



International Civil Aviation Organization

**FIFTEENTH MEETING OF THE
COMMUNICATIONS/NAVIGATION/SURVEILLANCE AND
METEOROLOGY SUB-GROUP (CNS/MET SG/15) OF APANPIRG**

Bangkok, Thailand, 25 – 29 July 2011

Agenda Item 19: Any Other Business

REVIEW CNS PART OF ASIA/PAC BASIC ANP

(Presented by the Secretariat)

SUMMARY

This paper provides the meeting an opportunity to review and update the communication, navigation and surveillance (CNS) part of the ASIA/PAC Basic Air Navigation Plan (ANP) and FASID Tables.

This paper relates to:

Strategic Objectives:

A: Safety – Enhance global civil aviation safety

D: Efficiency – Enhance the efficiency of aviation operations

Global Plan Initiatives:

GPI-9 Situational awareness

GPI-17 Data link applications

GPI-22 Communication infrastructure

1. Introduction

1.1 The Part IV of the Asia and Pacific (ASIA/PAC) Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to communications, navigation and surveillance (CNS) as developed for the ASIA/PAC regions.

1.2 Maintaining the Basic ANP and associated FASID Tables has many purposes which include: (1) regional planning by operators and service providers (2) measurement of implementation which allows for proper focus in implementation strategies by many entities (Operations, States and ICAO); and (3) input to cost-recovery of CNS Services provided for international aviation. Therefore, regular review of the latest Basic ANP and FASID Tables is strongly encouraged.

2. Discussion

Recent updates

2.1 Several amendment proposals to the CNS part of the ASIA/PAC Regional Air Navigation Plan FASID Tables were approved in 2008, 2009 and 2010.

Proposed updates

2.1 Review of Conclusions adopted by APANPIRG in the last few years regarding policies and operational requirement for AFS, ATN/AMHS, AIDC and ADS-B has resulted in proposed updates to the text part of Part IV of ASIA/PAC Basic ANP as shown in **Attachment** to this paper.

3. Action required by the Meeting

3.1 The meeting is invited to

- a) review the proposed changes to the text of Part IV of ASIA/PAC Basic ANP (CNS) and provide comments and input if necessary; and
- b) consider adopting the following draft conclusion:

Draft Conclusion 15/xx — Amendment to Intro Text of Part IV of ASIA/PAC BANP

That, the amendments proposed to the Part IV- CNS of the Asia Pacific Regions Air Navigation Plan (Doc 9673), Volume 1, Basic ANP provided in **Appendix XX** be adopted and incorporated in the Plan in accordance with the established procedure.

Part IV

COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

INTRODUCTION

1. This part of the Asia and Pacific (ASIA/PAC) Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to communications, navigation and surveillance (CNS) as developed for the ASIA/PAC regions.

2. As a complement to the Statement of Basic Operational Requirements and Planning Criteria (BORPC) set out in Part I, Part IV constitutes the stable guidance material considered to be the minimum necessary for effective planning of CNS facilities and services in the ASIA/PAC regions. A detailed description/list of the facilities and/or services to be provided by States in order to fulfil the requirements of the plan is contained in the ASIA/PAC Facilities and Services Implementation Document (FASID). During the transition and pending full implementation of the future communications, navigation and surveillance/air traffic management (CNS/ATM) system, it is expected that the existing requirements will gradually be replaced by new CNS/ATM system-related requirements. Further, it is expected that some elements of CNS/ATM system will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

3. The Standards, Recommended Practices and Procedures to be applied are contained in:

- a) Annex 10 — *Aeronautical Telecommunications*, Volumes I, II, III, IV and V;
- b) Annex 11 — *Air Traffic Services*; and

c) *Regional Supplementary Procedures* (Doc 7030).

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

5. The elements of the material referred to above are presented in the following paragraphs with appropriate cross-references to recommendations and/or conclusions of ASIA/PAC/3 and ~~regional planning groups~~ Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG).

COMMUNICATIONS

General

6. The plan and details of the operational requirements for communications are contained in Tables CNS 1A, CNS 1B, CNS 1C, CNS 1D, CNS 1E, CNS 2, CNS 3, CNS 4A and CNS 4B, and associated charts in Part IV of the FASID.

Ground-ground communications

Aeronautical fixed service (AFS)

7. The aeronautical fixed service comprises of:
- a) the aeronautical fixed telecommunication network (AFTN);

- b) data communications subnetworks and associated systems supporting the ground-ground applications of the aeronautical telecommunication network (ATN), namely the ATS message handling services (ATS MHS) and ATS inter-facility data communications (AIDC);
- c) ATS direct speech circuits; and
- d) meteorological operation circuits, networks and broadcast systems.

Aeronautical fixed telecommunication network (AFTN)

8. States should ensure that telecommunication agencies engaged in providing aeronautical circuits be impressed of the need for:

- a) high reliability terrestrial links connecting aeronautical facilities and common carrier terminals inclusive of priority restoration of service commensurate with the requirements of a safety service; and
- b) rapid restoration of circuits in the event of breakdown. [ASIA/PAC/3, Conc. 10/1]

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

10. States responsible for the operation of AFTN circuits which are not adequately meeting transit time requirements should record transit time statistics on the twenty-third day of each third month (January, April, July and October) of each year, in accordance with the existing practices, for the AFTN circuits and terminals under their jurisdiction which do not meet the specified transit time criteria. The data recorded should be exchanged directly between the correspondent stations, with copies to administrations concerned and to the ICAO Regional

Office.

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

10.1 States operating AFTN circuits may exchange circuit loading statistics only for those circuits where occupancy level exceed permissible levels specified in the Manual on Planning and Engineering of AFTN, Doc. 8259. [APANPIRG/16, Conc. 16/28]

11. States operating AFTN circuits should:

- a) record AFTN statistics on the form contained in Attachment B, from 23 to 25 April and October each year;
- b) exchange the circuit loading data for each circuit with each correspondent station and provide a copy to the ICAO Regional Office; and
- c) evaluate circuit loading and take appropriate remedial action when occupancy level exceeds permissible levels specified in the *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunications Network* (Doc 8259). [ASIA/PAC/3, Conc. 10/4]

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

13. The AFTN entry/exit points:

- a) between ASIA/PAC and AFI should be Brisbane and Mumbai;
- b) between ASIA/PAC and EUR should be Bangkok, Singapore and Tokyo;
- c) between ASIA/PAC and MID should be Karachi, Mumbai and Singapore;
- d) between ASIA/PAC and NAM should be Brisbane, Nadi and Tokyo; and
- e) between ASIA/PAC and CAR/SAM should be Brisbane.

[APANPIRG/11, Conc. 11/6]

Technical aspects of AFTN rationalization.

14. The ~~main~~ trunk circuits interconnecting main AFTN communication centres should be provided by landline teletypewriter (LTT) facilities, operate at a modulation rate commensurate with operational requirements, and employ International Alphabet Number 5 (IA-5) and character-oriented data link control procedures — system category B, or bit-oriented data link control procedures as defined in Annex 10, Volume III, Part I, Chapter 8.

15. Also, the ~~tributary~~ circuits ~~inter~~connecting tributary AFTN communication centres with main AFTN communication centres, or with other tributary AFTN communication centres, or with AFTN stations should be provided with LTT facilities where available and feasible, preferably operating at a modulation rate commensurate with operational requirements, and employing IA-5 code and procedures and an appropriately controlled circuit protocol.

[ASIA/PAC AFS RPG/3, Rec. 3/1]

16. To support data communication requirements and to provide needed data integrity and minimal transit time, the CCITT X.25 protocol should be used between AFTN COM centres and main and tributary COM centres in the ASIA/PAC regions.

[APANPIRG/4, Conc. 4/27 and APANPIRG/7, Conc. 7/14]

16.1 States should continue using X.25 as recommended protocol to support implementation of ATN ground infrastructure in the short to medium term (5-10 years) and consider acquisition of sufficient spares for the service life of the equipment. States not implementing X.25 consider the use of emerging replacement technology.

[APANPIRG/15 in 2004, Conc.15/11]

17. States should consider implementing digital communication networks or circuits in a coordinated manner in order to meet current and future AFS communication requirements for data/voice communications and to facilitate the introduction of ATN.

[APANPIRG/11, Conc. 11/14]

17.1 States should consider the provision of an alternative communication links for critical AFS communications which are supported by a single VSAT system between States and for remote control air-ground (RCAG) VHF stations supported by a single VSAT link.

[APANPIRG/11, Conc.11/15]

17.2 States in the Bay of Bengal area are urged implement AFS circuits using VSAT technology as a

matter of high priority to enhance safety and efficiency of aircraft operations and to meet AFS communication requirements for data/voice communications.

[APANPIRG/13 Conc.13/13]

ATN infrastructure transition and implementation

18. Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) in the further development of the ASIA/PAC communications, navigation and surveillance (CNS)/air traffic management (ATM) implementation plan, further determine plans for the integration of ground-ground communications systems necessary for the implementation of the aeronautical telecommunication network (ATN), taking into account the work of the aeronautical telecommunication network panel (ATNP) on this subject.

[ASIA/PAC RAN/3 Conclusion 11/8]

18.1 The ATN transition plan outlines the requirements to increase bandwidth and upgrade protocols for those trunk circuits that will support main data flow of traffic in the ASIA/PAC regions. The plan also provides target dates for implementation of boundary intermediate systems (BIS) and backbone BIS in the ASIA/PAC regions.

[APANPIRG/12, Conc. 12/14]

19. ATN development should be introduced in an evolutionary and cost-effective manner based on available ICAO SARPs and regional ATN technical and planning documents. ~~The ATN infrastructure transition is expected to be implemented in three phases as follows:—It is recommended that there will be three phases in the implementation of the ATN infrastructure~~

~~a) Phase 1. Upgrade of existing AFTN circuits where necessary to support the introduction of the ATN backbone BIS;~~

~~b) Phase 2. Implementation of the ATN regional backbone BIS; and~~

~~e) Phase 3. Implementation of supporting ATN BIS.~~

- Phase 1. Up-grade of existing subnetwork infrastructure to support the Backbone BISs (BBISs)

- Phase 2. Implementation of ATN Regional BBISs; and

- Phase 3. Implementation of supporting ATN BISs

[APANPIRG 12/14]

19.1 Considering the inclusion of ATN over IPS

SARPs in ICAO Annex 10, Volume 3 and to support global harmonization of ATN implementation, States hosting BBIS be urged to implement ATN over IPS in addition to ATN over OSI and complete this implementation of Dual Stack ATN (ATN/OSI and ATN/IPS) by 2011.
[APANPIRG 19/20]

19.2 Permit non-backbone States, and States in other regions with connections to Asia/Pacific region, to connect their Message Transfer Agents (MTAs) to backbone States using either the OSI-based ATN Internet Communications Services (ICS) or the ATN IPS on a bilateral basis.
[APANPIRG 21/20]

20. States should consider establishment of gateways, where required, to allow inter-operation between AFTN and ATS MHS.

ATS direct speech circuits

ATS direct speech communications.

21. States concerned should assign a high priority to the establishment, in accordance with Annex 11, 3.6.1.1, of efficient direct-speech communications between ATS units serving adjacent areas in order to permit proper use of air-ground frequencies and further implementation of the air traffic control (ATC) service.
[ASIA/PAC/3, Conc. 5/21]

22. ~~Voice switching centres should be provided at the following locations:~~

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

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

~~23. Dissemination of World Area Forecast System (WAFS) products in the ASIA/PAC regions will be accomplished by satellite broadcast.~~
[ASIA/PAC/3, Rec. 10/19]

ATS inter-facility data communications (AIDC) circuits

24. States should consider implementing ~~the ATN application~~ AIDC in order to enable the exchange of ATN messages ~~for active flights~~ related to flight notification, flight coordination, transfer of control surveillance data and free (unstructured) text data for active flights.

24.1 Noting the continued prevalence of RVSM Large Height Deviation (LHD) occurrences resulting from ATC Unit-to-ATC Unit coordination errors, APANPIRG recommended that States work towards the implementation of compatible AIDC capabilities based on the Asia/Pacific AIDC ICD between ATC units as soon as possible
[APANPIRG/18, Conc.18/3]

24.2 States are urged to expedite implementation of AIDC between neighboring ATS facilities in accordance with the Regional Air Navigation Plan and the Asia/Pacific AIDC ICD.
[APANPIRG/19, Conc.19/19]

Support for Global ICD for AFTN AIDC

24.3 Recognizing the benefits to be gained from globally harmonized interface arrangements for AIDC, APANPIRG supports the work being undertaken by the United States to coordinate a global Interface Control Document for AFTN AIDC and invites the Asia/Pacific Regional Office to act as the regional point of contact for this work.
[APANPIRG/20, Conc.20/14]

Air/ground communications

Aeronautical mobile service and aeronautical mobile satellite service

Frequency utilization lists.

25. States in the ASIA/PAC regions should coordinate, as necessary, with the ICAO Regional Office all radio frequency assignments for both national and inter-national facilities in the 190–526.50 kHz, 108–117.975 MHz, 960–1215 MHz and 117.975–137 MHz bands. The ICAO Regional Office, based on the information provided for this purpose by the States, will issue Frequency Lists Nos. 1, 2 and 3 at periodic intervals.

[ASIA/PAC/3, Conc. 11/4, 11/5 and 12/9]

HF en-route communications

26. States should be urged to coordinate on a national basis with the appropriate interested authorities, a programme directed towards achieving the elimination of the interference currently being experienced on some of the frequencies allocated to the Aeronautical Mobile (R) Service in the ASIA/PAC regions. When reviewing

methods for developing such a national programme, consideration should be given to the procedures in Article S15 of the ITU Radio Regulations.

27. In the case of an unidentified interfering station, States should notify the ICAO Regional Office concerned, utilizing the procedure and report form developed by the Fifth Session of the Communications Division (1954) and updated by the Communications Divisional Meeting (1978). The Harmful Interference Report Form is provided in Attachment C. However, in the case of persistent harmful interference to an aeronautical service which may affect safety, it should be immediately reported to ICAO and to the ITU, using the prescribed format, for appropriate action. [ASIA/PAC/3, Conc. 11/6]

27.1 States where aeronautical stations are experiencing HF radio interference, take necessary actions in coordination with respective radio regulators to identify the source of interference and to eliminate problem.
[APANPIRG/17, Conc.17/32]

Air-ground elements of ATN

~~28. With the implementation of the air ground applications of ATN, it is important to ensure that transit response times are kept to a minimum level so as not to affect the overall response time that it takes for traffic such as automatic dependent surveillance (ADS) reports and controller pilot data link communications (CPDLC) messages to be delivered to their final destination. This also reflects the need to ensure that critical ground links within the ASIA/PAC regions are capable of handling this information efficiently.~~

~~29. One important factor with air ground traffic is the generation of routing information caused by aircraft that will move between various ATN routing domains. As aircraft move through various coverage media and FIR boundaries, the ATN routing backbone will be notified of the changing routing data for each mobile aircraft in the region. To allow this routing information to be propagated within the region will require a minimum number of backbone routers to be implemented which protect all other ATN routers from being inundated with routing information.~~
[ASIA/PAC ATN transition plan]

Satellite Communication Service Performance

28. States and International Organizations be

requested to liaise with satellite service providers to establish a mechanism to maintain and modernize the satellite communication infrastructure.

[APANPIRG/19, Conc.19/24]

29. Provision of Aeronautical Mobile (R) Service in the ASIA/PAC Region will be guided by following strategy:

1. A channel spacing of 25 kHz will continue to be operational specification.
2. 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.
3. The requirement for basic voice communication will continue, supplemented by data-link Flight Information Service (DFIS) applications including D-VOLMET, D-ATIS and PDC to significantly reduce pressure on VHF spectrum congestion.
4. Frequency band 136 – 137 MHz will be used exclusively for the air-ground VHF data-link application.

[APANPIRG18, Conc.18/29]

NAVIGATION

General

30. The plan and details of operational requirements for radio navigation aids are contained in Table CNS 3 and associated charts in Part IV of the FASID.

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

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

radio navigation aid requirements at each location without reference to discrete frequency assignments. The ICAO Regional Office will continue to maintain its frequency selection and co-ordination role, including the maintenance and promulgation of Frequency Lists Nos. 1 and 2 in a timely and periodic manner.

[ASIA/PAC/3, Conc. 12/9]

Radio navigation aid requirements

33. States that have not yet done so should install VHF omnidirectional radio range (VOR) supplemented by distance measuring equipment (DME) as the primary aid for en-route navigation and, except in specified circumstances, delete any parallel requirement for a non-directional radio beacon (NDB) from the ANP.

[ASIA/PAC/3, Rec. 5/22]

Agreement for sharing DME Infrastructure

33.1 In the interest of efficiency, States with DME coverage extending beyond their FIRs be requested to consider allowing neighboring States to develop PBN procedures utilizing these DMEs.

[APANPIRG/19, Conc.19/26]

Constant Descent Final Approach (CDFA) and Baro-VNAV

34. In order to reduce the likelihood of CFIT accidents, States be urged to review non-precision approach procedures with LNAV lines of minima to include CDFA profile and include the Baro-VNAV design in the current and new RNP APCH approaches and consequent LNAV/VNAV approach minima.

[APANPIRG/19, Conc.19/28]

RF interference on the protected DME frequency

35. States' civil aviation administrations be encouraged to work closely with the respective regulatory authorities and undertake all necessary action to ensure the DME and SSR service are not interfered by devices such as wireless CCTV cameras.

SURVEILLANCE

General

34. The plan and details of operational requirements

~~for surveillance are contained in Table CNS 4A of Part IV of the FASID.~~

36. Surveillance systems for terminal and en-route ATC purposes should be installed, maintained and operated at international aerodromes and en-route area control centres whenever it is necessary to improve the safe and expeditious handling of air traffic and wherever the traffic density and associated complexity of operations, system delays, meteorological conditions and/or transition from oceanic to continental airspace would justify these installations.

[ASIA/PAC/3, Rec. 5/28]

37. Where different systems are used for navigation and position determination within the same controlled airspace, the ground facilities involved should be collocated and/or orientated so as to provide compatible flight paths and to ensure, as far as practicable, a fully integrated ATC pattern.

[ASIA/PAC, Rec. 7/14]

387. The ASIA/PAC regions are characterised by the use of:

- a) secondary surveillance radar (SSR) Mode A, C and, in the near future, Mode S in some terminal and high-density continental airspace;
- b) ADS in some parts of the ASIA/PAC regions;
- c) Automatic Dependent Surveillance – Broadcast (ADS-B); and
- d) the diminishing use of primary radar.

398. ADS-C is becoming available over the oceanic and continental airspace of the ASIA/PAC regions. SSR (augmented as necessary with Mode S) will continue to be used in terminal areas and in some high density airspace.

Automatic Dependent Surveillance -Contract - (ADS-C)

Coordination of activities related to the implementation of ADS

~~39. The introduction of air ground data links, together with sufficiently accurate and reliable aircraft navigation systems, presents the opportunity to provide surveillance services in areas lacking such services in the present infrastructure, in particular oceanic areas and other areas where the current systems prove difficult,~~

~~uneconomic, or even impossible, to implement. ADS is a function for use by ATS in which aircraft automatically transmit, via a data link, data derived from on board navigation systems. As a minimum, the data should include the four dimensional position. Additional data may be provided as appropriate. The ADS data would be used by the automated ATC system to present information to the controller. In addition to areas which are at present devoid of traffic position information other than pilot provided position reports, ADS will find beneficial application in other areas including high density areas, where ADS may serve as an adjunct and/or backup for SSR and thereby reduce the need for primary radar. Also, in some circumstances, it may even substitute for secondary radar in the future. As with current surveillance systems, the full benefit of ADS requires supporting complementary two way pilot controller data and/or voice communication (voice for at least emergency and non routine communication).~~

40. States should closely cooperate in the development of procedures for the implementation of ADS-C in the ASIA/PAC regions and participate to the extent possible in trials and demonstrations related to the implementation of ADS-C.

[ASIA/PAC/3, Conc. 14/21]

Automatic Dependent Surveillance – Broadcast (ADS-B)

41. 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
[APANPIRG/14, Conc. 14/20]

42. States are advised to use the following guidelines for the development of ADS-B implementation plan.

- a) minimize capital and operating costs of ADS-B data facilities;
- b) give priority to provide ADS-B coverage over major traffic flows and those airspaces currently not covered by radar. ADS-B should have overlapping area with existing radar coverage.
- c) provide ADS-B coverage in areas within 150 NM from FIR boundaries;

- d) suitable sites with power, shelter, access routes and data communication links shall be preferred; and
- e) overlapping of ADS-B coverage is preferred.
- f) Integrate ADS-B data with the ATM automation system wherever possible taking advantage of synergies with other means of surveillance (such as radar, ADS-C, flight plan tracks) ;
- g) Mandate ADS-B OUT equipage on the aircraft operating in the airspaces, at the flight levels or area where currently no radar surveillance is available and where ADS-B based services are offered (served with ADS-B ground stations).
- h) Expand the “mandate” to aircraft operating in other airspace when the ANSP is able to provide ADS-B based services in the airspace.
- i) ADS-B Implementation is more effective when it is implemented regionally both on the ground and on the aircraft.
- j) When considering the benefits of ADS-B Implementation, it is necessary to consider the total benefits to all stakeholders (airline operators, passengers, efficiency of the ATM network, and society etc) and not only the benefit derived for airlines operators and air navigation services providers.
[APANPIRG/20, Conc. 20/53]

Exchange of ADS-B surveillance data with neighbours

43. States are encouraged to share ADS-B surveillance data with neighbouring States and to develop mechanisms to achieve this as ADS-B ground infrastructure requirements are being identified during the design phase
[APANPIRG/15 Conc.15/26]

Support provision of VHF radio voice communication associated with ADS-B data sharing between adjacent States

44. States are urged to consider following regional policy on supporting provision of direct controller pilot communication capability associated with ADS-B data

sharing between adjacent FIRs of States.

“In order to provide radar like separation services using ADS-B, it is necessary for the controllers to have direct controller pilot communication (DCPC). In some cases, to achieve radar like separation services it may be necessary for the States to provide VHF radio voice communication services for use by adjacent States.

It is therefore recommended that States capable to do so support provision of VHF radio voice communication services to adjacent States when this is required to support the delivery of ADS-B based separation services. Cost of such service provision shall be agreed between the States concerned.”

[APANPIRG/19, Conc.19/38]

Secondary surveillance radar (SSR)

Implementation of surveillance systems

45+. Implementation of surveillance systems should be pursued as an enhancement to ATS where so required and the use of SSR alone, in accordance with the procedures in the *Regional Supplementary Procedures* (Doc 7030), should be considered as a cost-effective alternative to primary surveillance radar.

[ASIA/PAC/3, Rec. 14/20]

Coordination for SSR Mode S Interrogator Identifier Code

46. In view of low density of SSR interrogator installations in the region, only Interrogator Identifier (and not Surveillance Identifiers) codes be used for SSRs Mode S in the areas of overlapping coverage.

[APANPIRG/19 Concl 19/40]

47. while implementing SSR Mode S, States should take into account following issues while assigning Interrogator Identifier codes for these installations:

- for planning the implementation of SSR Mode S interrogators, administrations should ensure that the interrogators with overlapping coverage are not operating with the same Interrogator Identifier (II) codes.

- where, the coverage of the interrogator extends beyond the boundaries of the State, The II code and PRF should be worked out in coordination with the ICAO Asia and Pacific Office and the neighboring States, and

- administrations should inform the ICAO Asia and Pacific Office about the assigned II codes and PRFs for these installations.

[APANPIRG/19, Conc.19/40]

48. Recognizing more Mode S Radar ground stations being introduced in the region, States in the Asia and Pacific Region are urged to have aircraft registered having Mode S transponder regularly inspected to ensure correct operation of the Mode S transponders.

[APANPIRG17, Conc.17/29]
