



TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 2: Aerodrome operations – improving airport performance

2.2: Performance-based navigation (PBN) – a practical way to improve airport performance with safety and efficiency

FOR PBN OPERATING DURING APPROACH AND IN TERMINAL AREA ARNP WILL BE THE SOLITARY AIRCRAFT QUALIFICATION REQUIREMENT FOR ALL THE TERMINAL AREA APPLICATION

(Presented by China)

EXECUTIVE SUMMARY

China published the “China Civil Aviation PBN Implementation Roadmap” in 2009. 2012 is the last year of the near-term. By the end of 2012, 86 of all 183 civil transportation airports will have PBN flight procedures.

CAAC has conducted various PBN training in China to help PBN implementation. By now, all of the 33 airlines have possessed some kind of operational approval. Meanwhile, CAAC has provided the airports in China the full-amount subsidy for the development of PBN procedures, and will provide comprehensive aids including financial support for Chinese aviation operators to upgrade avionics.

CAAC is testing Beidou’s navigation performance and working on a plan to introduce Beidou into civil aviation.

Action: The Conference is invited to note the conclusions in paragraph 3.

1. INTRODUCTION

1.1 The CAAC is implementing PBN in three phases: near-term (2009 – 2012), medium-term (2013 – 2016), and long-term (2017 – 2025). The near-term phase focuses on selected applications of PBN, the medium-term phase focuses on overall application of PBN, and the long-term phase targets integration of PBN with communication, navigation, and surveillance/air traffic management (CNS/ATM), the foundation for China’s “next generation air transportation system.”

1.2 In the near-term, based on air transportation requirements, surveillance and communication capability, controller workload, and fleet equipage, the CAAC plans to selectively apply

RNP 10 and RNP 4 navigation specifications to certain oceanic operations and continental operations in western China. For certain busy routes, RNAV 2 or RNAV 5 navigation specifications are selectively applied, based on coverage of communication and surveillance signals, for reduced route spacing and higher utilization of airspace. Existing RNAV/RNP routes will be readjusted in accordance with PBN navigation specifications.

1.3 The CAAC plans to apply RNAV 1 navigation specifications to terminal area operations in China where radar, GNSS, and ground-based navigation infrastructure are available. RNAV 1 implementation shall start at international airports and busy airports where coexistence of PBN operations and conventional operations is allowed. RNAV operations shall be implemented at 30 per cent of airport terminal areas nationwide and all the nation's international airports by 2012. In the airport terminal areas where there is partial radar coverage or insufficient ground-based navigation aids, the CAAC will selectively use GNSS navigation to implement basic RNP 1 SID and STAR procedures.

1.4 The CAAC plans to implement GNSS-based RNP APCH procedures, supported with APV based on Baro-VNAV, at all newly built airports and some existing airports. These APV approach procedures will serve as the primary approach or as a backup for ILS precision approaches. RNP AR approach procedures will be used at certain airports where there is complex terrain and limited airspace depending on operational requirements. RNP approach capability will be available to 30 per cent of instrument runway ends nationwide by 2012. RNP APCH or RNP AR approach procedures will be mandated in certain airports. In this time frame, conventional navigation aids and flight procedures will be retained for aircraft without PBN capabilities.

1.5 By the end of 2012, 86 of all 183 civil transportation airports will have PBN flight procedures, which are operating under PBN condition partly or comprehensively.

1.6 **PBN training in China**

1.6.1 A PBN training base has been established in CAFUC including operation approval, flight procedure design and ICAO Standards. Over 500 people including CAAC inspectors, airlines operational engineers, procedure designers from regional authorities and ATMBs, controllers and airport personnel have been trained.

1.6.2 A PBN design office has been set up in the academy of aviation science. An ICAO Asia/Pacific PBN office has been settled in Beijing.

1.7 **Operational approval of airliner**

1.7.1 Accelerating PBN supplementary operational approval for airlines is one of the important jobs. Until the first half of 2012, all of the 33 airlines have possessed RNAV operational approval, and most of them have possessed RNP APCH operational approval, and part of them have possessed AR operational approval.

1.8 **CAAC's financial support for propelling PBN**

1.8.1 CAAC has provided the airports in China the full amount subsidy for the development of the PBN procedure, in order to nationalize these procedures. CAAC will formulate avionic standards for aeroplanes in service involving PBN upgrade, and provide comprehensive aids including financial support for Chinese aviation operators to achieve the goals above.

2. **DISCUSSION**

2.1 **CAAC and BEIDOU**

2.1.1 China launched a project to develop an independent satellite navigation positioning system in 1983, and began development of the BeiDou-G1 dual-satellite navigation system in 1994. In April 2004, BeiDou-G1 was completed and began to provide services for civil users.

2.1.2 On 27 December 2011, BeiDou Navigation Satellite System formally started to provide IOC. Since IOC, the system has performed stably. The space constellation performance has been improved apparently, and the user experience for the PNT service performance has been enhanced significantly.

2.1.3 Beidou is the GNSS developed by China alone. According to the construction plan of Beidou and the issued ICD, the performance has achieved the related GNSS requirements in ICAO Annex 10 — *Aeronautical Telecommunications*.

2.2 **Difficulties**

2.2.1 Improve implementation rate of procedures and implement them comprehensively and mandatorily step-by-step.

2.2.2 Strengthen the training for controllers.

2.2.3 Boost the airspace coordination work.

3. **CONCLUSION**

3.1 China will promote PBN implementation steadily and effectively in accordance with the “China Civil Aviation PBN Implementation Roadmap”.

3.2 Beidou is the GNSS developed by China alone. According to the construction plan of Beidou and the issued ICD, the performance has achieved the related GNSS requirements in ICAO Annex 10. Now CAAC is testing Beidou’s navigation performance and working on a plan to introduce Beidou into civil aviation.

3.3 ICAO is advised to provide the developing countries with support and guidance in the fields of technology, planning and personnel training.

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