

## EUR ANP, VOLUME II

### PART III – COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

#### 1. INTRODUCTION

1.1 This part of the EUR ANP, Volume II, complements the provisions in ICAO SARPs and PANS related to communication, navigation and surveillance (CNS). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of CNS facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300); and mandatory requirements related to CNS facilities and services to be implemented by States in accordance with regional air navigation agreements. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified.

#### 2. GENERAL REGIONAL REQUIREMENTS

##### Communications

##### *Aeronautical Fixed Service (AFS)*

2.1 The aeronautical fixed service should comprise the following systems and applications that are used for ground-ground (i.e. point-to-point and/or point-to-multipoint) communications in the international aeronautical telecommunication service:

- a) ATS direct speech circuits and networks;
- b) meteorological operational circuits, networks and broadcast systems, including World Area Forecast System – Internet File Service (WIFS) and/or Secure Aviation Data Information Service (SADIS);
- c) the aeronautical fixed telecommunications network (AFTN);
- d) the common ICAO data interchange network (CIDIN);
- e) the air traffic services (ATS) message handling services (AMHS); and
- f) the inter-centre communications (ICC).

2.2 To meet the data communication requirements, a uniform high-grade aeronautical network should be provided, based on the aeronautical telecommunication network (ATN), taking into account the existence and continuation of current networks.

2.3 Contingency procedures should be in place to ensure that, in case of a communication centre breakdown, all the parties concerned are promptly informed of the prevailing situation. All possible arrangements should be made to ensure that, in case of breakdown of a communications centre or ~~circuit~~connection, at least high-priority traffic continues to be handled by appropriate means.

2.4 AFS planning should permit flexibility in detailed development and implementation. Information related to User Agents, The required AFTN Stations and COM Centres can be found in the ATS Messaging Management Centre (AMC). International connections between COM Centres are listed in the AFTN/CIDIN/AMHS Plan in **Table CNS II-1**, available at:

[www.icao.int/EURNAT/EUR/NAT-Documents](http://www.icao.int/EURNAT/EUR/NAT-Documents)

##### *The Aeronautical Telecommunication Network (ATN)*

2.5 The ATN should be able to:

- a) support applications carried by the existing networks;
- b) support gateways enabling inter-operation with existing networks; and
- c) support ground-ground communications traffic associated with air-ground data link applications.

2.6 The ATN should make optimum use of dedicated bilateral/multilateral aeronautical links and other communication means commensurate with the operational Quality of Service (QoS) requirements.

2.7 The implementation of the ATN should take into account the need for cost-effective evolution in terms of network capacity, requirements and time-frame and allow for a progressive transition from existing communication networks and services to a uniform, harmonised and integrated communications infrastructure, capable of supporting the implementation of future aeronautical services such as Flight and Flow Information in a Collaborative Environment (~~FE~~-FICE), System-Wide Information Management (SWIM) applications, etc.

2.8 In case means other than dedicated bilateral links are used by the ATN, States should ensure that service level agreements (SLA) are met in terms of implementation priority, high availability, priority in restoration of service and appropriate levels of security.

2.9 The ATN should provide ~~for~~ interregional connections to support data exchange and ~~mobile~~ routing within the global ATN.

2.10 In planning the ATN, provisions should be made, where required, for interfacing with other international networks.

#### *Network services*

2.11 The Internet Society (ISOC) communications standards for the Internet Protocol Suite (IPS) should be used for the implementation of AMHS.

2.12 The migration from legacy bit-oriented protocols such as X.25 Protocol suite to IPS should be ~~planned~~pursued.

2.13 The migration of international or sub-regional ground networks to the ATN based on ~~Internet Protocol (IPS)~~ to support AFS communication requirements, while reducing costs, should be ~~planned~~considered.

2.14 States should ensure that the solutions provided for the implementation of the ATN meet the air traffic management and aeronautical fixed service requirements. Such requirements should consist of:

- a) Performance requirements: availability, continuity, integrity, monitoring and alerting criteria per data flow. In the case where a required communication performance (RCP) is globally prescribed, requirements derived from RCP should be stated;
- b) Interoperability requirements;
- c) Safety and security requirements, duly derived after the identification of operational hazards and threats, and allocation of objectives; and
- d) Implementation process requirements (creation, test, migration, upgrades, priority in restoration of service, termination).

#### *Network management*

2.15 An ICAO centralised off-line network management service is provided to participating AFTN/AMHS centres in the EUR Regions under the ATS Messaging Centre (AMC).

2.16 In the case of integrated communications services procured and shared by several States, organizational provisions should allow for the planning and performing of the management of technical performance, network configuration, fault, security, cost division/allocation, contract, orders and payment.

*Specific air traffic management (ATM) requirements*

2.17 Where ATS speech and data communication links between any two points are provided, the engineering arrangements should be such as to avoid the simultaneous loss of both circuits. The required ATS direct speech circuits plan is detailed under **Table CNS II-3**, available at:

[www.icao.int/EURNAT/Pages/EUR&NATDocuments](http://www.icao.int/EURNAT/Pages/EUR&NATDocuments)

2.18 Special provisions should be made to ensure a rapid restoration of ATS speech circuits in case of outage, as derived from the performance and safety requirements.

2.19 Data circuits between ATS systems should provide for both high capacity and message integrity.

2.20 The Inter-Centre Communication (ICC), consisting of ATS Inter-facility Data Communication (AIDC) application and the Online Data Interchange (OLDI) application, should be used for automated exchange of flight data between ATS units to enhance the overall safety of the ATM operation and increase airspace capacity.

2.21 Where Voice over IP is planned or implemented between ATS units for voice communications, it should meet the ATS requirements. ~~When data and voice are multiplexed, particular attention should be paid to the achievement of the ATM performance and safety requirements.~~

2.22 When services share same infrastructure, particular attention should be paid to the achievement of the ATM performance and safety requirements.

*Specific meteorological (MET) requirements*

~~2.22-23~~ The ~~increasing use of the GRIB (Gridded Binary or General Regularly distributed Information in Binary form) and BUFR (Binary Universal Form for the Representation of meteorological data) code forms for the dissemination of the upper wind and temperature and significant weather forecasts and the planned transition to digital form using extensible markup language (XML)/geography markup language (GML) for the dissemination of OPMET data should be taken into account in the planning process of the ATN.~~

~~2.23-24~~ In planning the ATN, account should be taken of changes in the current pattern of distribution of meteorological information resulting from the increasing number of long-range direct flights and the trend towards centralized flight planning.

*Specific aeronautical information management (AIM) requirements*

~~2.24-25~~ The aeronautical fixed service should meet the requirements to support efficient provision of aeronautical information services through appropriate connections to area control centres (ACCs), flight information centres (FICs), aerodromes and heliports at which an information service is established.

*Aeronautical Mobile (Route) Service (AM(R)S)*

~~2.25-26~~ 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.

~~2.26-27~~ Whenever required, use of suitable techniques on VHF or higher frequencies should be made.

~~2.27-28~~ Aerodromes having a significant volume of International General Aviation (IGA) traffic should also be provided with appropriate air-ground communication channels.

#### *Air-Ground Data Link Communications*

~~2.28-29~~ A Strategy for the harmonised implementation of the data link communications in the EUR Region should be developed based on the Global Operational Data Link Document (GOLD) adopted by ICAO Regions and the Aviation System Block Upgrade (ASBU) methodology.

~~2.29-30~~ Where applicable, controller-pilot data link communications (CPDLC), based on ATN VDL data link Mode 2 (VDL2) and/or FANS-1/A, should be implemented for air-ground data link communications.

~~2.30-31~~ Partial or divergent aircraft data link evolutions that result in excluding messages from aircraft systems should not be pursued. Interim steps or phases toward full implementation of the common technical definition in ground systems should only be pursued on a regional basis, after coordination between all States concerned.

~~2.31-32~~ Harmonization of operational procedures for implementation of the above packages is essential. States, Planning and Implementation Regional Groups (PIRGs) and air navigation services providers should adopt common procedures to support seamless ATS provision across FIR boundaries, rather than each State or Region developing and promulgating unique procedures for common functions.

#### *Required Communication Performance (RCP)*

~~2.32-33~~ The Required Communication Performance (RCP) concept characterizing the performance required for communication capabilities that support ATM functions without reference to any specific technology should be applied wherever possible.

~~2.33-34~~ States should determine, prescribe and monitor the implementation of the RCP in line with the provisions laid down in the *Performance Based Communication and Surveillance (PBCS) Manual* (Doc 9869).

### **Navigation**

#### *Navigation Infrastructure*

~~2.34-35~~ The navigation infrastructure should meet the requirements for all phases of flight from take-off to final approach and landing.

*Note: Annex 10 to the Convention on International Civil Aviation—Aeronautical Telecommunications, Volume I—Radio Navigation Aids, Attachment B, provides the strategy for introduction and application of non-visual aids to approach and landing.*

~~2.35-36~~ The EUR PBN Regional Roadmap/Plan provides guidance to air navigation service providers, airspace operators and users, regulators, and international organizations, on the expected evolution of the regional air navigation system in order to allow planning of airspace changes, enabling ATM systems and aircraft equipage. It takes due account of the operational environment of the EUR Region.

#### *PBN Transition Strategy*

~~2.36-37~~ During transition to performance-based navigation (PBN), sufficient ground infrastructure for conventional navigation systems should remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip appropriately to attain a performance level equivalent to PBN. States should approach removal of existing ground infrastructure with

caution to ensure that safety is not compromised. This should be guaranteed by conducting safety assessments and consultations with the users.

#### *Use of specific navigation aids*

2.37-38 Where, within a given airspace, specific groups of users have been authorized by the competent authorities to use special aids for navigation, ~~the~~ the respective ground facilities should be located and aligned so as to provide for full compatibility of navigational guidance with that derived from the SARPs.

2.3839 States should ensure and oversee that service providers take appropriate corrective measures promptly whenever ~~required by~~ a significant degradation in the accuracy of navigation aids (either space based or ground based or both) is detected.

#### **Surveillance**

2.40 Aeronautical surveillance systems constitute An an important element of modern air navigation infrastructure required to manage safely increasing levels and complexity of air traffic ~~is aeronautical surveillance systems.~~

2.41 When operating Mode S radars, States should coordinate with their respective ICAO Regional Office the assignment of their corresponding interrogator identifier (II) codes and surveillance identifier (SI) codes, particularly where areas of overlapping coverage will occur.

#### **Frequency Management**

##### *Aeronautical Mobile Route Service (AM(R)S)*

2.42 Frequencies should be assigned to all VHF aeronautical mobile route service (AM(R)S) facilities in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II, and take into account:

- a) agreed geographical separation criteria based on 25 kHz or 8.33 kHz interleaving between channels for the implementation of voice services;
- b) agreed geographical separation criteria for the implementation of VDL services;
- c) the need for maximum economy in channel frequency demands and for maximum efficiency in radio spectrum utilization; and
- d) the planning requirement ~~a deployment of frequencies which ensures~~ that international services ~~are planned to~~ be free of interference from other services using the same band.

2.43 The priority order to be followed in the assignment of frequencies to service is:

- a) ATS channels serving international services (ACC, APP, TWR, FIS);
- b) ATS channels serving national purposes;
- c) channels serving international VOLMET services;
- d) channels serving ATIS and PAR; and
- e) channels used for other than ATS purposes.

2.44 The criteria used for frequency assignment planning for VHF AM(R)S facilities serving international requirements should, to the extent practicable, also be used to satisfy the need for national VHF AM(R)S facilities.

2.45 Special provisions should be made, by agreement between the States concerned, for the sharing and the application of reduced protection of non-ATS frequencies in the national sub-bands, so as to obtain a more economical use of the available frequency spectrum consistent with operational requirements.

2.46 States should ensure that no air/ground frequency is utilized outside its designated operational coverage and that the designation of operational coverage of any given frequency can be met with operational coverage and that the stated operational requirements for coverage of a given frequency can be met for the transmission sites concerned, taking into account terrain configuration.

#### *Radio navigation aids for Aeronautical Radio Navigation Services (ARNS)*

2.47 Frequencies should be assigned to all radio navigation facilities taking into account agreed geographical separation criteria based on 50 KHz channel spacing for ~~to~~ ILS localizer and VOR and on 25 KHz channel spacing for GBAS, as well as the use of X and Y channels ~~to~~ for DME, in accordance with the principles laid out in Annex 10, Volume V and *ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) Volumes I and II. Also, the need for maximum economy in frequency channel demands and for maximum efficiency in radio spectrum utilization in conjunction with the planning requirement and a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band, need have to be considered.

2.48 The principles used for frequency assignment planning for radio navigation aids serving international requirements should, to the extent possible, also be used to satisfy the needs for national radio aids to navigation.

#### *Support to ICAO Positions for ITU World Radiocommunication Conferences (WRCs)*

2.49 Considering the importance and continuous demand of the radio frequency spectrum and for the protection of the current aeronautical spectrum and the allocation of new spectrum for the new services and system to be implemented in civil air navigation, States and international organizations are to support ICAO's position at ITU World Radiocommunication Conferences (WRCs) and in regional and other international activities conducted in preparation for ITU WRCs.

*Note: The Handbook on Radio Frequency Spectrum Requirements for Civil Aviation (Doc 9718) Volume I, contains ICAO policy statements relevant to the aviation requirements for radio frequency spectrum. The handbook is intended to assist States and ICAO in preparing for ITU WRCs.*

### **3. SPECIFIC REGIONAL REQUIREMENTS**

#### **Communication**

##### ***Network services***

3.1 The Transmission Control Protocol/Internet Protocol (TCP/IP) communication protocol should be used for the initial implementation of AMHS. [EANPG Conc. 44/45]

3.2 The migration of flight data exchange (OLDI) from X.25 to TCP/IP should be pursuedplanned.

3.3 The migration of international or regional ground networks to the EUR-ATN network based on internet protocol (IP) to support AFS communication requirements, while reducing costs, should be plannedconsidered.

##### ***Network management***

3.4 A centralised off-line network management service is provided to participating AFTN ~~/CIDN~~/AMHS centres in the EUR Region. [EANPG Conc. 45/10]

##### ***Multinational System Addressing***



3.5 The EU addressing indicator is reserved in *Location Indicators* (Doc 7910) for use by multinational systems in the ICAO European Region to allow multinational systems to retain the same addressing indicator, irrespective of which State or States the service is operated from. This enables the physical location of the service to be independent of the address used. The ICAO EUR/NAT Regional Director is the focal point for proposed changes to the EU addressing indicator in Doc 7910.

3.6 The use of the EU indicator needs to be carefully managed to ensure that the primary purpose of the addressing indicator, which is to enable the AFTN addressing system, is not compromised. Therefore, the following basic rules should be applied:

- i) only State groupings within the EUR Region that are providing multinational services can be considered as being eligible to use EU;
- ii) there must be clear operational and/or institutional needs for an allocation;
- iii) there must be an assessment of implications, and
- iv) assignments are to be formulated in accordance with the requirements of Doc 7910. The 3rd and 4th letters of an EU allocation will identify the function of the system. The 5th to 8th letters will be assigned in accordance with the requirements of Doc 8585, in close co-ordination with the EANPG COG.

3.7 The ICAO Regional Director of the EUR/NAT Office should consider a request for an EU allocation in ICAO Doc 7910 only when the above requirements are met.

#### ***Required Communication Performance (RCP)***

3.8 The RCP concept characterizing the performance required for communication capabilities that support ATM functions without reference to any specific technology should be applied wherever possible.

3.9 The States should determine, prescribe and monitor the implementation of the RCP in line with the provisions laid down in the *Performance Based Communication and Surveillance (PBCS) Manual* (Doc 9869).

### **Navigation**

#### **Performance-Based Navigation** ~~THE EUR PBN IMPLEMENTATION ROADMAP~~

##### *Principles of PBN Implementation*

3.10 The broad principles for PBN Implementation derived from the operational requirements of the EUR Region and the concepts and strategies ~~discussed above~~ are:

- a) the Navigation Application and Infrastructure Strategy is required to meet the requirements detailed in the ICAO Global ATM Operational Concept ([Doc 9854](#)) and the PBN Manual ([Doc 9613](#)). ~~As such, the Roadmap lays the foundations for achieving the goals of User Preferred Trajectories together with improved access, safety and reduced environmental impact targets;~~
- ~~a)~~ b) availability of both satellite and ground based infrastructure to maximize resilience and robustness of aircraft navigation by processing complementary navigation signals on-board;
- c) GNSS becomes the primary means of navigation, [evolving from single-frequency GNSS to dual-frequency multi-constellation \(DFMC\) GNSS \(including augmentations\) for enhanced performance and robustness](#) ~~to the degree that this can be demonstrated to be safe and cost effective; and~~

- ~~b)~~d) retention of a minimum operational network (MON) conventional navaid infrastructure in support of GNSS contingencies, so as to ensure availability of complementary means of navigation;
- ~~e)~~ given that ~~satellite-based~~ Navigation systems increasingly co-exist/integrate with ~~satellite-based~~ Surveillance and Communication systems-services, the ~~Roadmap~~ PBN implementation should takes due account of all ATM/CNS components-, to enable systemic resilience in the event of GNSS loss/degradations; and
- ~~e)f)~~ States should publish and keep relevant information about their PBN transition plans up-to-date.

3.11 The application of these principles shall:

- a) identify and evolve from the needs and priorities of both users and air navigation service providers ~~of the navigation systems and/or services;~~
- b) provide tangible and early benefits for the users;
- c) ensure that infrastructure planning takes system/component lifecycle into account to avoid unnecessary capital expenditures ~~safeguard capital investments, necessary to maintain the existing infrastructure and future rationalisation plans;~~
- d) take due account of sub-regional institutional arrangements and regulations;
- e) accommodate geographical differences in capabilities, performance requirements and infrastructure;
- f) enable coherent development plans within the EUR region and ensure an appropriate interface to the adjacent regions; and
- g) ~~accept~~ accommodate the continued operations of aircraft with lower navigation capabilities for as long as operationally feasible.

### Benefits

Note: ICAO Performance-Based Navigation Manual (DOC 9613), Paragraph 1.1.2 details benefits gained from PBN implementation.

3.12 ~~The following are the benefits expected to be derived by the implementation of PBN:~~

- ~~a) improved safety, efficiency and reduced environmental impact through the implementation of continuous and stabilized descent procedures using vertical guidance accompanied by the gradual elimination of Non Precision Approaches by 2016;~~
- ~~b) implementation of more flexible and precise approach, departure, and arrival paths that will reduce dispersion and will enable improved airspace design fostering increased capacity;~~
- ~~c) flight efficiency by the extension of RNAV applications allowing for more optimised trajectories;~~
- ~~d) increased capacity through implementation of additional parallel routes and additional arrival and departure points in terminal areas;~~
- ~~e) increase capacity through reduction of lateral and longitudinal separation enabled by RNAV and RNP;~~
- ~~f) reduced environmental impact resulting from savings in fuel and through noise reduction by the improved placement of routes using RNAV and RNP;~~



- ~~g) mission effectiveness improved through the accommodation of aircraft with lower navigation capability for as long as operationally feasible;~~
- ~~h) improved airport access through provision of APV and RNP APCH or RNP AR APCH;~~
- ~~i) decrease ATC and pilot workload by utilizing RNAV/RNP procedures and airborne capability and reduce the needs for ATC Pilot communications and radar vectoring; and~~
- ~~j) interoperability with other ICAO regions.~~

### **~~PBN Applications~~APPLICATIONS**

Note: States are responsible for developing regulations and rules on the performance-based navigation. Operators must comply with the regulations promulgated by relevant States when operating PBN procedures. EU Regulation 2018/1048 requires the implementation of PBN in the single European sky. It offers common airspace usage requirements and operating procedures concerning PBN. The Regulation is directly applicable in the European Union (EU) Member States, as well as in other European States with which the EU has signed binding agreements that require compliance with EU legislation in the field of civil aviation or its transposition into national law, e.g., European Economic Area (EEA), European Free Trade Area (EFTA), and the European Common Aviation Area (ECAA) Agreements. Such Agreements extend the applicability of the Regulation to Norway, Switzerland, Iceland, Moldova and the Western Balkans.

#### *En Route Operations*

~~3.13 For en route operations the application of RNAV 5 is mandated in designated parts of the ICAO EUR Region.~~

~~3.14 The ICAO EUR Region is characterized by diverse air traffic volumes and densities, operational requirements and CNS/ATM capabilities. This emanates partly from the fact that the EUR Region includes high density continental and low density remote continental areas. Therefore a single RNAV/RNP navigation specification may not meet operational requirements of the whole EUR Region and different navigation applications may be applied by different homogeneous ATM areas.~~

#### *TMA Operations*

~~3.15 Requirements for TMA operations have their own characteristics, taking into account the applicable separation minima between aircraft and between aircraft and obstacles. It also involves the diversity of aircraft, including low performance aircraft flying in the lower airspace and conducting arrival and departure procedures on the same path or close to the paths of high performance aircraft.~~

~~3.16 The mix of traffic differs remarkably between airports. Different capabilities of aircraft using an airport, together with airspace restrictions which can prevent the introduction of special RNAV/RNP routes, may result in constraining the possibility of an airport to introduce RNAV or RNP operations. Therefore, it is possible that airports situated within the same TMA could have differing capabilities to introduce PBN operations.~~

~~3.17 As a result, States should develop their own national plans for the implementation of PBN in TMAs, based on the PBN Manual, seeking the harmonization of the application of PBN and avoiding the need for multiple operational approvals and applicable aircraft separation criteria.~~

~~3.18 The following PBN strategy was agreed in the ICAO EUR Region:~~

- ~~a) implementation of any RNAV or RNP application shall be in compliance with ICAO PBN Manual (Doc 9613);~~
- ~~a) recognizing that B-RNAV/P-RNAV can be regarded as equivalent to RNAV5/RNAV1, as defined in the ICAO PBN Manual, their use will be continued for en route and terminal applications at least until 2015;~~

- ~~b) the target date for the completion of implementation for the Approach procedures with vertical guidance (APV) (APV/Baro VNAV and/or APV/SBAS) for all instrument runway ends is 2016;~~
- ~~e) replacement of RNAV5/RNAV1 (B RNAV/P RNAV) specification by RNP specifications (e.g. Basic RNP 1 and advanced RNP) for the use in the en-route and terminal airspace to commence by 2015.~~

*Note: ICAO PBN Manual compliant terms, e.g. RNAV 1 and RNAV 5, shall be implemented for all new aeronautical information publications and as an update to existing publications (i.e. initially published before end of 2014). (EANPG/Conclusion 50/14 refers).*

#### *Instrument Approaches*

~~3.19 States should introduce PBN approaches that provide Vertical Guidance to enhance safety. These should be based on APV, Baro VNAV and/or Space Based augmentation Systems (SBAS) where possible. Conventional approach procedures and conventional navigation aids should be maintained to support non-equipped aircraft during the transitional period.~~

~~3.20 With the expected reduction and subsequent removal of VOR and NDB it is expected that conventional Non Precision Approaches (NPA) will have to be withdrawn by 2025. States should make clear their own individual plans in order to assist operators in their planning for the transition to PBN.~~

#### **~~NAVIGATION INFRASTRUCTURE~~ Navigation Infrastructure**

3.12 The ongoing transition to a PBN environment requires changes to the ground-based and application of satellite-based navigation infrastructure up to 2030. The requirements for navigation infrastructure described hereafter address all phases of flight.

3.13 A PBN environment implies generalised use of GNSS, as other navigation sensors may not be able to support the applicable navigation specification, due to performance limitations of the technology or the necessary coverage not existing. For instance, GNSS may be the only choice for RNAV routes in those areas where suitable DME coverage cannot be achieved, such as low flight levels in terrain constrained areas; on the other hand, PBN approaches need GNSS mandatorily.

3.14 GNSS sensors will be necessary for all General Air Traffic (GAT) operations. Multi-sensor RNAV or RNP systems, e.g., integrating DME, Inertial navigation sensors inputs, or other solutions ensuring a level of safety commensurate to the type of operations, may be foreseen to overcome loss of GNSS signals in order to meet the operational requirements. Complementary equipage using ground-based navigation aids could be planned.

Note 1: Assembly Resolution 41-8, Appendix C (Ensuring the resilience of ICAO CNS/ATM systems and services) encourages transition towards optimized, secure CNS systems based on complementary integration of suitable and independent aircraft capabilities, satellite- and ground-based infrastructure which maximize resiliency and robustness to any type of interference.

Note 2: GNSS can suffer intentional and unintentional service disruptions, primarily, due to the low power of GNSS signals, which can be easily subject to radio-frequency interference (RFI). Signals can also be spoofed by attackers, who intend to alter the signals and introduce errors.

Note 3: In the last years, four different GNSS constellations have become operational globally, namely, GPS-USA, GLONASS-Russia, GALILEO-EU and BeiDou/BDS-China. Apart from performance enhancements, DFMC makes GNSS more robust to attacks and natural signal disruptions. This will allow for an increased reliance on GNSS once dual frequency and multi-constellation (DFMC) equipment is installed on aircraft.

Note 4: Research and development of complementary position, navigation and timing solutions (C-PNT) should progress in order to enable an alternative to existing GNSS technologies in the future.

3.15 Counting on a total RNAV environment with appropriate sensor robustness and redundancy requires enhancing DME coverage and ensuring the quality of GNSS signal, as well as the improvement of service quality for en-route and terminal operations. This should be achieved mainly by optimizing the overall DME network at national and international level, repositioning some of the existing facilities and/or deploying additional DMEs if necessary (with regards to spectrum optimization). VORs can be used as complementary sensors for supporting En-route operations in combination with DMEs.

Note: RNAV 1 infrastructure assessment guidance material (EUROCONTROL Guidelines for RNAV 1 Infrastructure Assessment) can be used to aid in the assessment of DME-DME network requirements for RNAV 1 and RNAV 5 procedures.

3.16 DME performance is expected to be upgraded with a view to supporting RNP applications, in particular, RNP 1 arrival and departure procedures, thus providing an alternative to GNSS.

3.17 The availability of SBAS and several GBAS stations in the EUR Region allows to improve GNSS performance, particularly, the integrity of the navigation service, but also the accuracy. In addition, SBAS and GBAS enable the implementation of approach procedures with vertical guidance, offering a potential alternative to CAT I ILS.

Note 1: European Geostationary Navigation Overlay Service (EGNOS; EU's SBAS) currently augments the GPS L1 signal (EGNOS V2) and enables the implementation of approach procedures down to LPV minima in accordance with the RNP APCH specification. DFMC EGNOS (EGNOS V3) will be in service at the end of the period enhancing the overall service performance and resilience. Minima differ depending on the EGNOS service area:

- a) APV -I service area, where LPV minima can be as low as 250 ft;
- b) LPV-200 service area, where LPV minima correspond to CAT I precision approaches, i.e., as low as 200 ft minimum.

In the European Union, the European Union Aviation Safety Agency (EASA) is the authority for the oversight of the provider of the EGNOS. Use of the service by equipped aircraft requires an agreement between the EGNOS service provider and the local service provider in charge of the implementation of procedures.

Note 2: Single-frequency GBAS are already deployed to augment one or two GNSS constellations, though the technology will evolve to support DFMC as well. Single-frequency GBAS currently supports CAT I and even CAT II approach operations in some EUR States. In the future, single-frequency GBAS will also support CAT II/III operations and it is expected that DFMC GBAS will enable more robust CAT II/III operations in the whole EUR Region.

3.18 Within the EGNOS LPV-200 service area, SBAS CAT I (GPS L1) could become the primary means in replacement of ILS CAT I. Inside and outside this area, GBAS/GPS and/or GLONASS remains an option, depending on local business cases. ILS CAT I will keep being used extensively until the end of the period (2030). The rationalization of CAT I ILS and its integration into the MON to cope with GNSS contingencies will depend on the exposure to GNSS jamming and spoofing, as well as the resulting operational risks.

Note – Runways presently not served with conventional precision approach procedures may consider SBAS to enable them (if within the LPV-200 service area), provided that the relevant aerodrome infrastructure is upgraded accordingly, e.g., airport lighting systems.

3.19 ILS will probably remain the primary means for CAT II/III operations beyond the end of this period (2030) and beyond. It is expected that CAT II/III GLS (GBAS/DFMC) will become available for use

in the future. With the increased equipage of aerodromes with GBAS ground station and aircraft with GLS capability, CAT II/III ILS would then start to be retained as part of the MON to address GNSS availability issues (e.g., jamming or space weather activity).

3.20 Development and deployment of DFMC technologies is underway, which is expected to enhance GNSS and existing types of augmentation systems, which in turn will allow the support of more stringent/performant operations also due to improvements in robustness and resilience.

3.21 The optimisation of the navigation infrastructure during the transition to a GNSS environment should allow the rationalization of conventional navigation aids, which will result in operational and maintenance savings and frequency spectrum optimization. However, a sufficient MON of conventional navigation aids should be retained to ensure secure, safe, resilient and robust operations and support legacy and any contingency procedures.

3.21 The requirements for navigation infrastructure described hereafter address all phases of flight.

### En-route and TMA

#### 2010-2015

3.22 Transition to a total RNAV environment requires enhancing DME coverage and/or ensuring the quality of GNSS signal, as well as the improvement of service quality for en-route and terminal operations. This should be achieved mainly by deploying additional DMEs and certifying GNSS service providers in part of the EUR Region. Repositioning some of the existing facilities might be needed, as required by decommissioning of VORs.

3.23 P RNAV infrastructure assessment guidance material (EUROCONTROL Guideline for P RNAV Infrastructure Assessment) has been developed and can be used to aid in assessment of DME DME network requirements.

3.24 Decommissioning of NDBs and reduction of the number of VORs take place due to a progressive reduction of conventional routes and procedures. During this transition, a sufficient backbone of conventional navigation aids should exist to support the remaining non RNAV routes. This remaining infrastructure should also support the existing conventional approach procedures. At the same time, it will also allow ATC to re-route aircraft in the event of individual aircraft RNAV failure.

3.25 In the European Union the European Aviation Safety Agency (EASA) is the authority for the oversight of the provider of the European Geostationary Navigation Overlay Service (EGNOS). Equipped aircraft will be authorized to use EGNOS within its area of coverage and within the limits of its declared performance after the certification of the relevant Navigation Service Provider (NSP).

#### 2015-2020

3.26 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.

3.27 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.

~~3.28 Galileo and enhanced GPS should become available during the 2015-2020 timeframe. This will allow for an increased reliance on GNSS once dual constellation and dual frequency equipment are installed in aircraft and experience is built up on Galileo operation.~~

~~3.29 The existence of a total RNAV environment should allow further removal of VORs and NDBs, as well as further removal of unnecessary avionics.~~

#### ~~Beyond 2020~~

~~3.30 In this time frame, a multi constellation and multi frequency GNSS environment is expected. This will provide an adequate level of GNSS service in terms of robustness and performance.~~

~~3.31 These GNSS enhancements should reduce significantly the probability of having a GNSS failure and would reduce the extent of an alternative reversion. They should also allow for a reduced DME network enough to support the back-up requirement.~~

~~3.32 The existence of a total RNAV environment should allow for an almost total removal of VORs.~~

#### ~~Approach and Landing~~

##### ~~2010-2015~~

~~3.33 Instrument Landing System (ILS) remains during this period the prime source of guidance for precision approaches and landings in the EUR and continues to support all categories of airspace users.~~

~~3.34 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 limited availability of Cat II/III GLS based operations (using an augmented GPS/GBAS capability of on board systems) at runways with Cat II/III lighting. This might increase the potential use of GBAS as a back up to ILS in case of maintenance/system failures.~~

~~3.35 NPAs (both conventional and RNAV) are gradually being replaced by Approaches Procedures with Vertical Guidance (APV), based on either SBAS or Baro VNAV, in accordance with the A37-11 resolution. This is expected to be completed during the period 2015-2020 with the provision of APV to all IFR runway ends, including those mainly used by general aviation. The prioritization of RNP APCH implementation in the ICAO EUR Region will be done as follows (EASPG Statement 55/1 refers):~~

- ~~a) implement APV Baro VNAV or LPV procedures:~~
  - ~~i) at instrument runways served only by procedures based on NDB; and~~
  - ~~ii) as replacements to all non-precision approach procedures~~

~~Note: Whenever LPV is available, a Baro VNAV should be provided too, as practicable~~

- ~~b) implement APV as back up to precision approaches procedures.~~

~~3.36 Runways presently not equipped with Precision Approach and Landing systems may consider SBAS (e.g. LPV down to 200 ft DH) or Cat I GLS (GBAS/GPS) systems associated with airport lighting systems upgrades as needed.~~

~~3.37 Some CAT I ILSs may be replaced by SBAS APV or CAT I GLS. Business cases to justify such changes depend upon the EGNOS NSP certification, the number of procedures published in the AIPs,~~

~~nature of traffic, the capability of SBAS to serve multiple runway directions at a single aerodrome and the availability of aircraft with certified GNSS based approach and landing systems.~~

~~3.38 — 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~~

~~3.39 — ILS remains the prime source of guidance for precision approaches and landings in the EUR Region. MLS, Cat I GLS and LPV 200 continue to be introduced or maintained where required.~~

~~3.40 — 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.~~

~~3.41 — 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 an increased number of applications in those places where RNP operations cannot be undertaken using RNP APCH procedures.~~

#### ~~Beyond 2020~~

~~3.42 — ILS should remain a significant source of guidance for precision approaches and landings in Cat II/III.~~

~~3.43 — MLS, Cat I GLS and LPV 200 should continue to be introduced where required.~~

~~3.44 — An increased number of GLS equipped aircraft 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 an extensive decommissioning of ILS CAT I systems, based on a positive business and safety case.~~

~~3.45 — ILS Cat II/III should be retained to provide backup for GLS to address GLS availability issues (deliberate jamming and solar activity) where and when justified. If ILS is not available, requirement for RNP APCH/LPV/GBAS should be established.~~

~~3.46 — An increased number of aircraft (including general aviation) equipped with combined GPS/Galileo/SBAS receivers will lead to the introduction of LPV procedures at all IFR runway ends.~~

~~3.47 — The application of RNP AR APCH should continue to increase where RNP operations cannot be undertaken using RNP APCH procedures.~~

#### ~~Transition Strategy~~

~~3.48 — During the transition to a PBN environment, sufficient ground infrastructure to ensure conventional navigation must remain available. Before removing ground infrastructure, users should be given reasonable transition time to install appropriate airborne equipment able to meet the PBN requirements. States should approach removal of existing ground infrastructure with caution to ensure that safety is not compromised. This could be guaranteed by performance of safety assessments and consultations with the users.~~

~~3.49 — States should cooperate on a multinational basis to implement PBN in order to facilitate a seamless and inter-operable environment and undertake coordinated R&D programs on PBN implementation and operation.~~

~~3.50 — States are encouraged to consider catering for traffic according to navigation capability and granting benefits to aircraft with better navigation performance, taking due consideration of the needs of State/Military aircraft.~~



~~3.51 States should encourage operators and other airspace users to equip with PBN capable avionics. This can be achieved through early introductions of RNP approaches, preferably those with vertical guidance.~~

### ~~Safety Documentation & Monitoring Requirements~~

#### ~~Need to document safety assessment~~

~~3.52 To ensure that the introduction of PBN is undertaken in a safe manner in accordance with relevant ICAO provisions, implementation shall only take place following the conduct of a documented safety assessment to demonstrate that an acceptable level of safety will be met. Additionally, ongoing periodic safety reviews should be undertaken where required in order to establish that operations continue to meet the target level of safety.~~

#### ~~Use of specific navigation aids~~

~~3.53 Where, within a given airspace, a group of users has been authorized to use special aids for navigation by the competent authorities, the respective ground facilities should be located and aligned in such a way to ensure full compliance with ICAO Annex 10 provisions.~~

~~3.54 States should ensure and oversee that Navigation Service Providers (i.e. providers of the navigation signals in space) take appropriate corrective measures promptly whenever a significant degradation in the accuracy of navigation aids (either space based or ground based or both) is detected.~~

## **SURVEILLANCE****Surveillance**

### ***Planning Considerations***

~~3.5522~~ The ICAO European Region is currently characterized by the use of the following surveillance systems:

- a) Secondary Surveillance Radars (SSR) Mode A, C and S in terminal and en-route continental airspace;
- b) Primary Surveillance Radars (PSR) primarily in terminal airspace;
- c) Automatic Dependent Surveillance – Broadcast (ADS-B) and Wide Area Multilateration (WAM).
- d) Automatic Dependent Surveillance – Contract (ADS-C) in some parts of the oceanic and remote continental airspace.

~~3.5623~~ In order to meet the evolving operational requirements foreseen by 2020, the following surveillance infrastructure guiding principles had been agreed in the EUR Region:

- a) an independent surveillance system to track non-cooperative targets where and when required. This will be provided by PSR unless and until an alternative solution is required and developed;
- b) an independent surveillance system to track co-operative targets. This can be enabled by SSR Mode A/C or SSR Mode S or Wide Area Multilateration;
- c) dependant co-operative surveillance based upon ADS-B providing positional data of suitable quality. The common, internationally agreed technical enabler for this type of surveillance is 1090 MHz Extended Squitter based ADS-B data link. ADS-C in remote and oceanic areas only;
- d) since aircraft will be equipped with Mode S and ADS-B systems, the choice of cooperative surveillance technology (Mode S, ADS-B, Multilateration) remains flexible, the service

- provider will determine the best solution for their particular operating environment, based on cost and performance;
- e) an increasing use of ADS-B and/or Airport Multilateration at aerodromes is also foreseen and, particularly, the use of the Advanced Surface Movement Guidance and Control System (A-SMGCS). Surface Movement Radars will provide Independent Non-Cooperative airport surveillance; and
  - f) an increased use of surveillance data on-board of 'ADS-B IN' equipped aircraft will support Air Traffic Situational Awareness (ATSA) and spacing applications and later separation applications. This also allows for increased delegation of responsibility for separation to the flight crew.

~~3.5724 In the European Union, amended Commission Implementing Regulation (EU) 2017/373 lays down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, and amended Commission Implementing Regulation (EU) 2023/1770 lays down provisions on aircraft equipment required for the use of the Single European Sky airspace and operating rules related to the use of the Single European Sky airspace. In the European Union, Regulation (EU) No 1207/2011, as amended by Implementing Regulation (EU) No 1028/2014, lays down the requirements for the performance and interoperability of surveillance for the Single European Sky. This regulation is applicable to air traffic service providers which provide air traffic control services based on surveillance data, and to communication, navigation and surveillance providers which operate systems composing the surveillance chain. The Regulation essentially provides airborne carriage obligations for operators regarding secondary surveillance radar transponders (Mode S Elementary, ADS-B OUT, and Mode S Enhanced).~~

## ~~FREQUENCY MANAGEMENT~~ Frequency Management

### ~~Planning Considerations~~

#### ~~General~~

~~3.5825~~ Frequency assignment planning in the EUR region should be carried out in accordance with the provisions of Annex 10, and as necessary, ~~by~~ with regional recommendations and technical criteria developed for this purpose.

~~3.26 Principles and criteria applicable to the conduct of~~ Detailed guidance on frequency assignment planning for AM(R)S and radio navigation aids are contained in the ICAO EUR Frequency Management Manual (EUR Doc 011).

~~3.27~~ Coordination of frequency assignments in the ICAO EUR Region is carried out via an on-line coordination and registration tool (<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>).

Note – COM/NAV Tables of the EUR Region are published on the ICAO EUR/NAT website ([click here](#)).

~~3.28~~ To ensure interference-free operations in AM(R)S, the designated operational coverage of a frequency assignment intended for use by several control sectors should take into account all intended combinations of these sectors, notably during slack hours.

#### ~~AM(R)S~~

~~3.59~~ Frequencies should be assigned to all VHF AM(R)S facilities, taking into account:

- ~~a) agreed geographical separation criteria based on 8.33 kHz interleaving between channels for the area where this channel spacing is applicable;~~
- ~~b) agreed geographical separation criteria based on 25 kHz interleaving between channels;~~
- ~~c) agreed geographical separation criteria for the implementation of VDL services;~~
- ~~d) the need for maximum economy in frequency demands and in radio spectrum utilization; and~~
- ~~e) a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band.~~

~~3.60 The priority order to be followed in the assignment of frequencies to service is:~~

- ~~a) ATS channels serving international services (ACC, APP, TWR, FIS);~~
- ~~b) ATS channels serving national purposes;~~
- ~~c) channels serving international VOLMET services;~~
- ~~d) channels serving ATIS and PAR; and~~
- ~~e) channels used for other than ATS purposes.~~

~~3.61 The criteria used for frequency assignment planning for VHF AM(R)S facilities serving international requirements should, to the extent practicable, also be used to satisfy the need of national VHF AM(R)S facilities.~~

~~3.62 Special provisions should be made, by agreement between the States concerned, for the sharing and application of reduced protection of non-ATC frequencies in the national sub-bands, so as to obtain a more economical use of the available frequency spectrum consistent with operational requirements.~~

~~3.63 It should be ensured that no air/ground frequency is utilized outside its designated operational coverage.~~

~~3.64 It should be ensured that the stated operational requirements for coverage of a given frequency can be met for the transmission sites concerned, taking into account terrain configuration.~~

#### *Radio navigation aids*

~~3.65 Frequencies should be assigned to all radio navigation facilities taking into account:~~

- ~~a) agreed geographical separation criteria based on assignments of 50 kHz spaced frequencies to ILS localizer and VOR, X and Y channels to DME and 25 kHz space frequencies to GBAS;~~
- ~~b) the need for maximum economy in frequency demands and in radio spectrum utilization; and~~
- ~~c) a deployment of frequencies which ensures that international services are planned to be free of interference from other services using the same band.~~

~~3.66 The principles used for frequency assignment planning for radio navigation aids serving international requirements should, to the extent possible, also be used to satisfy the needs for national radio aids to navigation.~~

~~3.67 The following planning criteria for MLS frequency planning in the EUR region should be applied, aimed at allowing the maximum number of MLS-associated DME frequencies on X and Y channels so as to minimize the possible use of W and Z channels:~~

- ~~a) the height above which guidance signal need not be protected should be 10 000 feet;~~

~~Note. Signal protection to a height greater than 10 000 ft to meet special operational requirements shall be met on a case by case basis through technical (frequency) coordination among those States affected.~~

- ~~b) double channel pairing of ILS and MLS with the same DME channel (frequency tripling) is not required; and~~
- ~~c) the same channel (frequency) may exceptionally be assigned to both approach directions of a dually equipped runway in those cases where this is operationally acceptable.~~

### ~~AERONAUTICAL FIXED SERVICE~~ **Aeronautical Fixed Service (AFS)**

3.6829 The Regional AFTN/CIDIN/AMHS Plan is maintained in the ATS Messaging Management Centre (AMC). The plan is updated dynamically (AIRAC cycle) depending on network inventory data input in the AMC database by the Co-operating COM Centre (CCC) operators. The CCC operators in the EUR Region access the plan along with other AMC functions via Internet using the World-Wide Web. The plan is also electronically disseminated to other interested users (e.g. Regional Offices, States outside EUR) by the AMC operator, upon request.

*Note 1. - Further information on the ATS Messaging Management Centre (AMC) ~~may~~ can be found on the ~~EUROCONTROL website~~ at ~~https://www.eurocontrol.int/tool/air-traffic-services-messaging-management-centre~~<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>.*

*Note 2. - Connectivity details concerning AFTN/CIDIN/AMHS are shown in Table AFS 1 at:*

[www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-1](http://www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-1)

3.6930 Regional Flight Message Transport Protocol (FMTP) connection details are ~~ATS On Line Data Interchange (OLDI) planning information is~~ maintained within the European Internet Protocol Suite (IPS) Repository (EIPR) - EUROCONTROL Flight Message Transport Protocol (FMTP) Database. ~~The FMTP database may be accessed through a web based user interface providing States with a comprehensive and secured tool for updating and querying.~~

*Note 1. - Further information on the FMTP ~~database~~ ~~may~~ can be found on the ~~EUROCONTROL website~~ at ~~https://www.eurocontrol.int/service/flight-message-transfer-protocol-address-coordination~~<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>.*

*Note 2. - Connectivity details concerning ~~OLDI~~ FMTP are shown in Table AFS 2 at:*

[www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-2](http://www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-2)

~~[www.icao.int/EURNAT/Pages/EURandNATDocumentEUR&NATDocuments/AFS-2](http://www.icao.int/EURNAT/Pages/EURandNATDocumentEUR&NATDocuments/AFS-2)~~

3.7031 Regional ATS Direct Speech ~~planning~~ information is maintained in the EIPR- EUROCONTROL Air Traffic Management (ATM) Ground Voice Network Database (AGVN) Database. ~~The AGVN database may be accessed through a web based user interface providing States with a comprehensive and secured tool for updating and querying.~~

*Note 1. - Further information on the AGVN database ~~may~~ can be found on the ~~EUROCONTROL website~~ at ~~https://www.eurocontrol.int/database/air-traffic-services-ground-voice-network-database~~<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>.*

*Note 2. - Connectivity details concerning ATS Direct Speech are shown in Table AFS 3 at:*

[www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-3](http://www.icao.int/EURNAT/EUR/NAT/Documents/EUR/Documents/AFS-3)

~~[www.icao.int/EURNAT/Pages/EURandNATDocument](http://www.icao.int/EURNAT/Pages/EURandNATDocument)~~

3.7432 Use of means other than dedicated bilateral links may be made to meet data communication requirements in cases where performance, availability and cost effectiveness of such means are demonstrated to be equivalent or superior.

### **Aeronautical Radio Navigation Service**~~AERONAUTICAL RADIO NAVIGATION SERVICE~~

3.7233 Table CNS 4 lists, in alphabetical order by State, procedures and associated radio navigation aids required for non-precision and precision approaches in the EUR Region. Table CNS4 is regularly updated (usually bi-annually) and made available on the following URL - at [www.icao.int/EURNAT/Pages/EURandNATDocument](http://www.icao.int/EURNAT/Pages/EURandNATDocument)

3.7334 States should publish information related to the designated operational coverage of individual radio navigation aids in the relevant part of their Aeronautical Information Publications (AIP) and users should be requested not to use aids beyond the coverage specified in such publications.

3.7435 States should acknowledge that the designated operational coverage of en-route navigation aids as published in this part (Table CNS 4), while consistent with the stated operational requirements for support of the ATS routes, may be different from that indicated in the national AIPs for national reasons.

### **FREQUENCY ASSIGNMENT PLANNING FOR AM(R)S**

~~3.75 In order to avoid restrictions on frequency assignment possibilities due to adjacent channel interference on VHF, States that do not already have a requirement to implement 8.33 kHz channel spacing in the VHF aeronautical mobile service but that are located within air to air interference range of another State that has to employ that channel spacing, should provide their ground stations with equipment that, even if it operates on channels spaced by 25 kHz, nevertheless has frequency stability and selectivity appropriate to 8.33 kHz channel spacing operation. In addition, States should ensure that any aircraft flying over or within air to air interference range of States where 8.33 kHz channel spacing is employed in the VHF aeronautical mobile service is fitted with airborne equipment having frequency stability and selectivity appropriate to 8.33 kHz channel spacing operation.~~

~~3.76 A number of principles and criteria applicable to the practical conduct of frequency assignment are found in the EUR Frequency Management Manual (EUR Doc 011).~~

~~3.77 Assignment of frequencies to satisfy aeronautical operational control communication requirements should be made in accordance with the criteria and method shown in the EUR Frequency Management Manual (EUR Doc 011).~~

~~3.78 Coordination of frequency assignments in the ICAO EUR Region is carried out via an on-line coordination and registration tool (<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>). One outcome of this process is reflected in the Table COM. The purpose of these arrangements is also to serve the execution of the SES Network Management Function related to Frequency Management.~~

~~3.79 To ensure adequate operational flexibility, the designated operational coverage of an air/ground channel promulgated for specific ACC sectors should take into account any intended combination of control sectors, notably during slack hours.~~

~~Note: Table COM is regularly updated (usually bi-annually)~~

### **FREQUENCY ASSIGNMENT PLANNING FOR RADIO NAVIGATION AIDS**

~~3.80 Principles and criteria applicable to the practical conduct of frequency assignment to VHF/UHF/SHF aids are found in the EUR Frequency Management Manual (EUR Doc 011).~~

~~3.81 Principles and criteria applicable to the practical conduct of frequency assignment to LF/MF aids are found in the EUR Frequency Management Manual (EUR Doc 011).~~

~~3.82 Coordination of frequency assignments in the ICAO EUR Region is carried out via on-line coordination and registration tool (<https://extranet.eurocontrol.int/http://onesky.eurocontrol.int/portal/dt>). An outcome of this process is reflected in the Table NAV.~~

~~Note: Table NAV is regularly updated (usually bi-annually)~~

### Surveillance Systems ~~SURVEILLANCE SYSTEMS~~

~~3.83~~36 Principles, procedures and guidance on the use of Mode 3/A secondary surveillance radar codes in the EUR Region are found in the European Secondary Surveillance Radar (SSR) Code Management Plan (EUR Doc 023). The management of SSR codes in the ICAO EUR Region shall be in accordance with the procedures and technical requirements as detailed in EUR Doc 023. Attachment to EUR Doc 023 provides the latest SSR Code Allocation List (CAL) for the ICAO EUR Region.

~~3.84~~37 Principles and procedures for SSR Mode S Interrogator Codes Allocation in the ICAO EUR are provided in the ICAO European Principles and procedures for SSR Mode S Interrogator Codes (IC) Allocation (EUR Doc 024). The management of Mode S ICs in the ICAO EUR Region shall be in accordance with the procedures and technical requirements as detailed in EUR Doc 024. Attachment to EUR Doc 024 provides information about the Mode S Interrogator Code Allocation process and indicates how to access the latest status of the SSR Mode S Interrogator Code (IC) Allocations for the ICAO EUR Region.

*Note: The Tables and Attachments to EUR Doc 023 and EUR Doc 024 are regularly updated (usually bi-annually)*



**TABLE CNS II- 1 - AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORKS  
(AFTN/CIDIN/AMHS) PLAN**

*Note:* available at [www.icao.int/EURNAT/Pages/EUR&NATDocuments/AFS-1](http://www.icao.int/EURNAT/Pages/EUR&NATDocuments/AFS-1)

**TABLE CNS II-2 - REQUIRED ATN INFRASTRUCTURE ROUTING PLAN**

*Note: Not applicable in EUR Region.*

**TABLE CNS II-3 — ATS DIRECT SPEECH CIRCUITS PLAN**

*Note: Available at [www.icao.int/EURNAT/Pages/EUR&NATDocuments/AFS-3](http://www.icao.int/EURNAT/Pages/EUR&NATDocuments/AFS-3)*

**TABLE CNS II-4 - HF NETWORK DESIGNATORS**

*Note: Not applicable in EUR Region.*

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