropical cyclone symbol.

**ASIA/PAC WAFS Transition Plan and Procedures**    **Attachment 1**
*Indicative Timetable for Achieving the Final Phase of WAFS*

| Item | Task/Stage of Implementation of WAFS | Anticipated Date |
|:---:|---|:---:|
| 1 | 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)<br>early 2004 (ISCS) |
| 4 | All states that receive GRIB products capable of converting GRIB forecasts to Wind / Temp charts | mid 2004 |
| 5 | Removal of T4 Facsimile Wind / Temp charts from the satellite broadcast | late 2004 |
| | | |
| 6 | Training in the operational conversion of BUFR to SIGWX charts | late 2003 (SADIS)<br>early 2004 (ISCS) |
| 7 | States having the ability to operate the decoding software to convert BUFR SIGWX messages into graphical format | mid 2004 |
| 8 | The satellite distribution by the two WAFCs of global SWH and of SWM for limited geographical areas[(*)] in BUFR format | 2003 (SADIS)<br>early 2004 (ISCS) |
| 9 | Removal of T4 Facsimile SIGWX products from the satellite broadcast | late 2004 |

(*)    WAFC London will also distribute by satellite broadcast SWM in raw form, i.e. not quality controlled, outside the limited geographical areas. It is noted, however, that the non-quality controlled SWM data is not subject to a stated operational requirement and would be distributed outside WAFS.

## ASIA/PAC WAFS TRANSITION TASK FORCE

**1.      Terms of Reference**

Expedite the implementation of the final phase of World Area Forecast System (WAFS) in the Asia and Pacific Regions and develop the transition plans.

**2.      Work Programme**

The work to be addressed by the ASIA/PAC WAFS Transition Task Force includes:

(a)      Planning and coordinating the replacement of Wind/Temp charts in T4 facsimile format by GRIB encoded products.

(b)      Planning and coordinating the replacement of SIGWX charts in T4 facsimile format by BUFR encoded products.

(c)      Coordinating the provision of assistance to States to ensure the final phase of WAFS can be effectively implemented in the Asia and Pacific Regions.

(d)      Keeping the Asia/Pacific WAFS Transition Plan and Procedures up to date.

The work is expected to be carried out primarily by correspondence.

**3.      Composition**

(a)      The Task Force is composed by experts from:

Australia; Hong Kong, China (Chairman); India; Japan; New Zealand; United Kingdom and United States.

(b)      IATA is invited to participate in the work of the Task Force.

**ASIA/PAC OPMET EXCHANGE TASK FORCE (OPMET/E TF)**

**1.      Terms of Reference**

Review the OPMET exchange schemes in the ASIA/PAC Region and develop proposals for their optimization taking into account the current trends in the global OPMET exchange; update the regional guidance material related to OPMET exchange and develop monitoring and management procedures; liaise with similar groups in other ICAO Regions.

**2.      Work Programme**

The work to be addressed by the ASIA/PAC OPMET Exchange Task Force includes:

(a)      to examine the existing requirements and any new requirements for the OPMET exchange in ASIA/PAC regions and to assess the feasibility of satisfying these requirements, taking into account the availability of the data;

(b)      to review the ROBEX scheme and other OPMET exchange schemes and based on this review to prepare proposal for updating and optimizing of the schemes;

(c)      to review and update the procedures for interregional exchange and for transmission of the regional OPMET data to the satellite broadcasts providers (ISCS and SADIS);

(d)      to review and amend the regional guidance materials on the OPMET exchange and to include procedures for the exchange of all required OPMET message types: SA, SP, FC, FT, WS, WC, WV, FK, FV, UA;

(e)      to develop procedures for monitoring and management of the OPMET information, based on the procedures used at the OPMET data banks; EUR OPMET update procedure to be used as the bases for development of similar procedure for the ASIA/PAC Regions.

**3.      Composition**

(a)      The Task Force is composed by experts from:

Australia (Rapporteur), China, Fiji, Japan, Singapore, Thailand, United Kingdom and United States.

(b)      IATA is invited to participate in the work of the Task Force.

## ASIA/PAC VOLCANIC ASH TASK FORCE (VA TF)

**1.  Terms of Reference**

(a)  monitor the operational efficiencies of the IAVW within the ASIA/PAC regions.

(b)  continually seek ways to improve the operational efficiencies of the IAVW within the ASIA/PAC regions.

**2.  Work Programme**

The work to be addressed by the ASIA/PAC Volcanic Ash Task Force includes:

(a)  review procedures for notification of volcanic activity from observing sources or aircraft to the ACCs, MWOs and VAACs in the region  and to propose actions for their improvement;

(b)  investigate the deficiencies in the dissemination of the VA advisories, NOTAMs and SIGMETs and to propose actions for their improvement;.

(c)  investigate the need of the States for guidance and/or training related to the implementation of IAVW.

(d)  follow the development of the graphical warnings for VA and to coordinate the regional activities on this matter

(e)  report on its work to the CNS/MET SG/7.

The work is expected to be carried out primarily by correspondence.

**3.  Composition**

(a)  The Task Force is composed by experts from:

Australia, Japan (Rapporteur), New Zealand, United Kingdom, United States.

(b)  IATA is invited to participate in the work of the Task Force.

**TERMS OF REFERENCE OF THE**

**COMMUNICATIONS, NAVIGATION, SURVEILLANCE/METEOROLOGY
(CNS/MET) SUB-GROUP OF APANPIRG**

**TERMS OF REFERENCE**

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 Systems in the CNS/MET fields.

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 systems 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 systems.

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

**SUBJECT/TASKS LIST IN THE CNS/MET FIELDS**

The priorities assigned in the list have the following connotation:

A = Tasks of a high priority on which work should be expedited;

B = Tasks of medium priority on which work should be under taken as soon as possible but not to the detriment of Priority "A tasks; and

C = Tasks of medium priority on which work should be undertaken as time and resources permit but not to the detriment of priority "A" and "B" tasks.

TOR = Terms of Reference of the Sub-Group

| No | Ref. | Task | Priority | Action Proposed/In Progress | Action By | Target Date |
|---|---|---|---|---|---|---|
| 1 | RAN/3 C.8/6 | Subject: Shortcomings in volcanic ash colour codes<br><br>Task: Aviation volcanic ash color code | | Study proposal by IFALPA to modify the aviation volcanic ash code. | COM/MET IFALPA | Completed |
| 2 | RAN/3 C.14/24 | Subject: Relevance of the content of the table of navigation and surveillance services<br><br>Task:<br>a) To provide information for the update of the ANP taking into account required additions and deletions.<br>b) Provide the above information in an informal document that can also be used as a planning instrument for action o other tasks. | | a) Undertake a comprehensive review of the table of radionavigation aids at appropriate intervals in consultation with States and international organisations<br><br>b) Develop a document to indicate the current ANP requirements, the implementation status of those requirements and future planning requirements<br><br>Task completed:<br>Review completed<br>On-going review mechanism established | NAV/SUR | Completed |
| 3 | RAN/3 R.9/3b) | Subject: Procedures for exchange of METARS between regions<br><br>Task: Exchange of METARS to support operations between ASIA/PAC and other regions. | | Establish procedures for exchange of METARS between ASIA/PAC and other regions with a view of developing appropriate proposals to amend the ANP. | COM/MET | Completed |
| 4 | RAN/3 R.9/4 | Subject: Designation of International OPMET data banks<br><br>Task: Designation of international OPMET data bank to serve the Asia and Pacific Regions. | | Recommend an international OPMET data bank or banks to be designated to serve the ASIA/PAC region. | COM/MET | Completed |
| 5 | RAN/3 C.10/12 | Subject: Standard Protocols<br><br>Task: Harmonization of ground-ground data links. | | Consider harmonization of ground-ground data link protocols and procedures that will be inter-operable with the ATN. | COM/MET AFTN Mgmt. TF | Completed |

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| 6 | RAN/3 R.10/18 | Subject: WAFS satellite coverage in Asia Region<br><br>Task: Areas to be covered by World Area Forecast System (WAFS) satellite broadcast. | | Co-ordination with WAFS satellite broadcast provider States to ensure access for States in western part of Asia/Pac Region completed. | ICAO<br>WAFS provider State | Completed |
| 7 | RAN/3 C.10/20 | Subject: Alpha numeric data on WAFS satellite broadcast<br><br>Task: Inclusion of alphanumeric data on ASIA/PAC World Area Forecast System (WAFS) satellite broadcast. | | Consider inclusion of alphanumeric format OPMET and AIS messages on WAFS satellite broadcast. | COM/MET<br>WAFS provider States | Completed |
| 8 | RAN/3 C.11/9 | Expansion of Communication Tables Legends. | | Develop terminology and legends to represent elements used in ATN. | COM/MET | Completed |
| 9 | APANPIRG C.2/27 | Subject: Frequency congestion on SEA-1 network<br><br>Task: Aeromobile Communications Improvements - resolution of deficiencies | | Identify aeromobile communications deficiencies in the region and develop appropriate solutions | ICAO<br><br>States | Completed |
| 10 | APANPIRG C. 3/15 | Subject: Regional radar data exchange<br><br><br>Task: Standardize radar data formats | | 1) Gather information on formats used in the Region<br>2) Encourage the use of standardized and automated exchange of radar cross FIR boundaries<br>3) Consult with Eurocontrol on the use of ASTRIX<br>4) Consider ATN/ADS compatability issues | NAV/SUR<br><br><br><br>ICAO<br>US | Completed |
| 11 | RAN 3 C. 12/1 | Minimum value of field strength for NDB's | | Action on this subject completed. | NAV/SUR<br><br>C.2/2 | Completed |

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| 12 | RAN/3 C. 12/6 | Subject: Provision of cost effective and operationally acceptable approach and landing guidance<br><br>Task:<br>1) ILS/MLS transition planning<br>2) Action on the outcome of the Spec. om/Ops | | Develop an ILS/MLS transition plan taking into account;<br>1) cost benefit studies conducted by states in the Region<br>2) studies and trials on MLS development and other relevant systems<br>3) progress achieved on technical and operation issues on MLS<br>4) progress in ILS/MLS transition planning in other regions<br>5) current plans of individual States in the Region on ILS/MLS an<br>6) outcome of the COM/OPS Div 95 Meeting.<br><br><br>Task completed:<br>   ILS/MLS transition issues resolved by outcome of Spec. Com/Ops Div95 Meeting.  Regional strategy review completed. | NAV/SUR | Completed |
| 13 | APANPIRG D.7/28 | Subject: Non-implementation of carriage of ACAS in ASIA/PAC region<br><br>Task: To examine the application of ACAS in the ASIA/PAC region and to develop a time-table for implementation | | Review the benefits to be gained through carriage of ACAS in the region and develop a programme of implementation of carriage of ACAS | COM/MET/NAV/SUR | Completed |
| 14 | RAN/3 C.14/4<br><br>RAN/3 C.5/2<br><br>(TOR 1) | Development of detailed description for the contents of the ASIA/PAC Facilities and Services Implementation Document (FASID)<br><br>Ensure harmonised Regional Com/Met/Nav/Sur plan development | | Develop detailed format and content for the COM/MET/NAV/SUR part of the Facilities and Services Implementation Document (FASID) as a matter of priority. Take into account global CNS/ATM plans as adopted by APANPIRG. | COM/MET/NAV/SUR<br><br>AFS MGT TF<br><br>NAV/SUR TF | Completed |
| 15 | RAN/3 C.8/17<br><br>(TOR 3) | Subject:  Lack of WAFS data for long-haul operations<br><br>Task:  WAFS support to long-haul operations | | 1)    Study the development of interim arrangements to provide WAFS support to long haul operations.<br>2) India to rebroadcast WAFS charts received from Tokyo RAFC.<br>3) WAFC Washington provide wind/temp charts for 36 hours range. | COM/MET<br><br><br>USA | Completed<br><br>Completed<br>Completed |

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| 16 | APANPIRG D. 9/31 | Problem : Revision of GNSS RAS<br><br>Task : Development of an alternative strategy for the provision of GNSS RAS | A | Review the existing strategy and an alternative strategy be developed with a view to focus on ensuring appropriate service provision from the space-based system and alternative technology available | COM/MET/NAV/ SUR SG | Completed |
| 17 | RAN/3 C.14/19<br><br>(TOR 3) | Subject: Lack of AIDC procedures<br><br>Task: Development of on-line data interchange procedures and table for use in the Region | B | 1) Develop on-line data-interchange procedures to support CNS/ATM applications. (AFTN AIDC)<br>2) Develop a logical connectivity table for the exchange of flight data information using the ATN. (ATN AIDC Table) | ICD Task Force<br><br>COM/MET/NAV/SUR (ATN Trans. TF) | Completed<br><br>Completed |
| 18 | APANPIRG D. 4/46<br><br>RAN/3 C.12/3<br><br>APANPIRG 5/33<br><br>(TOR 3) | Subject: Provision of adequate COM/NAV/SUR services<br><br>Task: Monitor the development and implement new com/nav/sur services eg ATN,GNSS, ADS with minimal transitional impact | A | 1) Encourage States to conduct R&D, Trials & demonstrations of new com/nav/sur services eg. ATN, GNSS, ADS<br>2) Monitor global developments that may have beneficial impact on regional planning activities eg. ATN, WADGNSS, LADGNSS<br>3) Consolidate information on new capabilities in the CNS/ATM system, eg. FANS 1 avionics package, oceanic display systems etc. for the Sub-Groups review and action<br>4) Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to Com/Nav/Sur eg RNP compatibility<br>5) Provide for co-ordinated training/seminars to keep all States informed on developments of trials and demonstrations<br>6) Establish a GNSS Task Force to develop a Regional Strategy for GNSS augmentation<br>7) Develop transition planning consistent with Regional requirements | COM/MET/NAV/SUR | Completed<br><br><br><br><br><br><br><br>Completed<br><br>Completed |

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| 19 | RAN/3 C.9/7 (TOR 3) | Subject: Lack of adequate procedures for Exchange of OPMET data between regions<br><br>Task: Exchange of OPMET data between the ASIA/PAC and other Regions. | A | 1) Develop procedures and delivery scheme for exchange of OPMET data between ASIA and EUR regions Via Singapore ODREP.<br>2) Develop a draft proposal for amendment of the ANP and arrange amendment of the ROBEX handbook to reflect the new arrangements.<br>3) To develop procedure to make OPMET information available at Washington and London. | COM/MET/NAV/SUR<br><br><br>OPMET WG | Completed<br><br>Completed<br><br>Completed |
| 20 | C.9/12 (TOR 3) | Subject: The need for SIGWX charts to be available in London and Washington for WAFS dissemination<br><br>Task: Exchange of WAFS SIGWX charts. | A | 1) Plan for the exchange of SIGWX charts between all relevant RAFCs and the London and Washington WAFC.<br><br>2) Develop transition plan for transfer of responsibilities from the RAFCs to WAFCs.<br><br>3) Coordination between RAFCs and the respective WAFCs be effected to meet time table for production of test high level SIGWX forecasts and the dates when the charts are expected to be considered operational | COM/MET/NAV/SUR<br><br><br><br>WAFS Task Force States | Completed<br><br><br>Completed<br><br><br>Completed |
| 21 | RAN/3 R.10/19 (TOR 3) | Subject: Technical data not available for WAFS satellite broadcast implementation<br><br>Task: Dissemination of World Area Forecast System (WAFS) products by satellite broadcast. | A | 1) WAFS satellite broadcast provider States to advise ICAO of VSAT receiving equipment details.<br>2) ICAO to relay information to States in the region.<br>3) Develop draft proposal to amend the ANP as necessary.<br>4) States to install WAFS satellite receivers. | UK & US<br><br>ICAO<br>COM/MET<br>States | Completed<br><br>Completed<br>Completed<br>Completed |
| 22 | COM/MET /NAV/SUR /SG (TOR 2) | Subject: Protection of radio frequency spectrum to ensure safety and efficiency of aeronautical services.<br><br>Task: Take steps to protect the aeromobile spectrum from unauthorised interference.<br><br>Task: Suppport ICAO posistion on various Agenda at WRC including protecting GNSS spectrum for aeronautical use. | A | 1) Encourage States to monitor and co-operatively resolve unauthorized intrusion into aeronautical HF bands,<br><br>2) Work actively with State Telecommunications Authorities to ensure ICAO positions are supported and aviation views are included in WRC deliberations. | ICAO<br><br><br>States | Completed<br><br><br>Completed |

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| 23 | APANPIRG D. 10/13 | Problem : Revision of Strategy for PA Landing System<br><br>Task :  Development of an up-dated strategy | A | Review the current strategy and develop an up-dated strategy taking into account :<br><br>1)  standardized GBAS and SBAS<br><br>2)  feasibility of GBAS to support CAT II and III operations<br><br>3)  development and deployment of MMR<br><br>4)  the definition of RNP for approach, landing and departure operations<br><br>    and<br><br> 5)human, environmental and economic factors. | COM/MET/NAV/ SUR SG | Completed |
| 24 | APANPIRG D. 10/14 | Problem :   Lack of a general strategy for implementation of GNSS<br><br>Task : Development of a more general strategy for implementation of GNSS. | A | A more general strategy for the implementation of GNSS navigation capability in the ASIA/PAC region taking into account :<br><br>1)  RNP for all phases of flight<br><br>2)  standardization of GNSS by ICAO through SARPs, PANS-OPS<br><br>    guidance material<br><br>3)  human, environmental and economic factors. | COM/MET/NAV/ SUR SG | Completed |
| 25 | APANPIRG C. 8/21 | Problem : Transition to the final phase of WAFS<br><br>Task : Planning for transfer of responsibilities of the RAFCs to the WAFCs London and Washington. |  | Develop WAFS Transition Plan and Procedures and planning for Implementation of transfer of the RAFCs responsibilities to the WAFCs London and Washington. | COM/MET/NAV/ SUR SG WAFS Transition TF | Completed |

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| 26 | RAN/3 C.11/8 (TOR 1) | Subject: Planning of ground-ground communications required for implementation of ATN Task: Integration of ground -ground communications necessary for the implementation of the aeronautical telecommunication network. | B | Plan ground to ground communications for implementation of ATN, taking into account the work of the ATNP. 1) Development of ATN Routing architecture 2) Transition Plan | ATN Trans. TF/3 | Completed |
| 27 | RAN/3 C.10/11 (TOR 3) | Subject: Inadequate Ground-ground data coms. Task: Aeronautical Fixed Telecommunications Network (AFTN) management. | A | 1) Develop procedures for the establishment operation and management of databases. 2) Review AFTN loading, develop possible circuit improvements and routing changes. 3) Develop alternate routing coordination procedures to take into account address stripping procedures. 4) Plan changes to the AFTN with due account to transition to ATN. | COM/MET/NAV/SUR ATN Trans. TF COM/MET/NAV/SUR | Completed ~~On going~~ Completed Completed Completed |
| 28 | APANPIRG C.2/23 (TOR 2) | Subject: Lack of implementation of ATS voice circuits Task: Aeronautical Fixed Service (AFS) - resolution of deficiencies | A | Identify AFS deficiencies in the region and develop appropriate solution | CNS/MET States concerned | ~~On-going~~ Completed ~~On-going~~ Completed |

| No. | Ref. | Task | Priority | Action Proposed/In Progress | Action By | Target Date |
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| 29 | APANPIRG C. 9/29 | Problem : Lack of procedures for OPMET exchange to support the ISCS and SADIS broadcasts.<br><br>Task : Planning for dissemination of ASIA/PAC OPMET data to the WAFCs London and Washington | A | Develop procedures for dissemination of OPMET data to the WAFCs for uplink on the satellite broadcasts.<br><br>Planning an implementation of the procedures for OPMET exchange to support the ISCS and SADIS broadcasts.<br><br>- Develop the new procedure for dissemination of OPMET messages, as listed in Annex 1 to the SADIS User Guide, to the WAFCs London and Washington to meet IATA requirements.<br><br>- Planning for implementation of the new procedures | CNS/MET SG with assistance of OPMET WG | Completed<br><br>Completed<br><br>~~2002~~<br>2003<br><br>on-going |
| 30 | RAN/3 C.11/10<br><br>(TOR 1) | Subject: Ensure effective transition to sat. coms.<br><br>Task: Planning for the implementation of satellite communications. | B | In planning for the implementation of CNS/ATM take into account:<br><br>1) Requirements for an effective transition,<br>2) Time frame for implementing changes,<br>3) HF requirements after implementation of satellite communications,<br>4) Human factors (staffing, retraining). | CNS/MET | On-going |
| 31 | RAN/3 C.11/11<br><br>(TOR 1) | Subject: Lack of com facilities to support aircraft access to Met Data-bank(s)<br><br>Task: Communications facilities to support aircraft access to a MET data bank(s) and automation of meteorological information for aircraft in flight (VOLMET) broadcasts. | B | In planning CNS/ATM implementation consider com facilities to support direct access to OPMET data bank(s) and automation of VOLMET broadcast. | CNS/MET | 2003 |
| 32 | RAN/3 C.8/14<br><br>(TOR 3) | Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash<br><br>Task: Regional planning for implementation of international airways volcano watch (IAVW) | A | Plan implementation of IAVW procedures to ensure provision of timely information on volcanic ash to aircraft. | CNS/MET<br><br>Task Force Volcanic Ash | On going |

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| 33 | APANPIRG D. 9/21 | Problem : SADIS strategic assessment<br><br>Task: SADIS strategic assessment of data/information to be included in the satellite broadcast. | | Review requirements for SADIS broadcasts and maintain the SADIS strategic assessment tables. | CNS/MET SG | On-going |
| 34 | APANPIRG<br><br>(TOR 3) | Subject: Lack of procedure for application of MET data in ADS messages<br><br>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<br><br><br>2) Develop procedures for utilization of the available MET data by operational units, MET offices and WAFCs | CNS/MET New Zealand<br><br><br>CNS/MET | 2003 2002 Completed<br><br>2004 |
| 35 | (TOR 3) | Subject: To facilitate regional implementation of CNS/ATM<br><br>Tasks:<br>a) coordinate training/workshops to allow States to develop and implement new CNS/ATM procedures<br>b) encourage States to participate in the evaluation and training of new CNS/ATM systems<br>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<br><br>2) encourage States in the evaluation and training of new CNS/ATM systems<br><br>3) co-ordinate with States and monitor progress<br><br><br>4) collect information and suggest methods of resolving problems commonly faced by States | CNS/MET<br><br><br>CNS/ATM IC SG | On-going<br><br>On-going<br><br>On-going<br><br>On-going |

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| 36 | APANPIRG D. 4/46<br><br>RAN/3<br>C.12/3<br><br>APANPIRG 5/3<br><br>(TOR 3) | Subject:  Provision of adequate CNS/MET services<br><br>Task: Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States. | A | • Encourage States to conduct  R&D, trials & demonstrations of new CNS/MET services<br>• Monitor global developments that may have beneficial consequences on  regional planning activities<br>• Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action<br>• Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET<br>• 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 final phase of WAFS<br><br>Task : Implementation of the transition to the final phase of WAFS | A | 1) Development of guidelines for the use of BUFR and GRIB codes for the production of WAFS products.<br><br>2)  Planning and coordinating the transfer of SIGWX and WIND/TEMP charts from the current T4 facsimile format to BUFR and GRIB format.<br><br>3) Development of a regional training programme for the operational use of BUFR and GRIB.<br><br>4) Participate in the development and implementation of an adequate WAFS back-up system for dissemination of WAFS products in the Asia/Pacific Regions. | COM/MET/NAV/SUR SG<br><br>WAFS Transition Task Force | ~~2002~~ Completed<br><br>2004<br><br>2003<br><br>2004 |
| 38 | C12/36 | Subject : Lack of ATM requirements for MET components of the ASIA/PAC CNS/ATM Plan.<br><br>Task : Developing the MET Chapter for the ASIA/PAC CNS/ATM Plan. | A | 1. Development of the initial draft of the MET Chapter.<br><br>2. Development of the MET components of the CNS/ATM concept/ strategy.<br><br>3. Inclusion of ATM requirements for MET information in the CNS/ ATM Plan. | CNS/MET SG with assistance of MET WG on CNS/ATM Plan<br><br>CNS/MET SG with assistance of the METATM TF | Completed<br><br>~~2003~~ Completed<br><br>2004 |