

**55<sup>TH</sup> CONFERENCE OF  
DIRECTORS GENERAL OF CIVIL AVIATION  
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 4: AIR NAVIGATION

**CHINA PUBLIC RNP AR PROCEDURES MANAGEMENT  
CONCEPT AND ITS IMPLEMENTATION**

Presented by the People's Republic of China

**SUMMARY**

This DP introduces the China Public RNP AR procedures management concept and its implementation. With the PBN implementation in China, CAAC initiated and implemented public RNP AR to overcome the existing disadvantages of repeated design and review of RNP AR procedures. Some information contained in this paper come from *Guidelines for Airworthiness and Operation Approval of Required Navigation Performance Authorization Required (RNP AR) Procedures*, which is the Advisory Circular issued by CAAC, and from design reports the PD provider provided to the airports.

## **CHINA PUBLIC RNP AR PROCEDURES MANAGEMENT CONCEPT AND ITS IMPLEMENTATION**

### **1. INTRODUCTION**

#### **1.1 Background**

- 1.1.1 In China, 21 airports issued RNP AR procedures in the past 14 years. Most of these airports are high elevation airports or mountainous area airports. The purpose is to achieve airport accessibilities, improve flight safety and flight regularity, increase the payloads, and improve operational quality. The development of RNP AR projects implemented in China airports can be divided into three phases: a) RNP AR trial application in China; b) The application and implementation of customized RNP AR with airlines as its main body; and c) The promotion and practice of China Public RNP AR management concept with airports as the main body.

#### **1.2 The first pilot project of RNP AR in China**

- 1.2.1 CAAC initiated its first RNP AR trial project during 2004-2005, and implemented the Lhasa Airport RNP AR demonstration project. CAAC led the project, it was supported by Boeing and commissioned Naverus to design the flight procedures for Air China B757. The airport is located in the narrow valley of the Yarlung Zangbo River on the Qinghai-Tibet Plateau, with an airport elevation equals to 3570 meters (11713 feet) . Due to it's difficult to fly by traditional navigation, only visual approach and landing can be used, and the result is frequent return and alternate land. Both the development of airports and the operation of airlines are seriously restricted.

- 1.2.2 In order to solve the certain problem and to improve the fly ability of the procedures, the design criteria has to deviated from both the ICAO Doc 8168 which provides criteria for all procedure design and the Doc 9905 which provides criteria for RNP AR procedure design,

#### **1.3 The application and implementation of customized RNP AR with airlines as its main body in China**

- 1.3.1 After the great success in Lhasa airport, CAAC increased the RNP AR application in China. The airlines are encouraged to develop RNP AR procedure for their own certain fleet to improve the operation at those airports like Lhasa that benefits of RNP AR operation are significant. There are many high elevation airports implemented RNP AR, such as Linzhi Airport, Yushu airport, Shigatse airport and so on

#### **1.4 Problems encountered in the implementation of customized RNP AR**

- 1.4.1 As more and more airlines want to fly RNP AR in some certain airports like Lhasa airport, the short-comes of the customized RNP AR became more and more clear. The RNP AR procedure was originally designed for special approval of specific aircraft and aircrew, so its main body is the airlines. The RNP AR procedures designed by different airlines have different route point naming, which needed high cost and much time. It wasn't only easy to confuse tower controller, but brought great workload for the design, inspection, verification and approval of the procedure.

**1.5 The first practice of Public RNP AR with airport as the main body**

1.5.1 In order to change the restrictions on the promotion of RNP AR caused by repeated design and one-by-one approval of the customized procedure, CAAC decided to implement public RNP AR with airport as the main body at Jiuzhai Airport. Jiuzhai Airport is designed as a "four-in-one" public procedure, including horizontal track, the minimum obstruction clearance altitude of flight segment, flight reference point, decision point, etc. Thus, the main responsibility body is transferred from the airline to the airport. RNP AR enabled Jiuzhai Airport to achieve two-way takeoff and landing, saving 30 million yuan in clearance processing costs, the rate of flight regularity increased by 13.9% year-on-year, to 90.4%.

**1.6 The formation of China Public RNP AR procedure management concept**

1.6.1 In the process of RNP AR application, with the establishment of airline and ATC operation capability and the accumulation of operational experience, CAAC has formed a new management concept about RNP AR: Separate management of RNP AR procedure, aircraft capability and flight crew qualification to promote public RNP AR. If an airline uses the public RNP AR procedure published by the airport, no validation procedure is required, and if it is not explicitly specified, no field validation is required. When pilots have the experience, even if a new airport's RNP AR procedure is added, no special training is required. This greatly facilitates the implementation of RNP AR. Of course, we are still very concerned about safety. If there is a deviation between RNP AR procedures and specifications, or special skills are needed, airlines still need to take appropriate measures.

**1.7 The specific practices of China Public RNP AR management**

1.7.1 a) For the China Public RNP AR procedures, since the airport develop, validate, own and share the same trajectory to all the operators which operate at that airport. So the trajectory should be validated and approved only once. This greatly simplified the implementation and improved the efficient. b) The customization and validation of the operational minima vary from operator to operator, and aircraft to aircraft. For a brand new operator which is not RNP AR capable, no more simplify can be done. While to those operators already RNP AR capable, it is not necessary to go through the full process for every newly increased operational approval. c) For the same airport, validating the second aircraft configuration can be simplified as follows, taking into account of the three systems which will have major impacts on RNP AR operations.

**The configuration differences and recommended methods of inspection and verification**

configuration differences	inspection and verification methods for recommendation
different FMS	simulator check
different TAWS (e.g. T3CAS vs. EGPWS)	simulator check
different engine type	performance check

**2. DISCUSSION**

2.1 The major topic presented in this paper are:

- a) The management concept of China Public RNP AR procedure;
- b) The concrete practice of China Public RNP AR procedure;
- c) The simplified operational approval process of China Public RNP AR

**3. ACTION BY THE CONFERENCE**

3.1 The Conference is invited to:

Take note of the simplified operational approval process of China Public RNP AR. Recommend to adopt the management concept of China Public RNP AR, and to revise Doc9997 related content when it should be appropriate.

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