

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

**(DRAFT) REPORT OF COMMITTEE B
ON AGENDA ITEM 6**

The attached draft which constitutes a part of the report on Agenda Item 6 (sub-item 6.3) is presented for approval by Committee B for submission to the Plenary.

Agenda Item 6: Aeronautical navigation issues**6.3 AMENDMENTS ON AERONAUTICAL NAVIGATION
SUBJECTS IN RELEVANT ICAO DOCUMENTS
INCLUDING THE *GLOBAL AIR NAVIGATION PLAN
FOR CNS/ATM SYSTEMS (DOC 9750)*, ANNEX 10 —
*AERONAUTICAL TELECOMMUNICATIONS AND
OTHER DOCUMENTS AS NECESSARY*****6.3.1 Proposed updates to the ICAO Strategy for the
introduction and application of non-visual aids to approach
and landing
in Annex 10, Volume I**

6.3.1.1 The meeting was presented with updates, developed by the Global Navigation Satellite System Panel (GNSSP) at the request of the Air Navigation Commission (ANC), to the ICAO Strategy for the introduction and application on non-visual aids to approach and landing in Annex 10, Volume I, Attachment B. The meeting was advised that proposed amendments to the strategy took account of developments in aeronautical navigation since the strategy was approved by the COM/OPS Divisional Meeting in 1995. In particular, the progress was contemplated in the development of GNSS and introduction of GNSS-based operations.

6.3.1.2 In addressing proposed amendments the meeting agreed that the general objectives of the strategy were still valid and not affected by any developments since 1995. Accordingly, the meeting extended the applicability for the updated strategy until 2020.

6.3.1.3 The meeting was reminded that the current strategy had introduced a notion of generic criteria for approach, landing and departure operations which was intended to facilitate the application of emerging technologies for precision approach and landing operations. The development of the Standards and Recommended Practices (SARPs) for GNSS-based precision approach operations had shown that the required navigation performance (RNP) concept did not replace the need for detailed system-specific SARPs. Such SARPs for GNSS to support Category I precision approach were developed after the concept had been introduced, and additional standards were under development for Category II/III. Having noted that with the adoption of GNSS SARPs three standard aids were established, providing for the whole variety of precision approach and landing operations, the meeting agreed that no new precision approach and landing systems need to be standardized. References to the generic RNP criteria for precision approach and landing were no longer deemed necessary and therefore deleted in the proposed amendment to the strategy.

6.3.1.4 The meeting reviewed the strategy based on the latest information available and its previous deliberations. The most significant changes concerned the following areas:

- a) there had been some significant advances in the implementation of Category III MLS;

- b) GNSS with ground-based augmentation capable of supporting Category I operations did not progress as projected and was expected to become operational by 2006. GNSS-based approach with vertical guidance (APV) reached operational capability;
- c) development of performance requirements and SARPs for GNSS ground-based augmentation system (GBAS) to support Category II and III operations was in progress. However, it was not possible at the time to give an accurate forecast when an operational capability would be available. Thus, availability time frames were changed from 2005 - 2015 to 2010 - 2015;
- d) there had been some significant developments related to the multi-mode receiver (MMR). Multi-mode receiver Standards had been developed and MMRs had been fielded with ILS and basic GNSS functions. Other MMR functions such as MLS and GAAS were under development and expected to be available in the near future;
- e) as MMR was only one specific implementation of airborne landing capability, a more generic notion of multi-modal capability was introduced;
- f) as transition to GNSS as a global system for all phases of flight was recognized to be a long-term objective. Thus, the frequency bands allocated to ILS, MLS and GNSS needed to be protected indefinitely. A statement to this effect was included in the strategy; and
- g) Standards and criteria for approach and landing with vertical guidance (APV) were available or under development. APV procedures based on various technologies offered operational benefits and enhanced safety compared with non-precision approaches, particularly in regard to prevention of CFIT incidents/accidents. Thus, the strategy was expanded to include general information to this effect.

6.3.1.5 In reviewing proposed amendments to the strategy, the meeting was presented with and noted the IATA position on non-visual aids for Category II/III approach and landing. Taking IATA's views into account, the meeting agreed to update the strategy as shown in Appendix B to the report on this agenda item. The meeting therefore developed the following recommendation:

RSPP	Recommendation 6/10 — Amendment to Annex 10, Volume I, Attachment B — Updating the strategy for introduction and application of non-visual aids to approach and landing
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RSPP	That Attachment B to Annex 10, Volume I be amended as shown in Appendix B to the report on this agenda item.
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6.3.2 Amendments to the Global Plan

6.3.2.1 The meeting reviewed a proposal developed by the GNSSP to amend the navigation parts of the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) including, inter alia, updates to the document to reflect recent developments in the global navigation satellite system (GNSS).

6.3.2.2 The proposed amendments were based on the following key considerations:

- a) a vision of GNSS is evolving away from the concepts of supplementary, primary or sole means of navigation (using a single system) to the concept of multiple sensors to be used for area navigation and approach, landing and departure operations, where GNSS elements are regarded as individual sensors;
- b) the goal of transition to GNSS, which removes the requirement for conventional ground-based navigation aids, is maintained for the GNSS-based navigation and future ATM environments where this goal can be safely achieved;
- c) the need for some or all conventional ground-based navigation aids during the transition is maintained until such time when the requirements for safe operation using GNSS are met; and
- d) the need to retain conventional ground-based navigation aids during the transition does not imply a requirement to add ground-based NAVAIDs in less developed regions when introducing GNSS-based operations unless it is demonstrated that the safe implementation of particular operations demand such additional NAVAIDs.

6.3.2.3 The meeting developed additional amendments that were included in the proposal to take account of its earlier discussions concerning:

- a) vulnerability of GNSS to interference and the need for means of mitigation;
- b) enhanced role of DME and INS/IRS in the provision of navigation service; and
- c) importance of RNAV and RNP in the realization of GNSS benefits.

6.3.2.4 The meeting also considered a proposal to amend the time lines for implementation of CNS/ATM systems for the AFI Region which were contained in Part II of the Global Plan. It was stated that the originally expected pace of implementation has not been achieved, particularly in the AFI Region due to a number of factors such as delays in the availability and installation of appropriate avionics and lack of funding.

6.3.2.5 Arising from the above, the AFI States extended their time frame for CNS/ATM systems implementation up to 2015. Nevertheless, the ultimate objective of the region was a navigation system based on satellite navigation for all phases of flight. As far as augmentation was concerned, any deployment was to be in line with the regional policy as defined and approved by AFI Planning and Implementation Regional

Group (APIRG). It was noted that strategy had detailed an evolutionary path from existing constellations through a minimal SBAS providing over the whole AFI Region a non-precision approach capability with vertical guidance at the 20 m vertical accuracy and vertical alert limit of 50 m (APV-I).

6.3.2.6 The meeting took note of the information provided on the implementation objectives and plans. Concerning the proposed amendments to the implementation time lines, it was noted that similar changes may be proposed by other ICAO regions and that all such changes should be consolidated and reflected in the next edition of the document.

6.3.2.7 In concluding its consideration of the subject, the meeting updated the Global Plan as shown in Appendix C to this agenda item and developed the following recommendation:

**Recommendation 6/11 — Amendment to the Global Plan —
Navigation**

That:

- a) the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) be amended as shown in Appendix C to the report on this agenda item; and
- b) updated CNS/ATM systems implementation time lines contained in Part II of the Global Plan be reviewed by the Regional Implementation Group and consolidated for incorporation in the next edition of the Global Plan.

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