International Civil Aviation Organization

MIDANPIRG ATM/SAR/AIS Sub-Group

Twelfth Meeting (ATM/SAR/AIS SG/12)
(Cairo, Egypt, 21 - 24 November 2011)

Agenda Item 12: Review of the ATM and AIM Parts of the MID Air Navigation Plan (ANP)

REVIEW OF THE ATM AND SAR PARTS OF THE MID AIR NAVIGATION PLAN (ANP)

(Presented by the Secretariat)

SUMMARY

The aim of this working paper is to invite the meeting to review the ATM and SAR parts of the MID Air Navigation Plan (ANP).

Action by the meeting is at paragraph 3.

REFERENCE

- ICAO Global ATM Operational (Concept Doc 9854)
- MID Basic ANP and FASID (Doc 9708)
- MIDANPIRG/12 Report

1. INTRODUCTION

1.1 On 26 February 1997, the Council of ICAO decided that each of ICAO's Regional Air Navigation Plans (ANPs) should be divided into two documents; namely the Basic ANP and Facilities and Services Implementation Document (FASID), with a view to streamline and expedites the amendment procedures.

1.2 The Basic ANP would contain stable plan material and that the FASID would set forth the dynamic material from the plan constituted by the facilities and services required for international air navigation within the specified area. The FASID would also include appropriate additional guidance, particularly with regard to implementation, to complement the material contained in the MID Basic ANP.

2. DISCUSSION

2.1 Basic ANP and FASID is a planning document and need not necessarily reflect the existing facilities and services.

2.2 The meeting may wish to note that several amendment proposals to the TABLE ATS 1 ATS Routes and for Search And Rescue were circulated and approved. The last amendment was approved under State letter AN 6/5A -11/248 dated 26 September 2011.

2.3 The meeting further may wish to note that with the recent advancement in many fields of air navigation system especially in the ATM area, it is obvious that a full review of the entire Part V (ATM) of the MID Air Navigation Plan (Doc 9708) – Volume I (Basic ANP) is necessary in order to update many of the ATM parts of the MID ANP to reflect the global developments and the current regional requirements.

2.4 The meeting may wish to recall that ICAO is planning for the e-ANP and centralized databases, and progress has been achieved in the ICARD system and is going on for other areas.

2.5 The meeting may wish to review and update as necessary the draft version of part V of the MID Basic ANP which is at **Appendix A** to this working paper.

2.6 The meeting may wish to note that the ATM FASID parts as at **Appendix B** to this working paper, and the SAR FASID as at **Appendix C** to this working paper, that needs to be reviewed and updated.

3. ACTION BY THE MEETING

3.1 The meeting is invited to the information in this paper and its **Appendices**;

a) review and update part V, (ATM) of the MID Basic ANP as at **Appendix A** para 2.5; and

b) review, update part V (ATM) and part VII (SAR) of the MID FASID ANP as 2.6.

APPENDIX A

Part IV

Communications, Navigation and Surveillance (CNS)

INTRODUCTION

1. This part of the Middle East (MID) Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to communications, navigation and surveillance (CNS) as developed for the MID region.

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

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

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

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

c) Annex 11 — Air Traffic Services, Chapter 6; and d) Regional Supplementary Procedures (Doc 7030).

4. The elements of the material referred to above are presented in the following paragraphs with appropriate cross-references to recommendations and/or conclusions of MID meetings.

COMMUNICATIONS

General

5. The main function of communication systems is to provide for the exchange of aeronautical voice, text and/or data between users or automated systems (for data). The infrastructure used for communications can also be used in support of specific navigation and surveillance functions.

6. There are basically two categories of aeronautical communications:

a) safety-related communications requiring high integrity and rapid delivery:

1) air traffic services communications (ATSC) carried out between air traffic service (ATS) units and aircraft for air traffic control (ATC), flight information, alerting, etc.;

2) aeronautical operational control (AOC) communications carried out by aircraft operators on matters related to safety, regularity and efficiency of flights; and

b) non-safety related communications:

1) aeronautical administrative communications (AAC) carried out by aeronautical personnel and/or organizations on administrative and private matters;

2) aeronautical passenger communications (APC).

7. In general, communication systems used in the CNS/ATM systems are capable of carrying both of the above-mentioned categories. However, safety-related communications shall always have priority over non-safety ones.

Aeronautical fixed service (AFS)

8. The AFS comprises:

a) the aeronautical fixed telecommunication network (AFTN); and Common ICAO data Interchange network (CIDIN).

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 (AMHS) and inter-centre communications (ICC);

c) gateways enabling inter-operation (to the extent possible) between a), and b) above;

d) ATS voice communication circuits and networks; ~~and~~

e) aeronautical broadcast systems (e.g. for dissemination of world area forecast system (WAFS) products) and Operational Meterologocal Information (OPMET) circuits and centers~~.~~

f) ATS Computer to Computer data networks and circuits; and

g) the Satellite distribution system relating to air navigation (SADIS).

~~9. States should provide landline teletypewriter (e.g. cable, microwave) on all AFTN circuits to be used for international traffic. **[MID/3, Rec. 4.1/11]**~~

~~10. The modulation rates of circuits connecting main AFTN communication centres should be not less than 300 bauds. Additional capacity required to meet regionally agreed transit times should be obtained by increasing the modulation rate, increasing the number of channels that comprise the circuit or providing additional circuits, as bilaterally agreed between administrations concerned. **[MID/3, Rec. 4.1/12]**~~

~~11. The data transmission capacity of circuits connecting tributary AFTN communication centres to main AFTN communication centres should be determined by bilateral agreement in the light of the volume of data to be transmitted, circuit loading and the need to meet regionally agreed transit times. **[MID/3, Rec. 4.1/12].**~~

9. All possible arrangements should be made to ensure that, in case of breakdown of a communications centre or circuit, at least high-priority traffic continues to be handled by appropriate means.

10. Emergency procedures should be developed to ensure that, in case of a centre breakdown, all the parties concerned are promptly informed of the prevailing situation.

11. AFS planning should permit flexibility in detailed development and implementation

12. To achieve the required performance:

a) the international circuits forming part of the AFTN/AMHS and ATN plan in the MID region should be highly reliable circuits ~~such as microwave, satellite or cable~~. The use of international circuits leased from a Post Telephone and Telegraph (PTT) authority and/or RPOA should be extended to the respective aeronautical telecommunications facilities by links of high reliability and quality;

b) the main AFTN communication centres should operate in a fully automatic mode; with redundant circuits and

c) ~~the circuits interconnecting main AFTN communication centres equipped with automatic switching should be operated employing International Alphabet No. 5 (IA-5) and character-oriented data link control procedures, System Category B. Low speed International Telegraph Alphabet No. 2 (ITA-2) procedures should be used, as required, in the evolutionary transition to the application of character-oriented data link control procedures. **[MID/3, Rec. 4.1/13]**~~

~~13. As an integral part of the AFTN plan, automatic switching facilities should be installed or maintained in operation at the following locations: Bahrain; Beirut; Cairo; Jeddah; Kuwait; and Muscat/Seeb.~~

~~14. Associated terminal equipment should be installed or maintained in operation at the locations shown as tributary AFTN centres and stations in FASID Table CNS 1 and Chart CNS 1. **[MID/3, Rec. 4.1/14]**~~

~~15.~~13 States should take note of the increasing availability in the region of high grade and high reliability common carrier communications, inclusive of satellite communication services, and transfer, wherever practicable and economically feasible.~~, AFTN circuits currently operating on HF radio circuits to these services. **[MID/3, Rec. 4.1/1 a)]**~~

~~16~~14. States should ensure that telecommunication agencies engaged in providing aeronautical ~~circuits~~ communication be impressed of the need for 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 rapid restoration of circuits in the event of breakdown.

~~**[ASIA/PAC/3, Conc. 10/1; MID/3, Rec. 4.1/1 b)]**~~

15. The MID network should use Transmission Control Protocol/Internet Protocol (TCP/IP) communication protocol for the initial implementation of AMHS. The migration from X.25 to TCP/IP should be planned. The migration of international or regional ground networks to the MID-ATN network based on internet protocol (IP) to support AFS communication requirements, while reducing costs, should be planned.

~~17~~16. The entry/exit points:

a) between ASIA and MID should be Mumbai, Karachi and Singapore;

b) between MID and ASIA should be Bahrain, Kuwait and Muscat/~~Seeb~~;

c) between MID and EUR should be Beirut, Cairo and Kuwait;

d) between MID and AFI should be Cairo and Jeddah. ~~**[ASIA/PAC/3, Conc. 10/8; MID/3, Rec. 4.1/9]**~~

ATS speech circuits

18. States should provide LTF on all AFS circuits to be used for international direct ATS speech communications. ~~**[MID/3, Rec. 4.1/19]**~~**along with redundancy and should be tested quarterly. Copy from annex 10**

Satellite broadcast

19. WAFS products should be disseminated in the MID region by satellite broadcast as part of the AFS.

20. The satellite broadcast to serve the MID region is the satellite distribution system for information relating to air navigation (SADIS) provided by the world area forecast centre (WAFC) London. The area to be served by the SADIS is given in Part VI — MET and in FASID Chart CNS 1E.

Note.— Area covered by SADIS is WAFS service areas 1, 4, 6 and 7 with western parts of service area 2 being the "footprint" of INTELSAT 604 located over the Indian Ocean, i.e. longitude from 20 W to 140E. **[LIM/MID (COM/MET/RAC), Rec. 6/12]**

Aeronautical mobile service (AMS)

21. The AMS comprises:

a) air-ground voice and data communication systems;

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b) air-to-air voice (and data as applicable) communication systems; and

c) ground-to-air broadcast systems.

Aeronautical mobile service (AMS)

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.

To meet the air-ground data communication requirements, a high-grade aeronautical network should be provided based on the ATN, recognising that other technologies may be used as part of the transition. The network needs to integrate the various data links in a seamless fashion and provide for end-to-end communications between airborne and ground-based facilities.

Whenever required, use of suitable techniques on VHF or higher frequencies should be made.

Operation on HF should only be employed when use of VHF is not feasible. When HF is used, the single side-band technique should be employed. [Annex 10, Volume III, Part II, Chapter 2.]

Aerodromes having a significant volume of International General Aviation (IGA) traffic should be provided with appropriate air-ground communication channels

~~21. The AMS comprises:~~

~~a) air-ground voice and data communication systems;~~

~~b) air-to-air voice (and data as applicable) communication systems; and~~

~~c) ground-to-air broadcast systems.~~

~~22. States should employ selective calling (SELCAL) systems at HF aeronautical stations and wherever possible and necessary, on VHF/GP frequencies, take all necessary technical measures to ensure the satisfactory operation of the system and, when establishing a SELCAL facility, notify users by publication of the appropriate information.~~ ~~**[MID/3, Conc. 4.2/15]**~~

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VHF aeronautical mobile service facilities plan

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23. The civil aviation authorities concerned in ITU Region 3 should urge their radio frequency licensing authorities to take urgent action for the release of the frequencies in the band 132.000–136.000 follow-up State letter MHz for aeronautical mobile (R) service purposes. **[MID/SEA, Rec. 17/4]**

24. States are encouraged to permit aircraft operating agencies to establish VHF operational control channels and where such channels are provided, States concerned should:

a) select frequencies in so far as practicable from the upper end of the sub-band 128.825–132.025 MHz and in sequential order, so as to provide uniformity between AFI, ASIA and EUR regions in this matter;

b) ensure that at no time ATC service frequencies are left unguarded by the flight crews; and

c) advise the appropriate ICAO Regional Offices of the assignments for promulgation. **[MID/3, Conc. 4.2/14]**

25. States should study the feasibility of clearing the channel 128.95 MHz for exclusive use as an air-to-air communications channel. **[MID/3, Rec. 4.2/8]**

26. States should coordinate with the ICAO Regional Offices concerned all radio frequency assignments for both national and international facilities in the 117.975–136 MHz band. Because of the need to protect existing radio frequency assignments, frequencies for new requirements and frequency changes for existing requirements should be coordinated with the ICAO Regional Offices concerned prior to implementation of such frequencies. States should report complete and accurate data for inclusion in the frequency list of the ICAO Regional Offices concerned. Based on the information provided for this purpose by the States, the ICAO Regional Offices concerned should issue periodically a list or lists of frequencies in the 117.975–136 MHz band.

Note.— Beginning in 1990, the band 136–137 MHz will be available for aeronautical mobile service. **[MID/3, Rec. 4.2/19]**

Air-ground communications for ATS

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37. Air-ground communications for ATS purposes should be so designed that they 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 for optimum economy in the frequency spectrum used for this purpose. Basic elements for the determination of the need for air-ground communication channels and their economic use are given in Attachment A to Part V.II – ATS of the MID FASID.
[Annex 11, 6.1 and Attachment B]

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38. In addition, uniform values of designated operational range and height of VHF air-ground communication channels should be used for identical ATS functions in accordance with the table contained in Attachment B to Part V.I – ATS of the EUR FASID. Deviations from these values at specific

locations or for specific functions should only be made in those cases where adequate operational justification for such a deviation is provided by the State(s) concerned.
[Annex 11, 6.1 and Attachment B]

39. In order to achieve optimum economy in the use of the radio frequency spectrum used commonly for inter-national and national ATS air-ground communications (VHF), the above criteria should also be applied to national planning in the field of VHF air-ground communications.

Air-Ground Data Link Communications

The Global Operational Data Link Document (GOLD) was adopted by MIDANPIRG for the MID Region as guidance material for States and airspace users in conjunction with the provisions contained in ICAO Annex 10, Volume II and PANS–ATM (Doc 4444). The GOLD aims to facilitate global harmonization of existing data link operations and resolve regional and/or State differences impacting seamless operations. The GOLD includes required communication performance (RCP) and surveillance specifications, based on RTCA DO-306/EUROCAE ED-122, and guidelines on post-implementation monitoring and corrective action to address issues with satellite data communication services.

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HF en-route communications

27. FASID Tables and Chart CNS 2 contains only the appropriate designator(s) of the HF network(s) to be available at the aeronautical stations indicated, without reference to the discrete frequencies of such network(s). The inclusion of a network designator applicable to a given aeronautical station is to be interpreted as indicating that all frequencies of that network are assigned to that station, which may implement any desired number of frequencies of that family, based on propagation pertinent to the service range, and diurnal, seasonal and sun-spot cycle conditions, without further coordination with ICAO. Frequencies guarded must be adequate to permit communications with aircraft anywhere within the area served. Except for diurnal changes, the operational status of discrete frequencies should be reflected in the State's Aeronautical Information Publication. The implementation or discontinuance of guard on discrete HF frequencies should be announced to all aeronautical stations operating on the network concerned, and to the users, and should be promulgated by AIRAC NOTAM~~. [MID/3, Rec. 4.2/2]~~

Aircraft reporting time schedules

28. When the provisions of Annex 10, Volume II, 5.2.2.2.4 or 5.2.2.3.1.2 are applied, reporting schedules for transmission of position reports and "Operations Normal" reports (if employed) should be designated after correlation between the appropriate aeronautical stations so as to ensure minimum conflict for the network operations.

Note.— When applied in association with Annex 10, Volume II, 5.2.2.2.4, the designation of reporting times will be done by a "Regular Station". Application in association with 5.2.2.3.1.2 of Annex 10, Volume II, will result in the designation being made by the network station with which the aircraft makes its preflight check or its initial contact after take-off.

NAVIGATION

General

29. ~~The aeronautical radio navigation plan comprises all facilities that provide navigation support to en route, terminal, approach, landing and surface movement operations.~~

~~30. The growing number of modern aircraft equipped with area navigation (RNAV) and the increasing emphasis on required navigation performance (RNP) result in more flexible route selection and less dependence on any particular type of navigation system. Nevertheless, every single radio navigation facility must operate in strict conformance with the applicable standards.~~

It is foreseen that the provision of radio navigation services will gradually transition from ground-based to satellite-based system. The global navigation satellite system (GNSS) is the generic term used for the satellite-based aeronautical radio navigation systems. Existing and/or emerging navigation satellite constellations and their associated satellite-based, aircraft-based and ground-based augmentation systems (SBAS, ABAS and GBAS, respectively) all form elements of the GNSS

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

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

46. The Global ATM Operational Concept, endorsed by ICAO 11th Air Navigation Conference (AN-Conf/11) and published as ICAO Doc 9854, provides the framework for the development of all regional ATM concepts. AN-Conf/11 also endorsed a number of technical recommendations affecting navigation, including the harmonization of air navigation systems between regions, frequency planning, the transition to satellite based air navigation, curved RNAV procedures, and the use of multiple GNSS signals and the rapid implementation of approaches with vertical guidance.

48. In October 2010, the ICAO 37th General Assembly issued Resolution 37-11 which urged States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with the ICAO PBN concept laid down in the Performance-based Navigation (PBN) Manual (Doc 9613).

49. States in planning PBN should achieve:

- implementation of RNAV and RNP operations (where required) for en route and terminal areas, approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS), including LNAV only minima, for all instrument runway ends, either as the primary approach or

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as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014;

- implementation of straight-in LNAV only procedures, as an exception to above, for instrument runways at aerodromes where there is no local altimeter setting available and where there are no aircraft suitably equipped for APV operations with a maximum certificated take-off mass of 5 700 kg or more; and

- States include in their PBN implementation plan provisions for implementation of approach procedures with vertical guidance (APV) to all runway end serving aircraft with a maximum certificated take-off mass of 5 700 kg or more, according to established timelines and intermediate milestones;

50. The following PBN Implementation Roadmap addresses and supports this Resolution:

THE MID PBN IMPLEMENTATION ROADMAP

51. The Performance Based Navigation (PBN) concept specifies aircraft RNAV system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular airspace concept, when supported by the appropriate navigation infrastructure. In this context, the PBN concept represents a shift from sensor-based to performance –based navigation

52. The MID PBN Roadmap will be the basic material for the development of a boarder MID air navigation strategy, which will serve as guidance for regional projects for the implementation of air navigation infrastructure, such as SBAS, GBAS, etc., as well as for the development of national implementation plans.

53. After the implementation of PBN as part of the airspace concept, the total system needs to be monitored to ensure that safety of the system is maintained. A system safety assessment shall be conducted during and after implementation and evidence collected to ensure that the safety of the system is assured

Principles of PBN Implementation

54. Introduction of PBN should be consistent with the Global Air Navigation Plan. Moreover, PBN Implementation shall be in full compliance with ICAO SARPs and PANS and be supported by ICAO Global Plan Initiatives

55. The implementation of PBN in the MID Region shall be based on the following principles:

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(a) develop strategic objectives and airspace concepts as described in the PBN manual (Doc 9613) to justify the implementation of the RNAV and/or RNP concepts in each particular airspace;

(b) States conduct pre- and post–implementation safety assessments to ensure the application and maintenance of the established target level of safety;

(c) development of airspace concept, applying airspace modelling tools as well as real-time and accelerated simulations, which identify the navigation applications that are compatible with the aforementioned concept; and

(d) continued application of conventional air navigation procedures during the transition period, to guarantee the operation by users that are not RNAV- and/or RNP–equipped.

PBN OPERATIONAL REQUIREMENTS AND IMPLEMENTATION STRATEGY

56. Introduction of PBN should be consistent with the Global Air Navigation Plan. Moreover, PBN Implementation shall be in full compliance with ICAO SARPs and PANS and be supported by ICAO Global Plan Initiatives.

57. It is envisaged that for the short term and medium term implementation of PBN, the establishment of a backup system in case of GNSS failure or the development of contingency procedures will be necessary

PBN APPLICATIONS

En-Route Operations

58. For En-Route operations the application of RNAV-5 or RNAV-1 for continental en-route will be mandated in designated parts of the ICAO MID [Doc 7030]. The current application of RNAV-10 is expected to continue for Oceanic and Remote continental routes, and operators are required to have operational approval for RNAV-5 and RNAV-1.

TMA Operations

59. In selected TMAs, the application of RNAV 1 in a surveillance environment can be supported through the use of GNSS or ground navigation infrastructure, such as DME/DME and DME/DME/IRU. In this phase, mixed operations (equipped and non-equipped) will be permitted.

60. In a non- surveillance environment and/or in an environment without adequate ground navigation infrastructure, the SID/STAR application of Basic-RNP 1 is expected in selected TMAs with exclusive application of GNSS.

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61. Operators are required to have operational approval for RNAV 1 and Basic RNP 1 when operating in procedural control TMAs and in order to avoid unnecessary approvals, operators equipped with GNSS should apply for a combined RNAV-1 and Basic RNP-1.

Approach

62. The application of RNP APCH procedures is expected to be implemented in the maximum possible number of airports, primarily international airports. To facilitate transitional period, conventional approach procedures and conventional navigation aids should be maintained for non-equipped aircraft.

63. States should promote the use of APV operations (Baro-VNAV , SBAS , GBAS) to enhance safety of RNP approaches and accessibility of runways and implement straight-in LNAV only procedures, as an exception for instrument runways at aerodromes where there is no local altimeter.

64. The application of RNP AR APCH procedures should be limited to selected airports, where obvious operational benefits can be obtained due to the existence of significant obstacles.

65. Operators shall plan to have operational approval for RNP APCH with VNAV operations (Baro-VNAV and LNAV).Depending on operational needs, aircraft shall also meet the RNP AR APCH specification.

66. With the expected reduction and subsequent removal of VOR it is expected that conventional NPAs will have to be withdrawn until 2025. The States should make clear their own individual plans in order to assist operators in their planning for the transition to PBN.

NAVIGATION INFRASTRUCTURE

67. The navigation infrastructure requirements address all phases of flight from take off to final approach and also the precision approach and landing.

68. *En route and TMA*

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69. Transition to a total RNAV environment takes place that requires enhancing DME coverage and/or ensuring the safety of GNSS signals in space and improving the quality of service for en route and terminal operations. This should be achieved mainly by deploying additional DMEs and certifying GNSS service providers in part of the Region. Repositioning some of the existing facilities might be required, as enabled by decommissioning of VOR.

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70. RNAV infrastructure assessment guidance material is available at http://www.paris.icao.int/documents_open/subcategory.php?id=48 and can be used to aid in assessment of DME-DME network requirements.

71. Decommissioning of NDBs and reduction of VOR takes place due to a progressive reduction of conventional routes and procedures, while leaving a sufficient backbone of conventional navigation aids to continue supporting reducing non-RNAV routes at lower flight levels and supporting remaining conventional approach procedures and their associated missed approaches, and enable ATC to re-route aircraft in the event of individual aircraft RNAV failure.

72. In the European Union the European Aviation Safety Agency (EASA) is expected to become competent for oversight of the providers of GNSS signals in space. Equipped aircraft will be authorized to take advantage of European Geostationary Navigation Overlay Service (EGNOS), after the certification of the relevant Navigation Service Provider (NSP), within its area of coverage and within the limits of its declared performance.

2015-2020

71. The transition to a total RNAV environment requires generalised use of GNSS in those areas where suitable DME coverage cannot be achieved, such as low flight levels in terrain constrained areas.

72. GNSS Sensors might be required for all General Air Traffic (GAT) operations. Dual RNAV with DME/DME and GNSS sensors, or other solutions ensuring a level of safety commensurate to the type of operations, may be foreseen to overcome loss of GNSS signal in order to meet the operational requirements in respect of the risk of loss of navigation capability on Air Transport operations. Alternate equipage using ground based navigation aids could be planned.

73. Galileo and enhanced GPS should become available in the 2015-2020 timeframe allowing increased reliance on GNSS once dual constellation and dual frequency equipment is installed in aircraft and experience is built up on Galileo operation.

74. The existence of a total RNAV environment should allow further removal of VOR and NDB, as well as further removal of unnecessary avionics.

Post 2020

75. In this time frame, it is expected to have a multi-constellation and multi frequency GNSS environment that will provide an adequate level of GNSS service in terms of robustness and performance.

76. These GNSS enhancements should reduce significantly the probability of having a GNSS failure and would reduce the extent of an alternative reversion, allowing for a reduced DME network to support the back-up requirement.

77. The existence of a total RNAV environment should allow an almost total removal of any remaining VOR.

Approach and Landing

2010-2015

78. Instrument Landing System (ILS) remains the prime source of guidance for precision approaches and landings in the EUR and continues to support all categories of airspace users.

79. Cat I GLS (GBAS/GPS) becomes available. ILS will probably remain the only means for Cat II/III operations. However, toward the end of the period, depending on Research and Development results, there may be a limited availability of Cat II/III GLS capability (using a GPS/GBAS capability augmented by on-board systems) at runways with Cat II/III lighting. This might increase the rate of take up of GBAS based landing as a back up to ILS to cater for maintenance/system failures.

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80. The gradual elimination of NPAs (both conventional and RNAV) should take place in accordance with the decisions of the 36th ICAO Assembly to be replaced by Approaches with Vertical Guidance (APV) either based on SBAS or Baro-VNAV. This is expected to be completed early in the period 2015-2020 with the provision of APV to all IFR runway ends, including those mainly used by general aviation.

73. Runways presently not equipped with Precision Approach and Landing system may consider SBAS (e.g. LPV down to 200 ft DH) or Cat I GLS (GBAS/GPS) systems with airport lighting system upgrades as needed.

Some CAT I ILSs may be replaced by SBAS APV or CAT I GLS. Business case for such changes depends upon the certification of the EGNOS NSP, number of procedures published in AIP, nature of traffic, capability of SBAS to serve multiple runway directions at a single aerodrome and availability of aircraft with certified GNSS based approach and landing systems.

83. Where a business case can be made (e.g. improved capacity) MLS Cat II/III may be equipped as an alternative or replacement to ILS.

2015-2020

84. ILS remains the prime source of guidance for precision approaches and landings in the EUR. MLS, Cat I GLS and LPV 200 continue to be introduced or maintained where required.

85. As Cat II/III GLS (GBAS/Multi-constellation Dual Frequency) becomes available and with the increased equipage of aerodromes with GBAS ground station and aircraft with GLS capability, GLS procedures should be increasingly used.

86. Users not approved for RNP APCH/LPV approaches, may suffer operational limitations when conventional NPA procedures are removed and associated navigation aids are decommissioned. RNP AR APCH should have increasing application where RNP operations cannot be undertaken using RNP APCH procedures.

BEYOND 2020

87. ILS should remain a significant source of guidance for precision approaches and landings in Cat II/III.

88. MLS, Cat I GLS and LPV 200 should continue to be introduced where required.

89. Increased equipage of GLS aircraft capability together with the provision of GLS GBAS procedures (Cat I/II/III) at more airports should take place. This is expected to be accompanied by extensive decommissioning of ILS CAT I systems, where the Business and Safety Case can be established.

90. ILS Cat II/III should be retained to provide backup to GLS to address GLS availability issues (deliberate jamming and solar activity) where and when justified.

91. Requirement for RNP APCH/LPV/GBAS for RNAV approach should be established if ILS is not available.

92. Increased equipage of aircraft with combined GPS/Galileo/SBAS reception will lead to the introduction of LPV procedures to all IFR runway ends, including for use by general aviation.

74. 93. RNP AR APCH should continue to have increasing application where RNP operations cannot be undertaken with RNP APCH procedures.

31. ~~It is foreseen that the provision of radio navigation services will gradually transition from ground-based to satellite-based system. The global navigation satellite system (GNSS) is the generic term used for the satellite-based aeronautical radio navigation systems. Existing and/or emerging navigation satellite constellations and their associated satellite-based, aircraft-based and ground-based augmentation systems (SBAS, ABAS and GBAS, respectively) all form elements of the GNSS~~.

32. States should coordinate with the ICAO Regional Offices concerned all radio frequency assignments for both national and international facilities in the LF/MF, 108–117.975 MHz and 960–1215

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MHz bands. Because of the need to protect existing radio frequency assignments, frequencies for new requirements and frequency changes for existing requirements should be coordinated with the ICAO Regional Offices concerned prior to implementation of such frequencies. States should report complete and accurate data for inclusion in the frequency list of the ICAO Regional Offices concerned. Based on the information provided for this purpose by States, the ICAO Regional Offices concerned should issue periodically a list or lists of frequencies in the LF/MF, 108–117.975 MHz and 960–1215 MHz bands assigned to national and international aeronautical radio navigation facilities. **[MID/3, Rec. 4.3/4]**

33. States with expertise and capability in frequency management and assignment should make their expertise and capability known to the ICAO office serving the MID region, and cooperate in the establishment of an appropriate computer-assisted frequency management and assignment capability in the MID region. **[MID/3, Rec. 5/39]**

34. Where different systems are used for navigation and position determination within the same controlled airspace, the ground facilities involved should be collocated and/or oriented so as to provide compatible flight paths and ensure, as far as practicable, a fully integrated ATC pattern. **[ASIA/PAC/3, Conc. 14/21]**

SURVEILLANCE

General

35. The aeronautical surveillance plan comprises all facilities, systems and procedures that support the provision of aircraft position information to ATS units.

36. Traditionally, aeronautical surveillance has been performed by means of voice position reporting, primary surveillance radar (PSR) or secondary surveillance radar (SSR). SSR Mode S ground stations have been implemented in several parts of the world and their operation depends on properly equipped aircraft (i.e. Mode S transponder with assigned 24-bit address). An inherent feature of the SSR Mode S (for surveillance and/or data link) is the unique 24-bit aircraft address assigned to each aircraft, and a worldwide scheme for allocation, assignment and operation of such addresses is already in place (Annex 10, Volume III, Part I, Chapter 9 refers).

37. However, advances in aeronautical data links and on board navigation systems now allow for aircraft to transmit their position and other information to the appropriate ATS units, or even broadcast such information. These systems have been designated as automatic dependent surveillance (ADS), which is based on a contact between the ATS unit and aircraft, and ADS-broadcast (ADS-B), which allows other craft and ground systems within its area of coverage to receive the information.

38. It is envisaged that the use of ADS/ADS-B will gradually increase, especially in areas where the provision of radars is not practical or economical. It is also foreseen that the use of PSR for international civil aviation operations will diminish.

39. The plan and operational requirements for surveillance are contained in FASID Table CNS 4.

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

Implementation of surveillance systems

41. Implementation of surveillance systems should be pursued as an enhancement to ATS where so required and the use of SSR alone in accordance with the procedures in Doc 7030, should be considered as a cost-effective alternative to PSR. **[ASIA/PAC/3, Rec.14/20]**

Secondary surveillance radar

42 Details of the implementation and planning for the provision of ATC radar facilities are presented in FASID Table CNS 4. **[LIM MID RAN, Rec 2/21]**

Automatic dependent surveillance

43. States should closely cooperate in the development of procedures for the implementation of ADS in the MID region and participate to the extent possible in trials and demonstrations related to the implementation of ADS. **[ASIA/PAC/3, Conc. 14/21]**

Part V

Air Traffic Management (ATM)

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INTRODUCTION

1. This part of the Middle East (MID) Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to air traffic management (ATM) as developed for the MID region.

2. As a complement to the Statement of Basic Operational Requirements and Planning Criteria (BORPC) set out in Part I, Part V constitutes the stable guidance material considered to be the minimum necessary for effective planning of ATM facilities and services in the MID region. A detailed description/list of the facilities and/or services to be provided by States in order to fulfill the requirements of the plan is contained in the MID Facilities and Services Implementation Document (FASID).

3. This part of the Middle East Region Basic Air Navigation Plan (MID ANP) introduces the long-term MID Region ATM requirements based on the Global ATM Operational Concept. While the operational concept is visionary and even challenging, many of the current practices and processes detailed in the BORPC will continue to exist throughout the planning horizon. In this sense, the introduction of the new concepts should be seen as evolutionary. Following the description of the Concept, this Part provides detail on the ATM requirements during the transition to the ATM Concept's

Operational Components. Description of specific delivery programmes and associated electronic links are contained in the ATM element of the FASID.

4. During the transition and pending full implementation of the future communications, navigation and surveillance/air traffic management (CNS/ATM) system, it is expected that the existing requirements will gradually be replaced by new CNS/ATM system-related requirements. Further, it is expected that some elements of CNS/ATM system will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

~~3~~5.. The Standards, Recommended Practices and Procedures (SARPs) to be applied are contained in:

a) Annex 2 — Rules of the Air;

b) Annex 6 — Operation of Aircraft;

c) Annex 11 — Air Traffic Services;

d) Procedures for Air Navigation Services — Air Traffic Management (Doc 4444);

e) Procedures for Air Navigation Services — Aircraft Operations (Doc 8168); and

f) Regional Supplementary Procedures (Doc 7030).

g) *Middle East Region Secondary Surveillance Radar (SSR) Code Management Plan* (MID Doc 001).

4. Guidance material concerning the application of these SARPs can be found in the:

a) Air Traffic Services Planning Manual (Doc 9426);

b) Manual on Performance Based Navigation (PBN) ~~Required Navigation Performance (RNP)~~ (Doc 9613); and

c) Manual on Airspace Planning Methodology for Determination of Separation Minima (Doc 9689).

d) Continuous Descent Operations (CDO) Manual (Doc 9931)

5. ~~Background information of importance in the understanding and effective application of this part of the plan is contained in the Report of the Limited Middle East (LIM MID) COM/MET/RAC Regional Air Navigation Meeting, 1996 (Doc 9672) supplemented by information appropriate to the MID region contained in the reports of the other air navigation meetings~~.

6. ~~A regional air navigation (RAN) meeting recommendation or conclusion shown in brackets below a heading indicates the origin of all the paragraphs following that heading. A RAN meeting recommendation or conclusion shown in brackets below a paragraph indicates the origin of that particular paragraph.~~

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OBJECTIVES OF AIR TRAFFIC MANAGEMENT

General

7. The general objective of the ATM system is to provide services to operators so that they can meet their planned times of departure and arrival while adhering to their preferred profiles with minimum constraints. This objective should be achieved without compromising agreed levels of safety and with due regard to the need for efficiency and economy.

Elements of the ATM system

8. Air traffic management consists of a ground part and an air part, where both parts are needed to ensure a safe and efficient movement of aircraft during all phases of operations. The execution of ATM calls for close integration of the ground part and the air part through well defined procedures and interfaces.

9. An ATM system consists of several sub-elements. These are Airspace Management (ASM), Air Traffic Services (ATS), and the ATM-related aspects of flight operations. These sub-elements form an integrated system. As CNS/ATM is progressively introduced, the ATM-related aspects of flight operations will be fully integrated as a functional part of the ATM system. This integration will be accomplished through the use data link for the exchange of information between the various components of the overall ATM system.

Airspace management

10. The objective of ASM is to maximize, within a given airspace structure, the utilization of available airspace by dynamic time-sharing and, at times, segregation of airspace among various categories of users based on short-term needs.

11. As the CNS/ATM implementation proceeds, the scope of ASM will expand. In the seamless, global ATM system, ASM will not be limited only to tactical aspects of airspace use. Its main scope will be toward a strategic planning function of airspace infrastructure and flexibility of airspace use.

Air traffic services

12. ATS will continue to be the primary element of ATM in the MID region. ATS is composed of several sub-elements: alerting service, flight information service (FIS) and ATC. The primary objective of ATC service is to prevent collisions between aircraft and between aircraft and obstructions on the maneuvering area, and to expedite and maintain an orderly flow of air traffic. The objective of FIS is to provide advice and information useful for the safe and efficient conduct of flights. The objective of the alerting service is to notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

Air traffic flow management

13. The objective of ATFM is to ensure an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed the available capacity of the ATC system. The

ATFM system will assist ATC in meeting its objectives and achieving the most efficient utilization of available airspace and airport capacity while keeping delay cost to a minimum.

ATM requirements for CNS

14. The available CNS facilities are a significant factor for planning in all three areas of ATM, and each may generate its own requirements, particularly for communications facilities. Hence, ATM requirements for CNS facilities are included here rather than in the paragraphs specific to ASM, ATS and ATFM.

ATM requirements for communications

15. States should assign a high priority to the establishment, in accordance with Annex 11, 6.2.3.1.2, 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 ATC service. ~~**[LIM MID (COM/MET/RAC), Rec. 2/19]**~~

16. VHF air-ground facilities for direct static-free pilot-controller VHF communications should be provided in the MID region:

a) between an area control centre (ACC) and appropriately equipped aircraft flying anywhere within its controlled airspace, except where technically impossible; and

b) between a flight information centre (FIC) and appropriately equipped aircraft flying anywhere within its flight information region (FIR) outside controlled airspace, except where technically and economically impossible. ~~**[LIM/MID (COM/MET/RAC), Rec. 2/37]**~~

17. The emergency channel 121.5 MHz should be provided and guarded at all ATS units. Note.— At locations where more than one element of ATS is provided within the same office, the joint use of 121.5 MHz by all such collocated services would be acceptable. ~~**[LIM/MID (COM/MET/RAC), Rec. 2/34]**~~

ATM requirements for navigation

18. States which 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 air navigation plan. ~~**[LIM MID (COM/MET/RAC) Rec. 2/42]**~~

19. Where different systems are used for navigation and position determination within the same controlled airspace, the ground facilities involved should be collocated and/or orientated so as to provide compatible flight paths and to ensure, as far as practicable, a fully integrated ATC pattern. ~~**[LIM MID (COM/MET/RAC) Rec. 2/44]**~~

ATM requirements for surveillance

~~**[LIM/MID (COM/MET/RAC), Rec. 2/42]**~~

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20. Secondary surveillance radar should be provided whenever it is necessary to improve the safe and expeditious handling of air traffic.

21. States should provide, at the earliest practicable date, secondary surveillance radar when:

a) primary radar target detection capabilities are known to be questionable; and/or

b) significant reduction in air-ground communications can be achieved with the addition of this feature, subject to appropriate changes in the normal radar traffic control procedures.

Part V.I

~~AIRSPACE MANAGEMENT (ASM)~~ Airspace Organisation and Management

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OBJECTIVES ~~OF ASM~~

22. Best use of airspace and airport capacity requires an efficient airspace structure which permits collaboration planning between aircraft and ground ATM system. The airspace structure should be capable of dynamically adapting to changing circumstances and also accommodating the capabilities and desires of the airspace users, utilizing all available data.

23. The careful monitoring and efficient coordination of airspace use is essential to ATM. Therefore, the main objective of ASM is the avoidance of permanent reservation of parts of the airspace for one particular user. This applies to all airspace, but the objective is of special importance in airspace where the ATM system is based on a less rigid track structure, as opposed to a fixed network of ATS routes. When airspace user requirements conflict, resolution should be accomplished through coordination among all parties concerned with a view to sharing airspace when possible and keeping the exclusive use of blocks of airspace to a minimum. Finally, close cooperation should result in information being readily available on expected and actual utilization of temporarily reserved airspace.

24. In order to accomplish the above-mentioned ASM objectives, the following functions are necessary:

a) collection and evaluation of all requests that require temporary airspace allocation;

b) planning and allocation of the required airspace to the users concerned where segregation is necessary;

c) activation and de-activation of such airspace within narrow time tolerances, in close cooperation with ATS units and civil or military units concerned; and

d) dissemination of detailed information, both in advance and in real time, to all parties concerned.

FLIGHT INFORMATION REGIONS AND ATS ROUTES

FIR boundaries

25. The boundaries of the FIRs comprising the MID region are shown in Chart ATS 1.

Plan of ATS routes

26. The plan of ATS routes as shown in Table ATS 1 forms the ATS route network for the MID region. The routes are also shown in Chart ATS 2. ~~[LIM MID (COM/MET/RAC), Rec. 2/16]~~

27. Whenever practicable, States should, in close coordination with operators, attempt to establish the most direct routings between entry and exit points of terminal control areas for aircraft in transit. ~~[LIM/MID (COM/MET/RAC), Rec. 2/38]~~

Areas of application of the area navigation (RNAV) concept

28. States should identify those areas within their respective FIRs where the RNAV concept could be applied in order to take full advantage of the navigational capability of aircraft equipped with suitable RNAV equipment. and according to the MID Regional PBN Implementation plamn. ~~[LIM/MID (COM/MET/RAC), Rec. 2/15]~~

Functional Airspace Blocks (FAB)

The establishment of FABs, is not in itself subject to the process for amendment of ANPs. However, should changes to the FIR boundaries or to the facilities and services provided be required at a later stage, such changes might be subject to the ANP amendment procedure and should therefore be examined on a case-by-case basis. Pursuant to Article 83 of the ICAO Convention, agreements or arrangements for FABs are subject to registration with ICAO in accordance with the applicable Rules in ICAO Doc 6685.

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GENERAL GUIDELINES

Civil/military coordination ~~[LIM MID (COM/MET/RAC) Rec. 2/9]~~

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~~29.~~ In order to achieve optimum civil/military coordination and joint use of airspace with a maximum degree of safety, regularity and efficiency of international civil air traffic, States should:

a) establish appropriate civil/military coordination bodies to ensure, at all levels, the coordination of decisions relating to civil and military problems of ASM and ATC;

b) make known to military authorities the existing ICAO provisions (Assembly Resolution A37 – 15, Appendix O ~~Assembly Resolution A32-14, Appendix P~~ and Annex 11, 2.16 and 2.17) and guidance material (Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations (Doc 9554) and Manual Concerning Interception of Civil Aircraft (Doc 9433)) related to civil/military coordination and promote familiarization visits by military personnel to ATS units;

c) Annex 11 contains provisions on civil- military coordination and Annex 15 contains provisions for the promulgation of the relevant AIS by the competent authority responsible for the provision of ATS in the area within which the operations will take place.

d) The application of the FUA over the high seas is without prejudice to the rights and duties of States regarding access to high seas airspace under the Chicago Convention. Articles 3 a) and d) to the Chicago Convention apply.

e) The FUA provisions are not mandatory for application by States. They are intended to be a method to ensure maximum harmonisation of the application of the FUA in the MID Region

f~~e~~) arrange permanent liaison and close coordination between civil ATS units and relevant military operational control/ air defence units, in order to ensure the daily integration or segregation of civil and military air traffic operating within the same or immediately adjacent portions of airspace, employing civil and/or military radars as necessary, and to obviate the need for civil aircraft to obtain special "air defence" clearances; and

g~~d~~) take the necessary steps to prevent, as far as possible, penetration of controlled airspace by military aircraft without coordination with the ATC unit concerned.

h) Military exercises likely to affect civil flight operations should be scheduled, whenever possible, so as not to coincide with peak periods of civil air traffic and/or not to affect areas where a high density of civil air traffic occurs.

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Flexible Use of Airspace (FUA)

(GPI-1 Refers)

22. Airspace should not be designated as either purely civil or purely military airspace, but should rather be considered as one continuum in which all users' requirements have to be accommodated to the maximum extent possible.

23. States should apply the flexible use of airspace concept whenever:

a) activities require the reservation of a volume of airspace for their exclusive or specific use for determined periods due to the characteristics of their flight profile or their potential hazards and the need to ensure effective and safe separation from non-participating air traffic;

b) different types of aviation activities occur in the same airspace but with different requirements. Their coordination should seek to achieve both the safe conduct of flights and the optimum use of available airspace;

c) accuracy of information on airspace status and on specific air traffic situations, and timely distribution of this information to civil and military controllers and controlling military units has a direct impact on the safety and efficiency of operations; and

d) timely access to up-to-date information on airspace status is essential for all parties wishing to take advantage of airspace structures made available when planning their flights.

Flexible Use of Airspace Over The High Seas

24. The flexible use of airspace concept also covers airspace over the high seas. Its application should therefore be without prejudice to the rights and duties of States under the Convention on International Civil Aviation (Chicago Convention) and its annexes, or the 1982 UN Convention on the Law of the Sea (UNCLOS).

25. Regulations governing flights of State aircraft over the high seas should, to the maximum extent practicable, comply with the relevant provisions of Annex 2. Where this is not possible due to the nature of the operations involved, measures should be taken to ensure that other aircraft are not endangered by such operations. These should preferably be established in coordination with the State responsible for the provision of air traffic services over that part of the high seas affected by such operations.

Promulgation of prohibited, restricted and danger areas ~~[LIM/MID (COM/MET/RAC), Rec. 2/10~~]

30. States should refrain, to the extent possible, from establishing prohibited, restricted or danger areas, bearing in mind that, in accordance with Annex 15, prohibited areas or restricted areas may only be established over the territories of a State and not over international waters, and apply the following principles when the establishment of prohibited, restricted or danger areas becomes unavoidable:

a) give due regard to the need not to prejudice the safe and economical operation of civil aircraft;

b) provide adequate buffer, in terms of time and size, within the designated area, appropriate to the activities to be conducted;

c) use standard ICAO terminology in designation of the areas;

d) promulgate information regarding the establishment and day-to-day use of the areas well in advance of the effective date(s);

e) arrange for the closest possible coordination between civil ATS units and relevant units responsible for activities within the restricted or danger areas so as to enable the ATS units to authorize civil aircraft to traverse the areas in emergencies, to avoid adverse weather and to indicate whenever the restrictions do not apply or the areas are not active; and

f) review the continuing need for the prohibited, restricted or danger areas at regular intervals.

31. When reservation of airspace outside territorial limits becomes unavoidable, it should be of a temporary nature and States should apply the following principles:

a) prior to requesting the establishment of a temporary airspace reservation, the requesting authority shall obtain full information on the likely effect of such a reservation on air traffic. Such information shall include areas of high traffic density which may exist in the vicinity or at the planned location of the airspace reservation, as well as information on peak periods of traffic operating through such areas. In the light of that information, the requesting authority should, to the extent possible, select the site of the airspace reservation, and the time and duration so that this will have the least effect on normal flight operations conducted in the area in question;

b) in specifying the extent of a requested temporary airspace reservation and its duration, the requesting authority shall limit the size of the area to the absolute minimum required to contain the activities intended to be conducted within that area, taking due account of:

1) ATS route structure and associated airspace arrangement;

2) operational requirements of civil aircraft;

3) the navigation capability of aircraft or other vehicles within the airspace reservation;

4) the means available to monitor those activities so as to guarantee that they will be confined within the airspace reservation;

5) the ability to interrupt or terminate activities;

c) the duration of the airspace reservation shall be limited, taking a realistic account of preparation of the activities and the time required to vacate the reservation after the completion of the activities; and

d) the actual use of the temporary airspace reservation shall be based on appropriate arrangements made between the ATS unit normally responsible for the airspace and the requesting authority. Such arrangements shall be based on the general agreement reached previously between the competent ATS authority or ATS authorities and the requesting authority. They should, inter alia, cover:

1) the start of the use of the temporary airspace reservation;

2) the termination of its use;

3) emergency provisions in case of unforeseen events affecting the activities to be conducted within the temporary airspace reservation.

32. When developing the plans for future ATS systems, prime consideration should be given to the creation of a flexible ASM system capable of integrating the requirements of all categories of users in the most effective manner.

Delegation of responsibility for the provision of ATS (for short distance ATS routes) ~~**[LIM MID (COM/MET/RAC);Rec 2/36]**~~

33. In cases where ATS routes traverse FIRs for short distances and agreement cannot be reached on adjustment of the FIR boundaries, the States concerned should attempt to reach agreement regarding the delegation of responsibility for the provision of ATS to flights along such route segments, so as to reduce cockpit workload and the need for coordination between the ATS units concerned.

Characteristics of control areas

34. The lateral and vertical limits of control areas to encompass the ATS routes shown in Table ATS 1 should be determined in accordance with the following criteria:

a) Lateral limits. To be determined by the States concerned in consultation with the operators, taking full account of the limitations of navigation aids available and the need to allow for flexibility in the routing of aircraft to avoid adverse weather, resolve traffic conflicts and employ more direct routings when traffic and other conditions permit. In establishing the width of airways, the following planning principles should apply:

1) for ATS routes defined by a VHF omnidirectional radio range (VOR), an overall system accuracy figure should be assumed to be ±5 degrees;

2) for ATS routes defined by non-directional radio beacons (NDB), the overall system accuracy should be assumed to be ±7 degrees; however with the implementation of PBN the NDB should be phased out as planned by 2012.

3) other overall accuracy figures may be used in the light of flight check information or to meet specific national criteria. Recognizing the variances which may exist in the airborne equipment, however, any reduction in the tolerances mentioned above should be made only after consultation with the operators concerned;

~~4) the overall width of an airway defined by navigation aids (VOR and NDB) and serving a single ATS route should be not less than 4 NM on either side of the track up to and including 20 000 ft, and 5 NM on either side of the track above 20 000 ft, unless the guidance material in Annex 11 is found to be applicable~~;

~~5) the width of an airway which is not defined by ground-based navigation aids may be increased to not more than 50 NM on either side of the track.~~

~~b) Vertical limits. To be determined by States in consult ation with the operators concerned taking into account all operational requirements and the following criteria:~~

~~1) Upper limit. At least:~~

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~~for SST aircraft, approximately FL 660~~

~~for turbo-jet aircraft, FL 460~~ ~~for turboprop aircraft, FL 360~~

~~for aircraft with reciprocating engines, FL 255~~

~~2) Lower limit.~~

~~FL 245 for control areas established only in the upper airspace~~

~~FL 55 for control areas over oceanic areas or 900 m (3 000 ft) for control areas above land and adjacent territorial waters.~~

The vertical limits and classification of airspace should be as follows:

a) the vertical limits for all control areas established in the MID Region be:

1) upper limit — unlimited; Controlled airspace up to a harmonised flight level and all uncontrolled airspace above be Class G.

2) lower limit - ATM provided in various airspace volumes should be based on the ICAO airspace classification system as defined in Annex 11 — *Air Traffic Services* (i.e. Class A to G), and those classifications should be implemented on the basis of a safety assessment, taking into account the volume and nature of the air traffic.

Details of airspace parameters within FIRs should be shown in respective national Aeronautical Information Publications.

~~c) In applying the foregoing, States should:~~

~~1) ensure that the airspace allocations are adequate to contain the type of operations to occur therein;~~

~~2) having satisfied 1), determine an adequate buffer airspace;~~

~~3) in promulgating the airspace, include the selected buffer within the controlled airspace boundary.~~

~~d) In connection with a), b) and c), attention should be drawn to the PANS-ATM (Doc 4444) which specifies a minimum track difference of 15 degrees between aircraft using VOR and 30 degrees between aircraft using NDB for separation at a distance of 15 NM or more from the facility.~~ ~~**[ASIA/PAC/3, Rec. 5/12]**~~

~~**Uniformity in cruising levels**~~ ~~**[ASIA/PAC/3, Rec. 6/1]**~~

~~35. States that have not already done so should implement, in the airspace under their jurisdiction, the table of cruising levels as prescribed in Annex 2, Appendix 3.~~

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~~**Negotiations on transfer of control problems**~~
~~**[LIM/MID (COM/MET/RAC), Rec. 2/43]**~~

~~36. Wherever transfer of control problems arise in the MID region, direct contact should be established between the aeronautical authorities of the States concerned, with the assistance when so required of the ICAO Regional Office concerned, to facilitate the resolution of same.~~

States should adopt a common division level between upper and lower airspace; airspace classifications above the division level should be harmonised. (GPI- 4 refers).

32. ATS routes and organised track structures should be provided to meet ATM requirements. States should to the extent possible coordinate with the ICAO Regional Office any changes to the airspace structure, the assignment of or changes to compulsory reporting points and ATS routes; route and reporting point designators should be obtained from the ICARD Global Database

. Dynamic and flexible ATS route management should be provided when ATM and aircraft capabilities can safely accommodate such arrangements. (GPI-7 refers)

Determination of transition altitudes and transition levels

37. States in the MID region should:

a) ensure that all international aerodromes are assigned a transition altitude and a transition level, as appropriate, in accordance with the PANS-OPS (Doc 8168); and

b) publish corresponding procedures in their respective Aeronautical Information Publication (AIP). ~~**[ASIA/PAC/3, Rec. 6/2]**~~

Establishment of standard arrival and departure routes

38. States that have not already done so should establish standard departure and arrival routes wherever necessary, taking into account relevant provisions in Annex 11, Appendix 3 and guidance material in Doc 9426. ~~**[ASIA/PAC/3, Rec. 5/20]**~~

Implementation of Performance Based Navigation (PBN)~~required navigation performance~~

39. States should carry out studies and assist the Middle East Air Navigation Planning and Implementation Regional Group (MIDANPRG) in the implementation of P~~p~~erformance B~~b~~ased N~~n~~avigation (PBN) ~~required navigation performance (RNP)~~ in the MID region on an evolutionary basis, taking into account the introduction of new technologies and anticipated requirements for reductions in separation standards. States should also determine the routes where PBN ~~RNP~~ could be applied and explore the possibilities of introducing RNAV 5 ~~RNP 4~~ on trunk routes in the MID region for early implementation. ~~**[LIM/MID (COM/MET/RAC) Rec. 2/24]**~~

~~**Implementation of reduced vertical separation minimum**~~

~~40. States, supported by the MIDANPIRG, should commence their work on reduced vertical separation minimum (RVSM) as soon as possible on a date to be determined once the planning process is sufficiently advanced.~~

Part V.II

AIR TRAFFIC SERVICES (ATS)

PROVISION OF SERVICES

Air traffic control (ATC) service ~~[LIM MID (COM/MET/RAC) 10/10]~~

41. States that have not already done so should implement an ATC service for IFR flights along all ATS routes used for international aircraft operations, except where the type and density of traffic clearly do not justify the provision of such a service.

The ATC Service should maintain a safe, orderly and expeditious flow of air traffic by applying separation between aircraft and by issuing clearances to individual flights as close as possible to their preferred profiles, taking into account the actual state of airspace utilization and within the general framework of ATFM measures when applicable. Air traffic control service should be provided on a 24-hour basis in all controlled airspace used by international operations both during the en-route and the terminal phases of their flight.

Flight information service (FIS)

42. Flight information service should be provided on a 24-hour basis within each FIR and upper flight information region (UIR) either by an ACC where such centre is established, or by a FIC established for the purpose. **[~~LIM/MID (COM/MET/RAC), Rec. 2/35~~]**

43. Meteorological information and other operational flight information should be provided in the MID region as part of the FIS through efficient means, including data link. ~~[LIM/MID (COM/MET/RAC), Rec. 2/23].~~

Approach control service ~~[LIM/MID (COM/MET/RAC), Rec. 2/40]~~

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44. Approach control service should be provided:

a) at each regular international aerodrome; and

b) at those alternate international aerodromes which are equipped with aids for instrument approach and where the nature and density of traffic justifies the provision of approach control service.

45. Control zones and, as necessary, related terminal control areas should be maintained or established, in accordance with Annex 11 and its attachments, at those aerodromes in 5.9.1(a)

Aerodrome control service

46. ~~Aerodrome control service should be provided at each international regular and alternate aerodrome required primarily for international commercial air transport, and at those additional international aerodromes required for international general aviation where the traffic density warrants the provision of this service. [LIM/MID (COM/MET/RAC), Rec. 2/41]~~

As an integral part of the ATM system, the aerodrome should provide the needed ground infrastructure including, *inter alia*, lighting, taxiways, runway and runway exits, precise surface guidance to improve safety and to maximize aerodrome capacity in all weather conditions. The ATM system will enable the efficient use of the capacity of the aerodrome airside infrastructure. The key conceptual changes are:

a) runway occupancy time will be reduced;
b) the ability to safely manoeuvre in all weather conditions whilst maintaining capacity;
c) precise surface guidance to and from a runway will be required in all conditions; and
d) the position (to an appropriate level of accuracy) and intent of all vehicles and aircraft operating on the manoeuvring and movement areas will be known and available to the appropriate ATM community members.

Air traffic advisory service ~~[LIM/MID (COM/MET/RAC), Rec. 2/39]~~

47. An air traffic advisory service should be implemented on international ATS routes, on an interim basis only, when facilities or personnel are not yet fully adequate for permitting the introduction of ATC service.

48. States concerned should review their ATS organization with the objective of replacing existing air traffic advisory service by ATC service at the earliest possible time and of converting any air traffic advisory service implemented in the future to ATC service within one year.

Reduction in separation minima ~~[LIM MID (COM/MET/RAC), Rec. 2/28]~~

49. States should

a) take immediate action to reduce the longitudinal separation minimum along routes in the MID region to 10 minutes or less with Mach number technique; and

b) implement CNS facilities necessary, including radar, to permit the introduction of further reduced separation minima on high density trunk ATS routes.

GENERAL

Reporting and investigation of air traffic incidents ~~[LIM MID (COM/MET/RAC), Rec. 2/31]~~

50. `States that have not already done so should:

a) implement procedures for the timely reporting of air traffic incidents;

b) publish reporting procedures in their AIPs and relevant ATS documents and make the model ATS Incident Report Form available at ATS units including those offices used for pre-flight and post-flight pilot briefing;

c) establish procedures for the investigation of causes and circumstances concerning significant air traffic incidents; and

d) emphasize, in national documentation, the need for rapid notification of the results of investigations to all parties concerned including pilots, aircraft operators, ATS units, ICAO and other affected States or agencies.

Interception of civil aircraft ~~[LIM MID (COM/MET/RAC), Rec. 2/12]~~

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51. States that have not yet done so should ratify, as soon as possible, the Protocol incorporating Article 3 bis into the Chicago Convention as established in Assembly Resolutions A25-1 and A25-2.

Publication of information in AIPs ~~[LIM MID (COM/MET/RAC), Rec. 2/13]~~

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52. States that have determined that there is a risk of interception in case of penetration of certain areas adjacent to ATS routes, should include in their AIPs, as soon as possible, text relating to the potential risk of interception, including the navigation requirements to keep clear of the area.

53. States that have not determined the existence of interception risk, but which are affected by a situation of this nature, should adopt, as soon as possible, all measures which may be necessary to comply with the indications referred to in xx.

54. States that possess the facilities to monitor deviations from track which may involve the possibility of penetrating airspaces where interception procedures are implemented, should include in their AIPs that such deviations will be communicated to the aircraft concerned.

55. AIS units should prepare a separate pre-flight bulletin on dangers to air navigation with details on activated areas, for distribution to flight crews and operations personnel.

Operational letter of agreement between ATS and military units ~~[LIM MID (COM/MET/RAC), Rec. 2/14]~~

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56. In order to facilitate uniformity in the application of ICAO Standards and Recommended Practices relating to the interception of civil aircraft, States should, as far as possible, when establishing agreements between ATS units and between ATS units and appropriate military units, use, to the extent possible, the model letter of agreement appearing at Appendix B to Doc 9433.

Part V.III

AIR TRAFFIC FLOW MANAGEMENT (ATFM)

GENERAL PRINCIPLES OF THE ATFM SERVICE

57. In airspaces with high volumes of air traffic, ATFM is needed to support ATM as a planning tool by providing for an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed, the available capacity of the ATM system. The oceanic ATFM service should be interfaced with domestic ATFM organizations/units to provide maximum harmonization.

58. When operationally required, the MIDANPIRG should develop appropriate procedures for the provision of the ATFM service within the MID region to cater for the requirements of flights to and from FIRs in the regions and adjacent to it. To achieve this, the following basic principles should be covered in the future ATFM system:

a) pro-active ATFM requires the ability to dynamically interact with the strategic planning of traffic flows. Therefore, ATFM in the MID region should be interfaced with the overall ATFM strategies in other regions. To this end, the ATM system should also be capable of adjusting to the varying requirements;

b) re-active ATFM is required to take account of short-term contingencies. The ATM system should be able to react quickly and provide early information and advice to the controller and the pilot of the best tactical response necessary to achieve ATFM objectives;

c) data should be collated on likely future demand using historical information, planned development by airports and airlines, aircraft manufacturers, plus the economic forecasts and trends in States of the regions;

d) a recognized and common methodology for the assessment of the capacity of the current and planned ATM system should be developed to include sector capacities and in particular "choke" points;

e) regions should consider the introduction of a centralized flow management unit; and

f) where more than one flow management unit exists, plans to harmonize procedures and practices with adjacent units should be developed.

SSR CODE MANAGEMENT

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Originating Region Code Assignment Method (ORCAM)

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48. Within the context of ATM and the provision of ATS, SSR code management is a key element of ATM to ensure continuous, unambiguous aircraft identification. SSR codes have a finite limit and without management results in capacity constraints and aircraft delays. SSR code management within the MID Region is achieved via ORCAM. States should ensure their systems are compliant with the technical requirements of ORCAM system as adopted. Detailed procedures and requirements on the

ORCAM system can be found in ICAO MID Doc 001- the MID *Secondary Surveillance Radar (SSR) Code Management Plan*. (To replace existing material in the (ATM) FASID, Part V **Attachment B**).

APPENDIX B

Part V

AIR TRAFFIC MANAGEMENT (ATM)

1. Introduction

1.1 The standards, Recommended Practices and Procedures to be applied are as listed in Part V - ATM of the basic MID ANP. The material in this Part complements that contained in Part I - BORPC of the MID ANP and should be taken into consideration in the overall planning processes for the MID Region.

1.2 This Part contains a detailed description/list of the facilities and/or services to be provided to fulfill the basic requirements of the Plan and are as agreed between the provider and user States concerned. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. This element of the FASID, in conjunction with the MID Basic ANP, is kept under constant review by the MIDANPIRG in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO Middle East Regional Office, Cairo.

2. Air Traffic Management

2.1 *Airspace Management (ASM)*

2.1.1 The plan of ATS routes for the MID region is contained in Tables ATS 1 and 2 of the MID Basic ANP (Doc 9708).

2.1.2 Planning for new ATS routes, and planning associated with the introduction of CNS/ATM systems, should be based on the major traffic flows, as defined in FASID Table 2-10, Part II.

2.1.3 The planning of airspace and ATS routes within the MID region should also take into consideration the principles of air route design listed in **Attachment A.**

2.2 *Air Traffic Services (ATS)*

2.2.1 FASID Tables ATS 2, and ATS 3 contain the MID regional requirements in relation to:

- ☐ HF radiotelephony VOLMET broadcasts - Table ATS 2
- ☐ VHF VOLMET broadcasts - Table ATS 3

SSR CODE MANAGEMENT

Originating Region Code Assignment Method (ORCAM)

2.2.2 Within the context of ATM and the provision of ATS, SSR code management is a key element of ATM to ensure continuous, unambiguous aircraft identification. SSR codes have a finite limit and without management results in capacity constraints and aircraft delays. SSR code management within the MID Region is achieved via ORCAM. States should ensure their systems are compliant with the technical requirements of ORCAM system as adopted. Detailed procedures and requirements on the ORCAM system can be found in ICAO MID Doc 001- the MID *Secondary Surveillance Radar (SSR) Code Management Plan*. (To replace existing material in the (ATM) FASID, in **Attachment B**).

~~2.2.3 The principles applied in the development of the SSR code assignment system, and the SSR code allocations for the FIRs of the MID region, are contained in **Attachment B**.~~

2.3 ***Air Traffic Flow Management***

2.3.1 While some States of the MID region use tactical ATFM on a local basis, no regional requirements for ATFM have been identified.

2.3.2 The development of any future plans for ATFM should be coordinated with adjacent regions, to ensure harmonization with their plans for ATFM.

ATTACHMENT A

WORKING PRINCIPLES FOR THE CONSTRUCTION OF AIR ROUTES

1. Air routes will satisfy appropriate ICAO SARPS.

a) Where possible, routes should be established to increase efficiency, reduce complexity and provide additional benefits to users.
b) Separation assurance principles should apply:
c) routes should be established with sufficient separation to operate independently;
d) where possible, routes in a radar environment should be procedurally (laterally) separated;
e) segregated tracks should be established on medium/high density routes and be determined by set criteria.
f) Where required, routes should be constructed to support terminal area management procedures, e.g. SIDs/SRDs/STARs and flow management techniques, as applicable.
g) Holding patterns should be laterally separated from other tracks, and tolerances captured within a single sector.
h) A maximum of two routes containing high traffic density should be blended at a single point. Inbound tracks should be blended at <90 degrees. Up to three low traffic density routes may be blended at a single point.
i) Multiple crossing points involving major traffic flows should be avoided.
j) En-route crossings should be minimized. Where crossings are inevitable, they should, where possible, be established for cruise configuration. Such crossings should occur, wherever possible, within radar coverage.
k) Airspace sectorization should take account of the route structure, and workload considerations. If necessary, airspace should be re-sectorized to accommodate changes to air route configuration.
l) Routes should be constructed so as to reflect the optimum navigation capabilities of the principle users (e.g. RNAV or conventional).
m) The prime determinant should not be the number of track miles. A small increase in track miles may optimize traffic flows, avoid unpredicted delays or avoid holding requirements. Consideration should also be given to the provision of a range of routes which will permit operators to choose cost-efficient routes over the range of expected seasonal wind patterns.
n) Due allowance should be given to existing and future flight data processing (FDP) and radar data processing (RDP) capability (i.e. notification of messages for auto hand-off etc.)
o) A periodic safety audit and review process of routes should be conducted to test demand against capacity criteria, and the principles. This should ideally be done in parallel with the annual sectorization review.
p) Routes that can no longer be justified should be deleted.

TABLE ATS 2 - HF RADIOTELEPHONY VOLMET BROADCASTS

EXPLANATION OF THE TABLE

The name of the transmitting station appears at the top of each block. Names in lowercase letters indicate aerodromes for which reports (routine or selected special) are required, while names in uppercase letters indicate aerodromes for which forecasts are required.

MID REGION

FREQUENCIES 2956, 5589, 8945 kHz

Istanbul	Shiraz	Tehran
25B30 55B60	20B25 50B55	15B20 45B50
Istanbul	Tehran	Tehran
Ankara Athinai Thessaloniki Roma Tehran	Shiraz Isfahan Kuwait Bandar Abbass Bahrain Muscat Dubai	Shiraz Mashhad Karachi Ashgabat Baku Yerevan Tashkent
ISTANBUL	SHIRAZ	TEHRAN

UNASSIGNED FREQUENCY

VHF VOLMET

THIS CHART WILL BE PREPARED BASED ON TABLE ATS 2 AND INCLUDED LATER.

~~TABLE ATS 4 - POSSIBLE SST TRACKS~~

~~Designation~~	~~Significant points~~
~~1~~	~~2~~
~~1 a~~	~~[Gulf of Oman] - Singapore-Sydney~~
~~1 c~~	~~Beirut-Bangkok-Tokyo~~

- END -

APPENDIX C

Part VII
SEARCH AND RESCUE (SAR) SERVICES

1. Introduction

1.1 The standards, Recommended Practices and Procedures to be applied are as listed in Part VII -SAR of the basic MID ANP. The material in this Part complements that contained in Part I - BORPC of the MID ANP and should be taken into consideration in the overall planning processes for the MID Region.

1.2 This Part contains a detailed description/list of the facilities and/or services to be provided to fulfil the basic requirements of the Plan and are as agreed between the provider and user States concerned. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. This element of the FASID, in conjunction with the MID Basic ANP, is kept under constant review by the MIDANPIRG in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO Middle East Regional Office, Cairo.

2. Search and rescue facilities

~~[LIM MID (COM/MET/RAC), Rec. 3/8]~~

2.1 FASID Table SAR 1 contains the plan of search and rescue facilities.

Note 1.- The plan of search and rescue regions(SRR) is an element of the basic air navigation plan and is contained in the MID Basic ANP (Doc 9708), Part VII.

Note 2.- Rescue sub-centres (RSCs) are not shown except when located in a State different from that in which the relevant rescue co-ordination centre (RCC) is located.

Note 3.- Facilities listed are the minimum required for SAR purposes and it is recognized that many States have facilities available in addition to those listed.

Note 4.-Facilities listed need not be used exclusively for SAR operations but may be suitably equipped aircraft or ships also used for other missions that can be made available for SAR operations at short notice.

Note 5 - The type of facility listed must be readily available for SAR within its intended area of operation either directly or on a redeployment basis.

FASID TABLE SAR 1 C SEARCH AND RESCUE FACILITIES

*Note 1.*C *The plan of search and rescue regions (SRR) is an element of the basic air navigation plan and is contained in the MID Basic ANP (Doc 9708), Part VII.*

EXPLANATION OF THE TABLE

Column

1 Name of the rescue co-ordination centre (RCC) or rescue sub-centre (RSC) followed by the location of each rescue unit.

2 Minimum requirements for land rescue units (LRU) including mountain rescue units (MRU) and desert rescue units (DRU).

Extra Long Range (ELR): Those aircraft with a radius of action of 2 780 km (1 500 NM) or more, plus 22 hours search remaining.

Very Long Range (VLR): Those aircraft with a radius of action of more than 1 850 km (1 000 NM) plus 22 hours search remaining.

Long Range (LRG): Those aircraft with a radius of action of 1 390 km (750 NM) plus 22 hours search remaining.

Medium Range (MRG): Those aircraft with a radius of action of 740 km (400 NM) plus 22 hours search remaining.

Short Range (SRG): Those aircraft with a radius of action of 280 km (150 NM) plus 2 hour search remaining.

Helicopter (HEL-L): A helicopter suitable for rescue purposes with, in normal circumstances, a radius of action for rescue purposes of up to 185 km (100 NM) and a capacity for evacuating 1 to 5 persons.

Helicopter (HEL-M): A helicopter suitable for rescue purposes with, in normal circumstances, a radius of action for rescue purposes of 185 to 370 km (100 to 200 NM) and a capacity for evacuating 6 to 15 persons.

Helicopter (HEL-H): A helicopter suitable for search and rescue purposes with, in normal circumstances, a radius of action for rescue purposes of more than 370 km (200 NM) and a capacity for evacuating more than 15 persons.

Rescue Boat (RB): Short-range coastal and river craft with a speed approaching 14 knots or better.

Rescue Vessel (RV): Vessel possessing sea-going qualities, long range and reasonable speed. Patrol, customs, pilotage and other craft fulfil the purpose if assigned a high priority for search and rescue operations.

Notes:

1 Coverage by aircraft with shorter range than recommended at LRG range.

2 The Sri Lanka Government can only provide SAR facilities within a 370 km (200 NM) radius of its principal airports.

3 Rescue team.

RCC and rescue units RCC et groupe de sauvetage RCC y brigadas de salvamento	Required rescue facilities Moyens de sauvetage requis Instalaciones de salvamento requeridas
1	2
~~AFGHANISTAN~~ ~~KABUL RCC~~ ~~Kandahar~~ ~~Kabul~~	 ~~MRG~~ ~~HEL-M~~ ~~MRG~~ ~~HEL-M~~
BAHRAIN BAHRAIN RCC Bahrain Doha RSC	 HEL-L RB RV HEL-M RB SRG RV
EGYPT CAIRO RCC Cairo	VLR MRU LRG DRU MRG LRU SRG HEL-L PRU HEL-M HEL-H
Alexandria Luxor Hurghada M. Matruh	HEL-M RB RV HEL-M DRU HEL-M RB DRU RV HEL-M RB DRU RV
EL-Minya El Tor Habata New Valley Ras-Banas Siwa	DRU DRU DRU DRU RB DRU RV DRU
IRAN, ISLAMIC REPUBLIC OF TEHRAN RCC Tehran Bandar Abbass Busherhr Esfahan	 LRG MRU HEL-M LRU HEL-M RB DRU HEL-M RB HEL-M MRU

RCC and rescue units RCC et groupe de sauvetage RCC y brigadas de salvamento	Required rescue facilities Moyens de sauvetage requis Instalaciones de salvamento requeridas
1	2
Kermanshah Mashhad Tabriz Zahedan	DRU HEL-M MRU HEL-M MRU DRU HEL-M MRU HEL-M MRU DRU
IRAQ BAGHDAD RCC Baghdad Kirkuk Shaibah Basrah	 MRG HEL-M HEL-M HEL-M RB RV
~~ISRAEL~~ ~~BEN GURION RCC~~ ~~Eilat~~ ~~Haifa~~ ~~Ben Gurion~~	 ~~RV~~ ~~RV~~ ~~SRG~~ ~~HEL-M~~
JORDAN AMMAN RCC Amman	 MRG RB HEL-M
KUWAIT KUWAIT RCC Kuwait	 LRG RB HEL-M RV
LEBANON BEIRUT RCC Beirut Tripoli **OMAN** MUSCAT RCC	 SRG RV MRU HEL-M RB RB

Kerman	DRU HEL-M MRU
RCC and rescue units RCC et groupe de sauvetage RCC y brigadas de salvamento	Required rescue facilities Moyens de sauvetage requis Instalaciones de salvamento requeridas
1	2
Salalah	MRG RB MRU RV
SAUDI ARABIA	
JEDDAH RCC Jeddah	LRG RB HEL-M
Dammam	HEL-M RB HEL-M LRU
SYRIAN ARAB REPUBLIC	
DAMASCUS RCC Damascus	MRG MRU
Latakia	HEL-M RB RV
UNITED ARAB EMIRATES	
ABU DHABI RCC Abu Dhabi Dubai Fujairah ~~Doha RSC~~	SRG RB HEL-H RB RB ~~HEL-M RB SRG~~ ~~RV~~
YEMEN SANA'A RCC Sana'a	MRG DRU HEL-M
Aden	MRG RV HEL-H
Hodeidah	MRG RV HEL-M
Riyan	MRG RV HEL-H

Muscat	MRG RV DRU ELR MRU LRU
RCC and rescue units RCC et groupe de sauvetage RCC y brigadas de salvamento	Required rescue facilities Moyens de sauvetage requis Instalaciones de salvamento requeridas
1	2

- END -