

International Civil Aviation Organization

THIRTEENTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/13) Bangkok, Thailand, 9 to 13 September 2002

Agenda Item 3: CNS/ATM Implementation and related activities

REPORT ON GLOBAL AND REGIONAL DEVELOPMENTS IN THE MODERNIZATION OF AIR NAVIGATION SYSTEMS

SUMMARY

This paper provides an overview of the global and regional developments in the modernization of air navigation systems. The paper shows the current status of ICAO provisions relating to CNS/ATM systems, a summary of the work of relevant panels and study groups, textual and tabular representations of regional developments, a set of general observations and recommendations.

Proposed action by APANPIRG is in paragraph 5.

1. **INTRODUCTION**

- a. This report provides information on the status of the programmes of the relevant Air Navigation Commission panels, the Secretariat and the Planning and Implementation Regional Groups (PIRGs) and regional developments. These programmes and resultant developments are designed to modernize the air navigation infrastructure worldwide in order to provide increased airspace/airport capacity, higher operational efficiency, higher levels of aviation safety and better service regularity. The term "modernization" refers to building on existing air navigation systems, focussing mainly on emerging technologies, such as satellites and data links, for improved communication, navigation and surveillance functions, thus making the advanced air traffic management concepts feasible.
- b. The Commission recognizes that work related to air navigation systems and, in particular, development and implementation, continue to rank among the highest priority items on ICAO's work programme. Therefore, there was a need for timely completion of the necessary SARPs, PANS and guidance material, in order to provide a sound basis for implementation of emerging new air navigation systems. Through its panels and the Secretariat, assisted by study groups, the Commission progressed the development of SARPs, PANS and guidance material, as described in Section 3 of this paper. Near-term future developments are summarized as well.

Implementation of air navigation systems requires planning on a global, regional and national basis. The work of PIRGs and other implementation activities are summarized in Section 4 and some relevant general observations are presented in Section 5.

c. A summary of the development status of air navigation systems-related SARPs, PANS and guidance material is in Appendix A to this paper. A summary of the recent main activities of panels of the Commission and study groups involved in CNS/ATM-related activities is provided in a tabular form in Appendix B. Finally, a tabular representation of regional developments is presented in Appendix C.

2. SARPS, PANS AND GUIDANCE MATERIAL RELATED TO AIR NAVIGATION SYSTEMS

a. **Recent developments**

Communications

- i. The validation of detailed technical specifications for very high frequency (VHF) digital link (VDL) Modes 3 and 4 as well as the systems management and security service of the aeronautical telecommunication network (ATN) was completed.
- ii. The Aeronautical Mobile Communications Panel (AMCP) began assessment of the need for SARPs for the universal access transceiver (UAT) serving as a data link for automatic dependent surveillance-broadcast (ADS-B) applications and for VDL Mode 4 serving as a communication data link.
- iii. Work was initiated on the relocation of detailed technical specifications of the aeronautical mobile-satellite service (AMSS) into a technical manual.
- iv. Frequency assignment criteria for VDL Mode 2 were completed.

Navigation

- v. Progress continued in a number of States and international organizations on the development and implementation of global navigation satellite systems (GNSS). A few more States approved the global positioning system (GPS) for supplemental or primary use for some operations and types of airspace.
- vi. The first package of SARPs for GNSS was incorporated into Annex 10—*Aeronautical Telecommunications*, Volume I *Radio Navigation Aids* as part of Amendment 76 which became applicable in November 2001. The package contains general provisions and technical specifications for the global positioning system (GPS), GLObal NAvigation Satellite System (GLONASS), aircraft-based augmentation system (ABAS), satellite-based augmentation system (SBAS), and ground-based augmentation system (GBAS). Pursuant to the adoption of the above-mentioned SARPs, a number of system enhancements, including GBAS positioning service, were developed and included in Amendment 77 to Annex 10.
- vii. Development of the SBAS continued. This form of augmentation is expected to support the use of GNSS for all phases of flight including approach with vertical guidance (APV) and in future, Category I precision approach. Several architectures for the GBAS to support precision approach applications also continued to be developed and tested. The latter type of augmentation may be used by some States as an alternative in support of Category I operations.

viii. Amendments to secondary surveillance radar (SSR) Mode S and airborne collision avoidance system (ACAS) SARPs were adopted in 2002 for inclusion in Annex 10 as part of Amendment 77. Additionally, work continued on the development of guidance material on the airborne separation assurance system (ASAS) to assist in the development of requirements. Moreover, initial concepts were developed to help the definition of required surveillance performance (RSP).

Air traffic management

ix. Amendment 76 to Annex 10, Volume II and the PANS-ATM (14th edition, applicability date of 1 November 2001) should facilitate implementation of the available technology in relation to controller-pilot data link communications (CPDLC) and data link — flight information service (D-FIS). Amendments stemming from recommendations of the tenth meeting of the Review of the General Concept of Separation Panel (RGCSP/10) introduced provisions for 55.5 km (30 NM) spacing between parallel RNAV route centre lines in remote and oceanic airspace (Amendment 41 to Annex 11) and 55.5 km (30 NM) longitudinal separation (Amendment 1 to the 14th edition of the PANS-ATM). These separation minima have associated requirements for automatic dependent surveillance (ADS) and are applicable only where aircraft navigation capability is RNP 4 or better. Coupled with this material, a new chapter dealing specifically with ADS procedures has also been incorporated into the same amendment to PANS-ATM with an applicability date of 28 November 2002.

Regional human resource planning and training needs for CNS/ATM implementation

- x. The first draft of a human resource planning manual was completed in 2001. The aim of the manual is to enhance States' individual capabilities in this area. To ensure that the manual fully meets States' and/or air navigation service providers' needs and is sufficiently user-friendly, preliminary or "beta" testing of the manual is required. This will be done directly with States and air navigation service providers during a Regional Human Resource Planning Seminar planned for this year in the Caribbean and South American (CAR/SAM) Regions. Once the manual is approved, the Secretariat plans to organize regular human resource planning seminars to assist States in developing and implementing their training and staffing plans.
- xi. The completion of the human resource planning manual is a fundamental element in the overall strategy to ensure that training needed to implement new and emerging air navigation systems is available. The other key element is the implementation of a regional training planning process. The aim of this process is to ensure that the training needed to implement regional air navigation plans is accessible and affordable within all ICAO Regions. The specific steps and procedures that could form the basis of a regional training planning process were developed by the Secretariat. To ensure that the planning process meets the needs of a region, it will need to be reviewed and adapted as necessary by the PIRG concerned. The CAR/SAM Regions will be the first to consider implementation of the process.

b. Near-term (by 2004) activities

Communications

- i. The AMCP will be considering the results of a comparative analysis of potential candidate links for ADS-B. The panel will also finalize frequency assignment criteria for VDL Modes 3 and 4.
- ii. The Aeronautical Telecommunication Network Panel (ATNP) will be developing provisions for the use of Internet Protocol (IP) networks and the optional use of the confidentiality feature (for message encryption) within the existing aeronautical information security framework (as reflected in ATN SARPs contained in Annex 10).

Navigation

- iii. Near-term enhancements to GNSS SARPs (defined in Amendment 77 to Annex 10) are being incorporated in the actual system design. This will improve system performance and expand services provided by SBAS and GBAS. Development of performance requirements and SARPs for more demanding GNSS applications (e.g. precision approaches for CAT II/III operations) and new GNSS elements (e.g. Galileo) will continue.
- iv. Implementation of GNSS (mainly GPS) based non-precision approach application (NPA) will be continued in ICAO Regions. These activities will be supported by the development of procedures and criteria for approaches with vertical guidance (APV) and Category I operations based on SBAS and GBAS.

Surveillance

v. The Surveillance and Conflict Resolution Systems Panel (SCRSP) will continue to address issues relating to the operational use of ACAS, ADS-B and the proposed ASAS. The panel will also continue monitoring of ACAS implementation worldwide and will further study the ACAS procedures for civil aircraft operation in case of military intercept.

Air traffic management

vi. Work continues on the development of ADS and controller-pilot data link communications (CPDLC) procedures as well as further reductions in separation minima aimed at increasing airspace capacity while maintaining or enhancing present safety levels. The first version of an air traffic management (ATM) operational concept document that was finalized at the first meeting of the Air Traffic Management Operational Concept Panel (ATMCP) in March 2002 will be further refined based on comments received from States and a review by the Commission. The concept is expected to provide a road-map to States and the PIRGs for implementation of an integrated global ATM system.

Flight Safety and Human Factors Programme

vii. A review of the *Human Factors Training Manual* (Doc 9683) is planned for 2003, specifically of Part 1, Chapter 3 (Human factors issues in the development and implementation of CNS/ATM systems) and Chapter 5 (Human factors issues in air traffic control). The objective of this review is to bring the document in line with the

manual *Human Factors Guidelines for Air Traffic Management (ATM) Systems* (Doc 9758), as well as to include the latest developments since Doc 9683 was published. Constant monitoring of developments within the industry will continue in order to take appropriate action as developments warrant.

3. GLOBAL AND REGIONAL PLANNING AND IMPLEMENTATION RELATED TO AIR NAVIGATION SYSTEMS

a. Global plan

- i. Since the acceptance of the first edition of the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) by the Council in 1998, the Secretariat, the Committee on Aviation Environmental Protection (CAEP), several panels of the Air Navigation Commission, and the PIRGs have recognized the increasing utility of the Global Plan in relation to their work, and its relevance in the overall ICAO CNS/ATM documentation structure. The need to update the document was also recognized. Based on the above, a comprehensive amendment to the document was developed by the Secretariat and accepted by the Council in June 2001.
- ii. The new Chapter 16: (Environmental Benefits Associated with CNS/ATM Initiatives) was developed on the basis of the work of the CAEP following a request which came from the third meeting of the ALLPIRG Advisory Group. Chapter 16 presents a methodology to estimate the environmental benefits associated with the implementation of CNS/ATM systems. Environmental considerations were also introduced, where appropriate, in other parts of the document.
- iii. The second edition of the document which incorporates the amendments accepted by the Council was published in April 2002.
- iv. Information and guidelines contained in the Global Plan are being used by PIRGs in their work.

b. **Regional plans**

General

i. The following paragraphs summarize the major planning activities which have been reported by recent meetings of the PIRGs.

AFI Planning and Implementation Regional Group (APIRG)

ii. The thirteenth meeting of APIRG was held in Sal, Cape Verde in June 2001. The meeting endorsed the draft Africa-Indian (AFI) Ocean Basic air navigation plan (ANP) and facilities and services implementation document (FASID) and requested ICAO to make the documents available, in working formats, for dynamic implementation processes while the formal editing and other related steps are proceeding. The meeting requested that ICAO consider an amendment to Annex 15—*Aeronautical Information Services* to upgrade a recommendation dealing with the language of publication of

NOTAM information to a Standard. The New Larger Aeroplane Task Force was established to evaluate the impact of such aircraft on aerodromes in the AFI Region. The creation of an aviation safety board as well as a Human Factors body is under consideration. The meeting requested that the documentation pertaining to all the planning and implementation regional groups be placed on the ICAO web page of the regional office concerned. The AFI Region list of deficiencies would be presented in a per-State form, with data in each air navigation field listed consecutively under the State name with the objective to assist in identifying specific problems in States and the consequent remedial actions required. APIRG noted that the Southern African development community (SADC) had endorsed a GNSS procedure project for States in the Region. The major objective of this project was to achieve harmonized GNSS procedure in the SADC States by the end of 2001, thereby significantly improving the effective use of airspace and providing safety, operational and economic benefits.

ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG)

iii. The twelfth meeting of APANPIRG, which took place in Bangkok, Thailand in August 2001, further reviewed and updated the regional plan for CNS/ATM systems which now includes a new chapter covering meteorological systems. The other major activities undertaken by APANPIRG are as follows: the development of the Asia and Pacific (ASIA/PAC) Basic ANP and FASID have been completed and approved by the President of the Council; a target date of 27 November 2003 has been set for the implementation of RVSM in the Bay of Bengal area and beyond, in conjunction with planned implementation in the Middle East (MID) Region; establishing an airspace system performance structure and funding mechanism for the ASIA/PAC Region in accordance with ICAO provisions in Amendment 40 to Annex 11 — Air Traffic Services is under consideration; to gain benefits in terms of safety, efficiency and capacity enhancements, the EMARSSH (Europe/Middle East/Asia Route structure South of Himalayas) project has been set up with a target date of implementation slated for 28 November 2002: implementation of aircraft collision avoidance systems II (ACAS II) in the ASIA/PAC Region was agreed upon with an applicable date of 23 March 2000, which is earlier than the global date of 1 January 2003; and, the ATN transition plan and related technical and planning documents were developed which outlined the requirements for ground-ground trunk circuits to be implemented by 2005.

Caribbean and South American Planning and Implementation Regional Group (GREPECAS)

iv. The tenth meeting of GREPECAS took place in Las Palmas, Canary Islands, Spain in October 2001. The major activities undertaken by GREPECAS are as follows: agreeing with the implementation of RVSM in the CAR/SAM Regions in conjunction with the planned implementation in the United States domestic airspace and Southern-Canadian airspace with effect from 1 April 2004; development of regional guidance material on ATS quality assurance programme; plan to establish a regional airspace safety performance monitoring agency for the CAR/SAM Regions in accordance with ICAO provisions related to the implementation of air traffic services (ATS) safety management programmes is under consideration; RNP/RNAV trials and demonstrations are being carried out on designated routes in CAR/SAM Regions; an ATN transition plan and

related technical and planning documents are being developed, with initial focus on ground-ground applications such as AMHS and AIDC; a set of guidelines are made available to the States of the CAR/SAM Regions for achieving an optimum interconnection of regional and interregional digital networks; and the revision of the CAR/SAM Regional plan for CNS/ATM systems is under way to include new sections corresponding to meteorological services, aeronautical information, human resources development and training needs.

European Air Navigation Planning Group (EANPG)

v. The forty-third meeting of the European Air Navigation Planning Group (EANPG) was convened in Paris, France in December 2001. While the meeting noted that there appeared to be an imbalance between the work undertaken in the Western and the Eastern parts of the region, it was considered most important that neither the EANPG nor the ICAO regional office be divided into Eastern and Western components, to ensure that the air navigation system of the entire ICAO European (EUR) Region remained a coherent environment and integrated with those of other regions. In relation to implementation of RVSM in the EUR Region effective from 24 January 2002, the meeting agreed that the European Organisation for the Safety of Air Navigation (EUROCONTROL) should be invited to continue post-implementation monitoring until a long-term monitoring plan has been developed. Concern was expressed about the need to address uninhabited aerial vehicles (UAVs), especially as the use of UAVs for military purposes has recently increased substantially. The EANPG, while noting an increasing incidence of interceptions of civil aircraft in the core area of Europe since the tragic events of 11 September 2001, urged pilots, air traffic controllers and military interceptors to strictly adhere to the applicable ICAO interception provisions to ensure that such actions were carried out safely. The meeting reviewed and updated the regional transition plan to CNS/ATM systems.

Middle East Air Navigation Planning and Implementation Regional Group (MIDANPIRG)

vi. The seventh meeting of the MIDANPIRG was held in Cairo, Egypt in January 2002. The major activities in the field of air navigation are as follows: the draft MID Basic ANP and FASID have been finalized and will go through an established approval process; preparations for the implementation of required navigation performance (RNP) and area navigation (RNAV) areas in the Middle East are in progress with a target date set for 28 November 2002; interregional coordination with the ASIA/PAC and EUR Regions is ongoing as part of the project preparations to implement RVSM in the MID Region effective 27 November 2003; a Regional Safety and Monitoring Agency has been established with initial focus on monitoring RVSM implementation in the MID Region; in addition to the examination of ATS routes crossing the MID Region under the framework of EMARSSH project with a target date of implementation set for 28 November 2002, the ATS routes within the MID Region have been reviewed and restructured; implementation of ACAS II in the MID Region was mandated with an applicable date of 1 July 2001; establishment of a MID regional very small aperture terminal (VSAT) network for ground-ground data/voice communications is under consideration; an ATN transition plan is under development, with an initial focus on implementation of ground-ground applications such as ATS message handling system (AMHS) and ATS interfacility data communications (AIDC) and the MID Regional plan for CNS/ATM systems has been reviewed and updated.

North Atlantic Systems Planning Group (NAT SPG)

vii. The thirty- seventh meeting of the NAT SPG took place in Paris, France in June 2001. The meeting agreed on the need for the development of lateral offset procedures that would mitigate the impact on the risk of increasing lateral overlap probability for its application in NAT RVSM airspace. The meeting expressed concerns regarding the current definition of *same track* and *same direction track*, as contained in the *Procedures for Air Navigation Services — Air Traffic Management* (Doc 4444), and requested clarification of the terms. The NAT SPG continued to attach importance to economic and financial matters with a view to ensuring the cost-effective management of the North Atlantic air traffic management system. The meeting agreed that a study be conducted to assess the viability of using satellite voice communications in the NAT Region. The meeting noted that work had been initiated on the development of operational, economic and financial performance indicators that would be used throughout the NAT Region. A review of NAT Basic ANP and FASID are being carried out so as to bring them in line with the ICAO standard format. The meeting agreed that the RVSM minimum monitoring requirements table should be updated on an annual basis.

Information on other major implementation activities High frequency data link (HFDL)

viii. Thirteen ground stations have already been implemented by ARINC Inc. at geographically diverse locations worldwide. The full network comprising sixteen ground stations is expected to be completed in 2002. The service is initially intended for aeronautical operational control (AOC) but efforts are underway by a number of ATS providers and aircraft operating agencies to start pre-operational trials of the link as a subnetwork of the ATN for air traffic service (ATS) communications.

VDL Mode 2

- ix. The société internationale de télécommunications aéronautiques (SITA) has already implemented ten ground stations supporting both VDL Mode 2 and aircraft communications addressing and reporting system (ACARS) in Europe and plans another twenty-five installations during 2002. These VDL Mode 2 ground stations will support the introduction of controller-pilot data link communications (CPDLC) in Europe, though they will also be used to provide for the exchange of aircraft communications addressing and reporting system (ACARS) messages (consisting of aeronautical operational control (AOC) and some limited ATS messages like pre-departure clearance).
- x. To date, fifty-five ground stations have been deployed by ARINC Inc. in the continental United States (CONUS). The total number of stations envisaged (for providing total enroute coverage) in CONUS is 175. These stations will also support both CPDLC and ACARS.
- xi. In general, the ground stations being implemented in Europe and the United States, provide the necessary infrastructure for the gradual introduction of CPDLC (as an ATN

application) in both continents in the 2003-2007 time frame.

VDL Mode 3

xii. The contract for development of ground systems has been awarded in the United States as part of the Next Generation Air-Ground Communications (NEXCOM) Programme. Initial operational capability is expected to be achieved in the fourth quarter of 2002.

VDL Mode 4

xiii. Programmes have commenced to implement VDL Mode 4 ground stations in Sweden and part of the Russian Federation in support of ADS-B.

Improvement of VHF spectrum utilization

xiv. The 8.33 kHz VHF voice channel spacing has been implemented in the core part of Europe above FL245. This has resulted in the availability of a significant number of new operational frequencies. Many aircraft have already been equipped with the 8.33 kHz compatible VHF radio. Implementation by many other European States is expected in the near future.

GNSS

xv. The programme for full-scale development and validation of the Galileo by the European Union (EU) and the European Space Agency (ESA), as another core satellite constellation of the GNSS, has recently been approved and funded. The GPS modernization programme also continued in the United States.

ATM Improvements

xvi. Substantial progress was made in all regions towards improving efficiency and capacity based on more accurate air navigation systems. In the Pacific Region, and in the South Atlantic corridor connecting Europe and South America, RNP formed the basis for a reduction of separation to 50 NM both longitudinally and laterally. Initial steps continued to be taken to implement similar reductions in the Caribbean, Middle East and South American Regions. RNP-5 was implemented in parts of the MID Region. RNP-5, in conjunction with RNAV, allowed States and aircraft operators in the EUR Region to take advantage of airborne RNAV capabilities within the coverage of existing VOR-based systems. RVSM was successfully implemented in the EUR Region, in the South Atlantic corridor and in parts of the Pacific Region.

4. **GENERAL OBSERVATIONS**

- a. The Commission made the following general observations:
 - a) all elements of the CNS/ATM systems have been standardized to the extent necessary to expedite their implementation. Current work on standardization entails emerging concepts/technologies and the refinement of existing provisions;
 - b) the translation of SARPs into definite implementation plans is gradual, incremental and progressive, taking into account differing requirements by States, subregions and regions;

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- c) the pace of implementation of CNS/ATM systems is generally and understandably slower than originally expected (using the implementation objective plans shown in the Global Plan as a baseline). Furthermore, regional plans for implementation of ACAS II prior to the globally agreed date of 1 January 2003 have proven impractical;
- d) planning activities by all PIRGs are based on homogeneous ATM areas and major traffic flows; it is expected by 2004 that all the regions would be implementing RVSM covering some of the major traffic flows;
- e) early implementation of certain air-ground data links (both on board aircraft and on the ground) namely aeronautical mobile-satellite service (AMSS), VDL Mode 2 and HFDL, have essentially been driven by the need for enhanced communication capacity for aeronautical operational control (AOC). ATS communications will be gradually accommodated as regional ATM scenarios evolve; and
- f) PIRGs are continually striving to facilitate the seamlessness between adjacent regions through the interregional coordination mechanism. However, in many cases, implementation plans will need to be better supported by solid operational and economical justification.
- b. Noting the above, the Commission concluded that the current scope, extent and level of standardization activities in ICAO was adequate and appropriate for the continuing modernization of air navigation systems worldwide. However, further effort is needed to encourage timely implementation of various elements of CNS/ATM systems and in this regard, the Council:
 - g) requested that PIRGs enhance their efforts to support CNS/ATM systems implementation plans with appropriate and adequate operational and economical analysis;
 - h) requested the Secretary General to further assist the PIRGs and in their efforts to carry out the above-mentioned analyses;
 - i) requested the Secretary General to take action necessary to enhance the ongoing inter-regional coordination activities; and
 - j) requested the Secretary General to take the necessary measures to expedite the work of the Secretariat Study Group on the Legal Aspects of CNS/ATM Systems.

5. **ACTION BY APANPIRG**

- a. The APANPIRG is invited to:
 - a) note the information provided in this working paper;
 - b) enhance its effort to support CNS/ATM system implementation plans with appropriate and adequate operational and economic analysis; and

c) enhance the ongoing inter-regional coordination activities.

Main field				SARPS/PANS	GUIDANCE MATERIAL		
		Elements	TARGET COMPLETION DATE	Status	TARGET COMPLETION DATE	Status	
	A T M	Global air traffic management requirements	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures under development.	2003	Draft global ATM operational concept finalized - 2nd edition of the Global Plan to be distributed in the 1st half of 2002.	
		Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures under development.	2003	Draft global ATM operational concept finalized - Further refinement to take place in 2003.	
		Required total system performance (RTSP)	2005	Draft policy statement under development.	2003	Definition developed - Role and functionality of RTSP being explored as part of work on the global ATM operational concept.	
A T M		ATM requirements for communications, navigation and surveillance	2004	Annexes 2, 6 and 11 SARPs and PANS-ATM procedures under development.	2003	Additional guidance material for the <i>Manual of Air Traffic Services Data Link Applications</i> (Doc 9694) under development.	
	A S	Airspace infrastructure planning			2005	Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689) published. Further guidance material under development by SASP and ATMCP	
	М	RNP and RNAV for en-route operations	Completed	Annex 11 SARPs and PANS-ATM procedures adopted by Council in 1998.	Completed	Update of the <i>Manual on Required</i> <i>Navigation Performance (RNP)</i> (Doc 9613) completed. Second edition published.	

APPENDIX A

DEVELOPMENT STATUS OF SARPS AND GUIDANCE MATERIAL RELATED TO CNS/ATM SYSTEMS

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Main field				SARPs/PANS	GUIDANCE MATERIAL		
		Elements	TARGET COMPLETION STATUS DATE		TARGET COMPLETION DATE	Status	
		Separation between aircraft	2005	PANS-ATM procedures approved by Council in 1998; further amendment to Annexes 2, 6, 11 and PANS-ATM under development.	2003	Amendment to the <i>Manual on</i> <i>Implementation of a 300 m (1 000 ft)</i> <i>Vertical Separation Minimum</i> <i>between FL 290 and FL 410</i> (Doc 9574) completed. Additional guidance is under development for the Manual on Airspace Planning Methodology (APM) (Doc 9689).	
		ATS (uplink of MET data)	2004	Annex 3 SARPs and PANS-ATM procedures concerning D-VOLMET being developed with the assistance of the METLINKSG.	_		
		ATS (uplink of SIGMET information in graphical format)	2004	Initial Annex 3 SARPs for graphical SIGMETs being developed with the assistance of the METLINKSG.	_	_	
A T M	A T S	WAFS planning and implementation (final phase)	2004	Annex 3 SARPs for global WAFS SIGWX forecasts in binary format (BUFR code) for direct transmission to airline and ATM computers being developed with the assistance of WAFSSG.	_	_	
		ATS applications for air-ground data links	2005	Annex 11 SARPs and PANS-ATM procedures are being developed.	Completed	The Manual of Air Traffic Services Data Link Applications (Doc 9694) published and dispatched in second quarter 1999. Additional guidance is under development.	

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Main field				SARPS/PANS	GUIDANCE MATERIAL		
		Elements	TARGET COMPLETION DATE	Status	TARGET COMPLETION DATE	Status	
		Data interchange between automated ATS systems	2004	Annex 11 SARPs and PANS-ATM procedures under development.	_	_	
	A T F M	ATFM systems and procedures	2005	Annexes 2 and 11 SARPs and PANS-ATM procedures to be developed.	2003	ATFM part of the ATM operational concept under development.	
CNS/ATM		Human Factors	Completed	HF-related SARPs were developed and incorporated in Annexes 10 and 11. Further, HF-related requirements for inclusion in the PANS-OPS were developed during 2000, with an applicability date of 1 November 2001.	Completed	A manual on Human Factors Guidelines for Air Traffic Management Systems (Doc 9758) was completed and published in 2000.	
		Human Resource Planning and Training	_	_	2003	The human resource planning guidance material is under development. A potential approach and format for regional training planning was developed.	
СОМ		VHF digital link (Modes 3 and 4)	Completed	Completed. Assessment of the potential use of VDL Mode 4 for communications initiated.	2002	SARPs adopted in 2001. Manuals on VDL technical details and implementation aspects will be published in 2002.	

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			SARPS/PANS	GUIDANCE MATERIAL		
Main field	Elements	TARGET COMPLETION DATE	TARGET COMPLETION STATUS DATE		Status	
COM (cont'd)	UAT	TBD	Work initiated to assess the need for SARPs	TBD	TBD (based on results of the assessment)	
	ATN	Completed	Completed	2002	Work in progress to finalize the second edition of Doc 9739 - <i>Comprehensive ATN Manual</i>	
	RNP (en-route)	Completed	Adopted/approved by Council in 1994 (Annexes 2, 4, 6, 11, 15 and PANS-ATM).	2004	Second edition of Doc 9613, <i>Manual</i> on <i>Required Navigation</i> <i>Performance (RNP)</i> was published in 1999. Additional guidance material on approval of aircraft and operations for RNP 10 was published in 2001. Similar guidance material for RNP 4 is under development.	
	RNP (terminal area, approach, landing, departure)	Completed	Recommended by AWOP/16 and adopted by the Council in 1999.	Completed	Developed by AWOP, in parallel with SARPs.	
NAV	WGS-84	Completed	Adopted by Council in 1994, 1995, 1997 and 1998. Annexes 4, 11, 14 (both volumes) and 15 updated, provisions applicable from 1 January 1998.	Completed	<i>WGS-84 Manual</i> (Doc 9674) Second edition included provisions relating to taxiway and apron surveying points. English version only distributed on 28 March 2002. ICAO WGS-84 website is under development.	
	Aeronautical data bases	2005	SARPs for the standard conceptual information model required for the provision and exchange of electronic aeronautical data initiated at the AIS/MAP/98 Divisional Meeting, are being developed by the Secretariat with the assistance of The East Tennessee State University (ETSU). In addition, the ETSU developed the aeronautical communication transfer protocol for the exchange of aeronautical information/data.	2006	To be developed by the Secretariat with the assistance of AISMAPSG and ADMSG.	

	Elements		SARPs/PANS	GUIDANCE MATERIAL		
Main field		TARGET COMPLETION DATE	Status	TARGET COMPLETION DATE	Status	
		2003	Initial SARPs for electronic aeronautical charts for cockpit display were incorporated by Amendment 52 to Annex 4. Further SARPs for Annex 4 under development.	2004	Under development by the Secretariat with the assistance of AISPMAPSG.	
		2006	SARPs for the electronic terrain data format and exchange are under development in consultation with RTCA/EUROCAE and ISO Technical Committee 211. An interim amendment to Annex 4 planned for applicability in 2004.	2007	To be developed by the Secretariat	
	GNSS performance criteria to support operational requirements	2001	Completed	2002	Developed by GNSSP in parallel with SARPs.	
NAV (cont'd)	SARPs for the use of existing satellite navigation systems with augmentation sub-systems	2001	Completed	2002	Under development	
	SARPs for the longer-term GNSS	2004	Work on the develoment of SARPs for new elements of GNSS (GPS second civil frequency, Galileo, GLONASS-M) is under way.	2004	Under development	

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			SARPS/PANS	GUIDANCE MATERIAL		
Main field	ELEMENTS	TARGET COMPLETION DATE	Status	TARGET COMPLETION DATE	Status	
	Surveillance system specifications for emerging surveillance systems and architectures	2004	Surveillance enhancements (ANC Task No. CNS-9601) being developed by SCRSP.	2004	Principles of operation for ASAS completed. Work continued on the development of a draft circular on the subject.	
	SSR procedures	Completed	Update of Annex 11 and PANS-ATM.	Completed		
SUR	ADS procedures	2004	Annex 11 SARPs and PANS-ATM procedures developed by the OPLINKP and SASP. Applicable in November 2002.	2003	Manual of ATS Data Link Applications (Doc 9694) published and dispatched in second quarter 1999. The first amendment is being developed.	
	ADS-B and equivalent	2005	Being developed by OPLINKP	2003	Amendment to the <i>Manual of ATS</i> <i>Data Link Applications</i> (Doc 9694) to be developed.	
	ADS: inclusion of turbulence reporting	completed	Annex 3 SARPs and PANS-ATM turbulence reporting procedures based on the eddy dissipation rate have been developed with the assistance of METLINKSG.			

ATM	_	Air traffic management	COM		Communications
ADS		Automatic dependent surveillance	GNSS	—	Global navigation satellite system
ADS-B	—	ADS broadcast	NAV	—	Navigation
AIS	—	Aeronautical information services	RNAV	—	Area navigation
ASM	—	Airspace management	RNP	—	Required navigation performance
ATFM	—	Air traffic flow management	SSR	—	Secondary surveillance radar
ATN	—	Aeronautical telecommunication network	SUR	—	Surveillance
ATS		Air traffic services	WAFS		World area forecast system
CNS	—	Communications, navigation, and surveillance	WGS		World geodetic system

PANEL/STUDY	WORK PROGRAMME						
GROUP	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS			
	ATM-9102	ATS applications for air-ground data links	2004 and beyond	Work continued on draft SARPs, procedures and guidance material relating to the use of ADS, CPDLC and other data link applications.			
	ATM-9502	ATM requirements for communication	On-going	The development of the concept of required communication performance was completed and distributed to States and international organziations for comments.			
OPLINKP	ATM-9506	Automatic dependent surveillance (ADS) systems and procedures	2004				
	ATM-9103	Data interchange between automated ATS systems	2003	Provisions applicable to air traffic services interfacility data communications (AIDC) are being developed.			
	ATM-0002	ADS-B, Traffic situational awareness and airborne separation assurance	On-going	Development commenced on an operational concept and operational requirements for the use of a system to increase aircraft situational awareness and airborne separation assurance are being developed.			
	CNS-7002	Aeronautical electromagnetic spectrum	On-going task	AMCP continued work on spectrum protection task inherited from the disbanded FMSG.			
	CNS-8702	Aeronautical mobile satellite air-ground data link (AMSS subnetwork)	2003	Work on upgrades to the AMSS SARPs was completed. Restructuring of the SARPs (separation of core from detailed technical specifications) has been initiated.			
АМСР	CNS-9902	Next-generation AMSS systems	T.B.D.	Work on the development of acceptability criteria and SARPs for next- generation satellite systems was completed. New systems will be evaluated as they emerge.			
	CNS-9102	VHF air-ground digital link (VDL subnetwork)	2004	Validation of the detailed technical specification for VDL Modes 3 and 4 completed. An assessment of the use of VDL Mode 4 for communications initiated.			
	CNS-9603	Air-ground data link to support navigation and surveillance applications	2004	Validation of the VDL Modes 3 and 4 SARPs completed. An assessment of the need for SARPs for the UAT serving ADS-B application was initiated.			
	CNS-9602	High frequency data link (HFDL)	2003	Validation of detailed technical specifications ongoing.			
	ATM-9501	Required total system performance	2002				
ATMCP	ATM-9202	Global air traffic management	2002 and beyond	The first draft of an operational concept document was finalized at			
	ATM-9510	Interoperability and functional integration of flight operations, ATS, ATFM and tactical ASM	2002	ATMCP/1 in March 2002.			

PANELS AND STUDY GROUPS INVOLVED IN CNS/ATM-RELATED ACTIVITIES

PANEL/STUDY	WORK PROGRAMME						
GROUP	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS			
	CNS-7001	AFS systems planning studies	Completed	SARPs completed Guidance material being finalized.			
ATNP	CNS-8101	AFTN procedures and message format	Completed	Completed. Task to be deleted.			
	CNS-9403	Aeronautical telecommunication network (ATN)	Completed	SARPs for ATN have been completed and incorporated in Annex 10. Current work involves the development of provisions to incorporate Internet Protocol (IP) networks in the ATN and the development of optional message encryption provisions.			
	CNS-9901	AFS procedures	Completed	Completed.			
CNSSD	CNS-9401	Global navigation satellite system (GNSS)	Completed	First set of SARPs was adopted and included in Annex 10, Volume I as part of Amendment 76 for applicability in November 2001.			
GNSSF	CNS-7002	Aeronautical electromagnetic spectrum	Ongoing task (in coordination with AMCP)				
OCP	OPS-8502	Flight procedures and obstacle clearance criteria based on GNSS & RNP systems	2001 and beyond	Recommendations arising from OCP/12 in July 1999 regarding Basic GNSS and APV baro-/VNAV included in Amendment 11 to PANS-OPS. GBAS Cat I criteria and RNP as well as improved RNP criteria for all departures/arrivals and non-precision approaches to be reviewed at OCP/13 in November 2003. Depending upon GNSSP deliberations SBAS procedures for APV and CAT I could also be considered at that meeting.			
	ATM-8505	Required navigation performance and area navigation for en-route operations	2003	SARPs completed. Second edition of Doc 9613, Manual on Required Navigation Performance (RNP) published in 1999. Additional guidance material on approval of aircraft and operators for RNP 10 published in 2001. Similar guidance material for RNP 4 under development.			
SASP	ATM-6301	Separation between aircraft	2004 and beyond	Developments of proposals were advanced for the amendment of SARPs and PANS concerning reduced separation minima including: lateral distance-based intersecting track separation; 30 NM oceanic lateral and longitudinal minima based on RNP 4 submitted for publication. Procedures for RNP 4 under development. The implementation of RVSM is continuing to be under review and the revision to the <i>Manual on</i> <i>Implementation of a 300 m (1 000 ft) Vertical Separation Minimum</i> <i>Between FL 290 and FL 410 Inclusive</i> (Doc 9574) is completed.			
	ATM-9505	Airspace infrastructure planning	Completed				
SCRSP	CNS-7901	Conflict resolution and collision avoidance systems	2004	Work is concentrating on surveillance enhancements and ADS-B while monitoring ACAS and Mode S implementation in the States. Activities on ASAS are progressing with the preparation of technical requirements for ASAS to be presented at SCRSP/1.			

PANEL/STUDY			WORK PRO	GRAMME	
GROUP	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS	
	CNS-9601	Surveillance enhancements (emerging surveillance systems)	2004		
	CNS-9701	Airborne separation assurance system (ASAS)	2004		
ADMSG	AIS-9401	Aeronautical data bases	2005	Evaluation and validation of the SICIM and FAA/EUROCONTROL AICM/AIXM were initiated at the first meeting in November 1999. Development of the concept of computerized aeronautical information services (CAIS) system being progressed by the Secretariat with the assistance of the East Tennessee State University (ETSU).	
	AIS-9801 Electronic aeronautical charts for cockpit display		2003	Amendment 29 to Annex 15 introduced aeronautical data base requirements including the quality system, data integrity and protection	
	AIS-9802	Electronic terrain data	2006	continued on tasks AIS-9801 and AIS-9802. The group will continue the	
AISMAPSG	AIS-9806	Transfer and access of aeronautical information from ground-based automated systems.	2005	work mostly by correspondence.	
AVSSSG	CNS-7001	AFS systems planning studies	2001	The third meeting of AVSSSG was held in Montreal in October 2000. SARPs on ATS voice networks were adopted in 2001. Guidance material has been finalized and is in the publication process.	
HFSG	PEL-9001	Flight safety and human factors	Completed	Review of SARPs on CNS/ATM, to ensure that Human Factors are properly taken into consideration. SARPs submitted to the Council during the periodic cycles of revision of the relevant Annexes.	
HRPTSG	PEL-9601	Regional human resource planning and training needs	2003	The first draft of the Human Resource Development Manual is under development. An initial version of a computer programme designed to indicate how CNS/ATM technologies affect job profiles and the consequential human	

PANEL/STUDY	WORK PROGRAMME					
GROUP	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS		
				resource planning and training requirements was developed.		
	MET-9101	Amendment to Annex 3 concerning automated air-reporting	On-going	The quality assurance of MET information included in ADS reports being studied.		
METLINKSG	MET-9301	Future requirements for the uplink of OPMET information to aircraft in flight	2004	Amendment 73 to Annex 3 being developed which includes meteorological specifications (templates) for D-VOLMET, and other data link applications.		

PANEL/STUDY		WORK PROGRAMME						
GROUP	TASKS	TITLE	TARGET COMPLETION DATE	STATUS /RECENT PROGRESS				
	MET-9602	SIGMET information in graphical format	2004	Amendment 73 being developed which includes specifications for the dissemination and uplink of graphical SIGMETs.				
TDNSC	CNS-9402	Testing of radio navigation aids	Completed	The study group produced a new version of Doc 8071, Volume I, <i>Manual</i> on testing of ground-based radio navigation systems (replacing former Volumes Lond II). TDNSC/2 and 4 produced Volume II (CNSS).				
IKNSG	CNS-9401	Global navigation satellite system (GNSS)	Completed	containing guidance material on testing of GNSS-based non-precision approaches.				
WAFSSG	MET-8802	WAFS planning and implementation	2004	Amendment 73 to Annex 3 being developed to include global WAFS SIGWX forecasts in binary format (BUFR) code for direct transmission to airline and ATM computers.				

LEGEND

ANC Panels

Study Groups

APANPIRG/13-WP/1
APANPIRG/13-WP/1

APANPIRG/13-WP/16 Appendix B

	AIR TRAFFIC MANAGEMENT							
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT
1	Revision of ATS route structure	South China Sea - 1 November 2001. Asia to Europe through Middle East via south of H i m a l a y a s - 28 November 2002.	Establishment of new ATS routes, namely UB540 Johannesburg- Francistown-Victoria Falls-Livingstone- 28 November 2002. Extension of route UR982 (Lome-Sao- Tome)- 28 November 2002. Implementation of	Asia to Europe through Middle East via south of Himalayas - 28 November 2002. Revision of route structure in Eastern and Western part of Europe - On going.	The development of a new ATS RNAV route network in CAR/SAM Regions - In progress.	Asia to Europe through Middle East via south of Himalayas - 28 November 2002.	The ATS route structure of the NAM Region will be reviewd and included in an updated version of the NAM ANP.	-
			28 November 2002.					
2	RVSM	Pacific airspace- implemented on 24 February 2000. Western Pacific airspace - 21 February 2002.	Being pursued by RVSM/RNAV/ RNP TF. Target date to be determined.	European Region - 24 January 2002.	EUR/SAM corridor - 24 January 2002.	Middle East Region - 27 November 2003.	Implementation of RVSM by Canada between FL 290 to FL 410 inclusive in Edmonton, Montreal and Winnipeg FIRs/CTAs up to North Pole planned for second quarter 2002.	Horizontal RVSM expansion in the entire NAT Region from FL 310 to FL 390 completed on 1 November 2001.
		Hong Kong FIR and Sanya AOR - 31 October 2002. Asia to Europe south of Himalayas - 27 November 2003.	Parts of Region falling in SAM and EUR corridor - 24 January 2002.		CAR/SAMRegions - 1 April 2004.		U.S. is planning to implement RVSM in the U.S. airspace from FL 290 to FL 410 - December 2004.	Vertical expansion of RVSM throughout NAT Region from FL 290 to FL 410 - 24 January 2002.
3	Establishment of regional airspace performance monitoring structure	In progress with a target date of September 2002.	Under consideration.	Under development.	Under consideration.	Under consideration.	Canada will implement in the designated RVSM airspace.	Implemented.

N.B. Historical data, wherever possible, has been indicated in *italics*.

				AIR TRAFFIC MA	NAGEMENT			
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT
4	ACAS II	Mandated from 23 March 2000. ¹	Mandated from 1 January 2000. ¹	Mandated from 1 January 2000. ¹	Mandated from 1 January 2003.	Mandated from1 July 2001. ¹	Implemented in Canada and the United States airspace.	Mandated from 31 March 2001. ¹
5	RNAV/RNP	 RNP 10: 1) North Pacific and Tasman - 23 April 1998; 2) South China Sea - 1 November 2001; 3) Australia and Indonesia - 1 November 2001; 4) Bay of Bengal - November 2002. Other routes in progress. 	RNP5 - implemented in continental Johannesburg FIR in 1998. For other routes - Under consideration.	RNAV/RNP5 implemented in ECAC area from January 1998. Implementation of precision RNAV (nearly equivalent to RNP 1) in terminal areas is planned for 2003.	EUR/SAM corridor RNP10 - 4 October 2001; Five routes approved by the CAR/SAM RAN/3 Meeting have been implemented. Tests and demonstrations to be carried out by TC project RLA/98/003 related to the use of RNAV and RNP10 on designated routes	RNP 5 Phase 1 Implemented - 14 June 2001. Phase 2 - 28 November 2002.	United States has implemented RNP in domestic and oceanic airspace since 1998. Canada is planning to implement RNP in domestic airspace in 2006. RNAV route structure in the NAM Region will be studied by a task force.	MNPS implemented in 1981.
					For other routes - Under consideration.			

¹Full implementation before the global date (1 January 2003) is not expected.

N.B. Historical data, wherever possible, has been indicated in *italics*.

	APANPIRG/13-W Appendix C
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	COMMUNICATIONS								
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT	
1	ATN (Subnetworks, End systems and Intermediate systems)	ATN transition plan has been developed with a target date of 2005 for ground -ground application namely AMHS.	ATN implementation is Under study. Focus is more on improving current circuits with long term plans for migrating to AMHS.	ATN transition plan has been developed. Pre- operational trials are in progress.	Current AFTN is being improved. Plans for the implementation of ATN regional backbone and interface with the AFTN using a gateway were established. Implementation of AMHS and AIDC are being studied.	ATN implementation is under consideration with initial focus on ground -ground application namely AMHS and AIDC - Dates to be determined. Guiding principles have been prepared.	ATN transition plan has been developed with focus on ground- ground applications. Test, development and validation phases completed. Operational implementation is under review.	Investigation of operational ATN data link scenarios in the Region with focus on air-groun applications is in progress.	

			Со	MMUNICATIONS				
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT
2	Air-ground communication infrastructure	VHF voice in continental and terminal areas. VHF data being studied. AMSS for data and	VHF Voice is provided in terminal areas. Extension of VHF coverage to	Implementation of air-ground data link services is planned for 2002- 2007. Horizontal	Implementation of VDL Mode 2 to support CPDLC and D-ATIS will be studied. Tests on HFDL are	VHF voice in continental and terminal areas. VHF data being studied. AMSS for data and	There are plans for AMSS for voice and ATN- compatible sub- networks such as VDL Mode 2, HFDL and AMSS to support CPDLC applications.	HF is the main communication and already saturated with difficulty of obtaining additional frequencies.
		voice in oceanic and remote areas. SSR Mode S data link for high density airspace are being planned.	en route areas is in progress in several FIRs. HF Voice is provided in most of FIRs and CPDLC based on FANS_1/A is being used.	expansion of 8.33 kHz channel spacing is planned effective from 31 October 2002. Vertical expansion of 8.33 kHz channel spacing may be necessary by 2008.	being conducted.	Voice in oceanic and remote areas. SSR Mode S data link for high density airspace are being considered.		CPDLC based on FANS_1/A is used for routine communications. AMSS application is being assessed.
3	Ground-ground communication infrastructure	Some of the States have implemented digital networks. Other States are also considering upgrading their networks.	Two major satellite networks have been provided in the States of the Region. Other areas are also being considered.	Well developed. Many of the States have upgraded to digital networks.	Number of digital networks have been implemented in the Region. Interconnection of theses networks so as to provide interoperability is in progress.	Establishment of a regional satellite based digital network is under consideration.	Well developed. Canada, Mexico and United States have upgraded to digital networks.	Well developed. Many of the States have upgraded to digital networks.

		APANPIKG/13-V Appendix C	
	NAT	WP/1]
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S- ed , it	NAT Transition to WGS-84 completed.	WP/16	

	NAVIGATION							
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT
1	GNSS	Transition to WGS- 84 is in progress.	Transition to WGS- 84 is in progress.	Transition to WGS-84 is on-going.	Transition to WGS-84 is in progress.	Transition to WGS- 84 is in progress.	Transition to WGS- 84 completed in Canada and United States. In Mexico, it is in progress.	Transition to WGS-84 completed.
		Strategy for implementation of GNSS along with a check list has been developed.	GNSS strategy has been adopted.	Launching of "Galileo", a new constellation of navigation satellites is under consideration with full operation		Strategy for implementation of GNSS is under development.	The GNSS/GPS strategy has been adopted.	
		Satellite based augmentation system (MSAS) is being developed.	SBAS test bed in cooperation with EGNOS is under study.	2008. Satellite based augmentation system (EGNOS) is being developed.	SBAS test bed project in cooperation with WAAS was established.	SBAS test bed in cooperation with EGNOS is under study.	SBAS based on the United States' wide area augmentation system (WAAS) is being developed.	CNSS is being used
		GNSS is being used for oceanic and continental en- route operations.	GNSS is being used for oceanic and continental en- route operations. Development of harmonized GNSS procedures for States of SADC completed in December 2001	GNSS is being used for continental en route operations.	GNSS is being used for oceanic and continental en route operations.	GNSS is being used for continental en route operations.	GNSS is being used for oceanic and continental en-route operations. A GNSS approach implementation programme has been initiated by all three States and GNSS augmentation system agreements have been completed for the future expansion of the GNSS concept.	GNSS is being used for oceanic operations.

	SURVEILLANCE								
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT	
1	SSR Modes A/C and SSR Mode S	Currently SSR Modes A and C is employed. In the near future SSR Mode S in some terminal areas and high density en route will be planned.	Surveillance in most FIRs is through voice position - reporting. PSR and SSR Mode A/C is employed in some busy terminals and for en-route operations. A PSR/SSR Plan on selected airspaces has been developed and is included in the AFI FASID.	Currently SSR Modes A and C is employed. SSR Mode S in some terminal areas and high density en route is planned for implementation in 2005.	Currently SSR Modes A and C is employed. In the near future SSR Mode S in some terminal areas and high density en route will be planned. Plans for SSR data sharing are being studied.	The Region is well covered by radars (PSR/SSR Mode A/C). In near future SSR Mode S in some terminal areas and high density en route will be planned.	En-route radar surveillance has seen substantial improvements with the upgrading of radar systems in a large part of the airspace. In several areas of the Gulf of Mexico and Northern Canada, surveillance has been restricted to position reports sent by pilots via air- ground communications, a plan to improve radar surveillance in the Gulf of Mexico is being developed.	Surveillance in most of the NAT Region is via position reports using HF Voice at approximately every 10° of longitude.	
2	ADS	ADS will be used initially for oceanic airspace and later in remote areas.	ADS will be used for low density, remote and oceanic airspace as well as outside SSR coverage.	ADS will be used in some parts of the Region.	ADS will be used initially for oceanic airspace and later in remote areas.	ADS will be used initially for oceanic airspace and later in remote areas and possibly as a backup to SSR in high density traffic areas.	ADS will be used in oceanic or remote areas; however, further review is needed for continental domestic airspace areas.	To improve surveillance, the regional plan specifies ADS over the ATN. Nevertheless, provisions have been made to accommodate FANS_1/A-equipped aircraft.	
3	ADS-B	ADS-B trials are in progress in a few States such as Australia and Japan. Implementation plans yet to be finalized.	To be determined.	To be determined.	To be determined.	To be determined.	ADS-B trials are in progress in Canada and United States. Implementation plans still have to be finalized.	-	

Appendix C	APANPIRG/13-
	13-WP/16

	RELATED ISSUES										
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT			
1	Transition from current single volume ANP to two volumes Basic ANP and FASID documents	Approved by the President of the Council on 11 August 2001; Document in final preparation stage for publication.	Material finalized and will go through an approval process.	Material finalized and published.	Approved by the CAR/SAM/RAN 3 Meeting. FASID is being kept up to date.	Scheduled for finalization by third quarter 2002.	A revision programme was proposed to update the FASID document.	The NAT Basic ANP and FASID are being reviewed and is scheduled to be completed by the middle of 2002.			
2	Development and update of Regional plan for CNS/ATM systems	Reviewed and updated. It now includes a new chapter on the subject of meteorology.	Reviewed and updated.	Reviewed and updated.	Under review to update the Plan.	Reviewed and updated.	Reviewed and updated.	New plan being developed.			
3	Meteorological component of CNS/ATM systems	Migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms) is being addressed.	Migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms) is being addressed.	Migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms) is being addressed.	Initial discussions have taken place to address migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms).	Migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms) is being addressed.	Initial discussions have taken place to address migration from traditional alphanumeric code forms to digital code forms (WMO BUFR and GRIB code forms).	Not applicable as this issue is being addressed by the States as part of EANPG.			
	phase of World Area Forecast System (WAFS)	The Regional Area Forecast Centres have been phased out and their responsibilities have been transferred to the World Area Forecast Centres.	The Regional Area Forecast Centres have been phased out and their responsibilities have been transferred to the World Area Forecast Centres	The Regional Area Forecast Centres have been phased out and their responsibilities have been transferred to the World Area Forecast Centres.	The transfer of responsibilities from the Regional Area Forecast Centres to the World Area Forecast Centre, Washington is under way.	The Regional Area Forecast Centres have been phased out and their responsibilities have been transferred to the World Area Forecast Centres.	The transfer of responsibilities from the Regional Area Forecast Centres to the World Area Forecast Centre, Washington is under way.	Not applicable.			

	RELATED ISSUES								
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT	
4	Review of deficiencies	Addressed as part of the PIRG work programme.	Addressed as part of the PIRG work programme. The list of deficiencies are grouped on the basis of States in addition to facility wise.	Addressed as part of the PIRG work programme.	Addressed as part of the PIRG work programme. An aviation safety board has been created.	Addressed as part of the PIRG work programme.	-	Addressed as part of the PIRG work programme.	
		Appropriate management tools are being developed.	Establishment of an aviation safety board is under consideration.						
5	Specific to the region	Guidance material to enhance aeronautical information services activities within the Region has been developed.	The new larger aeroplane task force has been established to evaluate the impact on aerodromes of the AFI Region.	Focussing on increasing the efficiency and capacity at international aerodromes through the implementation of capacity enhancing procedures.	Human resources and training issues are being addressed.	Formulation of a plan for development of regional training capabilities within specific training centres is being addressed.	_	Work has been initiated for the development of operational and economic performance indicators to be used throughout NAT Region.	
		AIS quality assurance manual has been developed.	Establishment of an appropriate body for addressing regional human resource and training issues is under consideration.	p	The development of an ATS Quality Assurance Programme and its associated activities are being carried out.				

N.B. Historical data, wherever possible, has been indicated in *italics*.

	AIR TRANSPORT - TRAFFIC FORECASTS AND ECONOMIC ISSUES									
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT		
1	Traffic Forecasting Groups(TFGs)	Traffic Forecasting Group-is in existence since 1991. Forecasts prepared for major route group up to the year 2015. Tenth meeting of TFG was held in Bangkok from 11 to 20 June 2001.	Traffic Forecasting Group formed in 1998. Major route groups identified. Forecasts to be prepared in 2002. Second meeting of TFG was held in Nairobi from 12 to 16 March 2001.	Data developed by EUROCONTROL are being used.	Traffic Forecasting Group established in 1996. Forecasts prepared for major route group up to the year 2010. In support of the study of the transitional plan (Project RLA/98/003), forecasts for 18 major traffic flows have been prepared by the Secretariat in lieu of CAR/SAM TFG. Fourth meeting of TFG was held in Lima from 17 to 21 July 2000.	Traffic Forecasting Group (TFG) created in 1998. Forecasts prepared for major route group up to the year 2015. Fourth meeting of TFG was held in Cairo on 22 February 2001.	Data being developed by CAN/MEX/USA.	NAT Forecasting Group was established in 1965.		
2	Traffic forecasts	Traffic forecasts have been developed and are currently under review to reflect changes due to recent events.	Forecasts are under development.	No ICAO involvement.	Traffic forecasts have been developed and are currently under review to reflect changes due to recent events.	Traffic forecasts have been developed and are currently under review to reflect changes due to recent events.	No ICAO involvement.	Traffic forecasts are developed annually. However, they are currently under review to reflect changes due to recen events.		

	AIR TRANSPORT - TRAFFIC FORECASTS AND ECONOMIC ISSUES									
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT		
3	Cost benefit study, business case analysis and cost recovery system	To progress the task of establishing a framework for business case studies for the implementation of CNS/ATM systems, a special implementation project has been proposed.	Business case and cost benefit analysis has been carried out for SADC States for the UACC project. Similar exercise is under consideration for route AR4.	Business case and cost benefit analysis are being carried out by EUROCONTROL.	The Secretariat has been approached to assist in the economic aspects of the study of the transitional plan (Project RLA/98/003) to CNS/ATM systems.	A business case illustrative application is being developed for the region.	Business case and cost benefit analysis are being carried out by CAN/MEX/USA.	The feasibility of creating a common cost-recovery system for the provision of air navigation services in the northern part of the region is being considered. Cost effectiveness of implementation of new systems are studied as an ongoing exercise.		

N.B. Historical data, wherever possible, has been indicated in *italics*.

	LEGAL ISSUES									
No	System	ASIA/PAC	AFI	EUR	CAR/SAM	MID	NAM	NAT		
1	Addressing legal issues such as universal accessibility, continuity, certification and liability.	Legal issues have been raised but these are beyond the scope of regional bodies. HQ should continue to provide guidance and address and resolve them at global level.	The subject has not yet been examined by APIRG. We expect the HQ to adequately address this issue for the benefit of PIRGs.	Legal issues were discussed in the context of the Galileo programme.	Legal issues are beyond the resolution at the regional level. HQ must provide the leadership in this domain.	The question is too large and complex. MIDANPIRG did not look into the matter deep.	-	-		
2	Development of an interim legal framework	An interim legal frame Assembly in the form The ICAO headquarte Secretariat Study Grou path toward its implen interference with CNS	ework, the "Charter on of Resolution A32-19, rs is accelerating its eff up on Legal Aspects of mentation, including the //ATM systems will als	the Rights and Obligat which embodies certai forts to resolve the com CNS/ATM systems wi consideration of an in o be reviewed in the co	ions of States Relating n fundamental principle plex legal issues involv ill finalize the concept of ternational convention.	to GNSS Services", wa es applicable to GNSS. ved and will continue to of a contractual framew The security aspects c ity.	s adopted in 1998 by the provide guidance at gork for CNS/ATM systematics oncerning prevention of the	ne 32nd Session of the lobal level. The tems and provide a of unlawful		

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N.B. Historical data, wherever possible, has been indicated in *italics*.