



Agenda Item 2: Air Navigation Matters
2.3 Other Specific Air Navigation Developments
2.3.4 Communications, Navigation and Surveillance (CNS)

UPDATES TO CNS SARPs AND FUTURE WORK OF THE CNS ICAO PANELS

(Presented by the Secretariat)

SUMMARY	
This information paper presents for the meeting's consideration of the working group implementation activities, a summary of the last amendments applicable to Annex 10 and other related CNS documentation, the proposals for amendment and future work of the ICAO panels on CNS aspects, and a brief description of other relevant CNS aspects.	
References:	
• ICAO Annex 10 – Aeronautical Telecommunications, Amendments 84 and 85 • ICAO ACP, NSP and ASP Panels Work Programmes • ICAO Document Transition Framework for an Electronic Air Navigation Plan (e ANP) • Forum for the SESAR and Next Gen programmes integration and harmonization (Montreal, Canada, 8 to 10 September 2008)	
Strategic Objectives	<i>This working paper is related with Strategic Objectives: A – Safety D – Efficiency</i>

1. Introduction

1.1 Development of implementation tasks by the Eastern Caribbean Working Group (E/CAR/WG) require availability of the last amendments and valid references of ICAO SARPs, as well as knowledge of future work that ICAO, through its different panels, is developing to facilitate and standardize implementation of systems and services, trying to harmonize the inter-regional implementation process to obtain clear benefits for the ATM community in the short and medium term.

1.2 The last meeting of the E/CAR/WG was held in October 2009. Several amendments to Annex 10 and other important events related to the CNS field since this date are presented.

2. Amendments to the SARPs related to CNS

2.1 Amendment 84 to Annex 10 – *Aeronautical Telecommunications*, Volume I, was approved by the 184th Session of the ICAO Council and came into effect on 19 November 2009, through which several updates referred to the conventional radio aids were included, in particular:

- a) update and reorganization of the text on general provisions for radio navigation aids contained in Chapter 2 (including GNSS material editorial changes);
- b) amend obsolete provisions related to the instrument landing system (ILS) and the VHF omnidirectional radio range (VOR);
- c) delete text concerning the testing of non-directional beacons (NDB), which duplicates existing guidance contained in Doc 8071, *Manual on Testing of Radio Navigation Aids*;
- d) reflect the results of the review of the distance monitoring equipment (DME) issues identified in Recommendations 6/14 and 6/15 of the Eleventh Air Navigation Conference;
- e) update the DME accuracy standard in light of actual avionics performance, and clarify and simplify existing material; and
- f) address potential safety problems related with the microwave landing system (MLS) Category III certification.

2.2 Amendment 85 to Annex 10 – *Aeronautical Telecommunications*, Volumes I, III and IV, was prepared by the Navigation System Panel (NSP) Working Group and the Aeronautical Surveillance Panel (ASP), approved by ICAO Council in its 189th Session and will come into effect on 18 November 2010. This amendment includes the following main elements:

- a) Updates to the ILS system coverage requirements, requirements of the signal in the GNSS airspace and GLONASS System requirements:
 - improve the ILS signal quality at aerodromes where building or terrain reflections cause interference of the reflected signal with the desired signal; introducing appropriate changes to coverage requirements appearing in Volume I, Chapter 3, 3.1.3.3;
 - updates to enable Category I approach operations supported by satellite-based augmentation system (SBAS); developed based on the system safety studies and operational experience with WAAS system augmentation; and
 - reflect the evolution of the GLONASS system.

- b) Updates to the allocation of 24-bit addresses, the SSR and extended squitter, as well as introducing new provisions for multilateration systems and airborne surveillance applications:
- improve the procedure for the allocation of 24-bit addresses to States and update the table of allocations;
 - update provisions relating to SSR (Modes A/C and S) and automatic dependent surveillance — broadcast (ADS-B) using 1090 MHz extended squitter resulting from operational experience;
 - introduce system-level and functional requirements for multilateration systems used for air traffic surveillance; and
 - introduce an initial set of technical requirements for airborne surveillance applications that are enabled by the use of ADS-B IN messages on the flight deck.
- c) Updates related to the airborne collision avoidance system (ACAS)
- new requirements for display of proximity traffic, traffic advisory (TA) and resolution advisory (RA);
 - introduction of a new functional requirement for monitoring an aircraft's vertical rate during an RA which would be affected by implementing a new version of the collision avoidance system (CAS) logic (commonly referred to as traffic alert and collision avoidance system (TCAS) Version 7.1); and
 - update existing provisions in light of relevant recent developments and operational experience.

2.3 New proposal for amendment (No. 86) to Annex 10 – Aeronautical Telecommunications, Volume I, related to the Ground-Based Augmentation System (GBAS) of the Global Navigation Satellite System (GNSS), with the purpose of including updates to Category 1 operational provisions based on the ground-based augmentation system (GBAS) as a result of operational experience with the initial implementation of these systems.

3. Future work of ICAO panels on CNS matters

Aeronautical Communications Panel (ACP)

3.1 As part of the work plan to be completed by the ACP in 2010, the following is included:

- a) update of certain texts on ATN/OSI contained in former document Doc 9705 and their transfer to the new document Doc 9880;
- b) complete Part III of the Manual on AMS(R)S, including a resolution on radio frequency (RF) compatibility matters between Inmarsat, MTSAT and Iridium satellite systems; and
- c) update Doc 9896, including provisions for voice over IP (VoIP) (based on EUROCAE ED136-138).

3.2 Likewise the following are part of the work plan to be initiated by the ACP in 2010:

- a) continue preparation for the WRC-2012 ITU meeting;
- b) interference matters and other subjects that may affect the use of the spectrum by civil aviation;
- c) provisions for the ADS-C and FIS Protected Mode;
- d) amendments to provisions for the VDL mode 2 and mode 4 based on validation activities and experience in their implementation;
- e) amendments to provisions for AMHS based on validation activities and experience in their implementation;
- f) guidance material for Doc 9896, including OSI to IPS transition matters, guidance for implementation, ICAO addressing scheme; etc.; and
- g) updates to Annex 10, Volumes III and V, to be in accordance with the ITU provisions.

3.3 Within the ACP panel, a new working group will be created, named “Surface” (WG-S), to develop the SARPs and guidance material for surface data links at airports. This is a high priority task, being an early requirement for the NextGen and SESAR programmes. This group will be activated once the development of several basic technical standards being carried out by the industry is completed (RTCA/EUROCAE).

Navigation System Panel (NSP)

3.4 At present this Panel is working in developing provisions to enable Category II and III approach operations and landing operations based on the use of the ground based augmentation system (GBAS).

3.5 Other additional developments in process or planned include:

- a) provisions to support introduction of the Galileo system;
- b) provisions to support progress of the GPS and GLONASS systems;
- c) update to guidance material related to navigation infrastructure (*Manual on GNSS*, Doc 9849 and *Manual on Testing of Radio Navigation Aids*, Doc 8071); and
- d) future updates to provisions of conventional radio aids, as required.

Aeronautical Surveillance Panel (ASP)

3.6 At present the ASP Panel has the following planned tasks:

- a) New regulations on the required surveillance performance (RSP) and onboard surveillance applications (related to the use of ADS-B reports onboard aircraft);

- b) Consolidation of guidance material on surveillance into a new aeronautical manual: This task has been finalized generating Doc 9924 – *Manual on Aeronautical Surveillance*.

4. Other important CNS issues

General View of the Framework for the Electronic Air Navigation Plan (eANP)

4.1 Within this performance measuring approach, ICAO continues developing an Electronic Air Navigation Plan (eANP). This eANP will facilitate the coordination and implementation of regional air navigation plans, will support the Global Air Navigation Plan and will contribute to the development of air navigation planning providing a framework for an efficient implementation of national, regional, inter-regional and global air navigation new systems and services.

4.2 In order to support implementation and use of the eANP, as well as to continue planning and implementation activities of systems and services, based on the Air Navigation performance requirements, updating of the information contained in the ICAO CAR/SAM Air Navigation Plan (Doc 8733), Volume II – *Facilities and Services Implementation Document (FASID)* have been initiated, highlighting the following approved amendments:

FASID Table	Title	Updated in:
CNS 1A	<i>AFTN Plan</i>	March 2009
CNS 1Ba	<i>ATN routers regional plan</i>	August 2008
CNS 1Bb	<i>ATN ground-ground applications</i>	August 2008
CNS 1C	<i>ATS direct speech circuits plan</i>	January 2010
CNS 2A	<i>Aeronautical mobile service and SMAS</i>	March 2009
CNS 3	<i>Navigation Systems</i>	July 2009
CNS 4A	<i>Surveillance Systems</i>	March 2009

Important ICAO Communications related with CNS

4.3 Since the second half of 2009, the following information for air navigation related with CNS has been prepared:

ICAO Communication	Subject	Action required	Reply Deadline
AN 13/2.5-09/45	<i>Amendments to Doc 4444 relating to the application of PBN and GNSS</i>	Comments	30 September 2009
AN 7/1.1.44-09/26	<i>Annex 10, Vol. I, Amendment 84, relating to the radio aids text</i>	Comments	19 October 2009
Assembly Resolution 36-23	<i>PBN Implementation Plan</i>	Implementation	31 December 2009
E 3/5-09/61	<i>ICAO Position for the CMR-2012</i>	Implementation	January 2012
AN13/2.1-08/50	<i>New Flight Plan Form</i>	Implementation	15 November 2012
AN 7/49.1-09/34	<i>AMC Users Registry</i>	Implementation	In process

ICAO Communication	Subject	Action required	Reply Deadline
SP 44/1-09/88	<i>Guidelines on sustainability of the 1 030/1 090 MHz RF environment; incorrect SSR practices by some military authorities; and guidance on ground testing of SSR transponders</i>	Implementation	- - -
Available on the ACP Panel website	<i>Fifth edition of the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation Doc 9718</i>	Implementation	- - -
Available on the ICAO-NET website	<i>Unedited version, ATN Manual on using IPS Standards and Protocols, Doc 9896</i>	Implementation	- - -
	<i>Unedited version, Manual on the Satellite Aeronautical Mobile Service (En-route), Doc 9925</i>	Implementation	- - -
	<i>Unedited version, Aeronautical Surveillance Manual, Doc 9924</i>	Implementation	- - -
AN 7/1.1.4.5 – 10/28	<i>Adoption of Amendment 85 to Annex 10</i>	Notify disapproval	12 July 2010
		Notify differences	18 October 2010