International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Second Meeting of the Communications, Navigation and Surveillance / Air Traffic Management Subgroup (CNS/ATM/SG/2)
(Mexico City, Mexico, 16 to 19 November 2010)

Agenda Item 2: **Follow-up to the implementation status of the performance-based navigation systems plans in the CAR and SAM Regions and to the latest amendments to the ATM- and CNS-related SARPs**

UPDATES TO CNS-RELATED SARPs AND FUTURE WORK OF THE ICAO CNS PANEL

(Presented by the Secretariat)

SUMMARY
This information paper presents a summary of the latest amendments applicable to Annex 10 and other CNS-related documents, the proposals of amendment and the future work of the ICAO panels on CNS aspects, and a brief description of other relevant CNS aspects, for consideration by the meeting in the implementation activities of the working group.

References:
- Amendments 84 and 85 to ICAO Annex 10 – Aeronautical Telecommunications   - Work programme of the ICAO ACP, NSP and ASP panels   - ICAO framework document for the transition to an electronic Air Navigation Plan (eANP)   - Forum for the integration and harmonisation of the SESAR and NextGen programmes (Montreal, Canada, 8-10 September 2008)

Strategic Objectives	*This working paper is related to Strategic Objectives A and D.*

1.   Introduction

1.1   In order to support the coordination and development of the tasks of the CNS/ATM Subgroup, this paper summarises the latest amendments and valid references to ICAO CNS SARPs and the work that ICAO is carrying out through its different panels to facilitate and regulate the implementation of services and systems, trying to harmonise the inter-regional implementation process in order to obtain clear benefits for the ATM community in the short and medium term.

1.2   The last meeting of the CNS/ATM/SG was held in March 2010. Since that date, several amendments to Annex 10 have been presented, new versions of guidance documentation have been released, and other CNS-related events have been held.

2.   **Amendments to CNS-related SARPs**

2.1   Amendment 84 to Annex 10 – *Aeronautical Telecommunications*, Volume I, became effective on 19 November 2009, including several updates related to conventional radio aids:

a)   Update and reorganise the text of the general provisions on navigation radio aids contained in Chapter 2 (including editorial changes to GNSS material);

b)   Amend obsolete provisions on the instrument landing system (ILS) and the VHF omnidirectional radio range (VOR);

c)   Delete the text corresponding to non-directional radio beacons (NDB) which is a repetition of the guidance that already exists in the *Manual on testing of radio navigation aids* (Doc 8071);

d)   Reflect the results of the analysis of issues related to distance-measuring equipment (DME), identified in Recommendations 6/14 and 6/15 of the Eleventh Air Navigation Conference;

e)   Update the DME precision standard, based on the performance of modern avionics, clarifying and simplifying the existing text; and

f)   Consider possible safety issues related to the certification of Category III microwave landing systems (MLS).

2.2   Amendment 85 to Annex 10 – *Aeronautical Telecommunications*, Volumes I, III and IV, was approved in Session 189 of the ICAO Council (ref. State Letter AN 7/1.1.45-10/28 of 1 April 2010) effective 12 July 2010, with an effective implementation date of 18 November 2010. This amendment contemplates the following main elements:

a)   Modify the standards and recommended practices (SARPs) concerning the coverage of the instrument landing system (ILS), performance requirements of the global navigation-satellite system (GNSS) signal-in-space, and the requirements of the global navigation satellite system (GLONASS);

b)   Amend the SARPs related to the 24-bit aircraft address, the secondary surveillance radar (SSR) and extended squitter, and introduce new provisions on multilateration systems and airborne surveillance applications; and

c)   Amend the SARPs related to the airborne collision avoidance system (ACAS).

2.3   Proposal of amendment to Annex 10 – *Aeronautical Telecommunications*, Volume I, concerning the Ground-Based Augmentation System (GBAS) of the Global Navigation Satellite System (GNSS), ref. State Letter AN 7/1.3.97-10/43 of 22 June 2010, to include updates to the provisions on Category 1 GBAS-based operations as a result of the operational experience gained in the initial implementation of these systems.

3.   **Current work of ICAO panels on CNS aspects**

Aeronautical Communications Panel (ACP)

3.1   Activities and work of the ACP:

a)   Assessment and analysis of the proposals to change UAT and VDL M2 and M4 regulations. The VDL M2 proposals seek to permit and accommodate multi-frequency operations and the new applications under study by the data link applications panel (OPLINKP).

b)   Assessment of safety provisions, whose changes will be included in Doc. 9880, as well as the updates to texts on ADS-C and FIS applications.

c)   Updates are being prepared to the future communication systems, the concept of the use of voice in a future data-based environment, the incorporation of digital voice into the future communications infrastructure (FCI) and the efficient use of aeronautical spectrum bands, for the 12th Air Navigation Conference.

3.2   Guidance documentation generated:

a)   First edition of Doc 9880 "Manual on detailed technical specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols".

b)   First edition of Doc 9925 "Manual on the AMS(R)S", which includes the outlook and guidelines for the implementation of specific satellite systems (Iridium, MTSAT and Inmarsat) that operate AMS(R). This document supplements ICAO SARPs contained in Annex 10, Vol. III, Part I, Chapter 4.

c)   Fifth edition of Doc 9718 "Handbook on radio frequency spectrum requirements for civil aviation", which contains the latest ICAO policy statement emerging from the 2007 ITU World Radiocommunications Conference.

3.3   The 2010 work plan of the ACP also includes:

a)   Continue preparing for the ITU WRC-2012.

b)   Interference and other matters that may affect the use of the spectrum by civil aviation.

c)   Amendments to provisions on the AMHS, based on the validation activities and experience with its implementation.

d)   Update Doc 9896 "Manual for the ATN using IPSS standards and protocols" with the technical voice over IP (VoIP) provisions, and subsequently develop guidance material on IP addressing and security.

e)   Update Annex 10, Volumes III and V, to be consistent with ITU provisions.

3.4   Within the ACP, a new working group called "Surface" (WG-S) will be established for the development of SARPs and guidance material on airport surface data links. This is a high-priority task, since it is an early requirement of the NextGen and SESAR programmes. This group will be activated once several basic technical standards have been developed by the industry (RTCA/EUROCAE).

Air Navigation Panel (NSP)

3.5   This panel is working on the development of provisions for rating Category II and III approach operations, and landing operations based on the use of the ground-based augmentation system (GBAS).

3.6   Additional developments in progress or planned include:

a)   Development of provisions in support of the introduction of the Galileo system;

b)   Provisions in support of the evolution of GPS and GLONASS systems;

c)   Updates to the guidance material related to the navigation infrastructure (GNSS Manual, Doc 9849, and the Manual on testing of radio navigation aids, Doc 8071); and

d)   Future updates to the provisions on conventional radio aids, as required.

Aeronautical Surveillance Panel (ASP)

3.7   Activities and work of the ASP:

a)   Development of new provisions on the required surveillance performance (RSP) and airborne surveillance applications (related to the use of ADS-B reports on board the aircraft).

b)   A first edition of Doc 9924, Aeronautical Surveillance Manual, has been prepared, which consolidates the relevant and updated parts of Doc 9684, Manual on the secondary surveillance radar systems, and Doc 9688, Manual on Mode S specific services, with new guidance material, such as multilateration, ADS-B, surveillance data sharing and others.

c)   Complete the data formats for a new set of 1090 MHz extended squitter (ES) messages used for ADS-B and TIS-B. This new set of messages (called version 2) is aligned with the latest industry standards (basically RTCA DO-260B, MOPS (Minimum Operational Performance Standards) for 1090 MHz ES ADS-B and TIS-B, issued in December 2009, and EUROCAE ED-102A). This information will be included in the second edition of Doc 9871, Technical provisions for Mode S services and extended squitter.
These changes to the SARPs concerning version 2 of ES messages is scheduled for discussion by the ASP in October 2011, and if proposed, will be incorporated in Annex 10, Vol. IV as part of the proposal of amendment 86, effective in November 2013. It should be noted that the current plans for the implementation of ADS-B by the United States and Europe are based on the new ES data formats.

3.8   The work plan, study and analysis of the ASP also includes the following:

a)   Increase the 1090 MHz ES capacity with the additional introduction of phase modulation;

b)   Guidelines on test flights for ADS-B systems and multilateration (MLAT);

c)   Analysis of the multi-static primary radar (using emissions from sources such as radio and television transmitters);

d)   Possible need of a new generation of ACAS; and

e)   Detection and prevention (in terms of prevention of collision with other aircraft) for unmanned aircraft systems (UAS).

3.9   The ACP, in coordination with the ASP, will complete a new set of messages for the universal access transceiver (UAT), in keeping with version 2 of ES 1090 MHz messages, for its incorporation in Doc 9861, *UAT Manual*.

3.10   The recently-established airborne surveillance task force (ASTAF) held its first meeting in Montreal on 26 to 28 May 2010, and agreed that one of its first tasks would be a manual with guidance material on initial applications rated for the use of ADS-B IN. The work programme of the ASTAF contemplates the development of provisions and procedures in support of the safety, efficiency and harmonious implementation of the following operational capabilities by late 2011:

a)   Situational awareness of air traffic for ITP (ATSA-ITP) procedures in oceanic airspace (improvement of flyover and fly-by operations);

b)   Identification of the aircraft referred in radiotelephony (ICAO three-letter designator *versus* call sign);

c)   Situational awareness of air traffic at cruise level/approach and on the aerodrome surface (improved situational awareness of air traffic during flight operations and improved situational awareness of air traffic on the airport surface (ATSA-SURF)); and

d)   Merging and sequencing (M&S) in terminal control area (TMA), taking into account the requirements for continuous descent operations (CDO).

3.11   Within the operational aspect, the Separation and Airspace Safety Panel (SASP) completed the development of guidance material to support in-trail procedures (ITP), which included the planning of proposals of amendment to the *Procedures for air navigation services – Air traffic management* (PANS-ATM, Doc 4444) during 2009. This material will be submitted to the Air Navigation Commission in the fall of 2010. The preliminary circular entitled "Safety assessment for the development of separation minima and means for in-trail procedures (ITP) using ADS-B (Version 1.5.3)", contains, *inter alia*, the proposals of amendment planned for the PANS-ATM, which are subject to coordination by various panels.

3.12   Finally, the SASP and the Operational Data Link Panel (OPLINKP) are developing provisions (SARPs, Procedures for air navigation services (PANS) and/or guidance material) within the 2012/2013 timeframe on the following topics:

a)   A new automatic dependent surveillance – contract application (ADS-C) as part of a package in support of 4D path management 4D (4D-TRAD);

b)   Surveillance capacity extended to broad area multilateration systems;

c)   In-trail climb using ADS-B and controller-pilot data link communications (CPDLC); and

d)   Criteria for the use of ADS-B and MLAT for the provision of 3-NM separation.

4.   Other CNS relevant aspects

Overview of the Work Framework for the Electronic Air Navigation Plan (eANP)

4.1   Within this performance measurement approach, ICAO continues developing an Electronic Air Navigation Plan (eANP). This eANP will facilitate 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 new air navigation systems and services at national, regional, inter-regional and global level.

4.2   In order to support the implementation and use of the eANP, and to continue with service and system planning and implementation activities based on air navigation performance requirements, the information contained in the ICAO CAR/SAM Air Navigation Plan (Doc 8733), Volume II – *Facilities and Services Implementation Document (FASID)* has been updated, and its amendments are posted in the respective web site of each Regional Office.

Relevant ICAO CNS-related Communications

4.3   The following information concerning CNS-related air navigation has been generated to date:

ICAO communication	Subject	Required action	Deadline for response
E 3/5-09/61	*ICAO position for WRC-2012*	Implementation	January 2012
AN13/2.1-08/50	*New flight plan format*	Implementation	15 November 2012
AN 7/49.1-09/34	*Registry of AMC users*	Implementation	- - -
SP 44/1-09/88	*Guidance on the sustainability of the 1 030/1 090 MHz RF environment; incorrect SSR practices by some military authorities; and guidance on ground trials for SSR transponders*	Implementation	- - -
Available on the ICAO-NET website	*Fifth edition of the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Doc 9718*	Implementation	- - -
	First edition, Manual for the ATN using IPS standards and protocols, Doc 9896	Implementation	- - -
	First edition, Manual for the ATN using ISO/OSI standards and protocols, Doc 9880	Implementation	- - -
	First edition, Manual on the Aeronautical Mobile Satellite (route) Service, Doc 9925	Implementation	- - -
	First edition, Aeronautical Surveillance Manual (Doc 9924)	Implementation	- - -
AN 7/1.1.4.5-10/28	*Adoption of amendment 85 to Annex 10*	Report differences	18 October 2010
AN 7/1.3.97-10/43	*Proposal of amendment to Annex 10, Volume I, concerning the ground-based augmentation system (GBAS) of the global navigation satellite system (GNSS)*	Send comments	30 September 2010

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