e-ANP – WP/02
Agenda Item 2
07/04/15

International Civil Aviation Organization

e-ANP CNS DEVELOPMENT WORKING GROUP (e-ANP)

08 – 10 April 2015, Bangkok, Thailand

Agenda Item: 2: Review and update of draft action plan

REVIEW OF CONTENT IN BASIC ANP – DOC 9673 VOLUME I

(Presented by the Secretariat)

SUMMARY

This paper presents current contents in the Basic Regional Air Navigation Plan i.e. Doc 9673 Vol. I for review. The meeting is expected to consider whether regional specific information therein should be retained in addition to those identical wording developed by the e-ANP working group and adopted by the ICAO Council.

1. INTRODUCTION

1.1 One item in the action plan for this working group is to identify whether need to remain some information in the current CNS Part of Basic ANP for Asia and Pacific Regions.

1.2 The harmonized text to be appearing in the Basic ANP for CNS part and general introduction part has been approved by the ICAO Council.

2. DISCUSSION

2.1 The current text in the part IV of basic ANP is provided in the **Attachment 1** for review by this meeting. It was resulted from a consolidated amendment to the CNS part of BANP including conclusions and provisions adopted by APANPIRG in the last 15 years which still appear to be valid. The latest PfA to this part of BANP with current text was approved by the President of ICAO Council on 30 August 2012. States and Administrations were notified of the approval of amendment on 4 September 2012 through State Letter Ref.: APAC 12/7- CNS: AP113/12 (CNS).

2.2 The CNS related general statement is included in the General Introduction Part of new e-ANP template. The harmonized wording for CNS requirements are included the part III of BANP of new e-ANP template (CNS Part becomes Part III in the basic ANP resulted from removal of BORPC part in the basic ANP i.e. the basic operational requirements and planning criteria). The new text relevant to CNS part is reproduced in **Attachment 2** to this paper for easy reference by this meeting.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper; and

3.2 Discuss whether the contents of the current Basic ANP Part IV are still valid and required as regional specific requirements in the new eANP.

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Part IV

COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

INTRODUCTION

1. This part of the Asia and Pacific (ASIA/PAC) Regions 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) systems as developed for the ASIA/PAC regions.

2. 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 the States in order to fulfill the requirements of the plan is contained in the ASIA/PAC Facilities and Services Implementation Document (FASID). 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 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 meeting and Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG).

AERONAUTICAL TELECOMMUNICATIONS

General

6. The plan and details of the operational requirements for CNS 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 sub-networks and associated systems supporting the ground-ground applications of the aeronautical telecommunication network (ATN), namely the ATS message handling services (ATS MHS) and ATS inter-facility data 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 data. Where a circuit consistently achieves 97 per cent reliability, the exchange of performance data may cease. The circuit performance data 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 do not adequately meet 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]

11. 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]

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 inter-regional 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 trunk circuits interconnecting main AFTN communication centres should be provided to 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 circuits 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, a modulation rate commensurate with operational requirements 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, 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 the 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 should 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 to 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/AMHS implementation

18. 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. It is recommended that there will be three phases in the implementation of the ATN infrastructure

- Phase 1. Up-grade of existing sub-network 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 should 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

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]

ATS inter-facility data communications (AIDC) circuits

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

22.1 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]

22.2 States should 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

23. 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 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

24. 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 the190–526.50 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

25. States should be urged to coordinate on a national basis with the appropriate national regulators, 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.

26. In the case of an unidentified interfering station, States should notify the ICAO Regional Office, 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 A. 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 States, where aeronautical stations are experiencing HF radio interference, should take necessary actions in coordination with respective radio regulators to identify the source of interference and to eliminate the problem.
[APANPIRG/17, Conc.17/32]

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

1) A channel spacing of 25 kHz will continue to be the 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.

[APANPIRG/18, Conc. 18/29]

Satellite Communication Service Performance

29. States and International Organizations are requested to liaise with satellite service providers to establish a mechanism to maintain and modernize the satellite communication infrastructure.
[APANPIRG/19, Conc.19/24]

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

34 In the interest of efficiency, States with DME coverage extending beyond their FIRs are requested to consider allowing neighboring States to develop PBN procedures utilizing these DMEs.
[APANPIRG/19, Conc.19/26]

RF interference on the protected DME/SSR frequencies

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

GNSS minimum requirement for RNP

36. GNSS-enabled area navigation systems for all RNP navigation specifications are adopted as minimum requirement in the Asia/Pacific Region.
[APANPIRG/22, Conc.22/22]

36.1 State aviation authorities, in partnership with other agencies of the State are requested to prohibit malicious and unintentional interference to GNSS and regulate legitimate uses of technology to preserve aviation utility of GNSS.
[APANPIRG/22, Conc.22/28]

Constant Descent Final Approach (CDFA) and Baro-VNAV

37. In order to reduce the likelihood of CFIT accidents, States should 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]

Sharing of Ionospheric Data

38. States are urged to coordinate with their relevant national organizations for sharing of available GNSS data with the relevant civil aviation agencies to facilitate characterization of ionosphere to support GNSS implementation in the region.
[APANPIRG/22, Conc.22/27]

SURVEILLANCE

General

39. 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 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]

40. Where different systems are used for navigation and position determination within the same controlled airspace, the ground facilities involved should be co-located 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]

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

a) secondary surveillance radar (SSR) Mode A, C and, Mode S in some terminal and high-density continental airspace;

b) ADS-C in some parts of the regions;

c) Automatic Dependent Surveillance – Broadcast (ADS-B); and

d) the diminishing use of primary radar.

42. ADS-C is 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)

43. Global Operational Data Link Document (GOLD) was adopted as Asia/Pacific regional guidance material for use by States and airspace users as the basis for operating Automatic Dependent Surveillance – Contract (ADS-C) and Controller Pilot Data Link Communications (CPDLC), in conjunction with *Annex 10 – Aeronautical Telecommunications Volume II – Communications Procedures including those with PANS status* and the *Procedures for Air Navigation Services – Air Traffic Management (PANS–ATM Doc 4444).*
[APANPIRG/20, Conc.20/73]

Automatic Dependent Surveillance – Broadcast (ADS-B)

44. Mode S Extended Squitter (1090 ES) is to 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]

45. 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 ensure ADS-B coverage over major air traffic flows and *over those airspaces currently not covered by radar. ADS-B should have overlapping coverage with existing radar.*

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 required; and

e) overlap 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 that airspace.

i) ADS-B Implementation is more effective when it is implemented regionally both on the ground and on board the aircraft.

j) When considering the benefits of ADS-B Implementation, it is necessary to consider the total benefits for all stakeholders (airline operators, passengers, efficiency of the ATM network, and society etc) and not only the benefit derived by airline operators and air navigation services providers.

[APANPIRG/20, Conc. 20/53]

Exchange of ADS-B surveillance data between neighbouring FIRs

46. States are encouraged to share ADS-B surveillance data with neighboring 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

47. States are urged to consider following regional policy on supporting the provision of direct controller pilot communication capability associated with ADS-B data sharing between adjacent FIRs of States.

47.1 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]

Coordination for VHF sharing

47.2 States are urged to support provision of VHF radio voice air/ground communication infrastructure for use by adjacent States and States sharing ADS-B data and providing VHF voice air-ground communication infrastructure to adjacent States should co-ordinate with ICAO Regional Office and their national Telecommunication Regulatory Authority for assignment of specific VHF radio frequencies to be used by the adjacent States.
[APANPIRG/22, Conc.22/32]

Implementation of surveillance systems

48. 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 provisions 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

49. In view of low density of SSR interrogator installations in the region, only Interrogator Identifier (not Surveillance Identifier) codes are used for SSRs Mode S in the areas of overlapping coverage. [APANPIRG/19 Conc.19/40]

50. 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 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 ICAO Asia and Pacific Office about the assigned II codes and PRFs for these installations.

[APANPIRG/19, Conc.19/40]

51. Recognizing more Mode S Radar ground stations being introduced in the region, States in the Asia and Pacific Regions 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]

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TEMPLATE APPROVED BY THE COUNCIL
on 18 June 2014

(*NAME*) AIR NAVIGATION PLAN

VOLUME I

(*NAME*) AIR NAVIGATION PLAN

VOLUME I

TABLE OF CONTENTS

(*NAME*) ANP, VOLUME I
PART 0 – INTRODUCTION

1. GENERAL

1.1 On ***18 June 2014***, the ICAO Council decided that the regional air navigation plans (ANPs) should be published in three volumes.

1.2 ANP Volume I contains stable plan elements whose amendment necessitates approval by the Council such as the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300); and the current to medium term mandatory regional requirements related to aerodrome and air navigation facilities and services to be implemented by States in accordance with regional air navigation agreements and requirements specific to the region which are not covered in the ICAO Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS). The material to be included in Volume I should minimise the requirement for frequent amendment. The following is a non-exhaustive list of such elements:

- Flight Information Regions (FIR) boundaries (Table and Charts);
- Search and Rescue Regions (SRR) boundaries (Table and Charts);
- Volcanic Ash Advisory Centres (VAAC);
- Tropical Cyclone Advisory Centres (TCAC); and
- Volcano Observatories (VO).

1.3 ANP Volume II contains dynamic plan elements material related to the assignment of responsibilities to States for the provision of aerodrome and air navigation facilities and services and the current to medium term mandatory regional requirements related to aerodrome and air navigation facilities and services to be implemented by States in accordance with regional air navigation agreements involving the relevant PIRG. The amendment of these elements does not require approval by the Council. The following is a non-exhaustive list of such elements:

- Major traffic flows;
- ATS route network;
- Meteorological Watch Offices (MWO);
- Secondary Surveillance Radar (SSR) codes;
- Five-letter name-codes; and
- VOLMET Broadcasts.

1.4 ANP Volume III contains dynamic/flexible plan elements providing implementation planning guidance for air navigation systems and their modernization taking into consideration emerging programmes such as the ICAO Aviation System Block Upgrades (ASBUs) and associated technology roadmaps described in the *Global Air Navigation Plan* (GANP) (Doc 9750). The ANP Volume III would also include appropriate additional guidance, particularly with regard to implementation, to complement the material contained in the ANP Volumes I and II. The amendment of Volume III would not require approval by the Council (approval of Part II is under the responsibility of the relevant PIRG).

Note 1: The ANP does not list all facilities in the region(s) but only those required for international civil aviation operations. Documents from the Integrated Aeronautical Information Package and other States publications should be consulted for information on additional facilities and for operational information in general.

Note 2: The general structure of the regional plans for the parts which concern an air navigation field in Volumes I and II consists of an "Introduction", "General Regional Requirements" and "Specific Regional Requirements". Only Tables shown under "General Regional Requirements" are harmonized for all Regions. Should a Region require a Table for a specific field, this should be reflected under "Specific Regional Requirements" of the subject concerned. The naming convention for such tables

consists of the technical field concerned (AOP, CNS, ATM, MET, SAR and AIM), the ANP Volume number (I or II), the Region (APAC, AFI, CAR/SAM, EUR, MID, NAM and NAT) and the consecutive number of the table. Examples are as follows: Table ATM I-EUR-1, Table CNS II-MID-1 or Table MET I-AFI-2.

1.5 Guidance material on the detail of programmes or concepts should be contained in supplementary material referenced appropriately or adopted as (***NAME***) Documents.

2. RELATIONSHIP BETWEEN THE GLOBAL AND REGIONAL AIR NAVIGATION PLANS

2.1 The ANPs represent the bridge between, on one side, the global provisions in the ICAO SARPs and the GANP, and on the other side, the States' air navigation plans and implementation status.

2.2 The GANP represents a rolling, 15-year strategic methodology which leverages existing technologies and anticipates future developments based on State/industry-agreed operational objectives. The GANP is an overarching framework that includes key aviation policy principles to assist ICAO Regions, sub-regions and States with the preparation of their regional and State air navigation plans and to support the establishment of air navigation priorities.

3. OBJECTIVE AND PURPOSE OF REGIONAL AIR NAVIGATION PLANS

3.1 The ANPs provide for the planning and implementation of air navigation systems within a specified area, in accordance with the agreed global and regional planning framework. They are developed to meet those needs of specific areas not covered in the worldwide provisions. The development and maintenance of the ANPs is undertaken by ICAO PIRGs with the assistance of the ICAO Secretariat.

3.2 The ANPs are used as a repository Document for the assignment of responsibilities to States for the provision of air navigation facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300).

3.3 The ANPs contain requirements related to the facilities and services to be implemented by States in accordance with regional air navigation agreements. The procedural parts of ANPs are published in the *ICAO Regional Supplementary Procedures* (SUPPs) (Doc 7030).

3.4 The ANPs contain provisions that States can follow in the planning of aerodrome and air navigation facilities and services activities, with the assurance that facilities and services furnished in accordance with the plan will form with those of other States an integrated system adequate for the foreseeable future.

3.5 The ANPs may serve as a legal basis for air navigation services charges which are levied for services provided or made available to users, in accordance with ICAO's *Policies on Charges for Airports and Air Navigation Services* (Doc 9082) and *ICAO Manual on Air Navigation Services Economics* (Doc 9161).

3.6 The ANPs support the performance-based approach to planning adopted by ICAO to measure the efforts made by States in implementing the agreed requirements.

4. MANAGEMENT AND AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

4.1 The elements of the existing planning system and the planning principles, operational requirements and planning criteria as developed for the (***NAME***) Region(s) are kept under constant review by the (***name of PIRG***) in accordance with its schedule of meetings, in consultation with provider and user States and with the assistance of the ICAO Regional Office(s) concerned.

4.2 The detailed amendment procedure of the three ANP Volumes is described in paragraph 5 below.

5. PROCEDURE FOR THE AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

5.1 The procedure for the amendment of regional air navigation plans in three Volumes as approved by the Council is shown in **Appendix A**.

6. ABBREVIATIONS

6.1 The abbreviations used in this document are contained in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC)* (Doc 8400), with the exception of those used in the explanations of any tables appearing herein, which also give their meaning.

7. ESTABLISHMENT AND PROVISION OF A MULTINATIONAL ICAO AIR NAVIGATION FACILITY/SERVICE (*If applicable*)

7.1 The operation of multinational air navigation services is well established within the (***NAME***) Region(s). The ICAO *Manual on Air Navigation Services Economics* (Doc 9161) details the ICAO policies on charges for air navigation services and provides additional information on the various models adopted globally. The introduction of multinational air navigation services does not dilute the principle that a State has the responsibility of overseeing the provision of air navigation services and that it shall maintain that responsibility within its sovereign airspace as well as within the airspace over the high seas for which it has accepted the responsibility for the provision of services. Where there is no intention to change or modify the FIR boundaries nor the facilities and services currently listed in the ANP there is not a requirement to amend the ANP. However, should changes to the FIR boundaries or to the facilities and services provided be required, such changes are likely to be subject to the ANP amendment procedure and should therefore be examined on a case-by-case basis. Advice on this issue can be obtained from the ICAO Regional Office(s). Any multinational arrangements for the provision of air navigation services should be registered with ICAO (Article 83 of the Convention (Doc 7300) and *Rules for Registration with ICAO of Aeronautical Agreements and Arrangements* (Doc 6685)).

APPENDIX A - PROCEDURE FOR THE AMENDMENT OF REGIONAL AIR NAVIGATION PLANS

*(Approved by Council on **18 June 2014**)*

1. Introduction

1.1. The procedure outlined below has been evolved to provide a means of maintaining the regional air navigation plans using an ANP web based platform.

2. General criteria

2.1. The Assembly has resolved that regional plans should be revised when it becomes apparent that they are no longer consistent with current and foreseen requirements of international civil aviation and that, when the nature of a required change permits, the associated amendment of the regional plan should be undertaken by correspondence between the Organization and the States and international organizations concerned.

2.2. When a State cannot immediately implement a particular part or a specific detail of a regional plan although it intends to do so, when practicable, this in itself should not lead to the State proposing an amendment to the plan.

2.3. The general structure of the regional plans for the parts which concern an air navigation field in Volumes I and II consists of an "Introduction", "General Regional Requirements" and "Specific Regional Requirements". As the section "General Regional Requirements" is harmonized for all regions, an amendment of the provisions (text) in "General Regional Requirements" will lead to amendment of Volumes I and II of the regional plans of all regions.

2.4. The amendment process of Volume III is under the responsibility of the relevant Planning and Implementation Regional Group (PIRG). The Parts 0 (Introduction) and I (General Planning Aspects) of Volume III are harmonized for all regions and the amendment of these parts should be made following inter-regional coordination.

3. User rights

3.1. Access to the ANP web based platform to develop and submit amendment proposals to the regional plan and to comment on an officially issued amendment proposal should be provided through controlled access by the State's or international organization's designated Focal Points. The State or international organization should officially inform their respective Regional Office of the registration of their designated Focal Points.

4. States and international organizations to be consulted

4.1. The Secretary General, through the relevant Regional Office, will determine the States and international organizations to be consulted on the amendment proposal. These will generally only include the provider and user States and international organizations that have a direct and obvious interest in the amendment in question.

PART A — AIR NAVIGATION PLANS, VOLUME I

5. Procedure for amendment of Volume I

5.1. If, in the light of the above general criteria, any State (or group of States) of a region wishes to effect a change in the approved air navigation plan for that region, it should propose to the Secretary General, through the Regional Office accredited to that State, an appropriate amendment to the plan, adequately documented; the proposal should include the facts that lead the State (or group of States) to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions. (This procedure does not preclude a State having previous consultation with other States before submitting an amendment proposal to the Regional Office.) This proposed amendment should be submitted via the web based tool and/or by correspondence to the Regional Office.

5.2. Upon studying the proposal, if the Secretary General considers that the proposed amendment requires further coordination through the relevant Planning and Implementation Regional Group (PIRG), the proposal will be presented, adequately documented, to the PIRG. The views of the PIRG will be coordinated with the originating State and the proposed amendment will be uploaded via the ANP web based platform for processing proposals for amendment for approval by the Council.

5.3. If the proposal concerns an amendment of the provisions (text) in "General Regional Requirements", the Secretary General will coordinate and circulate, through all Regional Offices, an amendment of all the regional plans.

5.4. If the Secretary General considers that the proposed amendment conflicts with established ICAO policy, or that it raises questions which the Secretary General considers should be brought to the attention of the Air Navigation Commission, the proposal will be presented, adequately documented, to the Commission. In such cases, the Commission will decide the action to be taken on the proposal.

5.5. The Secretary General, through the Regional Office, will circulate the proposal, adequately documented, with a request for comments to all provider and user States of the region considered affected as well as to user States outside the region and international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. The States and international organizations concerned should either send their comments/agreement/objection via the ANP web based platform and/or by correspondence to the Regional Office. Any comment or objection should be adequately supported by reasons for the comment or objection.

5.6. If, in reply to the Secretary General's inquiry, no objection is raised to the proposal by a specified date, the proposal should be submitted to the President of the Council, who is authorized to approve the amendment on behalf of the Council. The approved amendment should be incorporated into Volume I of the regional plan.

5.7. If, in reply to the Secretary General's inquiry, any objection is raised, and if objection remains after further consultation, the matter will be documented for discussion by the respective planning and implementation regional group (PIRG) and, ultimately for formal consideration by the Air Navigation Commission, if it remains unresolved. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

5.8. Proposals for the amendment of Volume I of the regional plan submitted by international organizations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings and which attended the meeting(s) where the relevant regional plan is managed, will be dealt with in the same manner as those received from States, except that, before circulating a proposal to States and selected international organizations, the Secretary General will ascertain whether it has adequate support from the State or States whose facilities will be affected. If such support is not forthcoming, the proposal will be presented to the Commission, and the Commission will decide on the action to be taken on the proposal.

5.9. Proposals for the amendment of Volume I of the regional plan may also be initiated by the Secretary General, through the Regional Office accredited to that State, provided that the State or States whose facilities will be affected have expressed their concurrence with the proposal.

5.10. Amendments to Volume I of the regional plan which have been approved in accordance with the above procedure will be published in the ANP web based platform at convenient intervals.

PART B — AIR NAVIGATION PLANS, VOLUME II

6. Procedure for amendment of Volume II

6.1. Amendments of Volume II of the regional plan should be effected on the basis of an adequately documented proposal submitted by a State (or a group of States) or the relevant PIRG to the Secretary General, through the Regional Office accredited to that State. The proposal should include the facts that lead to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions to Volume II of the regional plan. (This procedure does not preclude a State having previous consultation with other States before submitting an amendment proposal to the Regional Office.) This proposed amendment should be submitted via the ANP web based platform and/or by correspondence to the Regional Office.

6.2. If the proposal concerns an amendment of the provisions (text) in "General Regional Requirements", the Secretary General will coordinate and circulate, through all Regional Offices, an amendment of all the regional plans.

6.3. The ICAO Regional Office will circulate the proposal, adequately documented, with a request for comments to all provider and user States of the region considered affected as well as to user States outside the region and international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. The States and international organizations concerned should either send their comments/agreement/objection via the ANP web based platform and/or by correspondence to the Regional Office. Any comment or objection should be adequately supported by reasons for the comment or objection.

6.4. If, in reply to the ICAO Regional Office's inquiry, no objection is raised to the proposal by a specified date, it will be deemed that a regional agreement (involving the relevant PIRG) on the subject has been reached and the proposed amendment should be incorporated into Volume II of the regional plan.

6.5. If, in reply to the ICAO Regional Office's inquiry, any objection is raised, and if objection remains after further consultation, the matter will be documented for discussion by the respective planning and implementation regional group (PIRG) and, ultimately for formal consideration by the Air Navigation Commission, if it remains unresolved. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

6.6. Proposals for the amendment of Volume II of the regional plan submitted by international organizations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings, where the relevant regional plan is managed, will be dealt with in the same manner as those received from States, except that, before circulating a proposal to States and selected international organizations, the Secretary General will ascertain whether the proposal has adequate support from the State or States whose facilities or services will be affected. If such support is not forthcoming, the proposal will not be pursued.

6.7. Proposals for the amendment of Volume II of the regional plan may also be initiated by the Secretary General, through the Regional Office accredited to that State, provided that the State or States whose facilities or services will be affected have expressed their concurrence with the proposal.

6.8. Amendments to Volume II of the regional plan which have been approved in accordance with the above procedure will be published in the ANP web based platform at convenient intervals.

PART C — AIR NAVIGATION PLANS, VOLUME III

7. Procedure for amendment of Volume III

7.1. Amendments of Volume III of the regional plan are under the responsibility of the relevant Planning and Implementation Regional Group (PIRG) and not subject to a formal application of the procedure for amendment of the ANP described in Parts A and B above. However, the amendment of the provisions of Part 0 - "Introduction" and Part I - "General Planning Aspects" needs special coordination, as specified in 7.4 below. Since these two Parts are harmonized for all regions, an amendment of the provisions contained there-in will lead to amendment of Parts 0 and I of Volume III of the regional plans of all regions.

7.2. Amendments of Volume III of the regional plan should be effected on the basis of an adequately documented proposal submitted to the ICAO Regional Office concerned by:

- a State (or a group of States); or
- the relevant Planning and Implementation Regional Group (PIRG) of the region(s); or
- the ICAO Secretariat; or
- international organisations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings and/or which attended the meeting(s) where the relevant Volume III amendments were agreed.

7.3. This procedure does not preclude a State (or group of States) having previous consultation with other States before submitting an amendment proposal to the Regional Office. Such amendments may include additions, modifications or deletions to Volume III of the regional plan. In addition, the facts that led to the conclusion that the amendment should be included.

7.4. If the proposal concerns an amendment of the provisions in Part 0 - "Introduction" or Part I - "General Planning Aspects", the ICAO Regional Office concerned will submit the proposal to ICAO Headquarters (Air Navigation Bureau) for coordination with all ICAO Regional Offices. The views of the ICAO Regional Offices will be taken into consideration in the consolidation/approval of the amendment by the ANB. The approved amendment will be published in Volume III of all regional plans at convenient intervals.

7.5. The mechanism for the amendment of Part II of Volume III of the regional plan should be developed, agreed by the relevant PIRG and reflected in the corresponding PIRG Handbook.

(*NAME*) ANP, VOLUME I

PART I – GENERAL PLANNING ASPECTS (GEN)

1. GEOGRAPHICAL SCOPE

1.1 The (***NAME***) ANP is related to the ICAO (***NAME***) air navigation region(s). The ANP may call for the provision of basic facilities and services beyond the charted boundaries of a region where such facilities and services are necessary to meet the requirements of international air navigation within that region.

1.2 A number of States within the ICAO (***NAME***) Region(s) are members of one or more sub-regional groupings which have development plans to improve air navigation services; such plans contribute to the regional implementation of the ICAO *Global Air Navigation Plan* (GANP) (Doc 9750). Regional subgroups include the:

- ***(include appropriate regional subgroups names if applicable)***
- ***Note: Diagram or list of regional sub groupings to be inserted in the Volume II or database. (If applicable)***

2. FLIGHT INFORMATION REGIONS

2.1 **Table GEN I-1** shows the current Flight Information Regions (FIR)/Upper Information Regions (UIR) which are part of the ICAO (***NAME***) Region(s). More details of the FIRs and UIRs within the (***NAME***) air navigation region(s) are contained in **Table ATM I-1** and **Charts ATM I-1** and **ATM I-2**.

3. STATES' RESPONSIBILITIES

3.1 Each Contracting State is responsible for the provision of facilities and services in its territory under Article 28 of the Convention as well as within the airspace over the high seas for which it has accepted the responsibility for the provision of services. The Council has recommended that these facilities and services include those specified in the ANPs.

3.2 The inclusion of the basic facilities and services provided by non-Contracting States and territories in regional ANPs is simply recognition that they are needed by or likely to affect international civil aircraft operations of Contracting States or the facilities and services of these States.

Note. — Non-Contracting States in the (NAME) region are: **(include names as applicable)**

4. (*NAME*) REGIONAL PLANNING

4.1 The regional planning and implementation process is the principal engine of ICAO's planning framework. It is here that the top-down approach comprising global guidance and regional harmonization measures converges with the bottom-up approach constituted by national planning by States.

4.2 PERFORMANCE BASED APPROACH

4.2.1 Global Approach

4.2.1.1 In an effort to assist planners in weighing outcomes and making appropriate decisions, the *Manual on Global Performance of the Air Navigation System* (Doc 9883) has been developed. In this respect ICAO has defined 11 Key Performance Areas (KPA), one for each of the *Global ATM Operational Concept* (Doc 9854) expectations outlined below.

4.2.1.2 These general expectations are relative to the effective operation of the ATM system. The ICAO planning objective is to achieve a performance based global air traffic management (ATM) system through the implementation of air navigation systems and procedures in a safe, progressive, cost-effective and cooperative manner.

5. RELATIONSHIP BETWEEN GLOBAL, REGIONAL AND NATIONAL PLANNING

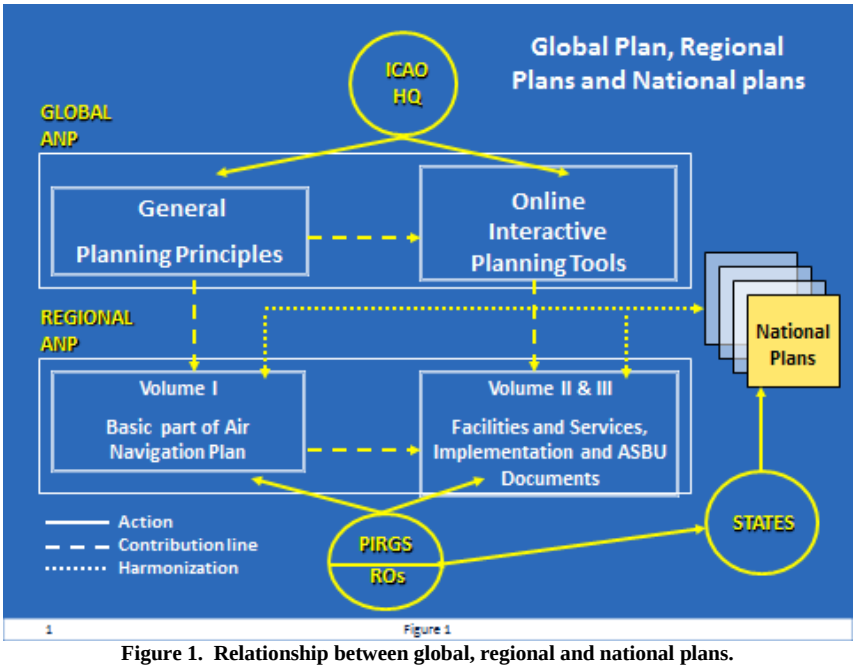

Figure 1. Relationship between global, regional and national plans.

5.1 Planning takes place at global, regional and national levels. Planning is accomplished with the help of planning tools and methodologies that are used primarily at the regional and national levels, conditioned by guidance from the global level. The basis for effective planning is the GANP (Doc 9750), which should guide the development of regional and national implementation plans that will support system architectures.

6. HUMAN RESOURCE PLANNING

6.1 Human resource planning can be considered "*the systematic and continuing process of analysing an organisation's human resource needs under changing conditions and developing personnel policies appropriate to the longer-term effectiveness of the organisation. It is an integral part of corporate planning and budgeting procedures since human resource costs and forecasts both affect and are affected by longer-term corporate plans.*"[1]

6.2 Estimating current and future requirements for civil aviation personnel and training capacity is essential for human resource planning, institutional capacity building, and related funding and policy measures. Such planning will need to take into account the interdependencies for supply and demand of qualified personnel at national, regional and global levels.

6.3 Human Performance

6.3.1 The high level of automation and interdependencies across aviation disciplines will only increase with evolving air navigation systems. To maximise potential safety and efficiency benefits that these offer, the development of human-driven, rather than engineering-driven interfaces is required, making it easier for the human operator to make sound decisions and take correct actions. Similarly, as part of a safety management systems approach, procedures need to be identified for the use of current and new

[1] Defined by the UK Institute of Personnel and Development

technologies that take into account human capabilities and manage the risk associated with human limitations.

6.3.2 States should:

a) Identify a certification process that requires at the design stage:

i) recognition of the potential human performance issues that the proposed new technology attempts to address; and

ii) consideration of the potential human performance issues, including changes in roles and the effects on individual and team behaviours, that may be introduced by the proposed new technology.

b) Identify processes for the implementation of new technologies, systems and procedures that describes the means by which human performance considerations can be addressed within operational contexts.

c) Consider the management of human performance-related risks as a necessary and essential aspect of the oversight of safety management systems.

d) Ensure that their technical personnel have exposure to training in human factors.

6.4 Training

6.4.1 A major goal of CNS/ATM systems is to create a seamless air navigation system. A seamless air navigation environment will require adequately qualified personnel prepared to perform their jobs in an evolving environment. At the same time, shortcomings in human resource planning and training are frequently mentioned as one of the reasons for the lack of implementation of regional ANPs. Human resource development challenges will be compounded during the transition period to CNS/ATM systems. As the existing and emerging air navigation technologies will co-exist in parallel for a period of time, civil aviation personnel will need to learn new skills, whilst retaining those needed to operate and maintain existing systems. To meet this challenge, a cooperative approach should be used in civil aviation training within the region. This approach should:

a) ensure that the training needs for the region are identified, documented and kept up to date;

b) facilitate the access to specialized types of training needed within the region or sub-regions that individual States cannot justify based on their national training needs alone;

c) ensure that a balanced market exists to support the development and on-going implementation of high-quality training in one or more training centres within the region or sub-regions;

d) endeavour to distribute equitably regional training activities among the training centres established within the region or sub-regions.

e) take advantage of readily available training materials including those available through the TRAINAIR Plus sharing system.

6.4.2 Appropriate bodies should be established to facilitate regional and sub-regional training planning. A quantitative approach should be used to determine the training capabilities needed within a region or sub-region. Decisions concerning required training capabilities should be based on an aggregate of training needs for existing air navigation technologies, as well as emerging technologies. A State consultation process should be used to formulate a plan for the establishment of specific regional training centres.

6.5 Training of technical personnel

6.5.1 States should develop and implement comprehensive training programmes and periodic training plans for all technical staff, including initial, on-the-job, recurrent and specialized training.

7. SAFETY CONSIDERATIONS

7.1 Safety fundamentally contributes to the sustainable growth of a sound and economically viable civil aviation system that continues to foster economic prosperity and social development. With air traffic projected to double in the next 15 years, safety risks must be addressed proactively to ensure that this significant capacity expansion is carefully managed and supported through strategic regulatory and infrastructure developments. It is imperative therefore that States and regions remain focused on their safety priorities as they continue to encourage expansion of their air transport sectors.

7.2 Acceptable safety levels are related to the establishment of State safety programmes (SSPs) that are able to anticipate and effectively respond to safety-related occurrences, resulting in continual improvements to an already low global accident rate. The *Global Aviation Safety Plan* (GASP) specifically establishes targeted safety objectives and initiatives that support SSP implementation while ensuring the efficient and effective coordination of complementary safety activities between all stakeholders.

7.3 PIRGs should harmonize activities undertaken to address aviation safety issues on a regional basis with the Regional Aviation Safety Groups (RASGs). In addition, PIRGs should coordinate relevant safety matters with RASGs to ensure consistency and avoid overlap.

7.4 PIRGs should ensure that air navigation services development programmes are consistent with the GASP safety objectives and initiatives. States are responsible for the prompt elimination of their air navigation deficiencies. Detailed information on the process of identifying and managing air navigation deficiencies is contained in the (***name of PIRG***) Handbook.

7.5 Adherence to the ICAO SARPs will significantly contribute to aviation safety. States should therefore ensure that they have the necessary regulatory framework in place to reinforce the adoption of the ICAO SARPs within their national regulations. States should also ensure that any differences to the ICAO SARPs have been assessed in respect of safety and are notified in accordance with ICAO requirements.

7.6 Unsatisfactory Conditions Reporting

7.6.1 States should act on any serious problems encountered due to the lack of implementation or prolonged unavailability of air navigation facilities or services required by the ANPs as reported by users of air navigation facilities and services.

8. ENVIRONMENT CONSIDERATIONS

8.1 It is an ICAO Strategic Objective to minimize the adverse effects of global civil aviation on the environment. PIRGs should ensure that environmental factors are taken into consideration when performance based systems implementation plans are developed and may wish to coordinate their plans with the State Action Plans on CO_2 Emissions Reduction. The results of environmental analysis can be useful in providing national decision-makers within the various sub-regions with information upon which to base airspace architecture decisions and in providing information on what the aviation industry is doing now to protect the environment in the future. Tools such as the ICAO Fuel Savings Estimation Tool (IFSET) are available from the ICAO public website to help quantify the environmental benefits from operational improvements. Environmental considerations should, however, not compromise acceptable levels of safety and be balanced against operational and economic considerations.

9. AIR TRAFFIC FORECASTS

9.1 Regional traffic forecasting supports the regional air navigation system planning. All States generally prepare individual forecasts, taking account of the regional information, for national planning purposes. A uniform strategy has been adopted by ICAO for the purpose of preparing traffic forecasts and other planning parameters in support of the regional planning process. This information should be shared through at least the sub-regional groupings to enable effective regional planning development.

10. CONTINGENCY PLANNING

10.1 Contingency plans may constitute a temporary deviation from the approved ANPs; such deviations are approved, as necessary, by the President of the ICAO Council on behalf of the Council.

10.2 The effects of disruption of services in particular portions of airspace are likely to affect significantly the services in adjacent airspace. States should co-ordinate with neighbouring States in the development and implementation of contingency plans, which in some cases may be developed on a sub-regional basis.

10.3 ICAO will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State in the event that the authorities cannot adequately discharge their responsibility for the provision of such services to ensure the safety of international civil aviation operations. In such circumstances, ICAO will work in coordination with States responsible for airspace adjacent to that affected by the disruption and in close consultation with international organizations concerned.

10.4 Regional contingency plans will be developed, approved and maintained by (***name of PIRG***) with the support of ICAO and other organizations.

10.5 States should prepare their contingency plans in advance and ensure their availability or accessibility to the ICAO Regional Office. The plans should be reviewed at regular intervals and updated as required.

TABLE GEN I-1 - FLIGHT INFORMATION REGIONS (FIR)/UPPER INFORMATION REGIONS (UIR) OF THE ICAO (*NAME*) REGION(S)

EXPLANATION OF TABLE

Column		
1	State	Name of State
2	FIR/UIR	Name of FIR/UIR

STATE	FIR/UIR
1	2

APAC ANP, VOLUME I

PART III – COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

1. INTRODUCTION

1.1 This part of the APAC ANP constitutes the agreed regional requirements considered to be the minimum necessary for effective planning and implementation of Communications, Navigation and Surveillance (CNS) facilities and services in the (***NAME***) Region(s) and complements the provisions of ICAO SARPs and PANS related to CNS. It contains stable plan elements related to the assignment of responsibilities to States for the provision of CNS facilities and services within the ICAO (***NAME***) region(s) in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300) and mandatory requirements related to the CNS facilities and services to be implemented by States in accordance with regional air navigation agreements.

1.2 The dynamic plan elements related to the assignment of responsibilities to States for the provision of CNS facilities and services and the mandatory requirements based on regional air navigation agreements related to CNS are contained in the (***NAME***) ANP Volume II, Part III – CNS.

1.3 The (***NAME***) ANP Volume III contains dynamic/flexible plan elements related to the implementation of air navigation systems and their modernization in line with the ICAO Aviation System Block Upgrades (ASBUs) methodology and associated technology roadmaps described in the Global Air Navigation Plan. The ASBU modules are aimed at increasing capacity and improving efficiency of the aviation system whilst maintaining or enhancing safety level, and achieving the necessary harmonization and interoperability at regional and global level. This includes the regionally agreed ASBU modules applicable to the specified ICAO region/sub-region and associated elements/enablers necessary for the monitoring of the status of implementation of these ASBU modules.

1.4 In planning for these elements, economy and efficiency should be taken into account in order to ensure that the requirements for the provision of CNS facilities and services can be kept to a minimum. CNS facilities and services should fulfil multiple functions whenever this is feasible.

Standards and Recommended Practices and Procedures for Air Navigation Services

1.5 The SARPs and PANS and related guidance material applicable to the provision of CNS are contained in:

a) Annex 10 – *Aeronautical Telecommunications*, Volumes I, II, III, IV and V;

b) Annex 2 – Rules of the Air;

c) Annex 3 – Meteorological Service for international air navigation;

d) Annex 6 – Operation of Aircraft, Parts I (Chapter 7), II (Chapter 7) and III (Chapter 5);

e) Annex 11 – Air Traffic Services;

f) Annex 12 – Search and Rescue;

g) Annex 15 – Aeronautical Information Services;

h) Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444);

i) Regional Supplementary Procedures (Doc 7030);

j) GNSS Manual (Doc 9849);

k) Manual on Detailed Technical Specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI Standards and Protocols (Doc 9880);

l) ICAO Aeronautical Telecommunication Network (ATN) Manual for the ATN using IPS Standards and Protocols (Doc 9896);

m) *Manual of Testing of Radio Navigation Aids* (Doc 8071);

n) *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunications Network* (Doc 8259);

o) *Manual on Required Communication Performance (RCP)* (Doc 9869);

p) *Training Manual* (Doc 7192);

q) *Performance-based Navigation Manual* (Doc 9613);

r) *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718);

s) *ICAO Manual on the Secondary Surveillance Radar (SSR) Systems* (Doc 9684);

t) *Manual on Airborne Surveillance Applications* (Doc 9994); and

u) *Manual of Air Traffic Services Data Link Applications* (Doc 9694).

2. GENERAL REGIONAL REQUIREMENTS

Communications

Aeronautical Fixed Service (AFS)

2.1 The aeronautical fixed service (AFS) should satisfy the communication requirements of ATS, AIS/AIM, MET and SAR, including specific requirements in terms of system reliability, message integrity and transit times, with respect to printed as well as digital data and speech communications. If need be, it should, following agreement between individual States and aircraft operators, satisfy the requirements for airline operational control.

The Aeronautical Telecommunication Network (ATN)

2.2 The ATN of the Region(s) should have sufficient capacity to meet the minimum requirements for data communications for the services mentioned in paragraph 2.1 above.

Aeronautical Mobile Service (AMS)

2.3 Air-ground communications facilities should meet the agreed communication requirements of the air traffic services, as well as all other types of communications which are acceptable on the AMS to the extent that the latter types of communications can be accommodated.

Air-ground communications for ATS

2.4 Air-ground communications for ATS purposes should be so designed to require the least number of frequency and channel changes for aircraft in flight compatible with the provision of the required service. They should also provide for the minimum amount of coordination between ATS units and provide for optimum economy in the frequency spectrum used for this purpose.

Air-ground data link communications

2.5 Air-ground data link communications should be implemented in such a way that they are regionally and globally harmonised and make efficient use of available communication means and ensure optimum economy in frequency spectrum use and system automation.

Navigation

2.6 Planning of aeronautical radio navigation services should be done on a total system basis, taking full account of the navigation capabilities as well as cost effectiveness. The total system composed of station-referenced navigation aids, satellite-based navigation systems and airborne capabilities should meet the performance based navigation (PBN) requirements for all aircraft using the system and should form an adequate basis for the provision of positioning, guidance and air traffic services.

2.7 Account should be taken of the fact that certain aircraft may be able to meet their navigation needs by means of self-contained or satellite-based aids, thus eliminating the need for the provision of station-referenced aids along the ATS routes used by such aircraft, as well as the need to carry on board excessive redundancies.

Surveillance

2.8 Planning of aeronautical surveillance systems should be made based on a system approach concept, where collaboration and sharing of data sources should be considered in support of an efficient use of the airspace.

Frequency Management

2.9 Frequency assignment planning in the Region(s) should be carried out in accordance with the provisions of Annex 10 and *ICAO Handbook on Radio Frequency spectrum for Civil Aviation* (Doc 9718), supplemented, as necessary, by regional recommendations and technical criteria developed for this purpose.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary).

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