AGENDA ITEM 2.2: CNS/MET MATTERS

2.2 CNS/MET Matters

2.2.1 The meeting reviewed the report of the Seventh Meeting of the CNS/MET Sub-Group (CNS/MET SG/7) which was held jointly with the Tenth Meeting of the CNS/ATM Implementation Co-ordination Sub-Group (CNS/ATM/IC SG/10) in Bangkok from 15 to 21 July 2003. 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/13 in the CNS and MET fields. The meeting took the following actions on the report of the CNS/MET SG/7 meeting.

ATN transition issues

2.2.2 The meeting reviewed the work accomplished by the Fifth Meeting of the ATN Transition Task Force which was held in Phuket, Thailand from 9 to 13 June 2003.

2.2.3 The meeting noted that the Sub-Group had conducted a review of the draft ASIA/PAC Regional Interface Control Document (ICD) for ATN ground-to-ground Router finalized by the Fifth ATN Transition Task Force meeting, contained in the report of the Sub-Group. In view of the above the meeting endorsed the Conclusion as follows:

Conclusion 14/12 - ASIA/PAC Interface Control Document (ICD) for ATN Router

That, the ASIA/PAC regional ICD for ATN Router be adopted and published.

2.2.4 The meeting agreed to adopt the ATN Documentation Tree provided in the report of the Sub-Group, which provided an index and hierarchy on available ATN related documents. The meeting recommended that the document be included in the Second Edition of the ATN Planning and Technical Document. In view of the foregoing the meeting endorsed the following Conclusion.

Conclusion 14/13 - ATN Documentation Tree

That, the updated ATN Documentation Tree be included in the Second Edition of the ATN Planning and Technical Document and forwarded to States.

2.2.5 The meeting noted that the detailed policy requirements and recommendations specified in the ASIA/PAC ATN Inter Domain Routing Policy (IDRP) presented in the report of the Sub-Group was derived from the general routing policy goal of providing global shortest path connectivity with a minimal exchange of routing information. The Routing Policy had explicit requirements for backbone routers as well as a number of recommendations for non-backbone routers intended to meet the above policy goal. It was considered as first release of routing policy for the ground/ground element of ATN.

2.2.6 It was further noted that the ASIA/PAC ATN IDRP document would allow States/Organizations to have additional local routing policies. Such policies may include various local preferences or Quality of Service based routing, for example, routing based on line error rates, delay, capacity, and priority. In view of the above, the meeting endorsed the IDRP document and adopted the following Conclusion.

Conclusion 14/14 - ASIA/PAC ATN Inter Domain Routing Policy (IDRP)

That, the ASIA/PAC ATN Inter Domain Routing Policy (IDRP) be adopted and distributed to States.

2.2.7 It was also recommended that if administrations within the ASIA/PAC region wish to pursue the implementation of the TCP/IP subnet as part of the ATN, they should be able to do so through bilateral agreements on the understanding that they may be required to make changes to their subnets if and when the TCP/IP subnet is developed as part of the ATN SARPs.

2.2.8 The meeting endorsed the proposal made by the Sub-Group to designate Nadi as BBIS - Backbone Boundary Intermediate System. It was agreed that changes would be made to the Table accordingly, in accordance with the established procedure.

Development of guidance material for the use of the Public Internet Technology to support AFTN

2.2.9 The meeting reviewed the guidance material developed by the Task Force for the use of the public Internet technology to support low speed AFTN. It was identified that various issues need to be addressed before implementing a system that uses the Internet as a delivery mechanism for AFTN. These issues include conducting a safety case analysis that identifies risks and mitigation plans, ensuring that security measures are implemented in order to protect the integrity of the AFTN from external unauthorized users. The use of appropriate logging and audit reporting required ensuring conformity and integrity of the service. The guidance material had also identified the need for appropriate contract agreements to be put in place with end users to ensure that they would not abuse or allow the system to be misused.

2.2.10 It was also recognized that before considering the development and implementation of a system that utilizes the Public Internet for delivery of AFTN, a Safety Hazard Analysis must be conducted. The Safety Hazard Analysis should identify hazards and risks. Once the risks were identified they must be mitigated.

2.2.11 The Secretariat informed the meeting that the Aviation Use of the Public Internet Study Group (AUPISG) being established by ICAO to assist ICAO Secretariat in conducting a study for aviation use of public Internet and to develop guidelines and other relevant provisions.

2.2.12 The meeting appreciated the efforts made by the Task Force in completing this task in time. The meeting noted the guidance material provided in the report of the Sub-Group and agreed to adopt it as an interim arrangement, pending the outcome of the result of the ICAO study conducted by AUPISG. In view of the above, the meeting endorsed the Conclusion as follows:

Conclusion 14/15 - Use of Public Internet to support AFTN

That, the Guidance Material for the use of Public Internet to support low speed AFTN circuits be adopted and circulated to States for use as an interim means pending, outcome of the result of Aviation Use of Public Internet Study Group.

2.2.13 It was suggested that all States and/or administrations, especially those who are nominated as Back Bone Intermediate System (BBIS) sites in the ASIA/PAC Region to implement systems according to the schedule listed in ATN Router plan and AMHS plan. States were also advised to establish their implementation schedule in a realistic and practical manner.

ATN Ground-Ground Trials and Implementation

2.2.14 To comply with the Regional ATN Transition Plan, close liaison had been initiated by States concerned with relevant ATS authorities to conduct AMHS trials the status of which was as follows:

- Beijing, China – to continue further ATN technical trials with Hong Kong, China from July 2003 with router developed by Beijing;

- Hochiminh, Viet Nam – to carry out AMHS technical trial with Hong Kong, China as from early 2004;

- Tokyo, Japan –to implement ATN and AMHS with Hong Kong, China in September 2004, with pre-operational trials starting from end 2003;

- Manila, Philippines – to carry out ATN/AMHS joint trials with Hong Kong, China in the 3rd quarter of 2004; and

- Taibei – to commence ATN/AMHS trials with Hong Kong, China in 2004.

2.2.15 Subject to thorough operational trials, Hong Kong, China is planning to launch the new 64 Kbps ATN link for operational use with Bangkok, Thailand in late 2003.

AMHS trials in Singapore

2.2.16 The AMHS trial was carried out between Singapore and Hong Kong, China during the period end of April to end of June 2003. Singapore is planning to start similar trials with Thailand during the first quarter of 2004.

FAA/JCAB ATN/AMHS implementation activities

2.2.17 The meeting noted that the FAA and JCAB had agreed to implement Air Traffic Message Handling Services (AMHS) service between the USA and Japan in March 2004. This will be the initial implementation of AMHS in the ASIA/PAC Region. The telecommunication connection between the US and Japan would be a point-point 64 kilobytes per second (kbps) circuit. It is planned to have both the AMHS and aeronautical fixed telecommunications network (AFTN) service operating in parallel in the event AHMS service is disturbed or interrupted. This service will be implemented between the FAA, Salt Lake Facility and Tokyo Area Control Center (ACC) Narita airport.

China/Fiji/PNG/USA Communication upgrade and trials

2.2.18 The USA informed the meeting of ATN trials with China and Fiji and voice improvements to reduce toll charges between Papua New Guinea and the Oakland Center. It was agreed by mutual agreement for the initial verification of the compatibility of the Air Traffic Message Handling Service (AMHS) application by testing Message Transfer Agent (MTA) to MTA using Connection Less Network Protocol (CLNP) with China including configuration and test procedures. AMHS trials between FAA and CAAC were planned for May 2004. The circuit between Fiji and the USA would be upgraded from 9600 bps to 64 Kbps in December 2003. It would accommodate ATS voice, AFTN data, meteorological data and bandwidth allocations for AMHS and ATN testing. The Fiji and USA have initiated informal technical discussions to begin AMHS trials in 2004. The USA was attempting to reduce the ATC telephone toll charges between Oakland ACC and Port Moresby flight information service (FIS) by proposing a direct speech circuit and flexible AFTN connection in

a cost effective manner.

Subject/Tasks List of the ATN Transition Task Force

2.2.19 The meeting noted that the following tasks identified by the Task Force in its effort to further the implementation planning of the ATN AMHS and included the tasks in the updated Task List of the Task Force.

a) AMHS Naming Registration; and
b) AFTN/AMHS Operational Procedures

2.2.20 The meeting reviewed the Subject/Task List of the Task Force taking into account the relevant items listed in the Key Priorities for the CNS/ATM implementation approved by APANPIRG/13. It was noted that the Router ICD identified in the item 1) of the Task No. 6 was completed and the Task No. 7 regarding the use of Public Internet was also completed.

2.2.21 It was also noted that the target date of completion of other items were reviewed and updated. Two new tasks No. 9 and 10 proposed to be undertaken were included in the Tasks List.

2.2.22 In view of the above, the Subject/Tasks List of the ATN Transition Task Force were updated and the following Decision was adopted.

Decision 14/16 - Updated Subject/Tasks List of the ATN Transition Task Force

That, the updated Subject/Tasks List of the ATN Transition Task Force provided in Appendix A be adopted.

AFTN Improvements

2.2.23 It was noted that the Sub-Group had reviewed and updated the status of implementation of AFTN circuits. The main highlights of the AFTN improvements made during the year 2002 and early 2003 were as follows:

- Apia-Faleolo/USA 2400 bps AFTN circuit with X.25 protocol was implemented using a router provided at Pago Pago, American Samoa;

- Singapore/Tokyo AFTN circuit was upgraded from 1200 bps to 9600 bps using X.25 protocol on 15 January 2003;

- Colombo/Mumbai AFTN circuit was upgraded from 50 baud to 64 Kbps using X.25 on 19 March 2003;

- A 64 Kbps circuit was implemented in April 2003 to upgrade AFS circuits between Chennai/Kuala Lumpur;

- Kolkata/Mumbai AFTN circuit was upgraded from 9600 bps to 64 Kbps in March 2003;

- Colombo/Singapore AFTN circuit was upgraded from 75 Baud to 9600 bps using X.25 protocol on 12 May 2003;

- Christchurch - USA 9600 bps AFTN circuit using X.25 protocol is under testing and expected to be implemented in July 2003;

- Christchurch/Tongatapu AFTN circuit was implemented using 2400 bps; and
- Routing of AFTN messages between Kolkata and Dhaka was established via Mumbai and Bangkok. The AFTN message transit time requirements for those messages relayed via the alternate route were satisfied.

Inter-regional AFTN entry/exit point

2.2.24 It was noted that a new 64 Kbps AFTN circuit between Brisbane to Johannesburg was being established in 2-3 months time to replace the existing Brisbane/Mauritius 50 Baud AFTN circuit in accordance with the Conclusion 13/9 of the Thirteenth African Planning and Implementation Regional Group (APIRG/13) Meeting which had proposed to change the AFI- ASIA/PAC AFTN entry/exit point from Mauritius to Johannesburg. It was noted that it would not require amendment to the ASIA/PAC AFTN Plan.

2.2.25 It was also advised that the 2400 bps COP-B circuit between Brisbane and Singapore was converted to X.25 protocol on 13 November 2002. In order to provide diversity between two centres in Australia, capability has been provided at Melbourne to operate Melbourne/Singapore AFTN using IPL. A need to rationalize three circuits linking to USA from Brisbane, Nadi and Christchurch was identified. The ATN Transition Task Force at its next meeting would address this issue

2.2.26 .

2.2.26 Japan had made a proposal to the Russian Federation to upgrade the Tokyo/Moscow circuit from 200 baud to 9600 bps through a 64 Kbps satellite circuit. Japan is expecting response from the Russian Federation concerning their readiness to upgrade the circuit.

AFS Communication Improvements in India

2.2.27 India provided status of implementation and the progress made in upgrading various AFTN circuits. The Chennai/Medan ATS direct speech communication had been implemented since December 2002 using IDD hotline to support implementation ATS route included in EMARSSH route structure. The meeting noted the above status and appreciated the efforts made by the Administrations concerned in upgrading the circuits to comply with the requirements specified in the AFTN Plan.

AFTN services in the Pacific

2.2.28 The meeting noted that Airways New Zealand had installed new AFTN terminals in Tonga and Samoa and upgraded the AFTN terminal in Rarotonga. All the circuits were operating with the signalling speed of 2400 bps. The implementation of the AFTN user terminals at Tonga, Samoa and Rarotonga has improved the efficiency of flight planning and provides access to a common database. It was noted that the implementation of a direct AFTN circuit between Christchurch and the United States was nearing completion.

AFTN/AIS database upgrade in New Zealand

2.2.29 The meeting noted that Airways New Zealand had embarked on AFTN replacement project, known as AMSAD (Aeronautical Message Switch/Aeronautical Database), not only provides current AFTN and Database functionality but has the ability to keep pace with the latest developments in AFTN and ATS message handling systems (AMHS). It provides an up-to-date windows interface through Airways' SkyLine ATM workstations and an enhanced environment in the NOTAM office.

Alternate routing proposal for ATS direct speech circuits between USA/Fiji and USA/New Zealand

2.2.30 The meeting noted USA's proposal for the establishment of a reliable ATC voice communications with alternate routing capability between USA/Fiji and USA/New Zealand, which was critical for safety, airspace efficiency, and the timely coordination of aircraft operations. The proposal to replace the existing IDD back service with an alternate routing was being considered by administrations concerned.

Result of COM co-ordination meeting

2.2.31 The meeting noted that in order to address resolution of deficiency in the communication field a COM Co-ordination Meeting was held in Dhaka, Bangladesh from 27-29 May 2003. The meeting developed a co-ordinated action plan, which called upon all Administrations concerned to take necessary actions to resolve noted deficiencies by the end of 2003. It was also agreed to upgrade the Colombo/Male 50 baud AFTN circuit to 9600 bps by the end of 2003 to comply with the requirement specified in the AFTN Plan.

International Direct Dialling (IDD) hotline for direct speech circuits

2.2.32 It was also noted that IDD hotlines were used by States to support the ATS direct speech circuits. It generally meets the requirement for 15 seconds access time in low-density traffic areas. Such IDD circuits should be upgraded to dedicated circuits or AIDC should be introduced when requirement warrants.

Use of VSAT to support AFS communications

2.2.33 The meeting expressed the view that the States concerned should give serious consideration for the use of VSAT as a cost effective solution to establish and upgrade AFS circuits and also to provide link to RCAG VHF sites. States were urged to take necessary action to overcome regulatory restriction for the use of VSAT between States to support aeronautical circuits.

2.2.34 It was noted that technical assistance was provided by IATA to Afghanistan and its neighbouring countries to establish VSAT link to implement required AFTN and ATS direct speech circuits as a cost effective means and thus IATA encouraged States to overcome regulatory restrictions and other constraints and implement VSAT as a cost effective means to support AFS circuits, where required.

Aeronautical Mobile Service

2.2.35 The meeting recognized that the following issues would serve as guidelines for States in the preparation for AN-Conf/11 from the ASIA/PAC perspective while dealing with agenda item 7 of the Conference.

a) a channel spacing of 25 kHz will continue to be the operational specification in ASIA/PAC Region as it is expected to satisfy requirement for the foreseeable futures;

b) the VHF voice service, backed by CPDLC and HF will be the primary communication medium for transcontinental traffic; and a combination of CPDLC and HF voice will be the communication medium for oceanic traffic; and

c) the requirements for basic voice communications will continue, supplemented by data link Flight Information Services (DFIS) applications including D-VOLMET, D-ATIS and PDC, which would significantly release the pressure of VHF spectrum congestion.

Data Link Services

2.2.36 The meeting noted the successful trials on Data link –automatic terminal information services (D-ATIS), Data link - VOLMET (D-VOLMET) and Pre-Departure Clearance (PDC) conducted by Hong Kong, China. The systems had been closely established and confirmed that they could offer added operational and/or safety benefits.

2.2.37 The meeting further noted that Republic of Korea had developed using domestic technology, as part of the new CNS/ATM system implementation, the pre-departure clearance (PDC) and Data link-ATIS (D-ATIS) systems and implemented at Gimpo International Airport. The number of aircraft serving domestic routes with ACARS had been increasing since 2002 and the frequency of requests for the PDC/D-ATIS using data link had been rising as more users have begun to acknowledge the convenience of the systems.

Satellite Voice Communication

2.2.38 It was noted that SATCOM voice was available for airline operational control communication and public communications and was also used for emergency communication but there was no procedure available for the use of SATCOM voice for ATS function. In view of the, Australia had identified a need to develop a globally coherent policy and operating procedure for the use of SATCOM voice for ATS function. This issue was considered to be one of the items that could be raised at the AN-Conf/11. During the discussions IFALPA had advised the meeting that SATCOM voice and data are minimum requirements for the use of the ATS route L888 in the Western part of China.

2.2.39 Secretariat informed the meeting that the SATCOM voice currently provided on board aircraft do not satisfy technical specification of Annex 10. Therefore, implementation and its performance had not been reviewed in terms of provisions of ATS.

2.2.40 In view of the foregoing, it was proposed that States use SATCOM voice service in compliance with the existing SARPs and that ICAO review the relevant Technical Work Programme (ANC Task No. CNS-9902) with respect to SATCOM to provide a global policy for use of SATCOM voice and endorsed the following Conclusion.

Conclusion 14/17 - Use of SATCOM voice for ATS

That,

a) SATCOM voice be used in compliance with existing SARPs; and

b) ICAO develop a global policy for the use of SATCOM voice for ATS function.

AMS Network Management

2.2.41 The current AMSS SARPs cover data transactions and do not define satellite voice. There is a need to address SARPs for satellite voice services and also to address network management arrangements between service providers.

2.2.42 VDL SARPs recognize intra network and system management. However inter networking was essential to ensure efficiencies related to frequency management and channel throughput. Network management arrangements must be pursued by service providers taking into account appropriate spectrum use to ensure service protection and recognition.

HF Communication

2.2.43 Republic of Korea informed the meeting of the need for an aeronautical station at Seoul to provide HF air-ground communication service for aircraft operating in the area out of VHF coverage in the North Central Asia-3 (NCA-3) network. The number of aircraft flying from the Republic of Korea to Russia, Mongolia, DPR Korea, and European countries via NCA-3 network had steadily increased since the early 1990s. It was noted that the airlines flying in the area had identified the need to provide HF aeronautical mobile communication service in NCA-3 network by Seoul radio. It was noted that provision of aeronautical mobile communication service in Major World Air Route Area (MWARA) NCA-3 network by Seoul radio would contribute to the safety and efficiency of aircraft operating in the region. The meeting agreed to the proposal made by the Republic of Korea to join MWARA NCA-3 network and provide aeronautical mobile service from the end of 2003 using 3004 kHz and 13303 kHz frequencies, which were allotted to NCA-3, network stations. Accordingly, the meeting endorsed the following Conclusion.

Conclusion 14/18 - Inclusion of Seoul in MWARA NCA-3

That, the ASIA/PAC FASID be amended in accordance with the established procedure to specify requirement for an aeronautical station in Seoul to provide HF air-ground communication in the MWARA NCA-3 Network.

HF/VHF Communication improvements

2.2.44 The meeting noted Australia's initiatives to rationalize and modernize HF voice communication services for international and domestic air-ground services by replacing the current International and Domestic High Frequency (HF) communications systems. The antennas utilized at several locations were capable of connecting high and low angles signals to separate receivers, where they would then be individually analyzed to determine signal quality and the best overall signal would be presented to the operator.

2.2.45 The meeting noted the overall status on improvement and enhancement of VHF coverage in Indian airspace using RCAG VHF stations at different sites controlled by Chennai, Kolkata and Mumbai, ACCs. An interim measure adopted by India to enhance VHF coverage in Delhi FIR using a RCAG station at Khajuraho was also noted. Plan to improve quality of HF air-ground communication was also noted. It was also informed that as a long-term measure, India had planned to enhance the VHF coverage using RCAG stations supported by satellite links. India had also plan to introduce VDL Mode 2 initially.

ADS/CPDLC

2.2.46 It was further stated by India that ADS/CPDLC at Kolkata and Chennai airports using air-ground link through SITA network is in operation for FANS-1/A users. Target date for implementation of ADS/CPDLC at Delhi and Mumbai airports integrated with flight data processing

system (FDPS)/ Radar data processing system (RDPS) automation system was end of 2004. The air-ground linkage for this application would be provided through a data link service provider.

A seminar on implementation of data link and SATCOM communication

2.2.47 The meeting was informed that a seminar on implementation of data link and SATCOM communication will be held in Bangkok from 17 to 19 November 2003 in conjunction with Aeronautical Communication Panel (ACP) Working Group M meeting scheduled for 20 to 28 November 2003.

Regional Strategies

2.2.48 The meeting noted the Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC Region as updated by the CNS/MET SG/7, which included an operation requirement of RNP 10 and 4 for en-route navigation and RNP 1 in the terminal area. System availability dates for Category I (2006) and Category II/III (2010 -2015) were reflected to update the information in the considerations part of the Strategy.

2.2.49 In the Strategy for the Provision of Precision Approach and Landing Guidance System an additional item was included to ensure the protection of radio spectrum for ILS, MLS and GNSS applications. Accordingly, the meeting endorsed proposed revisions and updated both strategies and adopted the following Conclusion:

Conclusion 14/19 - Updated Strategy for Precision Approach and Landing Guidance Systems and the Strategy for the Implementation of GNSS Navigation Capability in the ASIA/PAC 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 B and C respectively, to the report on Agenda Item 2.2 be adopted and provided to States.

Space Based Augmentation Systems

2.2.50 Japan informed the meeting on the current status of the MSAS and supporting MTSAT. MTSAT will be launched in early 2004. It will take several months for the testing of the satellite and it is expected that the AMSS will be operational in late 2004 and the MSAS to be operational in 2005. It is necessary for the MSAS to be strictly tested and certified before the commissioning.

2.2.51 The United States provided a status report on the Wide Area Augmentation System (WAAS). The most significant point was the commissioning of WAAS on 10 July 2003 for use in all phases of air navigation in the United States' NAS. After an extensive testing and assessment programme WAAS performance consistently demonstrates 1 m horizontal and 1.5 m vertical accuracy. WAAS IOC would provide users with the capability to fly approaches with vertical guidance. This initial WAAS capability also provides improved guidance to users in the en route and departure domains. At commissioning, over 500 LNAV/VNAV procedures would have been published, which could be flown by WAAS capable aircraft. LNAV/VNAV is an approach procedure with vertical guidance with nominal minimums of a 350' decision height, 1½-mile visibility, 556m horizontal alert limit (HAL), and 50m vertical alert limit (VAL). The WAAS service area is the continental United States and portions of Alaska.

2.2.52 A post IOC implementation strategy would see an optimization of terminal approach procedures (TERPS) and investment in GEO satellite services to ensure that WAAS IOC and FOC would be supported with redundant services. The United States informed the meeting of availability of TSO-145/146 receivers for WAAS.

AN-Conf/11 issues

2.2.53 The meeting noted Agenda Item 6 of the AN-Conf/11 and the explanatory notes of this agenda to develop better understanding of the issues involved. The meeting recognized that harmonised implementation of navigation system was desirable. The strategies for Precision Approach and Landing and for GNSS Implementation represent the regional position for the implementation of navigation services. It was considered important that implementation plans were suited to the Region's environment and maintained harmonisation with other regions.

ADS-B Trial

2.2.54 Australia informed the meeting of progress with the Operational Trial of ADS-B. The project has installed a single ADS-B ground station and equipped a number of aircraft with ADS-B avionics and has modified an operational air traffic management system to process and display ADS-B tracks. A safety case had been submitted to the Australian regulator and it was expected that the system would be used operationally using 5NM radar like separation standards. The performance of the system has exceeded expectations. The meeting was shown examples of coverage of low level helicopter operations, track comparisons between SSR radar and more dynamic ADS-B data and opportunity observation of an international freight aircraft.

2.2.55 The meeting was also informed by Australia of progress by the Separation and Airspace Safety Panel (SASP) on the use of 5NM radar separation standards for ADS-B. It is anticipated that the necessary amendments to PANS-ATM Doc 4444 will be finalised late 2004 with final publication in late 2005. It was also identified that the European implementation of Elementary and Enhance surveillance and United States changes to transponders for security purposes provide an opportunity to minimise the cost of ADS-B out equipage.

Update of ADS-B Activities in Mongolia

2.2.56 Mongolia informed the meeting of their activities regarding the implementation of ADS-B for both domestic and international airspace. Demonstrations and modelling have demonstrated the capability of ADS-B as well as capabilities achievable by combinations of ADS-C, ADS-B and radar. Continued validation and information gathering is being pursued through investment in two CNS/VDL Mode 4 ground stations and five airborne units that include cockpit display of traffic information (CDTI). The equipment will be installed on board domestic flying MIAT AN 24´s and the ground stations will be placed in Ulaan Baataar and Muren. Both ground stations will be connected to the Ulaan Baataar ATC Center.

2.2.57 The domestic traffic throughout the domestic network of airports has a need for surveillance coverage to ease constraints between aircraft. Another useful tool for the introduction of ADS-B is enhancement of the national search and rescue (SAR) capability.

2.2.58 Taking into consideration that the agreed recommendation for ADS-B data link for the ASIA/PAC Region will be Mode S (1090 ES), Mongolia advised the meeting that VDL Mode 4 data link equipment would only be used for domestic airline operations and planned to install additional ADS-B Mode S (1090 ES) equipment for use by international airlines.

Update of ADS-B Activities in USA

2.2.59 USA updated the ADS-B related information. The FAA ADS-B link decision was made in July 2002 and approved two data links. The 1090 MHz extended squitter ADS-B data link is to be used by air carrier and private/commercial operators operating in the higher altitudes, while a universal access transceiver (UAT) ADS-B link will be used by the typical, general aviation users. In 2003, the Alaska Capstone programme conducted the first commercial flight using an "optimized" RNAV Special FAR 97 route structure in conjunction with enhanced Capstone Phase 2 avionics that includes a GPS/WAAS receiver certified under TSO 145a, in airspace inaccessible with conventional avionics. The United States remarked that ADS-B was currently the most significant advancement for aviation. IATA supported this remark. The meeting was informed that the U.S. FAA would continue to use operational ADS-B in the separation of aircraft within the State of Alaska.

Automatic Dependence Surveillance-Broadcast (ADS-B) Study and Implementation Task Force (ADS-B SITF/1)

2.2.60 The meeting reviewed the work accomplished by the ADS-B SITF/1 meeting, which was held in Brisbane, Australia from 24 to 26 March 2003. The ADS-B SITF/1 meeting was attended by fifty-three experts.

2.2.61 The meeting noted that the ADS-B SITF/1 reviewed ADS-B related activities had conducted by States, Industries and ICAO Panels. The meeting also noted the excellent progress made by the Task Force in establishing direction for the implementation of ADS-B in the Region.

Near term applications of ADS-B in ASIA/PAC Region

2.2.62 The meeting noted the following potential ADS-B applications in the ASIA/PAC Region identified by the Task Force:

a) ground based radar-like services in areas not covered by radar:
- separation
- Directed Traffic Information (DTI)
- safety alerts
- FIR boundary safety

b) support surface movement surveillance:
- improved surveillance (detection and identification) of aircraft and vehicle
- runway incursion monitoring

c) operational control for operators:
- surveillance data to airlines

d) improve military-civil coordination based on common surveillance:
- airspace management and control
- implementation of Air Defence Identification Zone procedures

e) SAR support

f) provide enhanced pilot situational awareness

Near Term Benefits

2.2.63 The meeting noted the following near term benefits identified by the Task Force:

a) move from procedural to radar-like service;

- reduced path length/time through reduction in separation requirements and, therefore, number of conflicts
- increased access to optimum route through separation reduction
- increased access to optimum altitude through separation reduction
- predictable fuel burn reduction allows increased payload
- predictable reduction in flight plan time leads to reduction in block time
- predictable reduction in flight plan time leads to increase in aircraft utilization

b) reduction in the cost of the provision of air traffic services through operational efficiencies;

- optimization of sectorization
- increased controller capacity and efficiency
- reduced air-ground communication traffic (minimum R/T procedures)
- reduced ground-ground coordination
- reduced incident investigation

c) enabling a seamless “gate-to-gate” surveillance service, not only to international civil aviation but should include general aviation and military operations;

d) increased safety and efficiency through the use of aircraft-derived data in a variety of systems, e.g. ground-based conflict alert, minimum safe altitude warning, danger area proximity warning, automated support tools, surveillance data processing and distribution, as well as enabling access by the controller to state vector parameters, (sometimes described as controller access parameters, CAP);

e) increasing airport safety and capacity, especially under low visibility conditions, by providing airport surface surveillance and, at the same time protecting against runway incursions. ADS-B will enable the identification and monitoring of relevant airport vehicles as well as aircraft;

f) changes to airspace sectorization and route structure resulting from improved surveillance should provide more efficient routing;

g) reduced infrastructure costs. Especially, in airspace in which all aircraft are ADS- B equipped, it may be possible to decommission some radar equipment. Where multiple surveillance coverage is presently required, optimisation of the surveillance infrastructure should be achieved by the implementation of the most efficient mix of radar sensors and ADS-B. Consequently, ADS-B coverage could reduce the required number of radar sensors;

h) cost savings achieved from the implementation of an ADS-B based surveillance system rather than the lifecycle expenses associated with installing, maintaining, and extending existing radar-based surveillance systems;

i) possibility of overall savings if associated with relevant navigation changes;

j) improved SAR efficiency;

k) reduced impact on the environment; and

l) for those aircraft equipped with "ADS-B in" airborne surveillance capability that can improve flight crew situational awareness:

- reduced flight length/time through reduction in procedural avoidance
- reduced flight length/time through avoidance of runway clearance manoeuvres
- optimized flight time through ability to arrive in busy airspace with knowledge of traffic situation
- reduced collision risk and reduced need for collision avoidance manoeuvres

2.2.64 The meeting noted that the report of ADS-B SITF/1 was reviewed by the thirteenth meeting of ATS/AIS/SAR/SG and the combined meeting of CNS/MET/SG/7 and CNS/ATM/IC/SG/10. The meeting reviewed three draft conclusions, which were developed by the ADS-B Task Force and revised by Sub Groups.

2.2.65 It was noted that the ADS-B Task Force unanimously recommended Mode S Extended Squitter (1090 ES) as the data link for ADS-B radar like services for the near term in the ASIA/PAC Region. The Task Force described the datalink selection of Mode-S ES 1090 as near term and in the future additional datalinks may be specified as necessary. The meeting adopted the following Conclusion.

Conclusion 14/20 - Near term ADS-B datalink selection

That, Mode S Extended Squitter (1090 ES) be used as the data link for ADS-B radar like services in the ASIA/PAC Region in the near term.

2.2.66 The meeting agreed with the recommendation made by the Task Force and endorsed by the ATS/AIS/SAR Sub Group for implementation of "ADS-B out" ground-based surveillance services in ASIA/PAC Region on a sub-region by sub-region basis with a target date of January 2006. The meeting noted that the "ADS-B out" refers to the broadcast of ADS-B transmissions from aircraft without the installation of complementary receiving equipment to process and display ADS-B data on cockpit display to pilots. The complementary processing is called "ADS-B in". Accordingly, the meeting adopted the following Conclusion.

Conclusion 14/21 - Target date of ADS-B Implementation

That States, where necessary to do so, be encouraged to implement "ADS-B out" for ground-based surveillance services in ASIA/PAC

Region on a sub-region by sub-region basis with a target date of January 2006.

2.2.67 The meeting recognized the need for separation standards based on ADS-B surveillance and the need for positional source data integrity requirements to be included in the appropriate standards. Therefore, the meeting adopted the following Conclusion.

Conclusion 14/22 - Needs for development of ICAO SARPs for ADS-B

That, in view of the progress made by States with operational trials for the implementation of ADS-B, ICAO be requested to give priority to:

a) the inclusion of positional source data accuracy and integrity requirements for ADS-B services in the appropriate standards; and

b) development of separation standards for ADS-B surveillance.

2.2.68 The meeting recognized the need for ongoing work of the ADS-B Task Force to develop an implementation plan for near term ADS-B application in the ASIA/PAC Region taking into account available equipment standards and the readiness of airspace user and ATS providers. The meeting approved the proposed new Terms of Reference for the ADS-B Study and Implementation Task Force and adopted the Decision as follows:

Decision 14/23 - Terms of Reference of ADS-B Task Force

That, the new Terms of Reference of the ADS-B Study and Implementation Task Force be adopted as shown in Appendix D.

24 Bit Aircraft Addresses

2.2.69 It was noted that in a paper presented at the CNS/MET SG/7 meeting by Japan, an analytical result of the unauthorized aircraft addresses in 2002 by Aircraft Address Monitoring System (AAMS) installed at New Tokyo and Kansai international airports was provided. A downward trend in the number of unauthorised addresses was noted over the three year span of analysis. It was also noted that detected unauthorised addresses were followed-up with the operator. It was stated that the AAMS only detects aircraft within the vicinity of either New Tokyo or Kansai international airports so the result should be considered in that light. Discussion highlighted safety issues of addresses set to all zeros. These addresses were ignored by ACAS systems and therefore nullify the projection offered by ACAS.

2.2.70 The meeting also noted by that ICAO had written to States to ensure appropriate allocation, management and implementation of aircraft addresses. The mater was also raised at the 39th DGCA Conference, which formulated Action Item 39/9 to seek resolution of the problem.

2.2.71 It was agreed that the Regional Office should write to States referring to previous correspondence, advising States of continuing illegal or incorrect addresses being used by aircraft, emphasising that this can be a safety issue. It was also suggested to request States to advise their national airlines of this continuing problem and seek their assistance in overcoming it. Furthermore, it was suggested to seek advice from the SCRS Panel on:

a) plans or procedures for the allocation of 24 bit addresses to airport vehicles;

b) plan or procedures for the allocations and management of 24 bit addresses to leased aircraft; and
c) whether or not consideration has been given in SARPs or Guidance Material requirements for periodic checks (ramp testing) for 24 bit addresses.

Aeronautical electromagnetic spectrum utilization

2.2.72 The Secretariat provided details of the outcome of WRC-2003 on all Agenda Items of interest to aviation. The decisions of the WRC-2003 on all Agenda Items that addressed or affected aeronautical allocations fully met the ICAO Position whereas on 3 Agenda Items of WRC-2003 the ICAO Position was partially met. Many Administrations and Regional and International Organizations supported important elements of the ICAO Position.

2.2.73 Pivotal in achieving these results was the active participation of aeronautical experts from civil aviation administrations and ICAO at the various meetings of the regional telecommunication organizations and at WRC-2003 in accordance with Assembly Resolution A-32/13, APANPIRG Conclusions and Action Items of DGCA Conferences.

2.2.74 During the preparation for the WRC-2003, ICAO played an active role in the activities of the regional telecommunication organizations "Asia-Pacific Telecommunity (APT)" and also organized two Regional Preparatory Meetings to review and address developments by States and regional telecommunication organizations.

2.2.75 Designation of focal point of contact responsible for preparation for WRC-2003 was a very important factor in facilitating coordination with Telecommunication Regulators in each State to coordinate aviation position.

2.2.76 Australia had presented a comprehensive review of the outcome of the WRC-2003. The agenda for the WRC-2003 contained more than fifteen items, which will have an impact on aeronautical radionavigation and communication services to a greater or lesser degree. Subjects of particular importance include radionavigation satellite service/aeronautical radionavigation service (RNSS/ARNS) compatibility, future aeronautical utilization of the 5 GHz band in light of spectrum requirements for the microwave landing system (MLS), regulatory provisions permitting the operation of new ICAO standard systems supporting navigation and surveillance functions in the band 108-117.975 MHz and possible new requirements for ARNS and/or aeronautical mobile (R) services (AM(R)S).

2.2.77 That the meeting noted that there are significant issues that have implications for aviation resulting from WRC-2003 such as:

a) the use of the 14 GHz band for non-safety of life broadband satellite communication for aircraft passengers internet applications, HF interference mitigation techniques, protection of DME with the implementation of L5 GNSS, protection of radars with the evolution of L2 GNSS, protection of radars in the 2.9-3.1 GHz and 5 GHz bands, and spectrum allocations for GBAS/GRAS and VDL Mode 4; and

b) co-primary allocations in the 9 GHz aeronautical radar band, spectrum requirements for wideband aeronautical telemetry, use of the 5 GHz aviation band for air-ground voice communication and runway incursion systems, and modernization of civil aviation telecommunication systems through current satellite allocations;

2.2.78 IATA emphasized the need for spectrum in the 5 GHz band required for runway incursion and prevention will be one of the important issues to be considered by WRC-2007.

2.2.79 In view of the foregoing the meeting endorsed the following Conclusion to initiate actions for timely preparation for WRC-2007.

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

That, States,

a) assign high priority to aeronautical spectrum management;

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

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

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

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

Progress in implementation of the ISCS and SADIS

2.2.80 The FASID Table MET 7, which indicates the current status of implementation of SADIS and ISCS in the ASIA/PAC Region, has been reviewed and updated, as necessary. The meeting was informed that the provisions related to SADIS and ISCS in the regional ANPs should be harmonized for all ICAO regions. In this regard, a new simplified format of FASID Table MET 7 has been proposed. The meeting agreed on the proposed new table as shown in Appendix E to the report on Agenda Item 2.2 and requested the Secretariat to process it in accordance with the established procedure.

Follow-up of the SADISOPSG/8 meeting

2.2.81 The eighth meeting of SADISOPSG, Bangkok, 7 to 10 July 2003 formulated two draft conclusions to the attention of the PIRGs served by SADIS, related to the future development of the SADIS. The APANPIRG reviewed the proposals by the SADISOPSG/8 meeting and adopted the following Conclusions:

Conclusion 14/25 - Implementation of the SADIS second-generation system (SADIS 2G)

That, subject to the successful completion of the trials, the APANPIRG endorses the implementation of the SADIS second-generation broadcast (SADIS 2G).

Conclusion 14/26 - Discontinuation of the current first-generation SADIS two-way VSAT programme

That, the APANPIRG notes the plan to discontinue the current SADIS two-way VSAT programme as of 1 January 2004.

SADIS Strategic Assessment Tables

2.2.82 The meeting reviewed the SADIS Strategic Assessment Tables with entries regarding the current and projected data volumes for the period 2003-2007. The meeting agreed on the proposed tables and adopted the following Conclusion:

Conclusion 14/27 - SADIS strategic assessment tables

That, the ASIA/PAC SADIS strategic assessment tables, as given in Appendix F to the report on Agenda Item 2.2, be adopted and forwarded to the SADISOPSG for planning the future SADIS bandwidth requirements.

Implementation of the ISCS

2.2.83 A transition to a successor ISCS has been planned by the U.S. in connection with advances in computer and telecommunication technologies and also because the telecommunication provider's contract for the current ISCS would terminate in September 2003. The transition would require upgrade of the VSAT receivers currently in use due to the change from X.25 to TCP/IP protocol and replacement of the STAR4 workstations for processing and display of WAFS data received through ISCS. The meeting was provided with a revised schedule for implementation of the new ISCS, as follows:

- the TCP/IP protocol will be introduced in mid September 2003; the X.25 protocol will be also available until 1st January 2004; and

- after 1st January 2004 only TCP/IP protocol will be supported; thus, for a workstation to receive data via ISCS, it must be capable of interfacing to TCP/IP.

2.2.84 The U.S. informed the States concerned that, while the upgrading of the VSAT receiver, including the on-site installation of the necessary new components, will be taken up by the U.S., the replacement of the workstations will fall into the purview of each State. It was emphasized that all ISCS user States should have their new ISCS workstations operational by 15th December 2003 in order to continue receiving WAFS products and OPMET data via the new ISCS.

2.2.85 The meeting was informed of the possible interim solutions of acquiring WAFS data for those States who might not have a new or upgraded operational workstation at the time X.25 was no longer supported on ISCS. WAFC London was currently providing a free ftp service via Internet as a WAFS back-up for all authorized SADIS and ISCS users. If this service were used, visualization software for the WAFS products would be necessary. The meeting agreed that the ftp back-up service provided by the UK was the most suitable option for those States that might not be ready on time for receiving and processing WAFS data through the new ISCS, and adopted the following Conclusion:

Conclusion 14/28 - Use of the SADIS Internet Back-up Service by ISCS User States

That, the ISCS user States be encouraged to consider the use of the SADIS internet-based ftp back-up service as an interim solution for

reception of WAFS products and OPMET data in the event of difficulties in meeting the ISCS transition schedule.

Note: The use of the SADIS internet-based back-up service would require a software for visualization of the WAFS products.

Issues related to SADIS cost sharing

2.2.86 The meeting was informed of the concern expressed at the CNS/MET SG/7 meeting by the experts from China and Malaysia regarding the current mandatory scheme on the sharing of costs of SADIS from the perspective of developing countries. The meeting felt that this matter was more appropriate to the SADIS Cost Recovery Allocation Group (SCRAG), which was the group with the necessary expertise for discussing cost sharing matters. The meeting urged China and Malaysia, if they wished to pursue the matter with SCRAG, to support their case with a very comprehensive comparative analysis related to expected changes resulting from the proposed new method for calculating the States' shares and to take into account ICAO's guidance material and policies concerning the recovery of costs for provision of air navigation services.

2.2.87 It was further clarified that by introducing the mandatory scheme for SADIS cost sharing, it was always emphasized that the States could recover their shares through the air navigation charges. However, while the ICAO policy was that the service provided in accordance with Annex 3 was subject to cost recovery, some States had been facing practical difficulties in implementing the cost recovery through air navigation charges. Based on this discussion, the meeting considered it appropriate to encourage States to recover the costs incurred from the transition to the GRIB/BUFR coded WAFS products, the related changes in the SADIS and ISCS systems, and other costs, including the mandatory SADIS shares, following the relevant guidelines. In agreeing on this, The meeting adopted the following Conclusion:

Conclusion 14/29 - Cost Recovery for the utilization of WAFS by the States

That, ASIA/PAC States be encouraged to include the costs associated with the receipt and provision of WAFS products, in particular, the mandatory SADIS charges, the cost for the replacement or upgrade of WAFS workstations and software required for the transition to the GRIB and BUFR coded WAFS products, the upgrade and maintenance of the SADIS/ISCS VSAT equipment, in the cost recovery for the meteorological services provided in their territory via the air navigation service charges.

Note: The recovery of the costs should be in accordance with ICAO principles and policy on the air navigation service charges.

WAFS current status and ongoing issues for resolution

2.2.88 The current status of the WAFS and the outstanding issues related to the transition to the so called "final" phase were discussed in light of the recommendations by the MET Divisional Meeting (2002). It was reminded that in order to decode and display WAFS SIGWX products in BUFR code form, it would be necessary for the States to obtain the appropriate software and for their staff to be trained in its use. States should develop their plans for transition to GRIB/BUFR in such a way as to be ready well in advance to the target date of 1 July 2005, when the production/transmission of WAFS graphical output, i.e. T4 facsimile charts, by the WAFCs would be discontinued.

2.2.89 The meeting reviewed the results from the regional survey on the States' plans for transition to the GRIB/BUFR coded WAFS products, carried out during January–May 2003 by the WAFS Transition Task Force (WAFS/T TF) of the CNS/MET Sub-group in coordination with the ICAO Office, Bangkok, as a follow-up of APANPIRG Conclusion 13/25. The survey results, based on replies from 26 States and territories in the ASIA/PAC Region, were presented and the following findings were highlighted:

- 83% of States/Territories had yet to be capable to operationally convert BUFR coded WAFS products into SIGWX charts and 69% of States/Territories had yet to be capable to operationally convert GRIB coded WAFS products into Wind/Temperature charts;

- 14 returns indicated requirements for training in GRIB and/or BUFR;

- a number of States expressed difficulties in having operational GRIB and/or BUFR capability before the July 2005 time frame or indicated that more time may be required for the transition.

2.2.90 Based on the survey results, the meeting stressed that, as the anticipated date of removal of T4 facsimile products from the WAFS satellite broadcast was only two years ahead, it was imperative that:

a) all States should be urged to start the necessary preparation for the migration to GRIB and BUFR as soon as possible, if they have not already done so; and

b) considerable assistance in terms of the provision of equipment, software and training was urgently required for States having difficulties in the migration to GRIB and BUFR.

2.2.91 The CNS/MET SG/7 meeting was advised by the observer from the World Meteorological Organization (WMO) that, in view of the very short time left to the transition to the GRIB/BUFR coded WAFS products, requests by the States for assistance under the WMO Voluntary Cooperation Programme (VCP) should be submitted to WMO as soon as possible. The meeting noted this important information and adopted the following Conclusion:

Conclusion 14/30 - States' Actions for the Migration to the Operational Use of GRIB and BUFR coded WAFS Products

That,

a) ASIA/PAC States be urged to start the necessary preparations for the migration to the operational use of GRIB and BUFR coded WAFS products as a matter of urgency, if they have not already done so;

b) States having difficulties in the migration to the operational use of GRIB and BUFR coded WAFS products be encouraged to urgently approach WMO for assistance under the WMO Voluntary Cooperation Programme (VCP).

Note: In order to expedite WMO consideration of VCP requests, States are encouraged to contact potential donors and subsequently inform WMO.

BUFR coded SIGWX forecasts

2.2.92 The meeting noted the information regarding some outstanding technical issues related to the generation of SIGWX charts from BUFR coded data. The meeting agreed in this regard that further evaluation by WAFC London would be carried out to ascertain that the SIGWX charts generated by the available software packages meet the requirements of Annex 3 in full without the need for significant manual inputs. As regards the extent of the manual inputs to be required for generation of SIGWX charts from BUFR coded WAFS products, the meeting felt that States had to be made aware of the possible changes to the current operational procedures in handling WAFS SIGWX products in BUFR code instead of T4 facsimile charts. It was stressed that the SIGWX chart generation process from BUFR coded data, in particular for the generation of charts for the standard ICAO areas, should be automated to the extent possible. In this connection, the meeting adopted the following Conclusion:

Conclusion 14/31 - Automatic Production of SIGWX Charts from BUFR Coded WAFS Products

That, the WAFSOPSG be invited to consider the requirement for automatic production of SIGWX charts for the standard ICAO chart areas from BUFR coded WAFS products to be included into the set of minimum requirements to be achieved by the WAFS workstation manufacturers.

GRIB/BUFR training

2.2.93 The meeting was informed about the ASIA/PAC SADIS Workstation Software Training for decoding of WAFS products in the GRIB and BUFR codes held in Bangkok, Thailand from 18 to 20 November 2002 as a follow-up of APANPIRG Conclusion 12/22. The training was provided by the SADIS provider State, the organization and programme of the event being coordinated with the WMO.

2.2.94 The meeting was also informed of the ISCS provider State's plan for a similar training event for decoding and visualization of WAFS products in the GRIB and BUFR codes to be provided in late-2004/early-2005 after most of the ISCS user States had upgraded their ISCS workstations and received initial training from the workstation suppliers. Noting from the results of the regional survey that a number of SADIS user States in the ASIA/PAC Region indicated that training on GRIB and/or BUFR was still required, the meeting adopted the following Conclusion:

Conclusion 14/32 - GRIB/BUFR Training

That, the SADIS and ISCS provider States be invited to provide further training on the operational use of GRIB and BUFR coded WAFS products for the States in the ASIA/PAC Regions in coordination with ICAO and WMO.

Note: It is desirable that the above training is organized conjointly by the SADIS and ISCS provider States for both SADIS and ISCS user States in the ASIA/PAC Region in late 2004/early 2005.

Coordination with the new WAFS Operations Group (WAFSOPSG)

2.2.95 The meeting was informed of the establishment of the WAFS Operations Group (WAFSOPSG) as a successor of the WAFS Study Group (WAFSSG) to provide assistance in the

future planning and development of the WAFS. Australia, as an ex-RAFC Provider State, and Singapore, as an user State, would nominate members to WAFSOPSG from the ASIA/PAC Region.

2.2.96 With the establishment of the WAFSOPSG it was likely that the role of the PIRGs in WAFS planning would become of lesser importance. However, in respect of WAFS implementation, the CNS/MET SG was expected to continue to address the ongoing issues, including in particular, the States' progress in their capability to receive, decode, and process WAFS output products in the GRIB and BUFR code forms. In view of the above developments, the CNS/MET SG/7 meeting reviewed the TORs and the work programme of the WAFS Transition Task Force (WAFS/T TF) and agreed that the group should continue its work for one more year since the results of the GRIB/BUFR regional survey showed that urgent follow-up actions were required so that the States in the ASIA/PAC Region be ready for the migration to GRIB and BUFR by mid-2005. The meeting agreed also that the WAFS/T TF should focus on implementation aspects and amended the TORs of the group accordingly.

2.2.97 In view of the recent developments towards harmonization of the WAFS procedures in all ICAO Regions, the meeting agreed that the regional procedures related to WAFS in the ASIA/PAC Basic ANP and FASID needed to be updated and adopted the following Conclusion:

Conclusion 14/33 - Amendment of regional procedures related to WAFS in the ASIA/PAC Basic ANP and FASID

That, the ASIA/PAC Basic ANP and FASID (Doc 9673) be amended as indicated in Appendix G to the report on Agenda Item 2.2.

2.2.98 The CNS/MET SG/7 meeting identified that a notification procedure should be developed to ensure that all States would be promptly informed on any important changes in the WAFS operations in order to prepare their WAFS processing system. The following Conclusion was adopted in this regard:

Conclusion 14/34 - Notification for significant changes in the WAFS operation

That, WAFSOPSG be invited to develop adequate notification procedure for significant changes in the WAFS operation to ensure that all States/users concerned are informed with enough lead time to prepare for those changes.

OPMET Exchange

2.2.99 The first meeting of the OPMET Exchange Task Force of the CNS/MET Sub-group (OPMET/E TF/1), held in Bangkok, 19-21 February 2003, carried out a comprehensive review of the current status of the OPMET exchange schemes in the ASIA/PAC Region and the exchange with the other ICAO regions. The meeting was provided with detailed information on the OPMET management in the EUR Region by the observers from the EUR Bulletin Management Group.

2.2.100 It was agreed that the ROBEX scheme should continue to be used for the purpose of scheduled regular OPMET exchange within the Region. In addition to the current data types METAR (SA), "long" TAF (FT) and AIREP (UA), the scheme should accommodate SPECI (SP) and "short" TAF (FC). In the future, the scheme should be capable of carrying all OPMET data types, including the non-regular messages.

2.2.101 The meeting agreed that the current structure of the ROBEX scheme needed optimization and improved management. It was decided that in place of the current variety of collection centres, a number of ROBEX centres should be established. Each ROBEX centre should be responsible for all OPMET data types within its area of responsibility. It is expected that the second meeting of the OPMET/E TF would finalize the proposal for the new structure of the ROBEX scheme.

ROBEX optimization

2.2.102 A new format of the ROBEX tables was proposed by OPMET/E TF and presented to the CNS/MET SG/7 meeting. After reviewing the tables the meeting agreed upon the new format and that the new tables for the METAR and TAF exchange, and the table for the availability of METAR and TAF against the requirements in the ASIA/PAC AOP1 Table, as shown in Appendix H to the report on Agenda Item 2.2, be included in the new edition of the ROBEX Handbook. The meeting noted the plans for the draft new edition of the ROBEX Handbook with the updated ROBEX tables and other changes, reflecting the decisions of the OPMET/E TF/1 meeting, to be finalized by the end of September 2003 and after review by the States to be published by ICAO. The meeting requested that an electronic version of the Handbook would be made available on the ICAO, Bangkok web site.

2.2.103 The meeting was informed of the organization of the inter-regional OPMET exchange, as agreed by the OPMET/E TF/1 meeting. It would be carried out by inter-regional OPMET gateways, as follows: Singapore ROBEX centre for EUR Region, Tokyo ROBEX centre for NAM Region and Bangkok ROBEX centre for MID and AFI Region.

2.2.104 The meeting was aware that the 9-hour TAFs, issued by some States in the ASIA/PAC Region, were required by the operators, however, so far there was no formal requirement for these forecasts in the Regional ANP; that is why, they were not included in the ROBEX exchange. The meeting agreed that the 9-hour TAFs should be added to the ROBEX exchange and that the OPMET/E TF should make the necessary coordination and updates the relevant documentation. Based on this, the following Conclusion was adopted:

Conclusion 14/35 - Inclusion of 9-hour TAF in the ROBEX exchange

That, the ASIA/PAC States who are issuing 9-hour TAF, be invited to include these bulletins into the regular exchange under the ROBEX scheme.

Regional OPMET Data Banks (RODB)

2.2.105 The meeting agreed that all ASIA/PAC RODBs should handle all OPMET data types. Mirroring of the data bank content between the RODBs was found necessary in order to facilitate the users' access to all OPMET data available in the Region. It was agreed that the RODBs Tokyo, Singapore and Bangkok should start working on the procedure of mirroring of data banks content and the other two data banks should join on a later stage.

2.2.106 The OPMET TF/1 meeting proposed that OPMET monitoring procedures similar to those in use in the EUR Region should be developed and implemented by the RODBs in the ASIA/PAC Region. It was agreed that Bangkok RODB should perform the first monitoring trial on the regular METAR and TAF exchange. This trial was held on 1st July 2003 for 24 hours. During this period all received METAR and TAF bulletins by Bangkok RODB were filed and analysed in regard to the availability of METAR and TAFs from the aerodromes required by the ROBEX tables.

2.2.107 The meeting was aware that the current AFTN capacity was enough to accommodate much more OPMET information. It was recalled that the current user requirement, as reflected in APANPIRG Conclusion 10/23, was that all international aerodromes listed in ASIA/PAC FASID Table MET 1A should be included in the regular OPMET exchange. It was further explained that for the aerodromes, which do not operate continuously on 24-hour basis, the OPMET information should be made available for the exchange when produced by the responsible meteorological office.

Future work programme of the OPMET Exchange Task Force

2.2.108 The meeting was informed of the decision by the CNS/MET SG/7 meeting to change the title of the OPMET Exchange Task Force to OPMET Management Task Force to reflect better the work to be done by this task force. The terms of reference of the group were amended accordingly.

Issues related to SIGMET

2.2.109 The meeting recalled that the MET Divisional Meeting (2002) noted that some of the ICAO PIRGs had identified serious problems with the implementation of the issuance of SIGMETs by the meteorological watch offices (MWO) in certain States. The problems were related to all types of SIGMET but were most noticeable for SIGMETs for volcanic ash. The meeting emphasized that this problem was a serious safety issue and formulated two recommendations on the subject. ICAO gave urgent consideration to the implementation of special implementation projects (SIP) recommended by the PIRGs to assist States in fully implementing the SIGMET provisions in Annex 3. Regional surveys of the issuance of SIGMET messages in order to identify any deficiencies, as well as update of the regional SIGMET guides were amongst other actions to be taken in resolving the SIGMET related problems.

2.2.110 As a follow up of the MET Divisional Meeting recommendations a new edition of the ASIA/PAC Regional SIGMET Guide has been prepared by the ICAO Office, Bangkok. The Guide was aimed at providing assistance to the MWOs in better understanding the SIGMET format, the procedures for SIGMET issuance and dissemination, and the responsibilities and coordination between the MWOs and the associated ATS units. The CNS/MET SG/7 meeting reviewed the draft new edition of the Regional SIGMET Guide and agreed upon its publication by ICAO according to the established procedures. The meeting adopted the following Conclusion:

Conclusion 14/36 - ASIA/PAC Regional SIGMET Guide

That,

a) ICAO publish the new edition of the ASIA/PAC Regional SIGMET Guide in accordance with the established procedures; and

b) based on the guidance provided in the ASIA/PAC Regional SIGMET Guide, the States be invited to review the operations of the designated MWOs and ensure that SIGMET messages are issued in full compliance with the Annex 3 provisions and the requirements stated in the ASIA/PAC Regional ANP.

2.2.111 The meeting was further informed of the analysis carried out by the ICAO Regional Office on the SIGMET availability and format for a limited period of time in the first half of 2003. Through this analysis it was identified that there were two common problems regarding the implementation of SIGMET requirements by the MWOs, as follows: SIGMETs were not issued at all or issued only occasionally; or SIGMETs were issued but their format was not compliant with the format specified in Annex 3.

2.2.112 Particular attention was given to the existing format discrepancies in regard to the geographical part of the SIGMET, which was subject to greatest number of errors. It was considered in this regard, that the current SIGMET format as specified by Annex 3 needed some amendments aimed at standardizing the reporting of the geographical information in SIGMET. The meeting agreed that the proposed amendments to the SIGMET format would facilitate the MWOs in the preparation of SIGMET messages and adopted the following Conclusion:

Conclusion 14/37 - Amendments to the SIGMET format

That, ICAO be invited to consider amendments to the SIGMET format specified by Annex 3, in particular to the part of the SIGMET message related to the geographical location of the weather phenomenon, for which the SIGMET is issued, aimed at facilitating the preparation of SIGMET information and further standardization of the message format.

Note: Examples of proposed changes to the SIGMET format are shown in Appendix I to the report on Agenda Item 2.2.

2.2.113 The meeting was further informed of the decision by the CNS/MET SG/7 meeting on conducting a regional survey to identify all existing deficiencies related to the issuance of SIGMET by the MWOs. The results of such survey would be used in deciding on the further assistance to States needed.

Progress in the implementation of the IAVW in the ASIA/PAC Region

2.2.114 The meeting recalled that the implementation of the IAVW in the ASIA/PAC Region was undertaken by five Volcanic Ash Advisories Centres (VAAC): Anchorage, Darwin, Tokyo, Washington and Wellington, and a number of MWOs designated by the States. A statistical analysis on the issuance of volcanic ash advisories by all VAACs in the ASIA/PAC Region for the period 1998 – 2002 had been prepared by the VA Task Force. The results of this analysis showed that the VAACs had been performing very well during this period and as far as the advisories were concerned the IAVW was considered fully implemented in the Region.

2.2.115 Another study undertaken by the VA Task Force was aimed at receiving feed-back from the ASIA/PAC States on the utilization of the VA advisories by the MWOs in the issuance of VA SIGMETs. One of the findings of this survey was that most of the MWOs issued volcanic ash SIGMETs very rarely since volcanic ash was extremely rare event for their areas of responsibility. In this respect, concern was expressed that the personnel of the MWOs, who did not issue volcanic ash SIGMET for long periods of time, might not be prepared to do so in the rare but very important cases when SIGMET would be necessary. It was suggested that, in order to keep the system ready for action, periodic tests and exercises should be conducted with the participation of the VAACs and the MWOs under their areas of responsibility. The VA Task Force was tasked to develop procedures for such tests.

ASIA/PAC Special Implementation Project (SIP) on SIGMET for volcanic ash

2.2.116 The meeting recalled the APANPIRG Conclusion 11/33 that called for an ICAO SIP to address the deficiencies related to VA SIGMETs. A SIP proposal, which took into account also the recommendations by the MET Divisional Meeting (2002) on the subject, was submitted to the ICAO Council and was consequently approved for implementation during 2003.

2.2.117 The SIP would be conducted through visits to selected States aimed at identifying the problems in the implementation of the SIGMET procedures and providing on-site assistance to

develop actions for eliminating the existing deficiencies. The States with the highest volcanic activity to which visits would be conducted were: the Russian Federation, Indonesia, Papua New Guinea, Japan and Philippines.

2.2.118 The SIP started in April 2003 with visits to Japan and Philippines. Some preliminary findings based on these missions were presented to the CNS/MET SG/7 meeting. A full report, prepared in coordination with the VA Task Force would be presented to the CNS/MET SG/8 meeting in 2004.

Coordination with the new IAVW Operations Group (IAVWOPSG)

2.2.119 The meeting was informed of the establishment of the International Airways Volcano Watch Operations Group (IAVWOPSG) in response to recommendation by the MET Divisional Meeting (2002). This new group would take most of the planning of the IAVW, which became *de facto* global. With regard to the IAVW implementation, the APANPIRG role would not change and the CNS/MET sub-group should continue addressing all the implementation issues, in particular, regarding the States' progress in their capability to issue volcanic ash advisories (VAAC Provider States) and SIGMETs for volcanic ash clouds.

2.2.120 In view of the above changes of the responsibilities related to IAVW planning and implementation, the CNS/MET SG/7 meeting considered the future of the Volcanic Ash Task Force (VA TF), established by Decision 13/31 of APANPIRG. The meeting felt that there were a number of implementation issues regarding the volcanic ash advisories and SIGMETs in the Region that should be addressed by a group of experts. It was further discussed that similar implementation problems existed in regard to the tropical cyclones advisories and SIGMETs and that it would be feasible that one task force could address the issues related to both tropical cyclones and volcanic ash. Thus, it was proposed to disband the current VA TF and to replace it by a new task force on the implementation of volcanic ash and tropical cyclone advisories and SIGMETs. The meeting formulated the following draft decision:

Decision 14/38 - Task Force on the implementation of volcanic ash and tropical cyclone advisories and warnings (VA/TC Implementation TF)

That,

a) the Volcanic Ash Task Force, established by Decision 13/31 of APANPIRG be disbanded; and

b) a Task Force on the implementation of the volcanic ash and tropical cyclone advisories and SIGMETs in the ASIA/PAC Region (VA/TC Implementation TF) be established with terms of reference, work programme and composition as shown in Appendix J to the report on Agenda Item 2.2.

Harmonization of the format of VA and TC advisories

2.2.121 The CNS/MET SG/7 meeting noted some differences existing in the format of the field tags in the templates for the TC and VA advisories specified in Annex 3. Thus, the TC advisory template tags contained abbreviations, while the VA advisory template contained plain text, e.g., the date/time field in the TC advisory template was indicated with the abbreviation "DTG:", while in the VA template it was indicated as "ISSUED:". It was also recognized that the VA advisory contained a "remark" section and no such section was present in the TC advisory template. Since both types of

advisories were used by the MWOs, it was considered that their formats should be harmonized. In this regard, the meeting adopted the following Conclusion:

Conclusion 14/39 - Harmonization of the format of volcanic ash and tropical cyclone advisories

That, IAVW Operations Group (IAVWOPSG) be invited to review the format of the volcanic ash and tropical cyclone advisories and propose changes aimed at harmonizing the format of those elements which are common for both types of advisory messages.

Recent developments of the IAVW services in the States

2.2.122 The meeting was informed of the plans of VAAC Tokyo to introduce later this year the issuance of VA advisories regardless the height of the VA cloud to fully comply with Annex 3 provisions.

2.2.123 The expert from New Zealand informed the meeting of the difficulties experienced by the Wellington VAAC and Wellington MWO in the provision of service (volcanic ash advisories and warnings) south of 60 degrees South. It was explained also that the flight operations in this area were very infrequent. New Zealand was comfortable, that due to the absence of information in the extreme south of the Wellington VAAC area, and knowing that there were extremely little civilian international flight operations in the area, a note was introduced in FASID Table Met 3 – Volcanic Ash Advisory Areas, indicating that "*coverage south of 60°S latitude is currently not feasible"*. For very much the same reasons New Zealand would prefer that the ASIA/PAC FASID Table Met 1B – Meteorological Watch Offices, be amended with a similar note for the limitation of Wellington MWO coverage of the Auckland Oceanic FIR (NZZO) south of 60ºS. The meeting agreed with the request by New Zealand and formulated a Draft Conclusion as follows:

Conclusion 14/40 - Amendment to FASID Table MET 1B in regard to the service provided by the meteorological watch office Wellington

That, FASID Table MET 1B be amended by adding a note for MWO Wellington, New Zealand, as shown in the Appendix K to the report on Agenda Item 2.2.

Implementation of Annex 3 format of the TC advisories by the TCACs

2.2.124 The meeting recalled that the MET Divisional Meeting (2002) noted that some of the designated Tropical Cyclone Advisory Centres (TCAC) did not yet issue their TC advisories in the format required by ICAO. In this regard, a recommendation was adopted, which invited all TCAC Provider States to implement the Annex 3 format for the TC advisories for aviation. As a follow-up of this recommendation, a letter was sent by the ICAO Regional Office to the TCAC Provider States in the ASIA/PAC region calling for implementation of the issuance of TC advisories for aviation in full accordance with the format spelled out in Annex 3, paragraph 3.7.2.

2.2.125 Most of the TCACs in the ASIA/PAC Region cooperated fully in implementing the standard format of the TC advisories according to Annex 3. TCACs Darwin, Nadi and Tokyo implemented the Annex 3 format in the beginning of 2003. In May 2003 TCACs Miami and Honolulu added the 18-hour forecast of the TC centre to bring the TC advisories into full compliance with the information content and format in Annex 3.

2.2.126 The meeting expressed concern on the non-implementation of the TC advisories for aviation by TCAC New Delhi. The lack of TC advisories for the Bay of Bengal and Arabian Sea was considered a serious deficiency in view of the large number of important air routes over the region. The issue was addressed from ATM perspective by the ATA/AIS/SAR SG/13 meeting in June 2003. It was recognized that, the information for tropical cyclones was important for the planning and implementation of Large-Scale Weather Deviation Contingency Procedures by the Area Control Centres (ACC) in this region. In view of the above, the meeting agreed that the urgent implementation of the requirements for TC advisories by TCAC New Delhi should be given high priority and adopted the following Conclusion:

Conclusion 14/41 - Implementation of the requirement for TC advisories by TCAC New Delhi

That, India, as TCAC Provider State, be invited to implement, as a matter of urgency, the requirement for issuance of TC advisories by TCAC New Delhi as specified in the ASIA/PAC Basic ANP and FASID (Doc 9673), following the provisions of Annex 3, regarding the format of these advisories.

2.2.127 The meeting was informed of the discussions at the CNS/MET SG/7 meeting related to some difficulties in the implementation of Annex 3 provisions for tropical cyclone advisories and SIGMETs. It was felt that these issues should be addressed by ICAO in line with the feed-back from States calling for certain improvements, for instance: inclusion of a +6 hour forecast of the TC centre in and introduction of a "remark" section in the TC advisory format, detailing the provisions for the issuance of SIGMETs up to 12 hours before the FIR is affected by the tropical cyclone. Noting the need for a review of these proposals and subsequent amendments to the Annex 3 provisions related to the TC advisories and warnings, the meeting adopted the following Conclusion:

Conclusion 14/42 - Further development of the ICAO provisions for the tropical cyclone advisories and SIGMETs

That, ICAO be invited to consider further development of the Annex 3 provisions related to the format and content of the tropical cyclone advisories issued by the Tropical Cyclone Advisory Centres (TCAC) and SIGMETs for tropical cyclones issued by the meteorological watch offices (MWO).

Quality assurance seminar

2.2.128 The meeting recalled the APANPIRG Conclusion 13/32, calling ICAO to organize, in coordination with the WMO, a seminar on the quality assurance in the provision of meteorological services to aviation in the ASIA/PAC Region in 2003. The meeting was informed that, during the review of the APNAPIRG/13 report by the ICAO Council this conclusion was addressed to WMO, in accordance with the working arrangements between ICAO and WMO. The meeting was further informed that in April 2003 the Secretary General of ICAO sent a letter to the Secretary General of the WMO inviting WMO to arrange, in coordination with ICAO, the said training seminar. The meeting noted that Hong, Kong, China had offered to host this seminar. The meeting considered the next steps for organizing the training seminar and agreed to set up an ad-hoc team composing experts from Hong Kong, China, Malaysia, New Zealand, Singapore, USA, and WMO to draw up a tentative programme for the seminar, subject to confirmation from WMO.

Review Subject/Tasks List of the CNS/MET Sub-Group

2.2.129 The meeting reviewed the Terms of Reference of the CNS/MET Sub-Group and did not see the need to propose any change.

2.2.130 The meeting then reviewed the Subject/Task List of the CNS/MET Sub-Group. It was noted that of the 40 tasks 29 tasks were completed and the completed Tasks had been deleted from the list. It was noted that the Task No. 31 had identified the need to provide COM facility to support aircraft access to OPMET data bank. It was recognized that it was not operationally required to provide data link at 5 OPMET data banks in the ASIA/PAC region. Instead, it was considered desirable to provide access to VOLMET broadcast stations by aircraft via data link in accordance with Key Priority in the CNS/ATM Implementation. The Task No. 31 was therefore, amended accordingly in line with the Key Priority. Tasks No. 32 and 37 were amended to reflect new developments in the MET field. New Tasks, No. 39 on the improvement of the OPMET exchange in the ASIA/PAC region, and No.40 on the development of Quality Management Systems for the meteorological services provided for the international air navigation, were added to the list.

2.2.131 The target dates, actions proposed and/or in progress were updated to indicate the progress.

2.2.132 The updated Subject/Task List is provided in Appendix L. In consideration of the foregoing, the meeting adopted the following Decision.

Decision 14/43 - Update Subject/Tasks List of the CNS/MET Sub-Group

That, the updated Subject/Tasks List of the CNS/MET Sub-Group presented in Appendix L be adopted.

TITLE AND TERMS OF REFERENCE

TITLE: ATN Transition Task Force

TERMS OF REFERENCE:

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

Subject/Tasks List of the ATN Transition Task Force

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
1	RAN/3 C 10/12 C 10/11d	Subject: ATN Transition Guidance Material. Task: Develop Regional ATN Transition Guidance Material.		1) Development of detailed guidance material.	Completed
2	RAN/3 C 10/11d	Subject: ATN Transition Plan Task: Develop an ATN Transition Plan to provide seamless transition to ATN.		1) Develop Ground Transition Plan taking into account Air-to-Ground aspects. 2) Develop a set of planning documents covering: i) ATN Regional Routing Architecture ii) ATN Naming and Addressing Conventions, and iii) Documentation of the Assigned ATN Names and Addresses.	Completed
3		Subject: ATN major elements. Task: Provide performance and functional requirements of ATN.	A	1) Develop ATN Technical Documents. - Security - Performance - System Management	~~2003~~ 2004 ~~2003~~ 2004 ~~2003~~ 2004
4	RAN/3 C 10/11b	Subject: AFTN related issues Task: Review operation of AFTN.	B	1) Evaluate and review the effect of increases or decreases in capacity and network changes, on circuit loading. 2) Plan network changes for support of OPMET and AIS databases, automated VOLMET broadcast.	On-going ~~2003~~ completed
5		Subject: Planning and implementation information in ANP. Task: Develop G/G part of the CNS FASID.	A	Development of detail description for the existing tables and Charts for the G/G part of the CNS FASID. 1) Table CNS 1B – ATN Router Plan 2) Table CNS 1C – ATS MHS 3) Table CNS 1D – AIDC Routing Plan	 Completed ~~2003~~ 2004 ~~2003~~ 2005

No.	Ref.	Task	Priority	Action Proposed/In Progress	Target
6		Subject: ATN Documentation Task: Development of ATN Routing Documentations and ICDs.	A	Development of ATN Documents: 1) A Router ICD 2) A Routing policy for IDRP 3) A Routing policy for MTA 4) Directory of Service 5) An AMHS ICD 6) An AIDC ICD	~~2003~~ completed completed ~~2003~~ 2004 2004 completed 2004
7		Subject: Use of the public Internet Task: Develop guidance material for the use of the public internet technology to support AFTN, where required.	A	Study the possibility of using the public Internet and develop guidance material for its use to support low speed AFTN stations, as an interim measure, with particular emphasis on security and reliability.	~~2003~~ completed
8		Subject: Use of IP Task: Develop guidance material for the use of IP as a Sub-Network for ATN	B	In accordance with the work being performed by 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) (Monitor development in ACP)
9		Subject: AMHS Naming Registration Task: Develop registration forms for assigning AMHS address for the region	A	To develop an AMHS Naming Registration Planning Document for registering the AMHS naming conventions and assignments to be used within the region.	2004
10		Subject: AFTN/AMHS Operational Procedures Tasks: Revise and develop operational procedures applicable to the use of the AMHS.	A	To review existing AFTN proceduress and adopt or develop new procedures applicable to the operation and use of the AMHS.	2004

UPDATED 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 ICAO ~~GNSS~~ SARPs and guidance material ***for GNSS with augmentation to support Cat I precision approach;***

d) the knowledge that GNSS without augmentation can support non-precision approaches and that augmented GNSS- based systems ***is expected to*** ~~will~~ be available to support Category I operations ***by year 2006*** ~~from end of year 2004~~;

e) ~~feasibility of GBAS systems~~ ***GNSS with augmentation*** to support category II and III operations ***is expected to be available in 2010 – 2015 time frame*** ~~in 2006~~;

f) ~~the availability of a proven and standardized MLS to meet all weather operations requirements;~~ ***MLS Cat I is operational and ground and airborne Cat III B certification is in progress;***

g) ~~the development and deployment of multimode receivers;~~ ***a multi-modal airborne approach and landing capability is necessary and expected to be available;***

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

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

b) Implement GNSS with ***augmentation*** ~~GBAS~~ to support Category I operations where ***operationally required and economically beneficial*** ~~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.

g) Protect radio frequency spectrum of ILS, MLS and GNSS since the transition from ILS to GNSS and /or MLS will be evolutionary and will take some time.

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

Considering that:

1) Safety is the highest priority;

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

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

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

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

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

7) Development status of aircraft-based augmentation systems;

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

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

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

10) The regional navigation requirements are~~of~~:

(a) RNP10***/RNP4*** for en-route ~~in remote/oceanic areas~~;
(b) RNP4 for ~~en-route and~~ ***transition to*** terminal phase of flight;
(c) *RNP1 for terminal phase of flight*;
(~~e~~d) NPA/APV for approaches and departures; and
~~(d)~~(e) Precision approaches at selected airports.

The general strategy for the implementation of GNSS in the ASIA/PAC Region is detailed below:

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

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

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

~~3)~~4) 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~~;

5) Introduce the use of GNSS for en-route, terminal and approach navigation;

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~~ ***, taking due consideration of the need 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.

TOR of ADS-B STUDY AND IMPLEMENTATION TASK FORCE

TERMS OF REFERENCE

Complete an industry wide ADS-B cost/benefit study for the near term use of ADS-B throughout the ASIA/PAC Region.

Develop an implementation plan for near term ADS-B applications in Asia Pacific including target dates taking into account available equipment standards and readiness of airspace users and ATS providers.

Note:

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

2. The Task Force should report to the APANPIRG meeting to be held in 2004 and subsequent meetings.

ASIA/PAC FASID **6-7-1**

FASID TABLE MET 7 — ~~IMPLEMENTATION~~ AUTHORIZED USERS OF THE SADIS AND ISCS2 SATELLITE BROADCAST in ASIA/PAC Region

EXPLANATION OF THE TABLE

Column

1. Name of the State or Territory.

2. User of the satellite broadcast. Abbreviations used:

CAA — civil aviation authority
NMS — national meteorological service
O — other than the civil aviation authority or the national meteorological service.

3. Location of VSAT : town and, where applicable, aerodrome to be indicated.

~~4. Indication whether the access to the satellite broadcast has been approved:~~

~~X — yes~~
~~[blank] no~~

~~5~~4. Indication whether the equipment is operational:

2w — two-way VSAT operational
1w — one-way VSAT operational
[blank] — no

Editorial Note. —	Column 4 considered redundant and proposed therefore for deletion.

International Satellite Communication System (ISCS/2) provided by the United States					
State/Territory	**WAFS User**	**Location of VSAT**	**~~Access Approved~~**	**~~Equipment Installed~~**	**Equipment Operational**
1	2	3			4
American Samoa (United States)		Information received from the US NWS, Honolulu via a dedicated circuit			
Australia	Bureau of Meteorology	Melbourne	~~X~~	~~X~~	~~X~~1w
China China Meteorological Administration (CMA) Civil Aviation Administration Civil Aviation Administration Hong Kong Observatory Chinese Aeronautical Meteorology Association		National MET Centre, Beijing Beijing Intl. Airport Shanghai Intl. Airport Hong Kong Intl. Airport Taibei	~~X~~ ~~X~~ ~~X~~ ~~X~~ ~~X~~	 ~~X~~ ~~X~~ ~~X~~	 ~~X~~1w ~~X~~1w ~~X~~1w
Cook I.	Meteorological Service				
Fiji	Meteorological Service	Nadi Intl. Airport	~~X~~	~~X~~	~~X~~1w
French Polynesia (France)	Meteo France	Information received from France via satellite	~~X~~		
Indonesia	Meteorological and Geophysical Agency	Soekarno – Hatta International Airport	~~X~~	~~X~~	~~X~~1w
Japan	Japan Meteorological Agency	~~Kokusai Denshin Denwa Co.~~ KODI Co.	~~X~~	~~X~~	~~X~~1w
Kiribati					
Malaysia	Department of Meteorology	Kuala Lumpur International Airport	~~X~~		1w
Mongolia	Civil Aviation Authority	Ulaanbaatar	~~X~~		
Nauru					
New Caledonia (France)	Meteo France		~~X~~	~~X~~	~~X~~1w
New Zealand	MET Service of New Zealand, Ltd.	Auckland Wellington	~~X~~ ~~X~~	~~Backup only~~ ~~X~~	 ~~X~~1w
Niue					
Papua New Guinea	Meteorological Department	Port Moresby Intl. Airport	~~X~~	~~X~~	~~X~~1w[1]
Philippines	Department of Meteorology	Manila	~~X~~	~~X~~	~~X~~1w[1]
Republic of Korea	Korea Meteorological Administration	Incheon Intl. Airport	~~X~~	~~X~~	~~X~~1w
Samoa					
Singapore	Singapore MET Service	Singapore/Changi Intl. Airport	~~X~~	~~X~~	~~X~~1w
Thailand	Meteorological Department	Bangkok Intl. Airport	~~X~~		
Tonga					
Tuvalu					
Vanuatu	Meteorological Service	Port Vila	~~X~~		
Viet Nam	Meteorological Service	Hanoi City	~~X~~	~~X~~	~~X~~1w
United States	National Weather Service	Guam Hawaii	~~X~~ ~~X~~	 ~~X~~	 ~~X~~1w

[1] Information received from the State that equipment is not operational.

International Satellite Communication System (ISCS/2) provided by the United States					
State/Territory	**WAFS User**	**Location of VSAT**	**~~Access Approved~~**	**~~Equipment Installed~~**	**Equipment Operational**
1	2	3			4
Wallis I. (France)	Meteo France	Wallis	~~X~~	~~X~~	~~X~~1w

Satellite Distribution System (SADIS) provided by the United Kingdom					
State/Territory	**WAFS User**	**Location of VSAT**	**~~Access Approved~~**	**~~Equipment Installed~~**	**Equipment Operational**
1	2	3			4
Bangladesh	Department of Meteorology	Dhaka			~~X~~1w
~~Brunei~~	~~Department of Civil Aviation~~	~~Brunei Intl. Airport~~	~~X~~	~~X~~	~~X~~
China	China Meteorological Administration (CMA)	National MET Centre, Beijing	~~X~~	~~X~~	
	Civil Aviation Administration	Beijing Intl. Airport	~~X~~	~~X~~	~~X~~1w
	Civil Aviation Administration	Shanghai Intl. Airport	~~X~~	~~X~~	~~X~~1w
	Hong Kong Observatory	Hong Kong Intl. Airport	~~X~~	~~X~~	~~X~~1w
	Chinese Aeronautical Meteorology Association	Taibei	~~X~~	~~X~~	
	Civil Aviation Administration	Macau Intl. Airport	~~X~~	~~X~~	~~X~~1w
DPR of Korea	General Administration of Civil Aviation	Pyongyang Intl. Airport	~~X~~	~~X~~	~~X~~1w
India	Meteorological Department	New Delhi	~~X~~	~~X~~	~~X~~1w
Indonesia	Meteorological and Geophysical Agency	Headquarters	~~X~~	~~X~~	
Lao PDR	Department of Meteorology	Vientiane, Watty	~~X~~	~~X~~	~~X~~1w
Malaysia	Department of Meteorology	Kuala Lumpur Intl. Airport	~~X~~	~~X~~	~~X~~1w
Maldives	Department of Meteorology	Male Intl. Airport	~~X~~	~~X~~	~~X~~1w
Mongolia	Civil Aviation Authority	Ulaanbaatar Intl. Airport	~~X~~	~~X~~	~~X~~1w
Nepal	Department of Meteorology	Kathmandu Intl. Airport	~~X~~	~~X~~	~~X~~1w
Pakistan	Meteorological Department	Karachi Intl Airport	~~X~~	~~X~~	~~X~~1w
Republic of Korea	Korea Meteorological Administration	Incheon Intl. Airport	~~X~~	~~X~~	~~X~~1w
Sri Lanka	Department of Meteorology	Colombo	~~X~~	~~X~~	~~X~~1w
Thailand	Thai Meteorological Department	Bangkok Intl. Airport	~~X~~	~~X~~	~~X~~1w
Vietnam	~~Civil Aviation Administration~~	~~Gialam Airport, Hanoi~~	~~X~~	~~X~~	~~X~~1w
	Civil Aviation Administration	Tan-Son-Nhat Intl. Airport, Ho Chi Minh	~~X~~	~~X~~	

SADIS STRATEGIC ASSESSMENT TABLES
CURRENT AND PROJECTED DATA VOLUMES 2003-2007

Note 1:1 octet = 1 byte = 1 character;

Note 2: low level (SWL) <FL 100; medium level (SWM): FL100 – FL 250; high level (SWH): >FL250.

Table 1. ASIA— OPMET data volumes

Main routing(s): AFTN, direct line (GTS)

OPMET data	*Current 2003*	*Projected 2004*	*Projected 2005*	*Projected 2006*	*Projected 2007*
ALPHANUMERIC DATA					
Number of FC bulletins issued per day	106	110	120	130	140
Average number of stations per FC bulletin	6	6	6	6	6
Number of **FT bulletins** issued per day	211	220	230	240	250
Average number of stations per FT bulletin	6	6	6	6	6
Number of **SA bulletins** issued per day	1448	1500	1550	1600	1650
Average number of stations per SA bulletin	6	6	6	6	6
Number of **SP bulletins** issued per day	0	20	30	40	50
Number of **SIGMET** bulletins issued per day	25	25	25	25	25
Number of **FK/FV** bulletins issued per day?	**4**	**5**	**5**	**5**	**5**
BINARY DATA					
Number of other bulletins issued per day	**0**	**0**	**0**	**0**	**0**
(please specify header(s))					
Average number of stations per bulletin	**0**	**0**	**0**	**0**	**0**
TOTALS					
Total number of OPMET bulletins per day	1794	1880	1960	2040	2120
Average size of OPMET bulletin (bytes)	350	350	350	350	350
Total estimated OPMET data volume per day (bytes)	628K	658K	686K	714K	742K

Table 2. ASIA — T4 Facsimile chart volumes

Editorial Note.—	*Proposed for deletion*; no requirement.

Table 3. ASIA — BUFR data volumes

Main routing(s): GTS

BUFR SIGWX messages	*Current 2003*	*Projected 2004*	*Projected 2005*	*Projected 2006*	*Projected 2007*
(a) 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 (SWL)/medium (SWM) 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

Note: It is assumed that only one site will have the capacity to send BUFR information to WAFC London.

Table 4. ASIA — AIS data volumes

Main routing(s): AFTN

AIS (Subject to statement of an operational requirement)	*Current 2003*	*Projected 2004*	*Projected 2005*	*Projected 2006*	*Projected 2007*
ALPHANUMERIC AIS DATA (e.g. NOTAMs, ASHTAMs)					
Bulletin type	No requirement	No requirement	No requirement	No requirement	No requirement
Number of bulletins issued per day					
Average size of each bulletin (bytes)					
Bulletin type					
Number of bulletins issued per day					
Average size of each bulletin (bytes)					
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 (byte)					
Total number of AIS charts issued per day					
Average size of AIS chart (byte)					
Total estimated volume of AIS data per day (bytes)					

AMENDMENT PROPOSAL TO ASIA/PAC BASIC ANP AND FASID (DOC 9673)

ASIA/PAC BASIC ANP–MET **6-0-1**

PART VI

METEOROLOGY (MET)

. . . .

8. World area forecast system (WAFS)
(FASID Tables MET 5, MET 6 and MET 7)

8.1 FASID Table MET 5 sets out the ASIA/PAC Regions requirements for WAFS ~~products: upper wind and temperature and significant weather (SIGWX) charts, and the gridded binary (GRIB) data, and abbreviated plain language SIGWX,~~ forecasts to be provided by WAFCs London and Washington.
[APANPIRG/10 Concl. 10/18]

~~8.2 All the WAFS products should be prepared by WAFCs London and Washington for fixed valid times of 00, 06, 12 and 18 UTC.~~
~~[APANPIRG/10 Concl. 10/18]~~

Editorial Note. – Paragraph is redundant as it repeats Annex 3, 3.2.3.

8.~~3~~2 The levels for which forecasts of upper-air wind and temperature and SIGWX forecasts in charts ~~form~~ are to be provided by the WAFCs London and Washington and the areas to be covered by these charts ~~and the GRIB data~~ are indicated in FASID Table MET 5.
[APANPIRG/10 Concl. 10/18]

Note.– WAFCs will continue to issue forecasts of upper-air wind and temperature and of SIGWX in chart form until 1 July 2005.

8.~~4~~3 FASID Table MET 6 sets out the ~~WAFCs~~ responsibilities ~~for~~ of WACs London and Washington for the production of ~~SIGWX~~ WAFS forecasts ~~and upper wind and temperature charts for the areas of coverage indicated, and GRIB data. Each WAFC is responsible for the routine production, and dissemination by satellite broadcast, of charts for the areas of coverage listed.~~ For back-up purposes, each WAFC should have the capability to produce ~~SIGWX~~ WAFS forecasts for all the required areas of coverage.
[APANPIRG/10 Concl. 10/18]

8.~~5~~4 The projection of the WAFS forecasts in charts ~~from~~ and their areas of coverage should be as indicated in FASID Charts MET 4, MET 5 and MET 6 associated with FASID Table MET 6; their scale should be 1:20 X 10^6, true at 22.5^0 in the case of charts in the Mercator projection, and true at 60^0 latitude in the case of charts in the polar stereo-graphic projection.
[APANPIRG/10 Concl. 10/18]
[ASIA/PAC/3 Rec. 8/21]
[APANPIRG/12 Concl. 12]

Note.– WAFCs will continue to issue forecasts of upper-air wind and temperature and of SIGWX in chart form until 1 July 2005.

8.~~6~~5 WAFS products should be disseminated by WAFC London using the satellite distribution system for information relating to air navigation (SADIS) and by WAFC Washington using the international satellite communications system (ISCS2) covering the reception area shown in FASID Chart CNS 7. To fulfil the requirements of long distance flights, transmission of WAFS products should be completed not later than 11 hours before validity time.
[APANPIRG/10 Concl. 10/18]

8.~~7~~6 The amendment service to the ~~WAFS products~~ SIGWX forecasts issued by WAFCs London and Washington should be by means of ~~abbreviated plain language messages~~ amended BUFR files disseminated through SADIS and ISCS2.
[APANPIRG/10 Concl. 10/18]

8.8 Each State should make the necessary arrangements to receive and make full operational use of WAFS products ~~issued~~ disseminated by WAFCs London and Washington. FASID Table MET 7 provides ~~the status of~~ lists the authorized ~~access by~~ users of the SADIS and ISCS2 ~~users to the~~ satellite broadcasts in the ASIA/PAC Regions and location of the operational VSATs.
[APANPIRG/10 Conc. 10/18]

ASIA/PAC FASID–MET **6-0-1**

PART VI

METEOROLOGY (MET)

. . . .

6. WORLD AREA FORECAST SYSTEM (WAFS)

(FASID Tables MET 5, MET 6 and MET 7
FASID Charts MET 4, MET 5, MET 6, and MET 7)

6.1 FASID Table MET 5 sets out the ASIA/PAC Regions requirements for WAFS ~~products: upper wind and temperature and significant weather (SIGWX) charts, and the gridded binary (GRIB) data, and abbreviated plain language SIGWX~~ forecasts, to be provided by WAFCs London and Washington.

6.2 FASID Table MET 6 sets out the ~~WAFCs~~ responsibilities ~~for the production of SIGWX forecasts and upper wind and temperature charts for the areas of coverage indicated, and the GRIB data~~ of WAFCs London and Washington for the production of WAFS forecasts. ~~WAFS~~ The maximum areas of coverage of WAFS forecasts in chart form are shown on FASID Charts MET 4, MET 5, MET 6, and MET 7).

Note. – WAFCs will continue to issue forecasts of upper-air wind and temperature and of SIGWX in chart form until 1 July 2005.

6.3 FASID Table MET 7 ~~provides the status of~~ lists the authorized ~~access by~~ users of SADIS and ISCS2 ~~users to the~~ satellite broadcasts in ASIA/PAC Regions and location of the operational VSATs. The table is included in the FASID for information purposes and kept up-to-date by the Regional Offices concerned.

FASID TABLE MET 5 – REQUIREMENTS FOR WAFS PRODUCTS

EXPLANATION OF THE TABLE

~~*PRODUCT REQUIRED*~~

~~W/T Chart = Wind and temperature chart~~
~~SWM = Medium level significant weather chart (FL 100 - 240)~~
~~SWH = High level significant weather chart (FL 250 - 630)~~

Column

1. WAFS products required by the ASIA/PAC States, to be provided by WAFC London and Washington.

2. Area of coverage required for the WAFS forecasts, to be provided by WAFC London and Washington.

CHART COVERAGE REQUIRED

D, E, F, G, H, I, J, K, M = Maximum area of coverage required (see Charts MET 4, 5, 6 and 7 attached to Table MET 6)

FASID TABLE MET 5 - REQUIREMENTS FOR WAFS PRODUCTS

~~PRODUCT~~ FORECAST REQUIRED		AREAS REQUIRED
1		2
W/T CHART >	FL 390	D, E, F, G, I, J
A @ A @	FL 390	D, E, F, G, I, J
A @ A @	FL 340	D, E, F, G, I, J
A @ A @	FL 300	D, E, F, G, I, J
A @ A @	FL 240	D, E, F, G, I, J
A @ A @	FL 180	D, E, F, G, I, J
A @ A @	FL 100	D, E, F, G, I, J
A @ A @	FL 50	D, E, F, G, I, J
SWM (FL 100 - 450)		D
SWH CHART (FL 250 - 630)		D, E, F, G, I, J, K, M
~~GRIB data~~ SIGWX forecasts in the BUFR code form		GLOBAL
~~Amendment to SIGWX forecasts in abbreviated plain language~~ Upper-air wind and temperature forecasts in the GRIB code form		~~D, E, F, G, I, J, K~~ GLOBAL

Note 1.— SWM charts are provided for limited geographical areas as determined by regional air navigation agreement.

Note 2.— WAFCs will continue to issue forecasts of upper-air wind and temperature and of SIGWX in chart form until 1 July 2005.

FASID TABLE MET 6 – RESPONSIBILITIES OF THE WORLD AREA FORECAST CENTRES

EXPLANATION OF THE TABLE

Column

1 Name of the world area forecast centre (WAFC).

2 Area of ~~responsibility for the preparation~~ coverage of the significant weather (SIGWX) forecasts by the WAFC in Column 1.

3 Area of coverage of the SIGWX charts prepared or relayed by the WAFC in Column 1.

4 Area of coverage of the upper-air wind and temperature ~~charts prepared~~ forecasts in the GRIB code form issued by the WAFC in Column 1.

5 Area of coverage of the upper-air wind and temperature forecasts in chart form ~~GRIB data~~ prepared by the WAFC in Column 1.

FASID TABLE MET 6 B RESPONSIBILITIES OF THE WORLD AREA FORECAST CENTRES

WAFC	Areas of coverage of			
	SIGWX forecasts		Upper-air wind and Ttemperature forecasts	
	~~Area of responsibility~~ In the BUFR code form	~~Areas of coverage of SIGWX~~ In chart form[21]	~~Areas of charts coverage~~ In the GRIB code form	~~GRIB data~~In charts form[21]
1	2	3	4	5
London	Global[1]	D, E, G, K~~,~~ ~~ASIA SOUTH MEDIUM~~D (FL100-450)	~~D, E, G~~ gGlobal[1]	~~Global~~ D, E, G
Washington	~~global~~[1]Global	F, I, J, M	~~F, I~~ gGlobal[1]	~~Global~~ F, I, J, M

~~*Note : All SIGWX charts are for FL250 – 630, except for ASIA SOUTH*~~ *Notes corresponding to superscripts in FASID Table MET 6 above*

~~1) For back-up purposes~~

~~2~~1~~)~~ ~~Special medium level chart (FL100-450)~~ WAFCs continue to issue forecasts of upper-air wind and temperature and of SIGWX in chart form until 1 July 2005.

NEW ROBEX TABLES

Table 1. ROBEX Collection and Dissemination of METAR Bulletins - APAC Region

Explanation of Table

Col. 1: Name and ICAO location indicator of the MCC.

Col. 2: Description of the METAR Bulletin.

Col. 3: Regional OPMET Data Bank (RODB) responsible for collection and disssemination of the bulletin.

Col. 4: Official time of the bulletin. Aerodromes indicated with an asterisk (*) make half-hourly reports with official bulletin time in brackets.

Col. 5: Addresses to be used by the RODB in Col. 3 for the distribution in bulletin.

Table 1. ROBEX Collection and Dissemination of METAR Bulletins - APAC Region

1		2			3	4	5	
MCC		METAR Bulletin			RODB	Bul. Time	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			MCC Name	AFTN Address
Bangkok	VTBD	SAAS31	VTBD	BANGKOK/Bangkok Intl	BANGKOK	HH +30	Brisbane	YBZZSPTX
			VTCC	CHIANG MAI/Chiang Mai Intl		(HH +00)	Calcutta	VECCYPYX
			VTBU	RAYONG/U-Tapao Intl			Colombo	VCCCYPYX
			VTSS	SONGKHLA/Hat Yai Intl			Delhi	VIDPYPYX
			VTSP	PHUKET/Phuket Intl			Hong Kong	VHZZYPYX
			VLVT	VIENTIANE/Wattay			Jakarta	WIZZMCMC
			VYYY	YANGON/ Yangon Intl			Kuala Lumpur	WMZZYPYR
			VVTS	HO-CHI-MINH/Tan-Son Nhat			Mumbai	VABBYPYX
			VVNB	HANOI/Noibai			Incheon	RKSIYPYX
			VVDN	DANANG/Danang			Singapore	WSZZYPYM
			VDPP	PHNOM PENH/Pochentong			Wellington	NZZZYPYX
Beijing	ZBBB	SACI31	ZBAA	BEIJING/Capital	TOKYO	HH + 00	Bangkok	VTBBYPYX
			ZBTJ	TIANJING/Binhai		(HH + 30)	Brisbane	YBZZSQJX
			ZBYN	TAIYUAN/Wusu			Hong Kong	VHZZYPYX
			ZGGG	GUANGZHOU/Baiyun			Jakarta	WIZZMZBB
			ZSHC	HANGZHOU/Xiaoshan			Karachi	OPZZYPYX
			ZSPD	SHANGHAI/Pudong			Mumbai	VABBYPYX
			ZSSS	SHANGHAI/Hongqiao			Incheon	RKSIYPYX
			ZWWW	URUMQI/Diwopu			Singapore	WSZZYPYM
			ZYTL	DALIAN/Zhoushuzi			Tokyo	RJAAYPYX
			ZYTX	SHENYANG/Taoxian			Ulan Bator	ZMUBYMYX
							Wellington	NZZZYPYX
		SACI32	ZGKL	GUILIN/Liangjang	TOKYO	HH + 00	Bangkok	VTBBYPYX
			ZGNN	NANNING/Wuxu			Brisbane	YBZZSQSX
			ZGOW	SHANTOU/Shantou			Hong Kong	VHZZYPYX
			ZGSZ	SHENZHEN/Baoan			Jakarta	WIZZMZBB
			ZLXY	XIAN/Xianyang			Kuala Lumpur	WMZZYPYX
			ZMUB	ULAANBAATOR/Bryant-Ukhaa			Incheon	RKSIYPYX
			ZPPP	KUNMING/Wujiaba			Singapore	WSZZYPYM
			ZSAM	XIAMEN/Gaoqi			Tokyo	RJAAYPYX
			ZSQD	QINGDAO/Liuting			Wellington	NZZZYPYX
			ZUUU	CHENGDU/Shuangliu				
		SACI41	ZBHH	HOHHOT/Baita	TOKYO	HH + 00	Bangkok	VTBBYPYX
			ZGHA	CHANGSHA/Huanghua			Brisbane	YBZZSQJX
			ZHHH	WUHAN/Tianhe			Hong Kong	VHZZYPYX
			ZJHK	HAIKOU/Meilan			Jakarta	WIZZMZBB

1		2			3	4	5	
MCC		METAR Bulletin			RODB	Bul. Time	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			MCC Name	AFTN Address
			ZJSY	SANYA/Fenghuang			Karachi	OPZZYPYX
			ZLLL	LANZHOU/Zhongchuan			Mumbai	VABBYPYX
			ZSNJ	NANJING/Lukou			Incheon	RKSIYPYX
			ZSOF	HEFEI/Luogang			Singapore	WSZZYPYM
			ZUCK	CHONGQING/Jiangbei			Tokyo	RJAAYPYX
			ZWSH	KASHI			Ulan Bator	ZMUBYMYX
			ZYCC	CHANGCHUN/Dafangshen			Wellington	NZZZYPYX
			ZYHB	HARBIN/Yanjiangang				
Brisbane	YBBN	SAAU31	YSSY	SYDNEY/Kingsford Smith Intl	BRISBANE	HH + 00	Jakarta	WIZZMIMI
			YMML	MELBOURNE/Melbourne Intl		(HH + 30)	Nadi	NFFNYPYX
			YBBN	BRISBANE/Brisbane			Port Moresby	AYPYYMYX
			YPAD	ADELAIDE/Adelaide			Incheon	RKSIYPYX
			YPDN	DARWIN/Darwin			Wellington	NZZZYPYX
			YPPH	PERTH/Perth int			Hong Kong	VHZZYPYX
			YBCS	CAIRNS/Cairns				
			YBAS	ALICE SPRINGS/Alice Springs				
			YPLM	LEARMONTH/Learmonth				
			YBTL	TOWNSVILLE/Townsville				
			YPCC	COCOS ISL/Cocos Isl				
			YPXM	CHRISTMAS ISL/Christmas Isl				
			YPTN	TINDAL /Tindal RAAF				
		SAAU32	YSCB	CANBERRA/Canberra*	BRISBANE	HH + 00	Jakarta	WIZZMIMI
			YBCG	COOLANGATTA/Coolangatta*		(HH + 30)	Nadi	NFFNYPYX
			YMAV	AVALON/Avalon*			Port Moresby	AYPYYMYX
			YBRK	ROCKHAMPTON/Rockhampton*			Seoul	RKSSYPYX
			YPKG	KLAGOORLIE/Kalgoorlie*			Wellington	NZZZYPYX
			YPPD	PORT HEDLAND/Port Hedland*				
			YBRM	BROOME/Broome*				
			YSNF	NORFOLK ILS/Norfolk Isl*				
			YSDU	DUBBO/Dubbo				
			YSRI	RICHMOND/Richmond *				
			YWLM	WILLIAMTOWN/Williamtown *				
			YMLT	LAUNCESTON/Launceston*				
			YMHB	HOBART/Hobart*				
			YPEA	PEARCE/Pearce				

1		2			3	4	5	
MCC		METAR Bulletin			RODB	Bul. Time	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			MCC Name	AFTN Address
Colombo	VCCC	SASB31	VCBI	COLOMBO/Katunayake	BANGKOK	HH +50	Bangkok	VTBBYPYX
			VRMM	MALE/Male Intl		(HH + 20)	Kuala Lumpur	WMZZYPYR
							Mumbai	VABBYPYX
							Singapore	WSZZYPYM
							Tokyo	RJAAYPYX
							Hong Kong	VHZZYPYX
Delhi	VIDP	SAIN32	VIDP	DELHI/Indira Gandhi Intl	BANGKOK	HH + 30	Bangkok	VTBBYPYX
			VILK	LUCKNOW		(HH + 00)	Brisbane	YBZZSPXX
			VIBN	VARANASI/Varanasi			Calcutta	VECCYPYX
			VIAR	AMRITSAR/Amritsar			Karachi	OPZZYPYX
							Mumbai	VABBYPYX
							Tokyo	RJAAYPYX
							Hong Kong	VHZZYPYX
Hong Kong	VHHH	SAHK31	VHHH	HONG KONG/Hong Kong Intl	TOKYO	HH + 00	Bangkok	VTBBYPYX
			RCTP	TAIBEI/Taibei Intl		(HH + 30)	Beijing	ZBBBYPYX
			RCKH	GAOXIONG/Gaoxiong			Brisbane	YBZZSPHX
			RCSS	TABEI/Sungshan			Guangshou	ZGGGYPYX
			VMMC	MACAU/Macau Intl			Kuala Lumpur	WMZZYPYR
			RPLL	MANILA/Ninoy Aquino Intl*			Incheon	RKSIYPYX
			RPVM	LAPU LAPU/Mactan Cebu Intl*			Singapore	WSZZYPYM
			RPMD	DAVAO/Francisco Bangoy Intl			Tokyo	RJAAYPYX
			RPLB	SUBIC BAY/Subic Bay Intl			Wellington	NZZZYPYX
Jakarta	WIII	SAID31	WIIH	JAKARTA/Halim	SINGAPORE	HH + 00	Bangkok	VTBBYPYX
			WIII	JAKARTA/Soekarno-Hatta		(HH + 30)	Brisbane	YBZZSSHX
			WIMM	MEDAN/Polonia			Kuala Lumpur	WMZZYPYR
			WRSJ	SURABAYA/Juanda			Singapore	WSZZYPYM
			WRRR	DENPASAR*			Wellington	NZZZYPYX
			WAAA	UJUNG PANDANG/Hasanuddin			Hong Kong	VHZZYPYX
			WABB	BIAK/Frans Kaisieppo				
Calcutta	VECC	SAAE31	VECC	CALCUTTA/Netaji Subhash Chandra Bose Intl	BANGKOK	HH + 50	Bangkok	VTBBYPYX
			VEPT	PATNA/Patna			Brisbane	YBZZSPWX
			VGZR	DHAKA/Zia Intl			Colombo	VCCCYPYX
			VGEG	CHITTAGONG/M. A. Hannan Intl			Delhi	VIDPYPYX
			VNKT	KATHMANDU/Tribhuvan Intl*			Karachi	OPZZYPYX
							Mumbai	VABBYPYX
							Tokyo	RJAAYPYX
							Hong Kong	VHZZYPYX

1		2			3	4	5	
MCC		METAR Bulletin			RODB	Bul. Time	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			MCC Name	AFTN Address
Karachi	OPKC	SAPK31	OPKC	KARACHI/Quaid-E-Azam Intl	BANGKOK	HH +50	Abu Dhabi	OMZZYPYX
			OPRN	ISLAMABAD/Chaklala		(HH +20)	Bahrain	OBZZYPYX
			OPLA	LAHORE/Lahore			Beijing	ZBBBYPYX
			OPNH	NAWABSHAH			Calcutta	VECCYPYX
			OPGD	GAWADAR			Delhi	VIDDYPYX
			OPPS	PESHAVAR			Mumbai	VABBYPYX
							Tehran	OIZZYPYX
							Hong Kong	VHZZYPYX
Kuala Lumpur	WMKK	SAMS31	WMKK	KUALA LUMPUR/Kuala Lumpur Intl	SINGAPORE	HH + 30	Bangkok	VTBBYPYX
			WSSS	SINGAPORE/Changi		(HH + 10)	Colombo	VCCCYPYX
			~~WSAP~~	~~SINGAPORE/Paya Lebar~~			Hong Kong	VHZZYPYX
			WMKP	PENANG/Bayan Lepas			Jakarta	WIZZMBMB
			WBKK	KOTA KINABALU/Kota Kinabalu Intl			Manila	RPLLYPYX
			WBGG	KUCHING/Kuching			Mumbai	VABBYPYX
			WBSB	BANDAR SERI BEGAWAN /Brunei Intl			Incheon	RKSIYPYX
							Wellington	NZZZYPYX
Mumbai	VABB	SAIN31	VABB	MUMBA/Jawaharial Nehru IntlI	BANGKOK	HH + 40	Abu Dhabi	OMZZYPYX
			VOMM	CHENNAI/Chennai		(HH + 10)	Bahrain	OBZZYPYX
			VOTR	TIRUCHCHIRAPPALLI			Bangkok	VTBBYPYX
			VOTV	TRIVANDRUM/Trivandrum Intl			Brisbane	YBZZSPVX
			VAAH	AHMADABAD/Ahmadabad			Calcutta	VECCYPYX
			VOHY	HYDERABAD			Colombo	VCCCYPYX
			VANP	NAGPUR			Delhi	VIDPYPYX
							Karachi	OPZZYPYX
							Singapore	WSZZYPYM
							Tehran	OIZZYPYX
							Tokyo	RJAAYPYX
							Hong Kong	VHZZYPYX
Port Moresby	AYPY	SAPW31	AYPY	PORT MORESBY/Jacksons	BRISBANE	HH + 00	Bangkok	VTBBYPYX
			AYMD	MADANG		(HH + 30)	Beijing	ZBBBYPYX
			AYWK	WEWAK			Brisbane	YBZZSPSX
							Hong Kong	WSZZYPYM
							Wellington	NZZZYPYX

1		2			3	4	5	
MCC		METAR Bulletin			RODB	Bul. Time	DISSEMINATION TO	
Name	CCCC	BUL No.	CCCC	Aerodrome			MCC Name	AFTN Address
Incheon	RKSI	SAKO31	RKSI	SEOUL/Incheon Intl	TOKYO	HH + 00	Bangkok	VTBBYPYX
			RKSS	SEOUL/Gimpo Intl		(HH + 30)	Beijing	ZBBBYPYX
			RKPC	JEJU/Jeju Intl			Brisbane	YBZZSPSX
			RKPK	BUSAN/Gimhae Intl			Hong Kong	WSZZYPYM
			RKTU	CHEONGJU/Cheongju Intl			Singapore	WSZZYPYM
			RKNY	YANGYANG/Yangyang Intl			Tokyo	RJAAYPYX
			RKTN	DAEGU/Daegu Intl			Wellington	NZZZYPYX
							Mumbai	VABBYPYX
Tokyo	RJTD	~~SAJP31~~	RJAA	TOKYO/New Tokyo Intl	TOKYO	HH + 00	Beijing	ZBBBYPYX
		SAFE31	RJTT	TOKYO/Tokyo Intl		(HH + 30)	Brisbane	YBZZSPAX
			ROAH	NAHA/Naha			Hong Kong	VHZZYPYX
			RJOO	OSAKA/Osaka Intl			Incheon	RKSIYPYX
			RJBB	OSAKA/Kansai Intl			Singapore	WSSSYMYX
			RJNN	NAGOYA/Nagoya			Wellington	NZZZYPYX
							Bangkok	VTBBYPYX
							Guam	PGUMCOAX
							Nadi	NFZZRCXX
		~~SAJP32~~	RJCC	SAPPORO/New Chitose	TOKYO	HH + 00	Beijing	ZBBBYPYX
		SAFE32	RJFF	FUKUOKA/Fukuoka		(HH + 30)	Brisbane	YBZZSPAX
			RJFK	KAGOSHIMA/Kagoshima			Hong Kong	VHZZYPYX
			RJCH	HAKODATE/Hakodate			Incheon	RKSIYPYX
			RJFU	NAGASAKI/Nagasaki			Singapore	WSSSYMYX
							Bangkok	VTBBYPYX
							Guam	PGUMCOAX
							Nadi	NFZZRCXX
							London	EGZZMASI
							Wellington	NZZZYPYX
Wellington	NZKL	SANZ31	NZWN	WELLINGTON/Wellington Intl	BRISBANE	HH + 00	Bangkok	VTBBYPYX
			NZAA	AUCKLAND/Auckland Intl			Beijing	ZBBBYPYX
			NZCH	CHRISTCHURCH/Christchurch Intl			Brisbane	YBZZSPNX
							Jakarta	WIZZYPYX
							Hong Kong	VHZZYPYX
							Nadi	NFFNYPYX
							Port Moresby	AYPYYMYX
							Incheon	RKSIYPYX
							Singapore	WSZZYPYM
							Tokyo	RJAAYPYX

Table 2. ROBEX Collection and Dissemination of TAF (FT) Bulletins - APAC Region

Explanation of the Table

Col. 1: Name of the TCC.

Col. 2: Location indicator of TCC

Col. 3: Bulletin id

Col. 4: Location indicators of the aerodromes in the bulletin

Col. 5: Name of the aerodrome

Col. 6: Filing time of the bulletin

Col. 7: Start of validity time for the TAFs in the bulletin

Col. 8: Regional OPMET data bank responsible for the bulletin

Col. 9: Name of the aerodromes/OPMET centres to which the bulletin shall be disseminated

Col 10: AFTN address of the aerodrome/OPMET centre

Table 2. ROBEX Collection and Dissemination of TAF (FT) Bulletins - APAC Region

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
Bangkok	VTBD	FTAS31	VTBD	BANGKOK/Bangkok Intl	0400	0600	BANGKOK	Abu Dhabi	OMZZYPYX
			VYYY	YANGON/ Yangon Intl	1000	1200		Bahrain	OBZZYPYX
			VGZR	DHAKA/Zia Intl	1600	1800		Beijing	ZBBBYPYX
			VLVT	VIENTIANE/Wattay	2200	0000		Beirut	OLLLYPYX
			VVTS	HO-CHI-MINH/Tan-Son Nhat				Brisbane	YBZZSQEX
			VDPP	PHNOM PENH/Pochentong				Hong Kong	VHZZYPYX
								Jeddah	OEJDYPYX
								Karachi	OPZZYPYX
								Kuala Lumpur	WMZZYPYR
								Mumbai	VABBYPYX
								Incheon	RKSIYPYX
								Singapore	WSZZYPYX
								Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
								Wellington	NZZZYPYA
		FTAS32	VTBU	RAYONG/U-Tapao Intl	0400	0600	BANGKOK	Abu Dhabi	OMZZYPYX
			VTCC	CHIANG MAI/Chiang Mai Intl	1000	1200		Bahrain	OBZZYPYX
			VTSS	SONGKHLA/Hat Yai Intl	1600	1800		Beijing	ZBBBYPYX
			VTSP	PHUKET/Phuket Intl	2200	0000		Beirut	OLLLYPYX
			VVNB	HANOI/Noibai				Brisbane	YBZZSQEX
			VVDN	DANANG/Danang				Hong Kong	VHZZYPYX
								Jeddah	OEJDYPYX
								Karachi	OPZZYPYX
								Kuala Lumpur	WMZZYPYR
								Mumbai	VABBYPYX
								Incheon	RKSIYPYX
								Singapore	WSZZYPYX
								Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
								Wellington	NZZZYPYA
Beijing	ZBBB	FTCI31	ZBAA	BEIJING/Capital	0500	0600	TOKYO	Bangkok	VTBBYPYX
			ZBTJ	TIANJING/Binhai	1100	1200		Brisbane	YBZZSQJT
			ZBYN	TAIYUAN/Wusu	1700	1800		Hong Kong	VHZZYPYX
			ZGGG	GUANGZHOU/Baiyun	2300	0000		Karachi	OPZZYPYX
			ZSSS	SHANGHAI/Hongqiao				Mumbai	VABBYPYX

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
			ZSHC	HANGZHOU/Xiaoshan				Incheon	RKSIYPYX
			ZYTX	SHENYANG/Taoxian				Singapore	WSZZYPYX
			ZYTL	DALIAN/Zhoushuzi				Tokyo	RJAAYPYX
			ZWWW	URUMQI/Diwopu				Ulan Bator	XMUBYMYX
			ZSPD	SHANGHAI/Pudong				Wellington	NZZZYPYA
		FTCI32	ZPPP	KUNMING/Wujiaba	0500	0600	TOKYO	Bangkok	VTBBYPYX
			ZGNN	NANNING/Wuxu	1100	1200		Brisbane	YBZZSQJT
			ZGOW	SHANTOU/Shantou	1700	1800		Hong Kong	VHZZYPYX
			ZGSZ	SHENZHEN/Baoan	2300	0000		Jakarta	WIZZYPYX
			ZSAM	XIAMEN/Gaoqi				Karachi	OPZZYPYX
			ZSQD	QINGDAO/Liuting				Kuala Lumpur	WMZZYPYR
			ZUUU	CHENGDU/Shuangliu				Mumbai	VABBYPYX
			ZLXY	XIAN/Xianyang				Singapore	WSZZYPYX
			ZMUB	ULAANBAATOR/Bryant-Ukhaa				Tokyo	RJAAYPYX
			ZGKL	GUILIN/Liangjang				Wellington	NZZZYPYA
		FTCI41	ZBHH	HOHHOT/Baita	0500	0600	TOKYO	Bangkok	VTBBYPYX
			ZGHA	CHANGSHA/Huanghua	1100	1200		Brisbane	YBZZSQJX
			ZJHK	HAIKOU/Meilan	1700	1800		Hong Kong	VHZZYPYX
			ZHHH	WUHAN/Tianhe	2300	0000		Jakarta	WIZZYPYX
			ZSOF	HEFEI/Luogang				Karachi	OPZZYPYX
			ZSNJ	NANJING/Lukou				Mumbai	VABBYPYX
			ZUCK	CHONGQING/Jiangbei				Incheon	RKSIYPYX
			ZLLL	LANZHOU/Zhongchuan				Singapore	WSZZYPYX
			ZYHB	HARBIN/Yanjiangang				Tokyo	RJAAYPYX
			ZYCC	CHANGCHUN/Dafangshen				Ulan Bator	ZMUBYMYX
			ZWSH	KASHI				Wellington	NZZZYPYX
Brisbane	YBBN	FTAU31	YSSY	SYDNEY/Kingsford Smith Intl	0500	0600	BRISBANE	Bangkok	VTBBYPYX
			YPAD	ADELAIDE/Adelaide	1100	1200		Beijing	ZBBBYPYX
			YBBN	BRISBANE/Brisbane	1700	1800		Hong Kong	VHZZYPYX
			YMML	MELBOURNE/Melbourne Intl	2300	0000		Jakarta	WIZZYPYX
			YBCS	CAIRNS/Cairns				Manila	RPLLYPYX
			YPPH	PERTH/Perth				Mumbai	VABBYPYX
			YPDN	DARWIN/Darwin				Nadi	NFZZRFXX
			YBAS	ALICE SPRINGS/Alice Springs				Port Moresby	AYPYYMYX
			YPTN	TINDAL/Tindal				Singapore	WSZZYPYX
			YPXM	CHRISTMAS ISLAND/Christmas Island				Tokyo	RJAAYPYX
								Wellington	NZZZYPYX

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
		FTAU32	YSCB	CANBERRA/Canberra	0500	0600	BRISBANE	Bangkok	VTBBYPYX
			YBCG	COOLANGATTA/Coolangatta	1100	1200		Hong Kong	VHZZYPYX
			YMAV	AVALON/Avalon	1700	1800		Jakarta	WIZZYPYX
			YBTL	TOWNSVILLE/Townsville	2300	0000		Manila	RPLLYPYX
			YBRK	ROCKHAMPTON/Rockhampton				Mumbai	VABBYPYX
			YPLM	LEARMOUNTH/Learmounth				Nadi	NFZZRFXX
			YPKG	KALGOORLIE/Kalgoorlie				Singapore	WSZZYPYQ
			YPPD	PORT HEDLAND/Port Hedland				Tokyo	RJAAYPYX
			YPEA	PEARCE/Perace RAAF				Wellington	NZZZYPYX
			YPCC	COCOS ISLAND/Cocos Island					
		FTAU33	YBRM	BROOME/Broome	0100	0200	BRISBANE	Bangkok	VTBBYPYX
			YSNF	NORFOLK ISLAND/Norfolk Island	0700	0800		Hong Kong	VHZZYPYX
			YSDU	DUBBO/Dubbo	1300	1400		Jakarta	WIZZYPYX
			YSRI	RICHMOND/Richmond RAAF	1900	2000		Manila	RPLLYPYX
			YWLM	WILLIAMTOWN/Williamtown RAAF				Mumbai	VABBYPYX
			YMLT	LAUNCESTON/Launceston				Nadi	NFZZRFXX
			YMHB	HOBART/Hobart				Singapore	WSZZYPYQ
								Tokyo	RJAAYPYX
								Wellington	NZZZYPYX
Hong Kong	VHHH	FTHK31	VHHH	HONG KONG/Hong Kong Intl	0400	0600	TOKYO	Abu Dhabi	OMZZYPYX
			RCTP	TAIBEI/Taibei Intl	1000	1200		Bahrain	OBZZYPYX
			RCKH	GAOXIONG/Gaoxiong	1600	1800		Bangkok	VTBBYPYX
			RCSS	TABEI/Sungshan	2200	0000		Beijing	ZBBYPYX
			VMMC	MACAU/Macau Intl				Beirut	OLLLYPYX
			RPLL	MANILA/Ninoy Aquino Intl				Brisbane	YBZZSQKX
			RPVM	LAPU LAPU/Mactan Cebu Intl				Karachi	OPZZYPYX
			RPMD	DAVAO/Francisco Bangoy Intl				Mumbai	VABBYPYX
			RPLB	SUBIC BAY/Subic Bay Intl				Incheon	RKSIYPYX
			RPMZ	ZAMBOANGA/Zamboanga Intl				Singapore	WSZZYPYQ
			RPLI	LAOAG/Laoag Intl				Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
								Wellington	NZZZYPYA
Karachi	OPKC	FTPK31	OPKC	KARACHI/Quaid-E-Azam Intl	0400	0600	BANGKOK	Abu Dhabi	OMZZYPYX
			OPRN	ISLAMABAD/Chaklala	1000	1200		Bahrain	OBZZYPYX
			OPLA	LAHORE/Lahore	1600	1800		Bangkok	VTBBYPYX
			OPNH	NAWABSHAH/Nawabshah	2200	0000		Beijing	ZBBYPYX
			OPPS	PESHAVAR				Beirut	OLLLYPYX

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
			OPGD	GAWADAR				Brisbane	YBZZSQKX
								Hong Kong	VHZZYPYX
								Jeddah	OEJDYPYX
								Karachi	OPZZYPYX
								Singapore	WSZZYPYQ
								Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
Mumbai	VABB	FTIN31	VABB	MUMBAI/Jawaharlal Nehru Intl	0400	0600		Abu Dhabi	OMZZYPYX
			VAAH	AHMADABAD/Ahmadabad	1000	1200		Bahrain	OBZZYPYX
			VECC	CALCUTTA/Calcutta	1600	1800		Bangkok	VTBBYPYX
			VCBI	COLOMBO/Katunayake	2200	0000		Beijing	ZBBYPYX
			VIDP	DELHI/Indira Gandhi Intl				Beirut	OLLLYPYX
			VILK	LUCKNOW*				Brisbane	YBZZSQKX
			VOMM	CHENNAI/Chennai				Hong Kong	VHZZYPYX
			VOTV	TRIVANDRUM/Trivandrum				Jeddah	OEJDYPYX
			VANP	NAGPUR/Nagpur				Karachi	OPZZYPYX
			VNKT	KATHMANDU/Tribhuvan Intl				Singapore	WSZZYPYQ
								Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
Nadi	NFFN	FTPS31	NFFN	NADI/Intl	0400	0600	NADI	Brisbane	YBZZSUGX
			NWWW	NOUMEA/La Tontouta	1000	1200		Hong Kong	VHZZYPYX
			NSTU	PAGO PAGO/Intl, Tutuila I.	1600	1800		Singapore	WSZZYPYX
					2200	0000		Wellington	NZZZYPYA
Incheon	RKSI	FTKO31	RKSI	SEOUL/Incheon Intl	0500	0600	TOKYO	Bangkok	VTBBYPYX
			RKSS	SEOUL/Gimpo Intl	1100	1200		Hong Kong	VHZZYPYX
			RKPC	JEJU/Jeju Intl	1700	1800		Karachi	OPZZYPYX
			RKPK	BUSAN/Gimhae Intl	2300	0000		Singapore	WSZZYPYQ
			RKTU	CHEONGJU/Cheongju Intl				Tokyo	RJAAYPYX
			RKNY	YANGYANG/Yangyang Intl				Wellington	NZZZYPYX
			RKTN	DAEGU/Daegu Intl					
Singapore	WSSS	FTSR31	WSSS	SINGAPORE/Changi	0430	0600	SINGAPORE	Abu Dhabi	OMZZYPYX
			WSAP	SINGAPORE/Paya Lebar	1030	1200		Bahrain	OBZZYPYX
			WMKK	KUALA LUMPUR/Kuala Lumpur Intl	1630	1800		Bangkok	VTBBYPYX
			WRRR	DENPASAR/Ngurah Rai (Bali Intl)	2230	0000		Beijing	ZBBBYPYX
			WMKJ	JOHOR BAHRU/Sultan Ismail				Beirut	OLLLYPYX

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
			WMKP	PENANG/Bayan Lepas				Brisbane	YBZZSVLX
			WRSJ	SURABAYA/Juanda				Colombo	VCCCYPYX
			WIIH	JAKARTA/Halim				Hong Kong	VHZZYPYX
			WIII	JAKARTA/Soekarno-Hatta				Karachi	OPZZYPYX
			WMSA	SUBANG/Sultan Abdul Aziz Shah				Manila	RPLLYPYX
								Mumbai	VABBYPYX
								Nadi	NFZZRFXX
								Incheon	RKSIYPYX
								Tehran	OIIIYPYX
								Tokyo	RJAAYPYX
								Wellington	NZZZYPYA
		FTSR32	WBSB	BANDAR SERI BEGAWAN /Brunei Intl	0430	0600	SINGAPORE	Bangkok	VTBBYPYX
			WBKK	KOTA KINABALU/Kota Kinabalu Intl	1030	1200		Beirut	OLLLYPYX
			WBGG	KUCHING/Kuching	1630	1800		Brisbane	YBZZSVMX
			WIMM	MEDAN/Polonia	2230	0000		Hong Kong	VHZZYPYX
								Manila*	RPLLYMYX
								Mumbai	VABBYPYX
								Wellington	NZZZYPYX
Tokyo	RJTD	FTJP31	RJAA	TOKYO/New Tokyo Intl	0300	1200	TOKYO	Bangkok	VTBBYPYX
			RJTT	TOKYO/Tokyo Intl	0900	1800		Beijing	ZBBBYPYX
			ROAH	NAHA/Naha	1500	0000		Beirut	OLLLYPYX
			RJOO	OSAKA/Osaka Intl	2100	0600		Brisbane	YBZZSWRX
			RJCH	HAKODATE/Hakodate				Hong Kong	VHZZYPXX
			RJBB	OSAKA/Kansai Intl				Mumbai	VABBYPYX
			RJSS	SENDAI/Sendai				Seoul	RKSIYPYX
								Singapore	WSZZYPYX
								Wellington	NZZZYPYA
								Colombo	VCBIYMYX
								Roma	LIIBYMYX
								London	EGZZFRXX
								Singapore	WSSSYMYX
								Nadi	NFZZRAXX
								Washington	KWBCYMYX
								Saipan	PGSNYMYX
								Guam	PGUMCOAX
								Brasilia	SBBRYZYX

TCC		TAF Bulletin					Dissemination		
Name	CCCC	Bul No.	CCCC	Aerodrome	Filing time	Start of v.	RODB	Aerodrome	AFTN
1	2	3	4	5	6	7	8	9	10
		FTJP32	RJFF	FUKUOKA/Fukuoka	0300	1200	TOKYO	Bangkok	VTBBYPYX
			RJNN	NAGOYA/Nagoya	0900	1800		Beijing	ZBBBYPYX
			RJCC	SAPPORO/New Chitose	1500	0000		Beirut	OLLLYPYX
			RJFK	KAGOSHIMA/Kagoshima	2100	0600		Brisbane	YBZZSWRX
			RJSN	NIIGATA/Niigata				Hong Kong	VHZZYPXX
			RJFU	NAGASAKI/Nagasaki				Mumbai	VABBYPYX
			RJFT	KUMAMOTO/Kumamoto				Seoul	RKSIYPYX
			RJOA	HIROSHIMA/Hiroshima				Singapore	WSZZYPYX
			RJOB	OKAYAMA/Okayama				Wellington	NZZZYPYA
			RJOT	TAKAMATSU/Takamatsu				Colombo	VCBIYMYX
			RJFO	OITA/Oita				London	EGZZFRXX
			RJNT	TOYAMA/Toyama				Nadi	NFZZRAXX
			RJNK	KANAZAWA/Komatsu				Washington	KWBCYMYX
								Saipan	PGSNYMYX
								Guam	PGUMCOAX
								Brasilia	SBBRYZYX
Wellington	NZKL	FTNZ31	NZWN	WELLINGTON/Wellington Intl		1200	BRISBANE	Bangkok	VTBBYPYX
			NZAA	AUCKLAND/Auckland Intl		1800		Beijing	ZBBBYPYX
			NZCH	CHRISTCHURCH/Christchurch Intl		0000		Brisbane	YBZZSQCX
						0600		Nadi	NFZZRFYX
								Port Moresby	AYPPYMYX
								Singapore	WSZZYPYQ
								Tokyo	RJAAYPYX
								Hong Kong	VHZZYPYX

* - not in the FASID MET 1A Table

Table 3. ROBEX Exchange of METAR and TAF compared with ASIA/PAC ANP Table AOP1 (FASID Table MET 1A)

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
AMERICAN SAMOA(United States)					
PAGO PAGO/Pago Pago Intl	RS	NSTU		FTPS31 NFFN	Nadi
AUSTRALIA					
ADELAIDE/Adelaide	RS	YPAD	SAAU31 YBBN	FTAU31 YBBN	Brisbane
ALICE SPRINGS/Alice Springs	AS	YBAS	SAAU31 YBBN	FTAU31 YBBN	
BRISBANE/Brisbane	RS	YBBN	SAAU31 YBBN	FTAU31 YBBN	
BROOME/Broome	AS	YBRM	SAAU32 YBBN	FTAU33 YBBN	
CAIRNS/Cairns	RS	YBCS	SAAU31 YBBN	FTAU31 YBBN	
CHRISTMAS I./Christmas I.	RS	YPXM	SAAU31 YBBN	FTAU31 YBBN	
COCOS I./Cocos I.	RS	YPCC	SAAU32 YBBN	FTAU32 YBBN	
DARWIN/Darwin	RS	YPDN	SAAU31 YBBN	FTAU32 YBBN	
DUBBO/Dubbo	AS	YSDU	SAAU32 YBBN	FTAU33 YBBN	
HOBART/Hobart	RS	YMHB	SAAU32 YBBN	FTAU33 YBBN	
LEARMONTH/Learmonth	AS	YPLM	SAAU31 YBBN	FTAU32 YBBN	
MELBOURNE/Melbourne Intl	RS	YMML	SAAU31 YBBN	FTAU31 YBBN	
NORFOLK I./Norfolk I.	RS	YSNF	SAAU32 YBBN	FTAU33 YBBN	
PERTH/Perth Intl	RS	YPPH	SAAU31 YBBN	FTAU32 YBBN	
PORT HEDLAND/Port Hedland	RS	YPPD	SAAU32 YBBN	FTAU32 YBBN	
ROCKHAMPTON/Rockhampton	AS	YBRK	SAAU32 YBBN	FTAU32 YBBN	
SYDNEY/Kingsford Smith Intl	RS	YSSY	SAAU31 YBBN	FTAU31 YBBN	
TINDAL/Tindal	AS	YPTN	SAAU31 YBBN	FTAU32 YBBN	
TOWNSVILLE/Townsville	RS	YBTL	SAAU31 YBBN	FTAU32 YBBN	
CANBERRA*		YSCB	SAAU32 YBBN	FTAU32 YBBN	
COOLANGATA*		YBCG	SAAU32 YBBN	FTAU32 YBBN	
AVALON*		YMAV	SAAU32 YBBN	FTAU32 YBBN	
KLAGOORLIE*		YPKG	SAAU32 YBBN	FTAU32 YBBN	
RICHMOND*		YSRI	SAAU32 YBBN	FTAU33 YBBN	
WILLIAMTOWN*		YWLM	SAAU32 YBBN	FTAU33 YBBN	
LAUNCESTON*		YMLT	SAAU32 YBBN	FTAU33 YBBN	
PEARCE*		YPEA	SAAU32 YBBN	FTAU32 YBBN	
BANGLADESH					
CHITTAGONG/Chittagong	RS	VGEG	SAAE31 VECC		Bangkok
DHAKA/Zia Intl	RS	VGZR	SAAE31 VECC	FTAS31 VTBB	
BHUTAN					
PARO/Paro	RS	VQPR			
BRUNEI DARUSSALAM					
BANDAR SERI BEGAWAN/ Brunei Intl	RS	WBSB	SAMS31 WMKK	FTSR32 WSSS	Singapore
CAMBODIA					
PHNOM-PENH/Pochentong	RS	VDPP	SAAS31 VTBD	FTAS31 VTBB	Bangkok
SIEM-REAP/Angkor	AS	VDSR			
CANADA					Tokyo
ABBOTSFORD/Abbotsford	AS	CYXX			
CALGARY/Calgary Intl	RS	CYYC			
COMOX/Comox	AS	CYQQ			

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
EDMONTON/Edmonton Intl	RS	CYEG	**Not required for regular ROBEX exchange, but to be available on request through Tokyo RODB**		
VANCOUVER/Vancouver Intl	RS	CYVR			
VICTORIA/Victoria Intl	RNS	CYYJ			
CHILE					
ISLA DE PASCUA/Mataveri	RS	SCIP			
CHINA					
BEIJING/Capital	RS	ZBAA	SACI31 ZBBB	FTCI31 ZBBB	Tokyo
CHANGSHA/Huanghua	RS	ZGHA	SACI41 ZBBB	FTCI41 ZBBB	
CHENGDU/Shuangliu	RS	ZUUU	SACI32 ZBBB	FTCI32 ZBBB	
CHONGQING/Jiangbei	RS	ZUCK	SACI41 ZBBB	FTCI41 ZBBB	
DALIAN/Zhoushuizi	RS	ZYTL	SACI31 ZBBB	FTCI31 ZBBB	
FUZHOU/Changle	RS	ZSFZ			
GAOXIONG/Gaoxiong	RS	RCKH	SAHK31 VHHH	FTHK31 VHHH	
GUANGZHOU/Baiyun	RS	ZGGG	SACI31 ZBBB	FTCI31 ZBBB	
HAIKOU*/Meilan		ZJHK	SACI41 ZBBB	FTCI41 ZBBB	
GUILIN/Liangjiang	RS	ZGKL	SACI32 ZBBB	FTCI32 ZBBB	
HANGZHOU/Jianqiao	RS	ZSHC	SACI31 ZBBB	FTCI31 ZBBB	
HARBIN/Yanjiagang	RS	ZYHB	SACI41 ZBBB	FTCI41 ZBBB	
HEFEI/Luogang	AS	ZSOF	SACI41 ZBBB	FTCI41 ZBBB	
HOHHOT/Baita	RS	ZBHH	SACI41 ZBBB	FTCI41 ZBBB	
JINAN/Yaoqiang	RS	ZSJN			
KASHI/Kashi	AS	ZWSH	SACI41 ZBBB	FTCI41 ZBBB	
KUNMING/Wujiaba	RS	ZPPP	SACI32 ZBBB	FTCI32 ZBBB	
LANZHOU/Zhongchuan	AS	ZLLL	SACI41 ZBBB	FTCI41 ZBBB	
NANJING/Lukou	RS	ZSNJ	SACI41 ZBBB	FTCI41 ZBBB	
NANNING/Wuxu	AS	ZGNN	SACI32 ZBBB	FTCI32 ZBBB	
QINGDAO/Liuting	RS	ZSQD	SACI32 ZBBB	FTCI32 ZBBB	
SANYA/Fenghuang	RS	ZJSY	SACI41 ZBBB		
SHANGHAI/Hongqiao	RS	ZSSS	SACI31 ZBBB	FTCI31 ZBBB	
SHANGHAI/Pudong	RS	ZSPD	SACI31 ZBBB	FTCI31 ZBBB	
SHANTOU*		ZGOW	SACI32 ZBBB	FTCI32 ZBBB	
SHENYANG/Taoxian	RS	ZYTX	SACI31 ZBBB	FTCI31 ZBBB	
SHENZHEN/Huangtian	RS	ZGSZ	SACI32 ZBBB	FTCI32 ZBBB	
TAIBEI/Sungshan	AS	RCSS	SAHK31 VHHH	FTHK31 VHHH	
TAIBEI/Taibei Intl	RS	RCTP	SAHK31 VHHH	FTHK31 VHHH	
TAIYUAN/Wusu	AS	ZBYN	SACI31 ZBBB	FTCI31 ZBBB	
TIANJIN/Binhai	RS	ZBTJ	SACI31 ZBBB	FTCI31 ZBBB	
URUMQI/Diwopu	RS	ZWWW	SACI31 ZBBB	FTCI31 ZBBB	
WUHAN/Tianhe	RS	ZHHH	SACI41 ZBBB	FTCI41 ZBBB	
XIAMEN/Gaoqi	RS	ZSAM	SACI32 ZBBB	FTCI32 ZBBB	
XI'AN/Xianyang	RS	ZLXY	SACI32 ZBBB	FTCI32 ZBBB	
XICHANG/Qingshan	RNS	ZUXC			
Hong Kong, CHINA					
HONG KONG/Hong Kong Intl	RS	VHHH	SAHK31 VHHH	FTHK31 VHHH	Tokyo
Macau, CHINA					
MACAU/Macau Intl	RS	VMMC	SAHK31 VHHH	FTHK31 VHHH	Tokyo
COOK ISLANDS					
AVARUA/Rarotonga Intl	RS	NCRG			Brisbane
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA					
PYONGYANG/Sunan	RS	ZKPY			

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
FIJI					
NADI/Nadi Intl	RS	NFFN		FTPS31 NFFN	Nadi
SUVA/Nausori	RS	NFSU			
FRENCH POLYNESIA					
RANGIROA/Rangiroa	AS	NTTG			
TAHITI/Faaa	RS	NTAA			Brisbane
GUAM(United States)					
GUAM I./Agana NAS	RS	PGUM			
GUAM I./Anderson AFB	AS	PGUA			
INDIA					
AHMADABAD/Ahmadabad	AS	VAAH	SAIN31 VABB	FTIN31 VABB	Bangkok
AMRITSAR/Amritsar	RS	VIAR	SAIN32 VIDP		
CALCUTTA/Calcutta	RS	VECC	SAAE31 VECC	FTIN31 VABB	
CALICUT/Calicut	RS	VOCL		(FTIN31 VABB)	
CHENNAI/Chennai	RS	VOMM	SAIN31 VABB	FTIN31 VABB	
DELHI/Indira Gandhi Intl	RS	VIDP	SAIN32 VIDP	FTIN31 VABB	
HYDERABAD*		VOHY	SAIN31 VABB	(FTIN31 VABB)	
LUCKNOW*		VILK		FTIN31 VABB	
MUMBAI/Jawaharlal Nehru Intl	RS	VABB	SAIN31 VABB	FTIN31 VABB	
NAGPUR/Nagpur	AS	VANP	SAIN31 VABB	FTIN31 VABB	
PATNA/Patna	RS	VEPT	SAIN31 VABB		
TIRUCHCHIRAPPALLI/Tiruchchirappalli	RS	VOTR	SAIN31 VABB		
TRIVANDRUM/Trivandrum	RS	VOTV	SAIN31 VABB	FTIN31 VABB	
VARANASI/Varanasi	RS	VIBN	SAIN32 VIDP		
INDONESIA					
AMBON/Pattimura	RNS	WAPP			Singapore
BALIKPAPAN/Sepinggan	RS	WRLL			
BANJARMASIN/Syamsuddin Noor	AS	WRBB			
BATAM/Hang Nadim	AS	WIKB			
BIAK/Frans Kaisieppo	RS	WABB	SAID31 WIII		
DENPASAR/Ngurah Rai (Bali Intl)	RS	WRRR	SAID31 WIII	FTSR31 WSSS	
JAKARTA/Halim Perdanakusuma	RS	WIIH	SAID31 WIII	FTSR31 WSSS	
JAKARTA/Soekarno Hatta Intl	RS	WIII	SAID31 WIII	FTSR31 WSSS	
JAYAPURA/Sentani	RS	WAJJ			
KUPANG/Eltari	RS	WRKK			
MANADO/Sam Ratulangi	RS	WAMM			
MEDAN/Polonia	RS	WIMM	SAID31 WIII	FTSR32 WSSS	
MERAUKE/Mopah	RNS	WAKK			
PADANG/Tabing	RS	WIMG			
PALEMBANG/Sultan Mahmud Badaruddin II	RNS	WIPP			
PEKANBARU/Simpang Tiga	RS	WIBB			
PONTIANAK/Supadio	RS	WIOO			
SURABAYA/Juanda	RS	WRSJ	SAID31 WIII	FTSR31 WSSS	
TANJUNG PINANG/Kijang	RS	WIKN			
TARAKAN/Tarakan	RS	WRLR			
TIMIKA/Tembagapura	RNS	WABP			
UJUNG PANDANG/Hasanuddin	RNS	WAAA	SAID31 WIII		
JAPAN					
FUKUOKA/Fukuoka	RS	RJFF	SAFE32 RJTD	FTJP32 RJTD	Tokyo
HAKODATE/Hakodate	AS	RJCH	SAFE32 RJTD	FTJP31 RJTD	
HIROSHIMA/Hiroshima	RS	RJOA		FTJP32 RJTD	
KAGOSHIMA/Kagoshima	RS	RJFK	SAFE32 RJTD	FTJP32 RJTD	

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
KANAZAWA/Komatsu*		RJNK		FTJP32 RJTD	
KUMAMOTO/Kumamoto	RS	RJFT		FTJP32 RJTD	
NAGASAKI/Nagasaki	RS	RJFU	SAFE32 RJTD	FTJP32 RJTD	
NAGOYA/Nagoya	RS	RJNN	SAFE31 RJTD	FTJP32 RJTD	
NAHA/Naha	RS	ROAH	SAFE31 RJTD	FTJP31 RJTD	
NIIGATA/Niigata	RS	RJSN		FTJP32 RJTD	
OITA/Oita	RS	RJFO		FTJP32 RJTD	
OKAYAMA/Okayama	RS	RJOB		FTJP32 RJTD	
OSAKA/Kansai Intl	RS	RJBB	SAFE31 RJTD	FTJP31 RJTD	
OSAKA/Osaka Intl	RS	RJOO	SAFE31 RJTD	FTJP31 RJTD	
SAPPORO/New Chitose	RS	RJCC	SAFE32 RJTD	FTJP32 RJTD	
SENDAI/Sendai	RNS	RJSS		FTJP31 RJTD	
TAKAMATSU/Takamatsu	RS	RJOT		FTJP32 RJTD	
TOKYO/New Tokyo Intl	RS	RJAA	SAFE31 RJTD	FTJP31 RJTD	
TOKYO/Tokyo Intl	AS	RJTT	SAFE31 RJTD	FTJP31 RJTD	
TOYAMA/Toyama*		RJNT		FTJP32 RJTD	
JOHNSTON I.(United States)					
JOHNSTON I./Johnston Atoll	RS	PJON			
KIRIBATI					
KIRITIMATI/Christmas I.	RS	PLCH			
TARAWA/Bonriki Intl	RS	NGTA			
LAO PEOPLE'S DEMOCRATIC REPUBLIC					
VIENTIANE/Wattay	RS	VLVT	SAAS31 VTBD	FTAS31 VTBB	Bangkok
MALAYSIA					
JOHOR BAHRU/Sultan Ismail	RS	WMKJ		FTSR31 WSSS	Singapore
KOTA KINABALU/Kota Kinabalu Intl	RS	WBKK	SAMS31 WMKK	FTSR32 WSSS	
KUALA LUMPUR/Kuala Lumpur Intl	RS	WMKK	SAMS31 WMKK	FTSR31 WSSS	
KUANTAN/Kuantan	RS	WMKD			
KUCHING/Kuching	RS	WBGG	SAMS31 WMKK	FTSR32 WSSS	
MALACCA/Malacca	RS	WMKM			
PENANG/Bayan Lepas	RS	WMKP	SAMS31 WMKK	FTSR31 WSSS	
PULAU LANGKAWI/Pulau Langkawi	RS	WMKL			
TAWAU/Tawau	RS	WBKW			
MALDIVES					
GAN/Gan	AS	VRMG			Bangkok
MALE/Hulule	RS	VRMM	SASB31 VCCC		
MARSHALL ISLANDS					
MAJURO ATOLL/Marshall I. Intl	RS	PKMJ			
MICRONESIA, FEDERATED STATES OF					
MOEN/Truk Intl	RS	PTKK			
PONAPE I./Ponape	RS	PTPN			
YAP I./Yap Intl	RS	PTYA			
MONGOLIA					
ULAN BATOR/Ulan Bator	RS	ZMUB	SACI41 ZBBB	FTCI32 ZBBB	Tokyo
MYANMAR					
YANGON/Yangon Intl	RS	VYYY	SAAS31 VTBD	FTAS31 VTBB	Bangkok

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
NAURU					
NAURU I./Nauru	RS	ANAU			
NEPAL					
KATHMANDU/Tribhuvan Intl	RS	VNKT	SAAE32 VECC	FTIN31 VABB	Bangkok
NEW CALEDONIA (France)					
NOUMEA/La Tontouta	RS	NWWW	SANC01 NWWW	FTPS31 NFFN	Nadi
NEW ZEALAND					
AUCKLAND/Auckland Intl	RS	NZAA	SANZ31 NZWN	FTNZ31 NZKL	Brisbane
CHRISTCHURCH/Christchurch Intl	RS	NZCH	SANZ31 NZWN	FTNZ31 NZKL	
WELLINGTON/Wellington Intl	RS	NZWN	SANZ31 NZWN	FTNZ31 NZKL	
NIUE(New Zealand)					
ALOFI/Niue Intl	RS	NIUE			
NORTHERN MARIANA ISLANDS (United States)					
ROTA/Rota Intl	RS	PGRO			
SAIPAN I. (OBYAN)/Saipan I. (Obyan) Intl	RS	PGSN			
PAKISTAN					
GWADAR/Gwadar	RS	OPGD			Bangkok
ISLAMABAD/Chaklala	RS	OPRN	SAPK31 OPKC	FTPK31 OPKC	
KARACHI/Quaid-E-Azam Intl	RS	OPKC	SAPK31 OPKC	FTPK31 OPKC	
LAHORE/Lahore	RS	OPLA	SAPK31 OPKC	FTPK31 OPKC	
NAWABSHAH/Nawabshah	AS	OPNH	SAPK31 OPKC	FTPK31 OPKC	
PESHAWAR/Peshawar	RS	OPPS		FTPK31 OPKC	
PALAU					
KOROR/Koror	RS	PTRO			
PAPUA NEW GUINEA					
PORT MORESBY/Jacksons	RS	AYPY	SAPW31 AYPY	FTAU32 YBBN	Brisbane
VANIMO/Vanimo	RS	AYVN	SAPW31 AYPY		
PHILIPPINES					
DAVAO/Francisco Bangoy Intl	RNS	RPMD	SAHK31 VHHH	FTHK31 VHHH	Tokyo
LAOAG/Laoag Intl	AS	RPLI		FTHK31 VHHH	
LAPU-LAPU/Mactan Intl	RS	RPVM	SAHK31 VHHH	FTHK31 VHHH	
MANILA/Nimoy Aquino Intl	RS	RPLL	SAHK31 VHHH	FTHK31 VHHH	
OLONGAPO/Cubi Intl	RNS	RPMB			
SUBIC BAY*		RPLB	SAHK31 VHHH	FTHK31 VHHH	
ZAMBOANGA/Zamboanga Intl	AS	RPMZ		FTHK31 VHHH	
REPUBLIC OF KOREA					
BUSAN/Gimhae Intl	RS	RKPK	SAKO31 RKSI	FTKO31 RKSI	Tokyo
CHEONGJU/Cheongju Intl	RS	RKTU	SAKO31 RKSI	FTKO31 RKSI	
DAEGU/Daegu Intl	RS	RKTN	SAKO31 RKSI	FTKO31 RKSI	
SEOUL/Incheon Intl	RS	RKSI	SAKO31 RKSI	FTKO31 RKSI	
JEJU/Jeju Intl	RS	RKPC	SAKO31 RKSI	FTKO31 RKSI	
SEOUL/Gimpo Intl	AS	RKSS	SAKO31 RKSI	FTKO31 RKSI	
YANGYANG/Yangyang Intl	RS	RKNY	SAKO31 RKSI	FTKO31 RKSI	

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
SAMOA					
APIA/Faleolo Intl	RS	NSAP			
SINGAPORE					
SINGAPORE/Changi	AS	WSSS	SAMS31 WMKK	FTSR31 WSSS	Singapore
SINGAPORE/Paya Lebar	AS	WSAP		FTSR31 WSSS	
SINGAPORE/Seletar	RS	WSSL			
SOLOMON ISLANDS					
HONIARA/Henderson	RS	AGGH			
SRI LANKA					
COLOMBO/Katunayake	RS	VCBI	SASB31	FTIN31 VABB	Bangkok
MINNERIYA/Hingurakgoda (1997)	AS	VCCH			
THAILAND					
BANGKOK/Bangkok Intl	RS	VTBD	SAAS31 VTBB	FTAS31 VTBB	Bangkok
CHIANG MAI/Chiang Mai Intl	RS	VTCC	SAAS31 VTBB	FTAS32 VTBB	
CHIANG RAI/Chiang Rai Intl	RS	VTCR			
KHON KAEN/Khon Kaen		VTUK			
PHITSANULOK	RS	VTPP			
PHUKET/Phuket Intl	RS	VTSP	SAAS31 VTBB	FTAS32 VTBB	
RAYONG/Utapao Intl	RS	VTBU	SAAS31 VTBB	FTAS32 VTBB	
SONGKHLA/Hat Yai Intl	RS	VTSS	SAAS31 VTBB	FTAS32 VTBB	
SURAT THANI/Surat Thani	RS	VTSB			
UBON RATCHATHANI	RS	VTUU			
TONGA					
TONGATAPU/Fua'amotu Intl	RS	NFTF			
VAVA'U/Vava'u	RS	NFTV			
TUVALU					
FUNAFUTI/Funafuti Intl	RS	NGFU			
UNITED STATES					Tokyo
ANCHORAGE/Anchorage Intl	RS	PANC			
ANCHORAGE/Elmendorf AFB	AS	PAED			
COLD BAY/Cold Bay	AS	PACD			
EVERETT/Snohomish County	AS	KPAE			
FAIRBANKS/Eielson AFB	AS	PAEI			
FAIRBANKS/Fairbanks Intl	RS	PAFA			
FRESNO/Fresno Air Terminal	AS	KFAT			
HILO/General Lyman Field	AS	PHTO			
HONOLULU/Barbers Points NAS	AS	PHNA			
HONOLULU/Honolulu Intl	RS	PHNL			
KAHULUI/Kahului	AS	PHOG			
KING SALMON/King Salmon	AS	PAKN	**Not required for regular ROBEX exchange, but to be available on request through Tokyo RODB**		
LOS ANGELES/Los Angeles Intl	RS	KLAX			
OAKLAND/Metropolitan Oakland	AS	KOAK			
ONTARIO/Ontario Intl	AS	KONT			
PALMDALE/Palmdale P.F.T.I.	AS	KPMD			
PORTLAND/Portland Intl	AS	KPDX			
SACRAMENTO/Metropolitan	AS	KSMF			
SAN DIEGO/Lindbergh Field	AS	KSAN			
SAN FRANCISCO/San Francisco	RS	KSFO			
SAN JOSE/San Jose Intl	RS	KSJC			
SEATTLE BOEING FIELD/King County Intl	AS	KBFI			

Name of the aerodrome	Use	ICAO loc.ind.	ROBEX SA bulletin	ROBEX FT bulletin	RODB
1	2	3	4	5	6
SEATTLE/Seattle-Tacoma Intl	RS	KSEA			
SPOKANE/Spokane Intl	AS	KGEG			
STOCKTON/Metropolitan	AS	KSCK			
WASHINGTON/Dulles Intl	RS	KIAD			
VANUATU					
PORT-VILA/Bauerfield	RS	NVVV			
SANTO/Pekoa	RS	NVSS			
VIET NAM					
DANANG/Danang	AS	VVDN	SAAS31	FTAS32 VTBD	Bangkok
HANOI/Noibai	RS	VVNB	SAAS31	FTAS32 VTBD	
HO-CHI-MINH/Tan-Son-Nhut	RS	VVTS	SAAS31	FTAS31 VTBD	
WALLIS ISLANDS(France)					
WALLIS/Hififo	RS	NLWW			

* Aerodrome required for ROBEX exchange but not in FASID Table MET 1A

EXAMPLES OF PROPOSED CHANGES TO THE SIGMET FORMAT

Proposals for amendment of the format of location information in SIGMETs

1. It is felt that the current SIGMET format given in Annex 3, Appendix 5, Table A5-1, does not provide complete guidance regarding the format of the location information. The following typical cases are proposed for review and amendment of the current SIGMET format:

Example 1a: Description of a sector of a FIR referring to a meridian, given by its longitude:

E OF Ennn[nn] or Wnnn[nn] or
W OF Ennn[nn] or Wnnn[nn]

Example 1b: Description of a sector of a FIR referring to a parallel, given by its latitude:

N OF Nnn[nn] or Snn[nn] or
S OF Nnn[nn] or Snn[nn]

Note: These two cases are covered by the current provisions.

Example 2: Description of a sector of a FIR referring to a parallel and a meridian, given by their latitude and longitude respectively, for instance:

N OF Nnn[nn] [AND] W OF Ennn[nn]

Note: In this case, the word "AND" should be added to the SIGMET format.

Example 3: Description of a sector of a FIR referring to an arbitrary line given by lat/lon coordinates of 2 (or 3 points in case of a non-straight line), for instance:

NW OF [LINE] Nnn[nn]Ennn[nn][-]Nnn[nn]Ennn[nn]

Note: In this case, the word "LINE" should be added to the SIGMET format.

Example 4: Description of an arbitrary area of a FIR referring to up to 5 points forming a polygon, given by lat/lon coordinates of these points, for instance:

WI [AREA] Nnn[nn]Ennn[nn][-]Nnn[nn]Ennn[nn][-]
Nnn[nn]Ennn[nn][-][Nnn[nn]Ennn[nn][-]]
[Nnn[nn]Ennn[nn]]

Notes: *1) The limitation of "up to 5 points" should be imposed to avoid too lengthy SIGMET messages.*
2) In this case, the word "AREA" should be added to the SIGMET format.

2. It is necessary to standardize the format of reporting the geographical coordinates in the SIGMETs and the volcanic ash and tropical cyclone advisories. The exact format for latitude/longitude information should be clearly stated and used in all examples in the Annex 3.

3. In the case of reporting location by means of "geographic features well known internationally", the words "OVER" and "PART" could be added to the SIGMET format, to facilitate the description of the phenomenon location.

ASIA/PAC TASK FORCE ON THE IMPLEMENTATION OF VOLCANIC ASH AND TROPICAL CYCLONE ADVISORIES AND SIGMET (VA/TC IMPLEMENTTAION TF)

1. Terms of Reference

(a) Monitor the implementation of the tropical cyclone (TC) and volcanic ash (VA) advisories and SIGMETs within the ASIA/PAC Regions and identify any deficiencies.

(b) Coordinate operational issues related to the issuance of the VA and TC advisories and SIGMETs.

c) Continually seek ways to improve the operational effectiveness of the IAVW and the TC advisory and warning system;

d) Provide advice to the CNS/MET Sub-group on the above issues.

2. Work Programme

The work to be addressed by the ASIA/PAC VA/TC Implementation Task Force includes:

(a) review procedures for the issuance of VA and TC advisories and SIGMETs in the region and propose actions for their improvement;

(b) investigate the deficiencies in the format and dissemination of the VA and TC advisories and SIGMETs and propose actions for their elimination;

(c) investigate the need of the States for guidance and/or training related to the implementation of IAVW and tropical cyclone warning system;

(d) follow the developments in the States related to the improvement of the VA and TC advisories and warnings and provide regional input on these matters to the IAVW Operations Group (through APANPIRG);

(e) report on its work to the CNS/MET Sub-group of APANPIRG.

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, China, Tonga and Maldives.

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

AMENDMENT PROPOSAL TO ASIA/PAC FASID TABLE MET 1B

APAC FASID – MET **6-1B-5**

TABLE MET 1B – METEOROLOGICAL WATCH OFFICES

MWO location Emplacement du MWO Lugar de la OVM	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	Area served/Région desservie/Zona de servicio		Remarks Observations Observaciones
		Name/Nom/Nombre	ICAO location indicator Indicateur d'emplace-ment OACI Indicador de lugarde la OACI	
1	2	3	4	5
NAURU				
NAURU I./Nauru	ANAU	Nauru FIR and SRR	ANAU	
NEPAL				
KATHMANDU/Tribhuvan Intl	VNKT	Kathmandu FIR and SRR	VNSM	
NEW ZEALAND				
NEW ZEALAND/Wellington ~~Intl~~	NZWW	Auckland Oceanic FIR and SRR	NZZO	
		New Zealand FIR AND SRR	NZZC	
NORTHERN MARIANA ISLANDS (United States)				
SAIPAN I. (OBYAN)/Saipan I.(Obyan) Intl	PGSN	Guam SRR		
PAKISTAN				
KARACHI/Quaid-E-Azam Intl	OPKC	Karachi FIR and SRR	OPKR	
LAHORE/Lahore	OPLA	Lahore FIR and SRR	OPLR	
PAPUA NEW GUINEA				
PORT MORESBY/Jacksons	AYPY	Port Moresby FIR and SRR	AYPY	
PHILIPPINES				
MANILA/Ninoy Aquino Intl	~~RPMM~~RPLL	Manila FIR and SRR	~~RPMM~~RPHI	
REPUBLIC OF KOREA				
INCHEON/Incheon Intl	RKSI	Daegu FIR and SRR	RKRR	
SINGAPORE				
SINGAPORE/Singapore Changi	WSSS	Singapore FIR and SRR	WSJC	
SOLOMON ISLANDS				
HONIARA/Henderson	AGGH	Honiara FIR and SRR	AGGG	
SRI LANKA				
COLOMBO/Katunayake	VCBI	Colombo FIR and SRR	VCBI	

* Operational monitoring coverage south of 60˚S is limited due to the lack of information

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

TASKS NO. 1-29 HAVE BEEN COMPLETED AND REMOVED FROM THE LIST

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
30	RAN/3 C.11/10 (TOR 1)	Subject: Ensure effective transition to sat. coms. Task: Planning for the implementation of satellite communications.	B	In planning for the implementation of CNS/ATM take into account: 1) Requirements for an effective transition, 2) Time frame for implementing changes, 3) HF requirements after implementation of satellite communications, 4) Human factors (staffing, retraining).	CNS/MET	On-going
31	RAN/3 C.11/11 (TOR 1)	Subject: Need for data link to access VOLMET broadcast stations by aircraft. Task: Automation of meteorological information for aircraft in flight (VOLMET) broadcasts.	B	In planning CNS/ATM implementation consider automation of VOLMET broadcast and introduction of D-VOLMET by VOLMET broadcast stations specified in the FASID.	CNS/MET	2008
32	RAN/3 C.8/14 APANPIRG/ 14 (TOR 3)	Subject: Inadequate implementation of procedures for advising aircraft on volcanic ash and tropical cyclones Task: ~~Regional Planning for~~ Monitoring of the implementation of international airways volcano watch (IAVW) and tropical cyclone advisories and SIGMETs	A	~~Plan~~ Monitor and provide assistance in the implementation of ~~IAVW~~ volcanic ash and tropical cyclone advisories and SIGMETs procedures to ensure provision of timely information on volcanic ash and tropical cyclones to aircraft.	CNS/MET Task Force on the implementation of Volcanic Ash and Tropical Cyclone advisories and SIGMETs (VA/TC TF)	On going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
33	APANPIRG D. 9/21	Problem : SADIS strategic assessment Task: SADIS strategic assessment of data/information to be included in the satellite broadcast.		Review requirements for SADIS broadcasts and maintain the SADIS strategic assessment tables.	CNS/MET SG	On-going
34	APANPIRG (TOR 3)	Subject: Lack of procedure for application of MET data in ADS messages Task: Use of MET data from ADS messages	A	1) Review MET information transmitted with ADS messages Presentation of the WP on the subject to the CNS/MET/SG/6 2) Develop procedures for utilization of the available MET data by operational units, MET offices and WAFCs	CNS/MET New Zealand CNS/MET	2003 ~~2002~~ ~~Completed~~ 2004
35	(TOR 3)	Subject: To facilitate regional implementation of CNS/ATM Tasks: a) coordinate training/workshops to allow States to develop and implement new CNS/ATM procedures b) encourage States to participate in the evaluation and training of new CNS/ATM systems c) progress the adoption of WGS-84 co-ordinate system and introduction of high integrity systems for the management of the co-ordinate data	A	1) identify topics for training, develop syllabi and plan training programme 2) encourage States in the evaluation and training of new CNS/ATM systems 3) co-ordinate with States and monitor progress 4) collect information and suggest methods of resolving problems commonly faced by States	CNS/MET CNS/ATM IC SG	On-going On-going On-going On-going

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
36	APANPIRG D. 4/46 RAN/3 C.12/3 APANPIRG 5/3 (TOR 3)	Subject: Provision of adequate CNS/MET services Task: Monitor CNS/ATM systems research and development, trials and demonstrations in the fields of CNS/MET and facilitate the transfer of this information and expertise between States.	A	• Encourage States to conduct R&D, trials & demonstrations of new CNS/MET services • Monitor global developments that may have beneficial consequences on regional planning activities • Consolidate information on new capabilities in the CNS/ATM system, for the Sub-Groups review and action • Serve as a focal point for review of ongoing work of Regional formal and informal working groups that is relevant to CNS/MET • Provide for coordinated training/seminars to keep all States informed on developments of trials and demonstrations	CNS/MET	On-going
37	C 12/24	Subject : Transition to the ~~final phase~~GRIB and BUFR coded ~~of~~ WAFS products Task : Implementation of the transition to the GRIB and BUFR coded WAFS products~~final phase of WAFS~~	A	1) Development of guidelines for the use of BUFR and GRIB codes for the production of WAFS products. 2) Planning and coordinating the transfer of SIGWX and WIND/TEMP charts from the current T4 facsimile format to BUFR and GRIB format. 3) Development of a regional training programme for the operational use of BUFR and GRIB. 4) Participate in the development and implementation of an adequate WAFS back-up system for dissemination of WAFS products in the ASIA/PAC Region.	CNS/MET SG WAFS ~~Transition~~ Implementation Task Force	~~2002~~ Completed ~~2004~~July 2005 ~~2003~~2004 Completed ~~2004~~
38	C12/36	Subject : Lack of ATM requirements for MET components of the ASIA/PAC CNS/ATM Plan. Task : Developing the MET Chapter for the ASIA/PAC CNS/ATM Plan.	A	1. Development of the initial draft of the MET Chapter. 2. Development of the MET components of the CNS/ATM concept/ strategy. 3. Inclusion of ATM requirements for MET information in the CNS/ ATM Plan.	CNS/MET SG with assistance of MET WG on CNS/ATM Plan CNS/MET SG with assistance of the METATM TF	Completed ~~2003~~ Completed 2004

No.	Ref.	Task	Priority	Action Proposed/In Progress	Action By	Target Date
39	APANPIRG /13 D 13/28	Subject: To improve the efficiency of the regional and inter-regional OPMET exchange and the availability of OPMET information from the ASIA/PAC Region Task: Review and optimize the ROBEX scheme and other OPMET exchanges; introduce monitoring and management procedures for the ROBEX centres and Regional OPMET data banks	A	1) Review and update regional ROBEX tables and relevant documents 2) Propose optimization chages to the ROBEX scheme 3) Improve the availability of OPMET data at the Regional OPMET Data Banks (RODB) 4) Improve the availability of OPMET information from the Pacific States 5) Introduce monitoring and management procedures	CNS/MET SG OPMET Management Task Force	2003 2004 on-going on-going on-going
40	APANPIRG /13 C 13/32	Subject: Quality Management of the meteorological service for the international air navigation Task: Foster the development and implementation of quality management systems by the States' MET authorities/providers in the ASIA/PAC Region	B	1) Review the status of implementation of the quality management system in the region 2) Assist in the organization of regional seminars/workhops to foster exchange of information between the States on the matters of quality management systems	CNS/MET SG	On-going