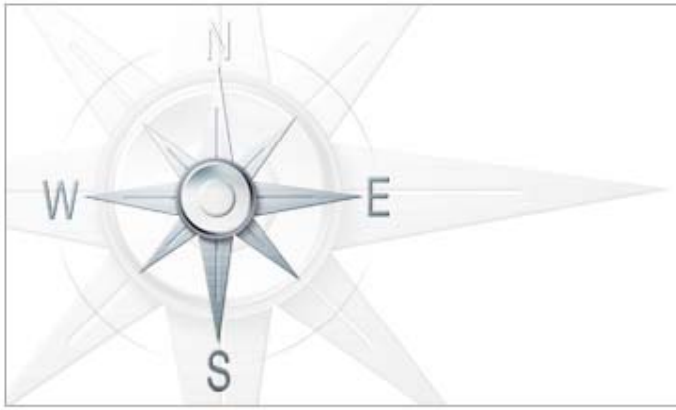


中 国 民 用 航 空 局
CAAC
Civil Aviation Administration of China

Change and Challenge
---What PBN Brings

Civil Aviation Administration of China
ICAO PBN Seminar, Bangkok
8-10 June 2015

Contents

PBN Roadmap of China

Initiate

- **2007.9** The ICAO 36th Assembly urged its Member States to develop national PBN implementation plan

Issuance

- **2009.10** CAAC issued Performance-Based Navigation Implementation Roadmap

Timeline

- Near term **2009-2012**, Medium term **2013-2016**, Long term **2017-2025** and course of actions

PBN Roadmap of China

CAAC

CHINA CIVIL AVIATION

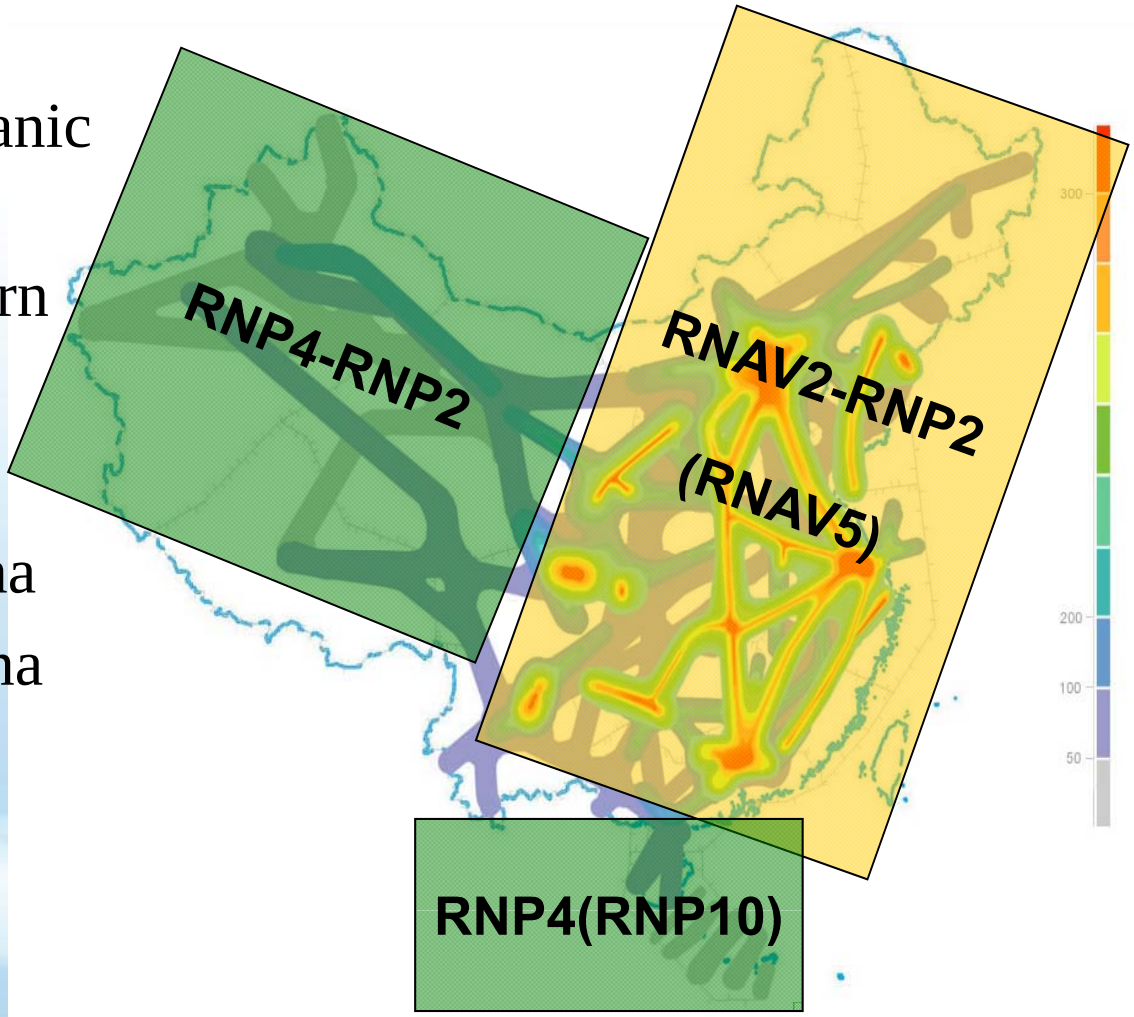
Performance-Based Navigation
Implementation Roadmap

中 国 民 用 航 空 局
Civil Aviation Administration of China

VERSION 1.0 OCTOBER 2009

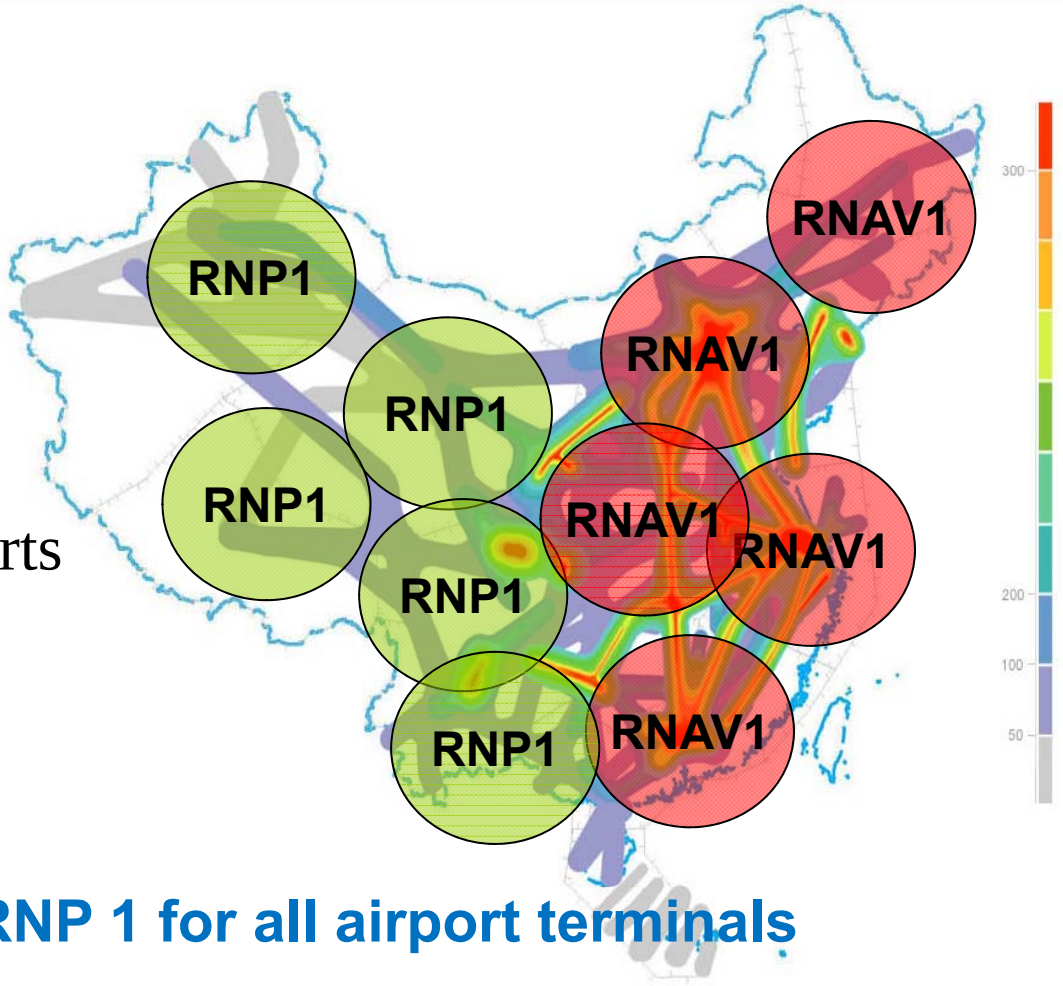
Medium Term – En-route

- Preferred Nav.Spec.
  - RNP4 (30*30) for oceanic and western China
  - RNAV2/RNP2 in eastern China
- Acceptable Nav.Spec.
  - RNP10 in western China
  - RNAV5 in eastern China



Medium Term – Terminal

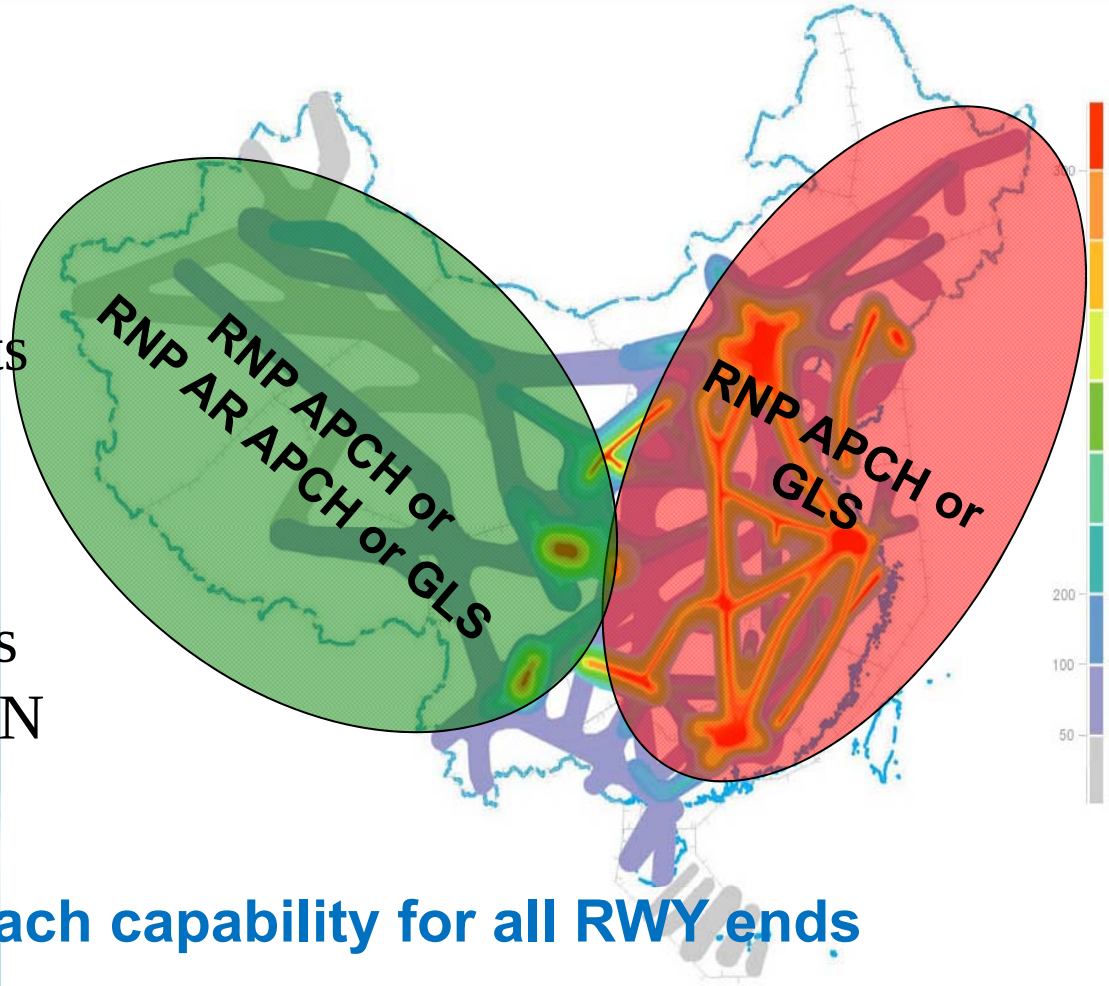
- Preferred Nav.Spec.
  - RNAV1 and RNP1
- Acceptable Nav.Spec.
  - Conventional operations, but priority given to PBN operations
  - Mandated in certain airports



By 2016, RNAV1 and RNP 1 for all airport terminals

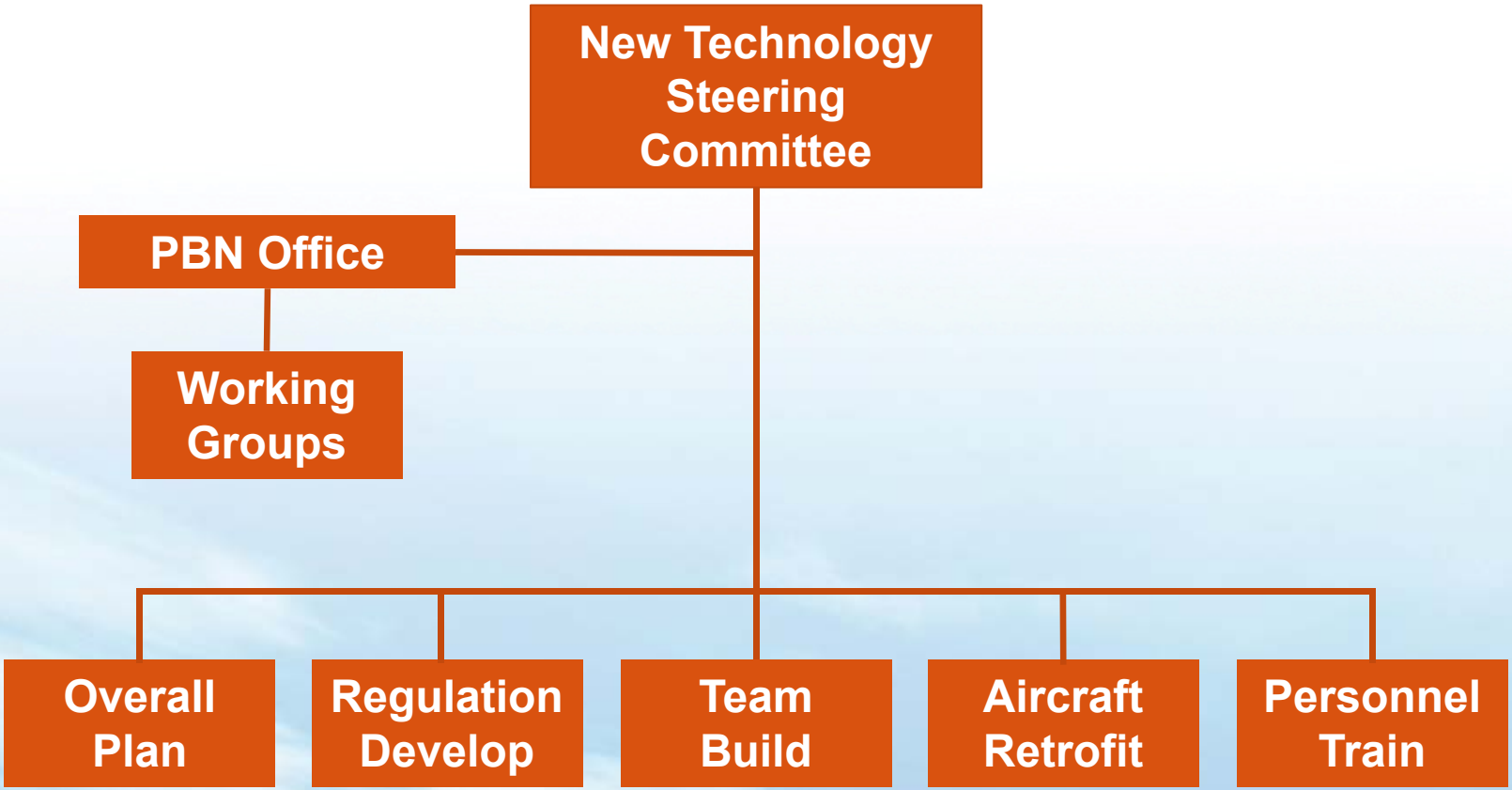
Medium Term – Approach

- Preferred Nav.Spec.
  - RNP APCH with Baro-VNAV
  - RNP AR where of operational requirements
  - Introduction of GLS
- Acceptable Nav.Spec.
  - Conventional operations but priority given to PBN operations



By 2016, RNP approach capability for all RWY ends

Organization



Regulation Framework

咨询通告

中国民用航空总局飞行标准司

特殊航空器
实施所需导航
适航与

咨询通告

中国民用航空局飞行标准司

咨询通告

中国民用航空局飞行标准司

FS－2010－01R1
月1日

指南

中国民用航空总局飞行标准司

编　　号：AC－91－08

咨询通告

下发日期：2008.2.22

编制部门：航务管理处

批 准 人：

RNAV5 运行批准指南

1. 目的

本咨询通告为航空器营运人提供了获得 RNAV5 运行批准的指南。本通告概述了 RNAV5 的实施背景，提供了使用区域导航系统获得运行批准的可接受方法。该指南并不是唯一的方法，营运人也可采用中国民航总局认为可接受的其他方法。

2. 适用范围

本通告适用于 CCAR91、121、135 部的营运人。

3. 定义

a. 基于性能的导航(PBN)。PBN 规定了航空器在指定空域内或者沿

－1－

咨询通告

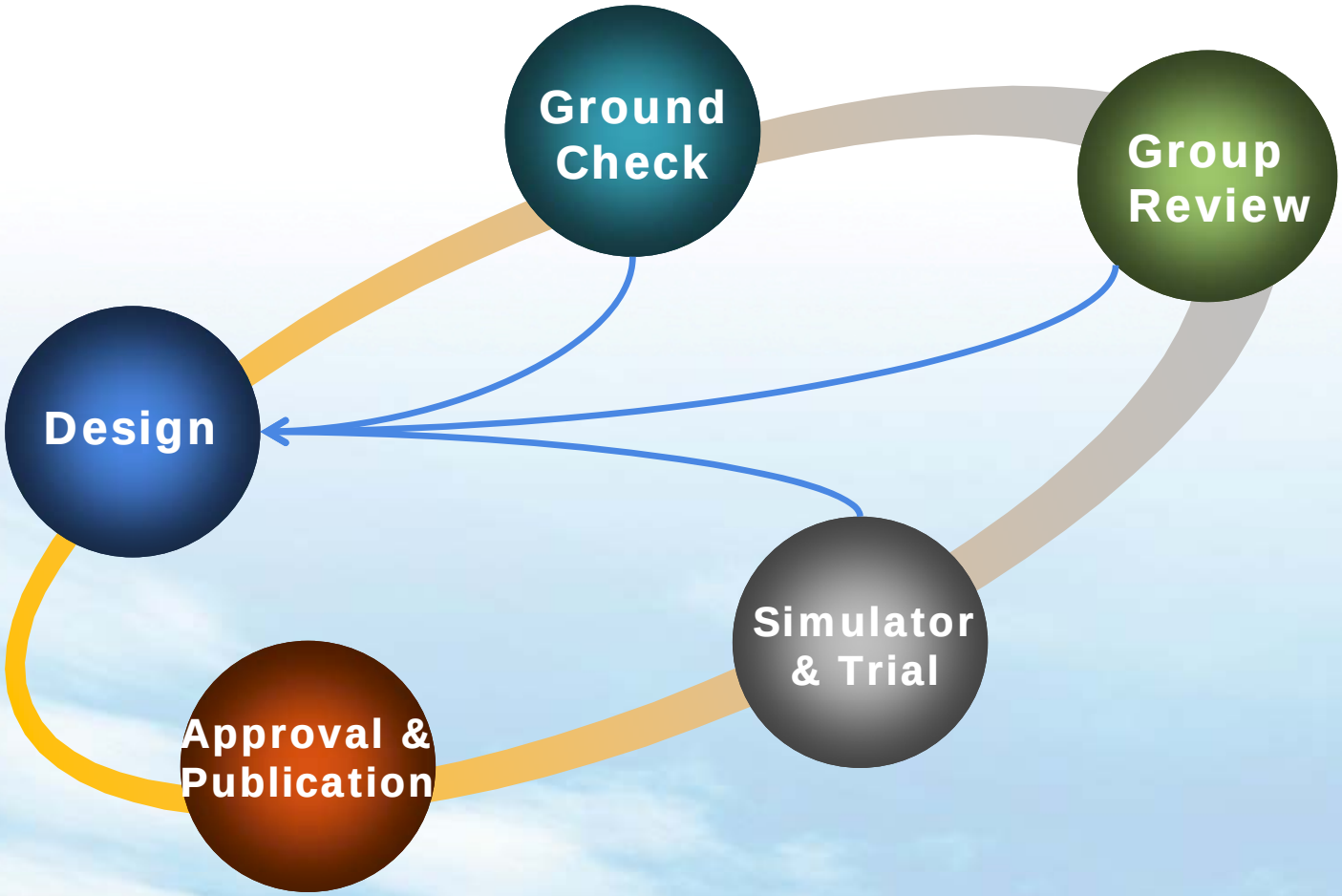
中国民用航空局飞行标准司

编　　号：AC－91－FS－2009－12

下发日期：2009 年 5 月 20 日

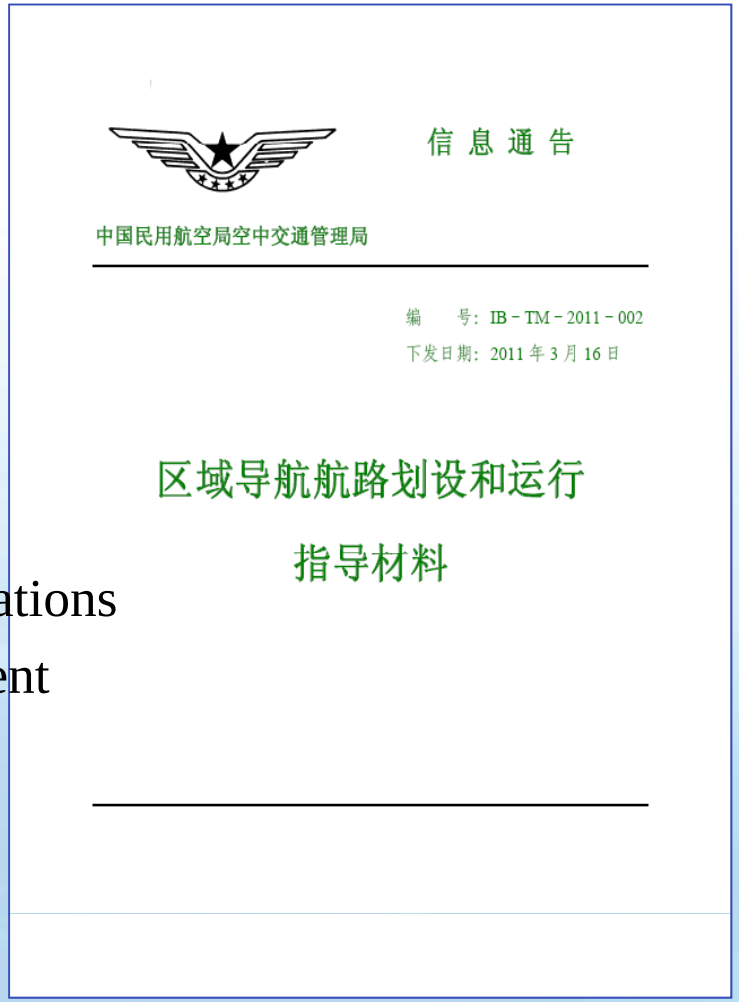
在海洋和偏远地区
空域实施 RNP4 的运行指南

Quality Ensurance of PBN FP



Guidelines on PBN Route

- Detailed 18 steps of PBN route design
- Guidelines on PBN route operations
  - FPL processing
  - Emergency arrangement
  - ATM system settings
  - ATC trainings
- Other important issues
  - Sectorization concerning parallel route operations
  - Operations in mixed navigational environment
  - Radiotelephony for ATC



信 息 通 告

中国民用航空局空中交通管理局

编　　号：IB－TM－2011－002

下发日期：2011 年 3 月 16 日

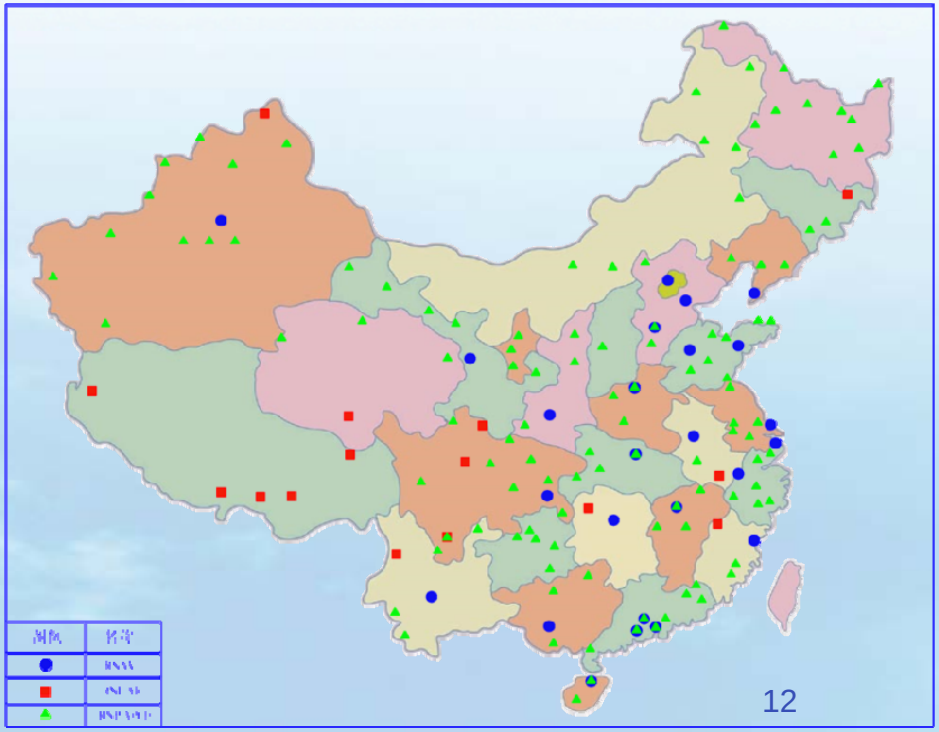
区域导航航路划设和运行

指导材料

Terminal & Approach Implementation

- Among 202 airports in China:
  - **145** airports (**71%**) have PBN (RNAV, RNP APCH, RNP AR) flight procedures, including **17** RNP AR airports
  - **66** airports have fully implemented PBN
- Aircraft fleet capability
  - Basically all have acquired operational approval of RNAV and RNP while some have RNP AR capability
  - All will be equipped of RNP capability by 2016 through the Retrofit Programme of CAAC

PBN Implementation Status in Airports by 2014



Terminal & Approach Implementation

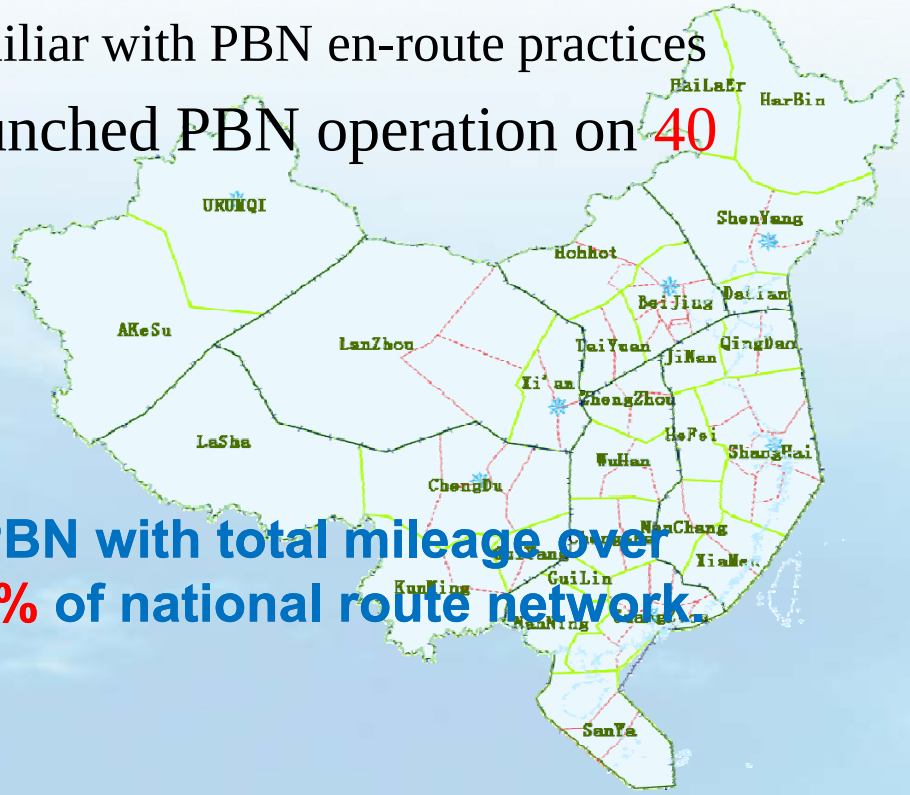
2006 First RNAV operation in Guangzhou/Baiyun Airport

2006 First RNP AR operation in Lhasa/Gongga Airport

2011 First RNP APCH operation in Sanya/Fenghuang Airport

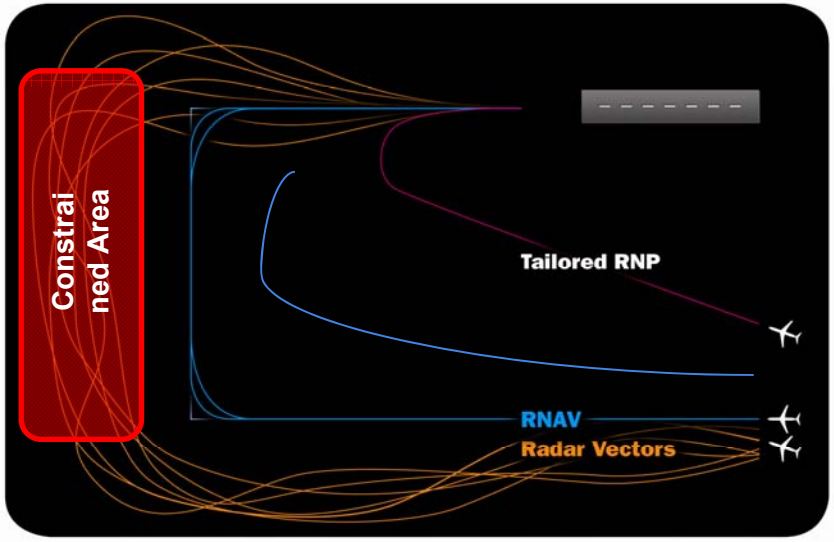
En-route Implementation

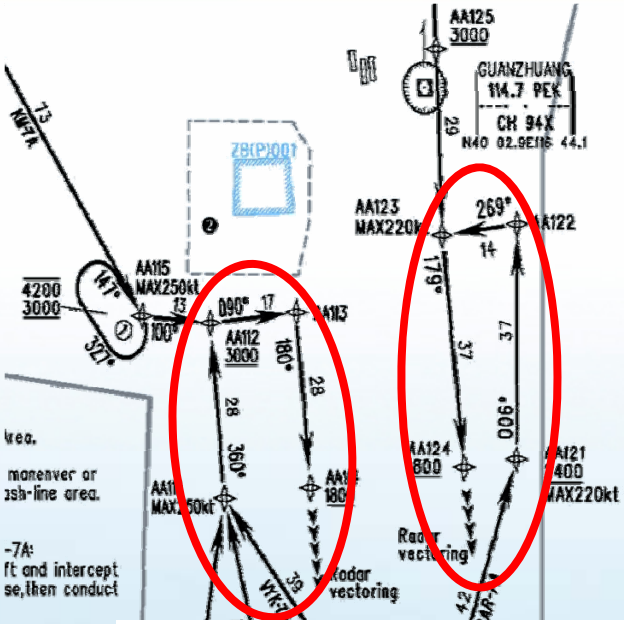
- In June 2013, CAAC commenced PBN operation on **6** truck routes
  - Mixed navigation of both PBN and conventional operation
  - Route designators remains unchanged
  - Within one year, **90%** of aircraft obtained operational approval
  - Flight crews and ATC are getting familiar with PBN en-route practices
- On February 2015, CAAC has launched PBN operation on **40** routes within Xinjiang area
  - **11** RNAV2 routes
  - **29** RNP4 routes

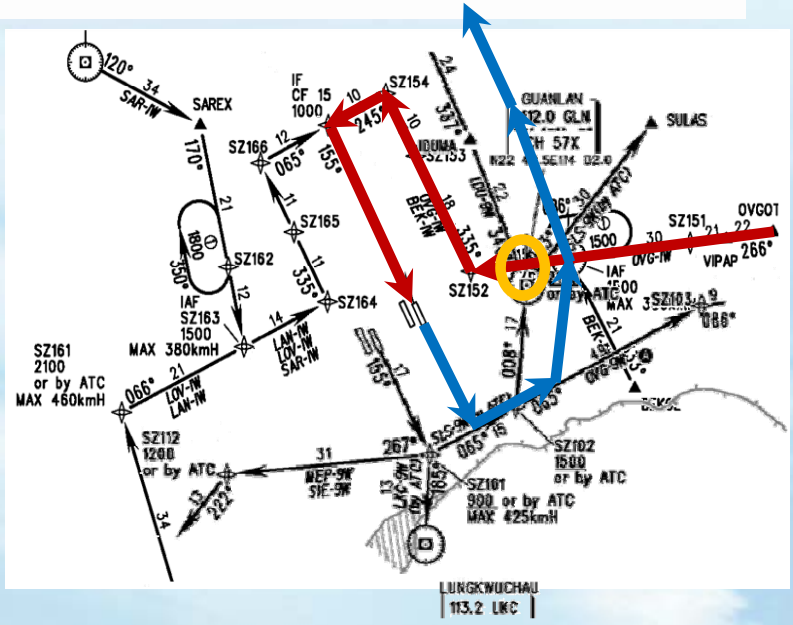


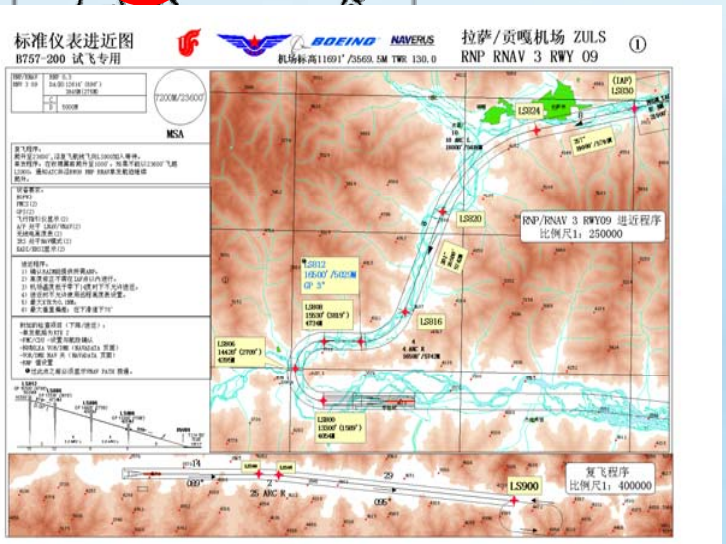
61 routes are implemented PBN with total mileage over 38,800km, accounting for 20% of national route network

Advantages of PBN

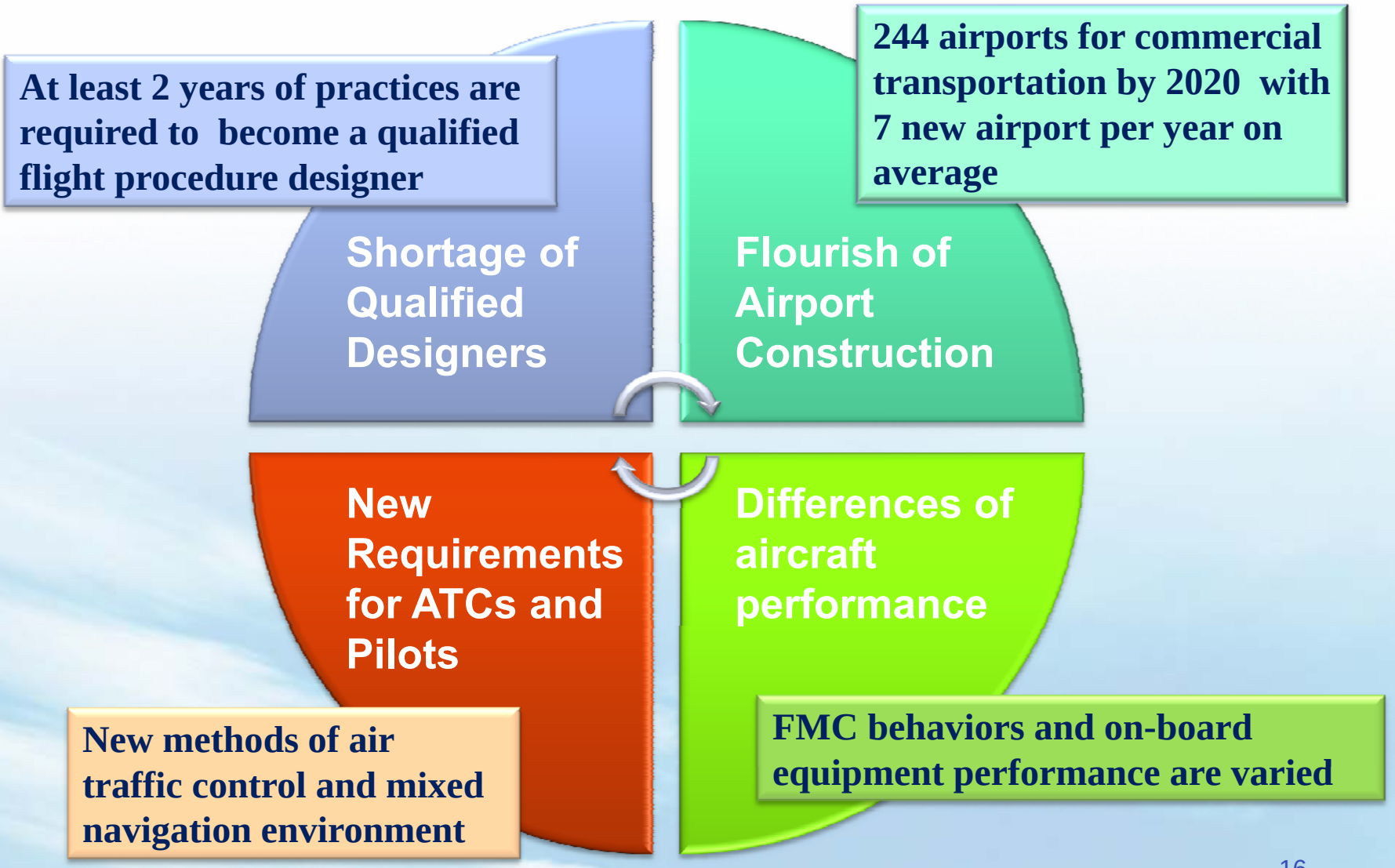








Challenges


At least 2 years of practices are required to become a qualified flight procedure designer
Shortage of Qualified Designers
244 airports for commercial transportation by 2020 with 7 new airport per year on average
Flourish of Airport Construction
New Requirements for ATCs and Pilots
New methods of air traffic control and mixed navigation environment
Differences of aircraft performance
FMC behaviors and on-board equipment performance are varied

Experiences Gained

Government Support

- Establishment of regulation framework
- Appropriate strategy on course of actions
- Necessary subsidy for aircraft operators

Training

- From PBN concept to technical criteria
- Integration of different expertise knowledge
- Combination of on-job and theoretical

Cooperation & Communication

- Extensive cooperation with aircraft manufacturers, DB providers
- Thorough communication among different lines of specialties

Next Step – Terminal & Approach

SPEED UP

- ✈Subsidy for aircraft retrofit and airport FP design
- ✈Airworthiness and operation approval
- ✈Mandated implementation in certain airports

✓ FP Design → Implementation
✓Administration → Operators

TARGET 2015

- ✈Accomplish **85%** of airports' PBN flight procedure
- ✈At least **50%** of airports are fully implemented

TARGET 2016

- ✈Accomplish **95%** of airports' PBN flight procedure
- ✈At least **75%** of airports are fully implemented

Next Step – En-route

- No imposition on aircraft retrofit
- No discrimination in operations
- No restriction for deadlines

- Approximately 70% by 2015
- Based on existing route network structure

- Stick to the Roadmap: RNAV2/RNAV5 (RNP2) in eastern China, RNP4(RNP2) for oceanic and western area

Principles by 2016

TARGETS

➢**By 2016**
all air routes are PBN operational

➢**By 2020**
smooth transition to PBN route network

China's Support for FPP

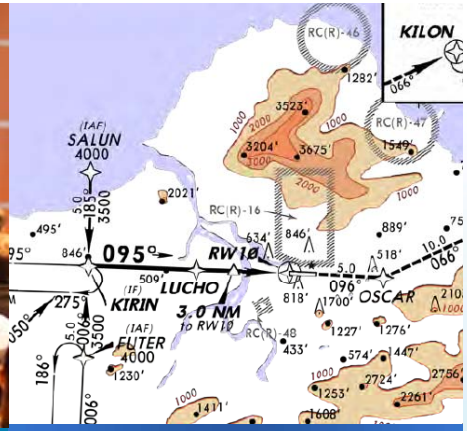
Office Facility	• China Academy of Civil Aviation Science and Technology (CAST) for Phase I • Co-located with the ICAO Asia and Pacific Regional Sub-Office with total office area of 900 m2 for Phase II
Administrative Supports	• CAAC has provided administrative personnel to FPP • During Phase II, China has arranged administrative budget to cover personnel cost and etc.
Competence Building	• 2009-2015, CAAC has provided 6 instructors to FPP, and sent 7 instructors and candidates for training abroad • Close cooperation with IATA

FPP Statistics

TRAINING

QUALITY ASSURANCE

PARTICIPATIONS IN INT'L FORUM



PROCEDURE DESIGN SUPPORT

Civil Aviation Administration of China
ICAO PBN Seminar, Bangkok
8-10 June 2015