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Agenda Item 4: Follow-up, Performance Evaluation and Monitoring of the CAR Regional Performance Based Air Navigation Implementation Plan
4.1 Progress Reports of the Task Forces of the ANI WG

PERFORMANCE BASED NAVIGATION (PBN) APPROACH CHARTS FROM AREA NAVIGATION (RNAV) TO REQUIRED NAVIGATION PERFORMANCE (RNP)

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
This paper introduces the transition plan for the change of PBN approach chart identification from RNAV to RNP. Coordination between States, GREPECAS, ICAO Headquarters and NACC Regional Office is required to develop a plan for this transition, which minimizes the impact on the ATM system.	
Action:	Action described in section 3
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Doc. 9613 - <i>Performance-Based Navigation Manual</i> (PBN) • Doc. 8168 - PANS OPS Vol. II • 39th Assembly of ICAO (WP-216) • ICAO Circular 353 - RNAV to RNP transition plan for the change to the identification of approach charts with instrument flight procedures

1. Introduction

1.1 Performance based navigation was introduced by ICAO to harmonize existing implementations of Area Navigation that were in place throughout the world. Doc 9613 – *Performance Based Navigation (PBN) Manual* contains details of the navigation specifications which are used to develop PBN routes and procedures.

1.2 As this PBN concept was brought in to replace existing Area Navigation Implementations, there has inevitably been some confusion regarding the old and new terminology. ICAO as well as industry recognized this became a problem for the appropriate understanding of the PBN concept

1.3 In order to address this, a plan to further harmonize the terminology used for PBN was developed. This would ensure that all references were consistent, as shown by the following table:

OM (PBN Operations)	PBN Requirements Box	Chart Name
RNP APCH	RNP APCH	RNP RWY 13

2. Discussion

2.1 In Nov 2014, Amendment 6 to PANS OPS Vol II became applicable which introduced a change to the way the PBN Approach Chart Identification was published. The summary of this change can be seen in the table below:

Navigation Specification	Existing chart title, permitted until 30 November 2022	Chart title required from 1 st December 2022
RNP APCH	RNAV (GNSS) RWY 23	RNP RWY 23
RNP AR APCH	RNAV (RNP) RWY 23	RNP RWY 23 (AR)

2.2 As show in the previous table, the transition period established with the adoption of this change allowed several years for implementation and no further structure was proposed regarding a planned transition for the new charts.

2.3 Many Region States have already begun to implement the new chart identification, and a number of new charts have been published in the States' AIP. The list of CAR States and the number of published charts is shown at **Appendix A**. States intending to produce new charts not previously published as RNAV should consider its implementation using the new chart identification to avoid duplication of efforts.

2.4 After the change in PANS OPS Vol. II came into effect, there were discussions, especially within the Study Group on Performance-Based Navigation (PBN/SG), but also in other expert groups, regarding the transition. These discussions focused on two areas:
Subsequent to the change becoming applicable in PANS OPS Vol II, discussions were held, primarily within the Performance-Based-Navigation Study Group (PBNSG) but also in other Panels and expert groups, regarding the transition. These focused on two areas:

- a) the lack of FMS updates with respect to the new identifications of the charts;
and
- b) the involvement at the level of the entire ATM system of a fragmented implementation approach

2.5 The PBN/SG did some research on both issues and presented their initial findings to the Air Navigation Commission. Subsequently a working paper on the same subject was also presented at the Technical Commission of the 39th Assembly of ICAO (WP-216). In both cases a task was given to ICAO to develop a coordinated transition plan to address item (2) above. It was accepted that an open transition period lasting several years would result in a large degree of variation in the charts used by international pilots, and that this situation could be improved by coordinating, as much as possible, the transition to the new chart identifications.

2.6 The PBN/SG has now completed the drafting of a global transition plan, as part of Circular 353 - Transition Planning for Change to Instrument Flight Procedure Approach Chart Identification From RNAV to RNP (included as **Appendix B**. This circular presents a framework for a coordinated global transition plan to minimize the system wide impact of the chart change. It provides guidance at the State, Regional and Global level and includes practical considerations for the establishment of the plan. Also included is a detailed hazard analysis, providing both risks and mitigations to support the successful implementation of the new instrument approach chart identification.

2.7 Initial analysis suggests that preparation work of up to a year may be needed before introducing the new charts and that there is a need to ensure good communication for all stakeholders prior to this change. Training will be required for pilots and controllers to ensure they are familiar with the new charts, and that they know how to confirm their operational approval to conduct relevant PBN operations.

2.8 Regional coordination to minimize the impact of the change may require States to consider implementing the new charts earlier than the final deadline of 30 November 2022. Planning for this change will need to start early enough to ensure a smooth transition. The Meeting is therefore requested to consider this activity in their plans and to ensure sufficient time is allocated to this task to successfully implement the new charts.

2.9 ICAO HQs will be providing the central repository of information on the chart transitions. This will identify, graphically, those States that have indicated a timeline for the transition as well as those which have finally completed this work. This will be available through: <https://www.icao.int/safety/charting/>

2.10 Additionally it is understood that during this transition, other elements of the chart can and should be used to confirm the correct procedure has been identified. In particular reference to the published minima can be used as confirmation, and for this to be useful more emphasis will need to be placed on the standardized depiction of these minima on the published charts. The below table shows how these can be used to identify the appropriate chart:

Navigation Specification	Chart title required from 1st December 2022	Minima Used
RNP APCH (Baro-VNAV)	RNP RWY 23	LNAV, LNAV/VNAV
RNP APCH (SBAS)	RNP RWY 23	LP, LPV
RNP AR APCH	RNP RWY 23 (AR)	RNP 0.3, RNP 0.15 etc.

2.11 ICAO Regions are urged to develop their transition plans for PBN approach charts from RNAV to RNP, to be included this in their regional plans, and ensure sufficient time is allocated to this task to successfully implement the new charts.

2.12 To start this process, a summary of the PBN procedures currently published within the region is attached in **Appendix C**.

3 Action by the Meeting

3.1 The meeting is invited to:

Note the information presented and develop a regional plan for the transition to RNP Instrument Approach Chart Identification and communicate it to ICAO HQs, within 8 months of the date of this Meeting.

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APPENDIX A

State Estado	Total PBN APTs	RNP RWY XX	% Complete	Total PBN Approaches	RNP_APCH	RNP_AR	% PBN Runways
Costa Rica	1	1	100%	3	---	2	67%
Cuba	14	10	71%	27	19	---	70%



| ICAO

Circular 353 AN/209

TRANSITION PLANNING FOR CHANGE TO INSTRUMENT FLIGHT PROCEDURE APPROACH CHART IDENTIFICATION FROM RNAV TO RNP

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FOREWORD

The advent of performance-based navigation (PBN) is having a major impact on all aspects of the aviation industry and associated professionals involved in PBN planning, implementation and execution. As part of a continuing effort to streamline inconsistencies resulting from the emergence of PBN, changes to the identification of instrument flight procedure approach charts from RNAV to RNP were introduced to align the procedure approach chart identification with the designation of the navigation specification. This document provides guidance for the development of transition plans to support the procedure approach chart identification change. This document replaces Circular 336 AN/195, *Area Navigation (RNAV) to Required Navigation Performance (RNP) Instrument Approach Chart Depiction*, which has been withdrawn (refer to ICAO Electronic Bulletin 2017/05 dated 6 January 2017).

This document does not specify new due dates for implementation of the instrument approach procedure charting change. Such dates will be communicated to States via the ICAO PBN Programme Office in synchronization with the ICAO regional offices after full consultation with States and regions.

If air traffic management (ATM) system-wide transition issues are to be avoided, synchronized transition planning is critical to achieving the chart identification change. For this reason, this change should not be undertaken in isolation on an airport-by-airport basis, but rather as part of an organized, synchronized and well-communicated regional transition plan. Synchronized transition planning, particularly within each ICAO region, is required to ensure that the transition period defined at the global level does not increase the levels of confusion currently experienced by flight crew, air traffic controllers and all other ATM stakeholders. As such, this document is intended for ICAO regions, States, regulators, air navigation services providers (ANSPs) and operational personnel.

This document is constructed based on several guiding principles that are grounded in the need for synchronized transition planning referred to above. These values may be outlined as follows:

- consideration given to operational requirements and the impact of implementation;
- recognition of the needs of all airspace users;
- ensuring a balanced approach between different requirements within ICAO regions and at the State level;
- ensuring collective benefit of all stakeholders through collaborative planning assured through a coordinated and integrated approach;
- communication of operational impact on all affected parties and measures taken; and
- assurance of synchronicity between regions and States within each region which makes the factor of ‘timing’ and scheduling critical.

These principles imply the need for:

- synchronized transition planning at all levels — global, regional and State transition plan;
- ICAO to guide its regions as to how and when to transition from current to end state;
- ICAO regions to direct States on the principles of transition requirements;
- consultation with stakeholders involved in transition planning to ensure that all stakeholders’ needs, issues and concerns are addressed;
- State (or other organization) decision-making bodies to publish in their AIP non-compliance with ICAO chart titling plan and to inform their stakeholders should the State not elect to transition to the new chart identification;

- regulators to ensure that the 'package' of chart identification, radio telephony, pilot and flight crew procedures (enabling shared flight crew/air traffic control (ATC) understanding) is properly formulated and is consistent with international practices;
- service providers and airline operators to provide effective briefings and knowledge transfer, and to ensure where appropriate that training is provided for operational personnel; and
- development of a timely and effective communication plan as this is key to synchronized transition planning and effective transition execution.

It is emphasized that the interim naming proposal that was indicated in Circular 336 is removed in this circular.

Mindful that aeronautical charts are covered in a wide range of ICAO material, this circular should not be read in isolation; ICAO's Annex 4 — *Aeronautical Charts*, Annex 15 — *Aeronautical Information Services*, complemented by the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), the *Procedures for Air Navigation Services — Aircraft Operations* (Doc 8168) and the *Aeronautical Chart Manual* (Doc 8697), Third Edition, 2016, are also relevant.

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GLOSSARY

ACRONYMS AND ABBREVIATIONS

AFIS	Aerodrome flight information service (AFIS)
AFM	Aircraft flight manual
AIC	Aeronautical information circular
AIM	Aeronautical information management
AIP	Aeronautical information publication
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical information service
ALARP	As low as reasonably practical
ANSP	Air navigation services provider
APCH	Approach
ARINC	Aeronautical Radio Inc.
ASBU	Aviation system block upgrade
ATC	Air traffic control
ATCO	Air traffic control officer
ATIS	Automatic terminal information service
ATM	Air traffic management
ATS	Air traffic services
CANSO	Civil Air Navigation Services Organisation
CAT	Category
CFIT	Controlled flight into terrain
DME	Distance measuring equipment
EUR	European
FMS	Flight management system
GNSS	Global navigation satellite system
GPS	Global positioning system
HIRA	Hazard identification and risk assessment
IAP	Instrument approach procedure
IATA	International Air Transport Association
IFATCA	International Federation of Air Traffic Controllers' Associations
IFPP	Instrument Flight Procedures Panel
IFR	instrument flight rules
IRU	Inertial reference unit
LNAV	Lateral navigation
LPV	Localizer performance with vertical guidance
MCDU	Multi-function control and display unit
MID	Middle East
MoU	Memorandum of Understanding
NAVAID	Navigation aid
NOTAM	Notice to airmen
NSA	National Supervisory Authority
OPS	Operations
PANS	Procedures for Air Navigation Services
PBN	Performance-based navigation
PIRG	Planning and implementation regional group
RF	Radius to fix

RNAV	Area navigation
RNP	Required navigation performance
R/T	Radiotelephony
RWY	Runway
SMS	Safety management system
SOPs	Standard operating procedures
STAR	Standard arrival
TMA	Terminal manoeuvring area
VNAV	Vertical navigation

DEFINITIONS

Note.— Where an asterisk appears beside a term, the term has already been defined as such in Annexes and Procedures for Air Navigation Services (PANS).

Change management. A formal process to manage changes within an organization in a systematic manner, so that changes which may impact identified hazards and risk mitigation strategies are accounted for, before the implementation of such changes.

Defences. Specific mitigating actions, preventive controls or recovery measures put in place to prevent the realization of a hazard or its escalation into an undesirable consequence.

Hazard*. A condition or an object with the potential to cause or contribute to an aircraft incident or accident.

Navigation application. The application of a navigation specification and the supporting NAVAID infrastructure, to routes, procedures, and/or defined airspace volume, in accordance with the intended airspace concept.

Note.— The navigation application is one element, along with communications, ATS surveillance and ATM procedures which meet the strategic objectives in a defined airspace concept.

Navigation function. The detailed capability of the navigation system (such as the execution of leg transitions, parallel offset capabilities, holding patterns, navigation databases) required to meet the airspace concept.

Navigation specification. A set of aircraft and aircrew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specification:

Area navigation (RNAV) specification. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in designated airspace.

PBN (requirement) box. Chart note published on the instrument approach procedure in a box which includes the identification of the PBN navigation specification used in procedure design and any optional requirements that are not included in the core navigation specification.

Procedure chart identification. The chart shall be identified by the name of the city or town or area which the aerodrome serves, the name of the aerodrome and the identification of the instrument approach procedure as established in accordance with the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168), Volume II, *Part I — Section 4, Chapter 9*.

Risk mitigation. The process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard's projected consequence.

RNP operations. Aircraft operations using an RNP system for RNP navigation applications.

RNP route. An ATS route established for the use of aircraft adhering to a prescribed RNP navigation specification.

RNP system. An area navigation system which supports on-board performance monitoring and alerting.

Safety management system (SMS)*. A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Safety risk*. The predicted probability and severity of the consequences or outcomes of a hazard.

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

1.1.1 Purpose

1.1.1.1 The purpose of this circular is to provide guidance regarding the transition from the area navigation (RNAV) global navigation satellite system (GNSS) RWY XX approach naming convention to RNP RWY XX, in accordance with Amendment 6 to the *Procedures for Air Navigation Services — Aircraft Operations* (Doc 8168, PANS-OPS), Volume II — *Construction of Visual and Instrument Flight Procedures*. In particular, it provides the framework for a global transition plan, the framework for developing a regional transition plan by the ICAO regional offices, as well as provides States with guidance on how to develop a State transition plan. In each case, all stakeholder requirements need to be considered, as well as hazards, risks and mitigations regarding transition planning and implementation.

1.1.1.2 A global timeline for conversion is established. Within this global timeframe each region inherits its own period of transition and each State receives from its regional transition plan a dedicated time slot during which the region will transition to the new chart identifications. Each State should plan to complete the transition in accordance with this slot. No regional transition plan should extend beyond the target date of the global timeline.

1.1.2 Target audience

1.1.2.1 This publication will be useful to civil aviation authorities that oversee instrument procedure design and charting/publication organizations (both internal and external). It will also assist all stakeholders, including ICAO regional offices; international organizations; air operators; air navigation service providers; data houses; procedure design organizations; air traffic control officer (ATCO) and pilot training organizations; charting organizations and aircraft manufacturers, with addressing applicable aspects of the conversion in relation to their specific areas of responsibility.

1.1.2.2 This circular includes practical considerations for the establishment of the global transition plan. ICAO regional offices and their stakeholders may use this circular as a guide for developing a regional transition plan with their stakeholders. Similarly, civil aviation authorities and stakeholders may use this circular as:

- a) a guide to the development of individual State transition plans; and
- b) as a checklist to ensure all aspects of transition are addressed.

1.1.3 Structure

Chapter 1 — *Introduction* explains the background to the charting change, context and clarification of Amendment 6 to the PANS-OPS (Doc 8168), and the requirement for connected global, regional and State transition planning.

Chapter 2 — *Key Considerations*: Explains main elements which must be considered when affecting the charting change. These include change management, impact assessment, safety management and transition planning which must factor in timely stakeholder consultation and effective communication planning.

Chapter 3 — *ICAO global framework for transition planning*: Provides at a global level identification of stakeholders and consultation (roles and responsibilities), and a roadmap for transition (activities, sequencing and interdependence with key considerations applied *globally*).

Chapter 4 — *Framework for ICAO regional transition planning*: Provides at a regional level guiding principles, identification of stakeholders and consultation (roles and responsibilities), and a roadmap for transition (activities, sequencing and interdependence with key considerations applied *regionally*).

Chapter 5 — *Example of State transition planning*: Provides at the State level identification of stakeholders and consultation (roles and responsibilities) and a roadmap for transition (activities, sequencing and interdependence with key considerations applied *nationally* and *locally*).

Appendix A — *Hazard identification and risk mitigation*.

Appendix B — *Sample State activities and responsible actors*.

Appendix C — *Sample State interdependencies and sequencing*.

1.2 BACKGROUND

1.2.1 Current PBN approach chart identification is not globally standardized and the chart identification does not match the designation of the RNP approach specifications published in the *Performance-based Navigation (PBN) Manual* (Doc 9613). Examples of current chart identification conventions used for the RNP APCH specification include RNAV (GPS) RWY XX and RNAV (GNSS) RWY XX. Approaches requiring the RNP AR APCH specification currently bear the chart identification of RNAV (RNP) RWY XX. To address this inconsistency, ICAO published provisions for a coherent naming convention reflecting the navigation application being used on the approach, either RNP APCH or RNP AR APCH. The rationale and recommendations made are summarized below.

1.2.2 The *PBN Manual* (Doc 9613) stipulates that RNP specifications include requirements for on-board performance-monitoring and alerting and that RNAV specifications should have no such requirement. The manual has two navigation specifications for use in the final approach segment. Both of these require on-board performance-monitoring and alerting, and are therefore designated, respectively, as RNP APCH and RNP AR APCH in the *PBN Manual* (Doc 9613), Volume II — *Implementing RNAV and RNP Operations*, Part B, Chapters 5 and 6, respectively. In the *PBN Manual's* (Doc 9613) first and subsequent publication in 2008 and 2013, the chart identification for RNP APCH and RNP AR APCH retained the pre-PBN chart identification convention whereby the chart identification for both was indicated as 'RNAV...', one of the main motivations being that this term (or its abbreviation 'RNV') was harmonized with a majority of existing avionics displays. However, as part of a continuing effort to ensure coherency of PBN across ICAO provisions, this chart identification discrepancy was one of various discrepancies and clarifications that ICAO sought to improve, and it did so by including a change to the chart identification convention in Amendment 6 to the PANS-OPS.

1.2.3 During the consultation process leading to Amendment 6, a need was also identified for a PBN box to be included on the chart with a view that this could be used to indicate the applicable navigation specification (i.e. RNP APCH, RNP AR APCH, Advanced RNP, RNP 0.3) or other optional or additional requirements, e.g. RF functionality. Additional information on the safety management process is included below.

1.3 SUMMARY OF CHART IDENTIFICATION CHANGE

1.3.1 Table 1-1 depicts the change in chart identification for RNP APCH and RNP AR APCH navigation specifications. For each State, the existing chart identification is permitted until a specified date which is the end of the State transition period; the new chart identification depiction is required thereafter. This document does not provide specific dates; such dates will be communicated to States via the ICAO PBN Programme Office in synchronization with the ICAO regional offices after full consultation with States and regions.

Table 1-1. Summary of chart identification changes

Navigation specification	Existing chart identification	New chart identification
RNP APCH	RNAV (GNSS) RWY 23	RNP RWY 23
RNP AR APCH	RNAV (RNP) RWY 23	RNP RWY 23 (AR)

1.3.2 The identification must also include a parenthetical suffix when exceptional conditions occur as described in Table 1-2 (this table refers to Table III-5-1-1 in Doc 8168, *Procedures for Air Navigation Services — Aircraft Operations*, Volume II — *Construction of Visual and Instrument Flight Procedures*).

Table 1-2. PBN approaches — parenthetical suffices

Condition	Suffix	Examples
Procedure has only an LPV line of minima	LPV only	RNP RWY 23 (LPV only)
Procedure has only an LNAV/VNAV line of minima	LNAV/VNAV only	RNP RWY 23 (LNAV/VNAV only)
Procedure has both LPV and LNAV/VNAV lines of minima but no LNAV minima	LPV, LNAV/VNAV only	RNP RWY 23 (LPV, LNAV/VNAV only)
Procedure has only an LP line of minima	LP only	RNP RWY 23 (LP only)

1.3.3 When changing the chart identification, additional procedure requirements must be provided as chart notes if not published earlier. PBN items must be separated out and published in a PBN requirements box which includes the identification of the navigation specification used in procedure design and any optional requirements as specified in Table 1-3. An example is shown in Figure 1-1.

Table 1-3. Examples of PBN requirements box

Navigation specification	Examples of additional requirements in PBN requirements box
RNP APCH	RF required
RNP AR APCH	RNP <0.3 Missed approach RNP <1
Advanced RNP	RNP <1 in initial and intermediate segment
RNP 0.3	RF required

Note.— The list of requirements associated with navigation specification is identified in the Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS, Doc 8168) and in the PBN Manual (Doc 9613).

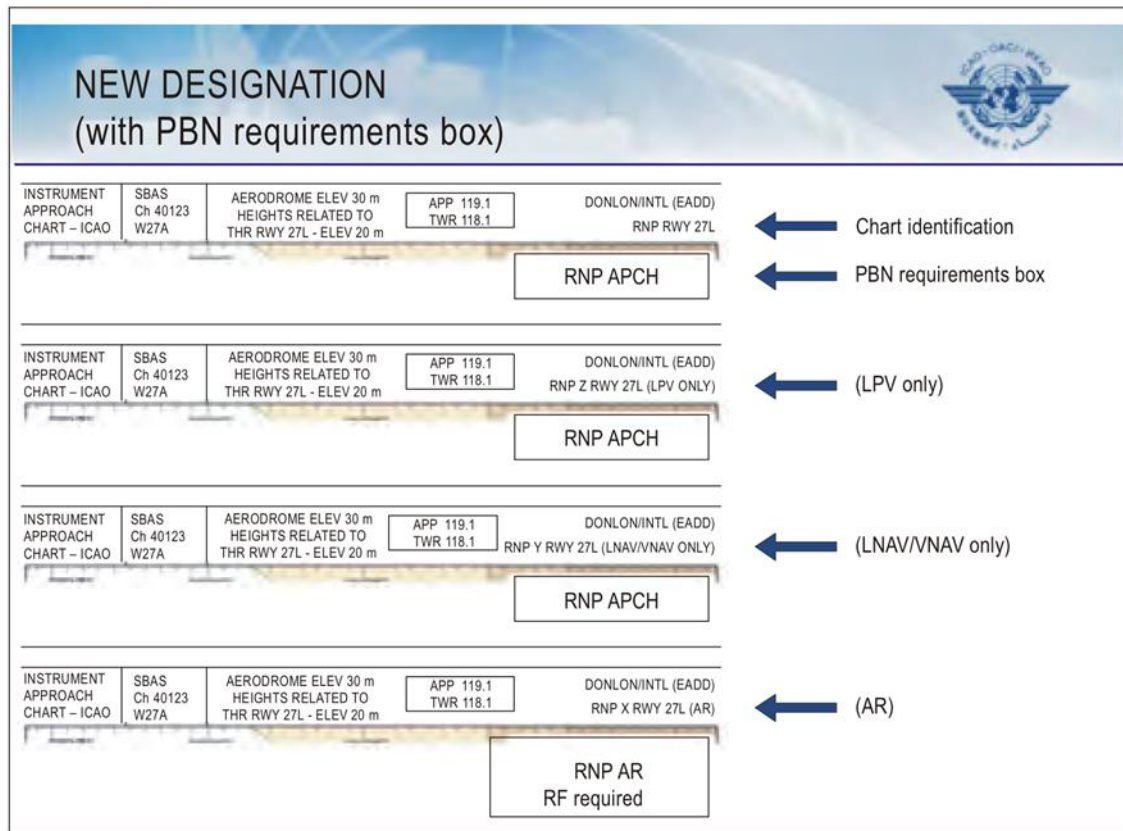
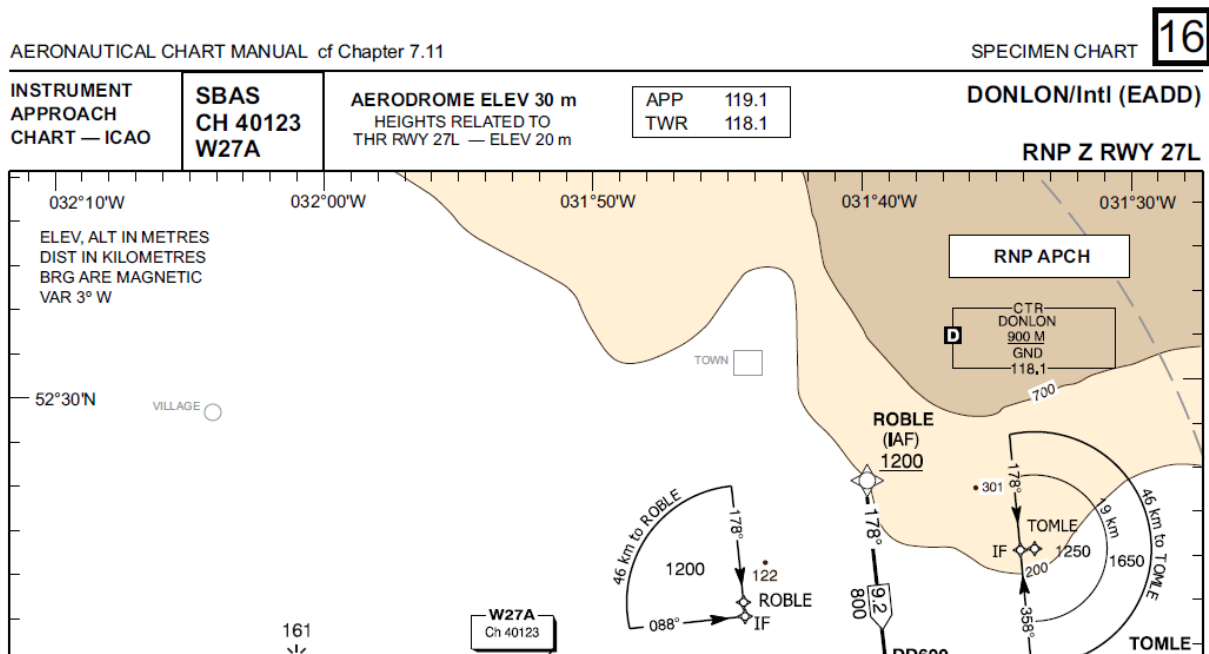


Figure 1-1. Example of new PBN chart designation (with PBN requirements box)

1.4 SUMMARY

1.4.1 This chapter has provided an overview of the procedure chart identification change required by Amendment 6 to the PANS-OPS (see Table 1-4).

Table 1-4. Required charting changes

Procedure chart identification	Existing PBN approach starts with procedure chart identification starting with RNAV will be re-named to start with RNP as shown at <i>Table 1-1. Summary of chart identification changes.</i>
Chart — PBN requirements box	PBN requirements box has to be added to each PBN approach chart.

1.4.2 The next chapters address key considerations to be accounted for when making this change and the need for transition planning.

CHAPTER 2

KEY CONSIDERATIONS

2.1 INTRODUCTION

Consideration must be given to key elements when implementing the charting change. These relate to change management, impact assessment, safety management and transition planning which includes consultation and communication planning.

It cannot be overemphasized that to ensure safe operational implementation, local chart identification changes must be synchronized with the State transition plan (Chapter 5) which must be synchronized with the associated regional transition plan (Chapter 4) which, in turn, is synchronized globally (Chapter 3).

In terms of transition planning, the *key transition plan* is the **regional** transition plan: this is the coordinating mechanism to ensure that pilots operating within a broad regional ATM system are exposed, for a very limited period only, to a mix of old and new chart identification.

2.2 CHANGE MANAGEMENT

In aviation, the proper management of change to the systems is critical as even the smallest adjustment can have significant consequences. For this reason, change management takes a structured, coordinated and synchronized approach globally, regionally and within a State, to ensure that the change is smoothly and successfully implemented without creating unforeseen consequences. The complexity of aviation requires such structure and planning to ensure that aviation safety is not jeopardized.

2.3 POTENTIAL IMPACT OF AMENDMENT 6 TO THE PANS-OPS

The change of the procedure chart identification from RNAV to RNP has economic, regulatory and operational impacts which must be managed by a robust safety management system to ensure implementation and safety. While Table 2-1 below provides a high-level indication of the impact of these changes, numbered 1 to 8, safety considerations and mitigations as well as the need for consultation, are also dealt with in the paragraphs which follow.

Table 2-1. Potential impact of chart identification change and PBN requirements box input

<u>Item</u> and associated requirement	Potential impact of an economic, regulatory or operational nature
1. <u>Chart identification and PBN requirements box:</u> Requirement to comply with Amendment 6 of PANS-OPS.	Economic: (Re-) publication of charts in AIP complying with requirements of Amendment 6. Changes to automation software may be required.
2. <u>Pilot procedures:</u> Requirement to provide training and information for pilots.	Economic: Knowledge and training (e.g. pilot bulletins, simulator training sessions and computer-based training sessions).
3. <u>Air traffic control (ATC) procedures:</u> Requirement to provide training information for ATCs providing approach, and tower services, or aerodrome flight information service (AFIS).	Economic: Knowledge and training (e.g. ATCO bulletins and training) prior to chart change.
4. <u>Procedure design software:</u> Procedure charting software may have to be amended to reflect charting change.	Economic: Software adaptations.
5. <u>Charting houses:</u> Requirement: Charts to be changed as per numbers 1 and 2. States to issue changes to aeronautical information publication (AIP) which would require charting houses to react.	Economic: Re-issue of charts closely coordinated between the State's aeronautical information service (AIS) organization and charting houses.. Software adaptations may also be needed to capture chart identification and PBN requirements boxes.
6. <u>Aircraft flight manual (AFM):</u> Requirement: The AFM may need to be amended to reflect RNP approval.	Economic: Amendment of AFM by air operators, if applicable. Operational: Regulator may have to issue clarification.
7. <u>Changes to on board the multi-function control and display unit (MCDU):</u> Requirements: None.	Economic: If airline operators or equipment manufacturers decide to make changes to their flight management systems to reflect the change from RNV to RNP, the economic impact of this is likely to be considerable which is why this change is likely to be introduced only by forward fit over several decades. Operational: If airline operators or equipment manufacturers decide against making changes to their flight management systems to reflect the change from RNV to RNP, the MCDU will not reflect the change so it will not be aligned with the procedure chart identification or the ATC clearance.

2.3.1 Safety management

Annex 19 – *Safety Management*, establishes SARPs for the implementation by States of State safety programmes (SSP), including requirements for service providers to implement safety management systems (SMS). The *Safety Management Manual (SMM)* (Doc 9859) provides guidance materials on the implementation of SSP and SMS. The focus of safety management is on managing aviation safety risks and ensuring that any new hazards that are introduced by a change are identified, the associated risks assessed and, if necessary, mitigated to a tolerable level. By using the safety risk management process outlined in Doc 9859, States will ensure that the risks introduced by a change will be successfully managed from a safety standpoint.

2.3.2 Overview of the issues

The following paragraphs identify in general terms the potential hazards, risks and mitigations related to procedure chart identification change. Appendix A (Hazard identification and risk mitigation) provides further details of the identified hazards and suggested mitigations that could be applied. States should use the information contained in Appendix A to support the conduct of a safety risk assessment, as described in Doc 9859 – *Safety Management Manual*, as part of the safety risk management activities under their State safety programme (SSP).

2.3.2.1 *Flight deck issues*

2.3.2.1.1 It should also be noted that current flight management system (FMS) procedure labels seldom reflect the charted approach naming convention for both conventional and PBN approaches. As well, FMS procedure labels vary among manufacturers. Pilots are already trained to find the required guidance to fly the correct procedure in the FMS.

2.3.2.1.2 While changing the procedure chart identification (from RNAV to RNP) appears simple, pilots will need to be particularly vigilant in distinguishing between the existing and the new chart identification convention, and understanding each procedure chart identification's significance. Attention is drawn to the following:

- Currently, *all* PBN approach chart identification start with the expression 'RNAV', and the RNP AR APCH is distinguished from the RNP APCH by the expression 'RNP' appearing between brackets in the chart identification immediately after RNAV for RNP AR APCH (e.g. RNAV RWY XX (RNP)).
- In the target system, all PBN approach chart identification will start with the expression 'RNP', and the RNP AR APCH will be distinguished from the RNP APCH by the abbreviation 'AR' between brackets at the end of the chart identification for the authorization required approaches (e.g. RNP RWY XX (AR)).
- Today an RNP AR APCH chart is identifiable because it is the only approach procedure chart identification bearing the letters RNP; in the future system all PBN approaches will start with the letters 'RNP' and the distinguishing 'AR' feature will come from insertion of AR between brackets.

2.3.2.1.3 The above may be exacerbated by the fact that MCDUs aboard most aircraft show, and will continue to show, 'RNV' for both RNP APCH and RNP AR APCH – as this is in accordance with the convention that may no longer be used on chart identification after each State's transition period, hence the economic impact alluded to in Table 2-1.

2.3.2.2 *ATM issues*

2.3.2.2.1 The mix of procedure chart identifications described in paragraph 2.3.2.1 is mirrored in the ATM system. From an ATM perspective, the situation to avoid is one whereby a controller within an ATCU is clearing an aircraft to execute an RNP APCH at Airport A using the *existing procedure chart identification* e.g. 'Cleared RNAV Y RW23', while simultaneously clearing another aircraft to execute an RNP APCH at Airport B using the *new chart identification* RNP Y RW19'. In this case, the mitigation is to ensure that all RNP APCH and RNP AR APCH procedures affected within the same terminal area, or under the authority of a common ATCO, change their procedure chart identifications simultaneously.

2.3.2.3 *Joint mitigation needed for flight deck – ATM system-wide issue*

2.3.2.3.1 The flight deck issues described at 2.3.2.1 taken together with the ATM issues described at 2.3.2.2, mean that a joint mitigation is needed. In most ICAO regions, well over 70 per cent of flights operate within one region,

and, in most ICAO regions, flight crews operate several flight segments daily.

2.3.2.3.2 For flight crews, it is desirable to minimize their exposure to alternate chart identification within the region, to avoid the flight deck risks described at 2.3.2.1, and the confusion that might arise. For air traffic controllers, in order to manage ATC training effectively within a State or air traffic facility, there needs to be one set of practices so that an incorrect clearance is not issued which would confuse flight crews.

2.3.3 Operational mitigations

2.3.3.1 Mitigations proposed to reduce the operational impact include training for air traffic control officers (ATCOs) and pilots, and robust transition planning.

2.3.3.2 *Training for ATCOs and pilots*

2.3.3.2.1 States should determine what sort of sufficient training should be provided for ATCOs and pilots to raise their awareness of the potential confusion which may arise while mixed procedure chart identifications exist.

2.3.3.3 *Global, regional and State transition planning*

2.3.3.3.1. The ICAO PBN Programme Office has developed a global transition plan (framework provided in Chapter 3). Full synchronization will be required between regional transition plans developed by ICAO regions (framework provided in Chapter 4). Additionally, full synchronization, with particular emphasis on sequencing of sub-regional rollout, will be required between an ICAO regional transition plan and individual State transition plans developed by the relevant authority (framework provided in Chapter 5). An overview of the methodology is shown in Figure 2-1.

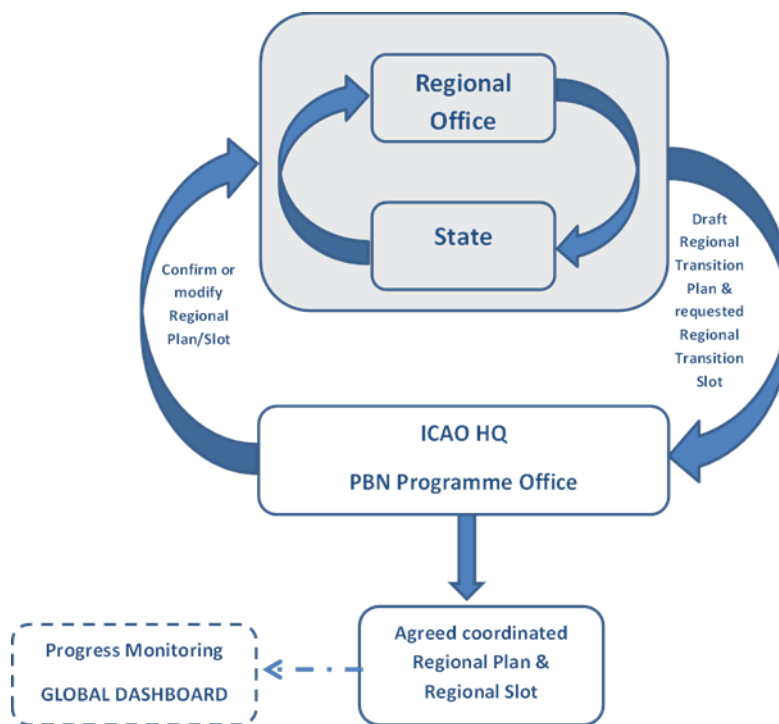


Figure 2-1. Global, regional and State coordination process

2.3.3.3.2 The process involves the ICAO PBN Programme Office coordinating closely with the ICAO regional offices, and each regional office coordinating closely with the States within its region. The process only becomes effective once the ICAO PBN Programme Office has notified the regional offices of the start of the transition period.

2.3.3.3.3 The process continues with each regional office discussing with its States to develop a draft plan for the region. To formulate the regional transition plan, the region will need to have determined how many AIRAC cycles it needs (i.e. a regional slot) and when it would like this regional slot to start. To determine the *duration* of the regional slot, the regional offices will need to have received from each State within the region, how many consecutive AIRAC cycles each State needs, together with the number of procedures to be changed in the State.

2.3.3.3.4 This draft regional transition plan is then sent to the ICAO PBN Programme Office for coordination with other regions (refer to Chapter 4). Where required, changes to the draft regional transition plan may be suggested by the PBN Programme Office in order to fit with the proposed plans of other regions. Once the PBN Programme Office confirms the regional transition plan with the regional office (with its allocated regional slot) then the regional office communicates State slots to the States within its region.

2.3.3.3.5 The PBN Programme Office then updates the global dashboard for tracking of the transition process.

2.3.3.3.6 **The ICAO regional office thus plays the critical role of regional programme manager. It must ensure that communication flows smoothly with the PBN Programme Office as well as with the States and all stakeholders within its region.**

2.3.4 Consultation

The global, regional and State stakeholders all need to consult with each other to ensure the successful implementation of the procedure chart identification changes. The stakeholders are identified with associated activities in Chapters 3, 4 and 5. A methodology for consultation is also provided.

2.3.5 Communication planning

2.3.5.1 Communication plans (including, for example, NOTAMs, regional circulars, chart legends) prepared by the PBN Programme Office, ICAO regional offices and State authorities, and the information they contain, should pass a harmonized and coherent message regarding the changes to the procedure chart identification change for PBN approach charts.

2.3.5.2 A key message relates to the purpose of the procedure chart identification change, which is to address inconsistencies in approach chart identification for RNP APCH and RNP AR APCH to directly align the charting with the navigation specifications in the *PBN Manual* (Doc 9613). Another key message is that a mix-and-match of procedure chart identification use is undesirable for pilots and ATC and could create confusion, hence the need for a synchronized transition plan.

2.3.5.3 To this end, communications from the PBN Programme Office, the ICAO regional offices and State authorities should use common vocabulary and convey the importance of shared responsibility for a safe implementation.

2.3.5.4 A Communication plans fit and form depends on its target audience. For example, a communication plan published by the PBN Programme Office would differ from that published by an ICAO region or from one published by a State. Nevertheless, the messages in the different plans communicating the changes to RNP procedure chart identification *must be consistent and synchronized*.

2.3.5.5 Typical contents of communication plans include, but are not limited to:

- **Main project objective(s):** Change to PBN approach procedure chart identification.
- **Secondary objectives:** Ensure a synchronized regional and State transition in line with global transition plan.
- **Project deliverables:** Depending on the level of the communication plan:
 - o for the ICAO PBN Programme Office, the switch over of all ICAO regions to the new PBN approach procedure chart identification;
 - o for the ICAO regions, the change of all PBN approach procedure chart identification within that region to the new procedure chart identification convention within a specified time period; and
 - o for States, the change of all PBN approach charts within a State to the new procedure chart identification convention within a specified time period.
- **Main project messages:** Synchronization of implementation is key and needs to be structured.

2.3.5.6 Communication plans should address all internal and external stakeholders identified by the project plan, and assess their information needs/risks that need to be mitigated (see Chapters 3, 4 and 5).

2.3.5.7 Communication plans should also be tailor-made for particular audiences. There may need to be one master communication plan with different versions/flavours for different stakeholder groups.

2.4 SUMMARY

2.4.1 This chapter has outlined key considerations related to achieving the change of procedure chart identification to PBN approach charts. Key considerations include change management, impact assessment, safety management and transition planning which include timely and effective consultation and communication planning.

2.4.2 The next three chapters address transition planning at global, regional and State levels.

CHAPTER 3

ICAO GLOBAL FRAMEWORK FOR TRANSITION PLANNING

3.1 INTRODUCTION

It cannot be overemphasized that to ensure safe operational implementation, local chart identification changes must be synchronized with the State transition plan (Chapter 5) which must be synchronized with the associated regional transition plan (Chapter 4) which in turn is synchronized globally (this chapter).

In terms of transition planning, the *key transition plan* is the **regional** transition plan: this is the coordinating mechanism to reduce the period that pilots operating within a broad regional ATM system are exposed, for a very limited period only, to a mix of old and new chart identification.

3.1.1 **The key to success lies in the critical role played by the ICAO PBN Programme Office, the ICAO regional offices, planning and implementation regional groups (PIRGs), and States.**

3.1.2 A global framework for transition planning is needed to allow formulation of ICAO regional transition plans which would in turn trigger the creation of State transition plans.

3.1.3 This chapter covers the framework for global transition planning and falls under the responsibility of the ICAO PBN Programme Office (see Figure 3-1).

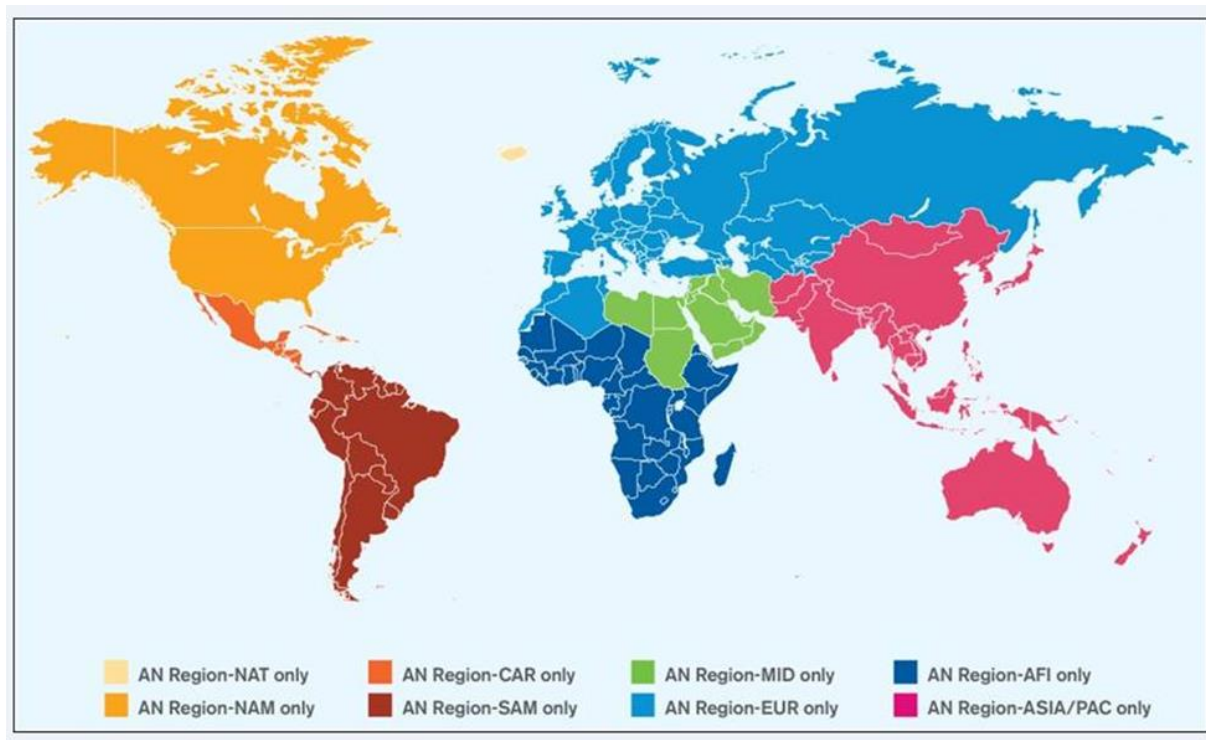


Figure 3-1. Map of ICAO regions and regional offices

3.2 ADDITIONAL CONSIDERATIONS AT THE GLOBAL LEVEL

3.2.1 In most ICAO regions, more than 70 per cent of flights operate within one region with flight crews completing several flight segments a day. The chief aim of transition planning at any level is to limit the period of time during which flight crew and air traffic controllers are exposed to a mix of (existing) RNAV and (new) RNP chart identification on a day-to-day basis.

3.2.2 In order to ensure the joint mitigation of flight deck-ATM system-wide issues described in Chapter 2, paragraph 2.3.2, and mitigate the potential negative impact between adjacent ICAO regions, the global framework includes additional principles. These are aimed at synchronizing the regional transition to the new chart identification, and relate to a regional slot of a certain duration and sequencing.

3.2.3 Regional slot

3.2.3.1 A regional slot refers to the unbroken period of time between a starting date and ending date to accommodate as many AIRAC cycles as determined by the regional plan. This is like a 'slot period' comprised of several AIRAC cycles. The beginning and end of a regional slot must be AIRAC cycle dates.

3.2.3.2 A regional slot is not of a standard duration; the time needed to achieve the name change can differ by ICAO region. The duration must be comprised of sufficient AIRAC cycles to allow the region to change to the new chart identification. The duration depends on various factors e.g. the number and complexity of procedure changes required within the region, and the number of AIRAC cycles needed to achieve the change. This may be a function of State publishing and/or data house capacity per AIRAC cycle (see Figure 3-2).

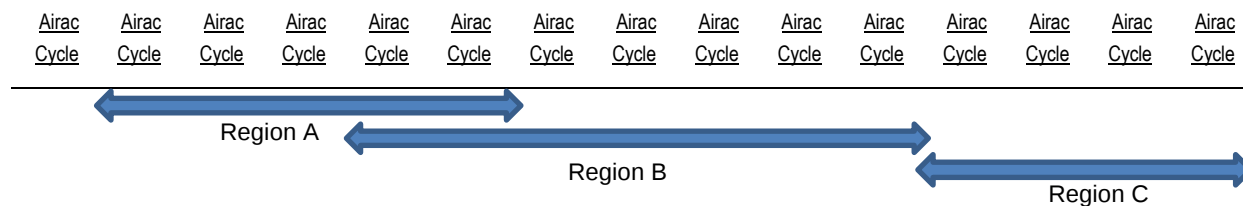


Figure 3-2. Additional global considerations

3.2.3.3 A regional slot is allocated by the global PBN programme to affect the RNP chart identification change. An entire region should change to RNP chart identification within the allocated regional slot unless negotiations have taken place between adjacent regions through the PBN Programme Office.

3.2.4 **Sequencing**

3.2.4.1 Sequencing refers to the ordering – in time – of regional slots allocated to a single ICAO region to undertake the chart identification change.

3.2.4.2 Responsibility for coordinating the sequencing of regional slots lies with ICAO's PBN Programme Office. See Chapter 3, 3.3.

3.2.4.3 Regional slots may overlap, in which case it is preferable that adjacent regions have sequential regional slots.

3.3 THE PROCESS

3.3.1 The ICAO PBN Programme Office will coordinate regional slot requests submitted by the regional offices as per the following process:

1. In accordance with the framework for a regional transition plan in Chapter 4, each ICAO region will develop its transition plan together with the States within that region.

While developing the regional transition planning, the ICAO regional offices need to communicate with the PBN Programme Office so as to determine, as soon as possible, the *duration* needed by the *region*, and estimate (with updates) the desired *regional slot*.

2. As a function of each region's requests and considerations such as data house capacity, the Global PBN Programme Office will allocate a regional slot.
3. Thereafter, the regional offices, PIRGs and Member States will implement the change in the allocated *regional slot*. The process only becomes effective once the ICAO PBN Programme Office has notified each regional office of the start of the transition period.

Note.— The ICAO PBN Programme Office will ensure that regional offices adhere to the regional time slot and regional offices will ensure that States adhere to their time slots. Any deviations will be addressed through established ICAO procedures.

3.3.2 Refer to Figure 3-3 which shows the sequence of the coordination process

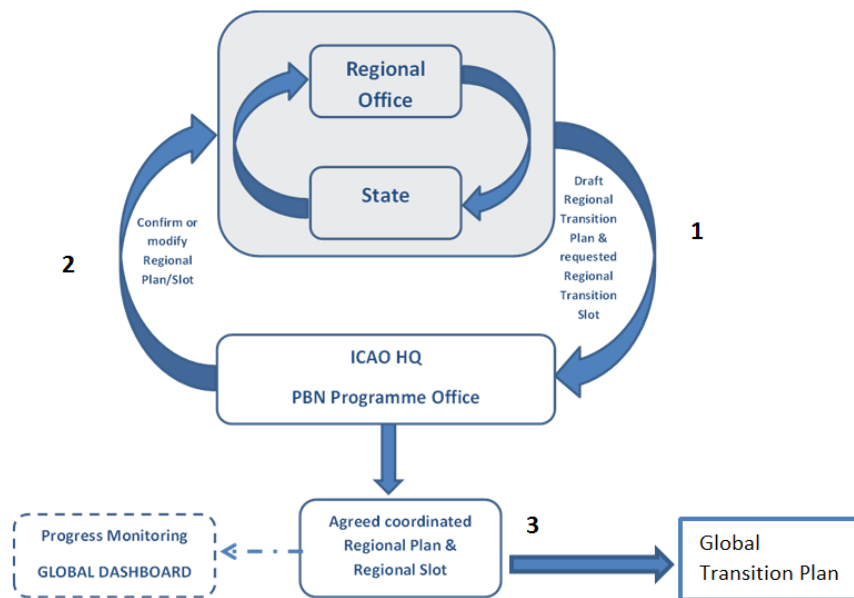


Figure 3-3. Global, regional and State coordination process

3.3.3 This commences with the ICAO PBN Programme Office coordinating with the regional office to develop a draft regional transition plan. This draft plan is then sent to the ICAO PBN Programme Office for coordination with other regions and available regional slots (refer to Chapter 4 (1)). Where required, changes to the plan may be suggested by the PBN Programme Office in order to fit with the proposed plans of other regions (2). Once agreed, the regional plan is then updated in the global dashboard for tracking of the transition process (3).

3.4 STAKEHOLDERS TO BE CONSULTED

3.4.1 Regional stakeholders to be consulted include:

- a) ICAO regional offices and PIRGs;
- b) data houses; and
- c) international organizations such as IATA, CANSO and IFATCA.

3.5 PBN PROGRAMME OFFICE ACTIVITIES

3.5.1 The PBN Programme Office will:

- a) liaise with all regional offices concerning their roles and responsibilities associated with the chart identification change;
- b) develop a communications plan for all stakeholders;
- c) make available tools and templates which regional offices can disseminate to States for guidance;

- d) develop and make available training material to address the transitional activities and processes;
- e) write and promulgate the global transition plan in which all regional slots are indicated; and
- f) develop and maintain a **global dashboard** with interactive links to the **regional equivalent**. The global PBN dashboard of the chart identification change will have 'regional' granularity showing, the status of the transition in each region.

3.6 SUMMARY

3.6.1 This chapter has outlined a framework for global transition planning, focusing on basic principles of regional slots, duration and sequencing.

3.6.2 The next chapter provides a framework for regional transition planning.

CHAPTER 4

FRAMEWORK FOR ICAO REGIONAL TRANSITION PLANNING

4.1 INTRODUCTION

The regional plan is the key element in the global transition. Each region will work with its Member States to develop a draft outline plan and determine a suitable slot. As shown in Figure 3-3, this plan is then coordinated with the ICAO PBN Programme Office. At this stage, changes may be proposed which result in further refinement of the plan. Once agreed, the region will be allocated the slot and will work with States to determine the State transition plans in line with the regional plan (See Chapter 5). The regional plans, once coordinated through the PBN Programme Office, form the global transition plan.

In terms of transition planning, the *critical transition plan* is the ICAO regional transition plan; this is the coordination mechanism to reduce the period that pilots operating within the ATM system of an ICAO region are exposed to a mix of old and new chart identification.

The key to success lies in the critical role played by the ICAO PBN Programme Office, the ICAO regional offices, PIRGs, and States.

The PBN Programme Office, before considering development of the global transition planning, launches the start of the development of the draft of regional transition plans.

The draft of a regional transition plan is mandatory input used by the PBN Programme Office to define the framework for global transition planning.

Therefore, when developing regional transition planning, the ICAO regional offices need to communicate with the PBN Programme Office so as to determine, as soon as possible, the duration needed by the region, and estimate (with updates) the desired regional slot.

4.2 ADDITIONAL CONSIDERATIONS AT THE REGIONAL LEVEL

4.2.1 In most ICAO regions, more than 70 per cent of flights operate within one region, with flight crews completing several flight segments a day. The chief aim of transition planning at any level is to limit the period of time during which flight crew and air traffic controllers are exposed to a mix of (existing) RNAV and (new) RNP chart identification on a day-to-day basis.

4.2.2 In order to ensure the joint mitigation of flight deck-ATM system-wide issues described in Chapter 2, 2.3.2, and mitigate the potential negative impact between adjacent States within an ICAO region, the regional framework includes additional principles. These are aimed at synchronizing the regional transition to the new chart identification, and relate to State clusters and State slots of a certain duration and sequencing.

4.2.3 **State cluster**

4.2.3.1 A State cluster refers to a group of two or more States within an ICAO region. A State cluster transitions to the new chart identification in the same State slot.

4.2.4 **State slot**

4.2.4.1 A State slot refers to an unbroken period of time between AIRAC cycle dates which a State cluster is allocated to transition to the new chart identification. The State slot must fall within the regional slot, and the beginning and end of a State slot must be an AIRAC cycle date.

4.2.4.2 A State slot is not of a standard **duration**; the time needed to achieve the name change can differ by State cluster. The duration must be comprised of sufficient AIRAC cycles to allow the State cluster to change to the new chart identification. Duration depends on various factors e.g. the number and complexity of procedures required within a State cluster and the number of AIRAC cycles needed to achieve the change. This may be a function of State publishing and/or data house capacity per AIRAC cycle, as coordinated through the global and regional transition plans. State slots need not be of the same duration.

4.2.5 **Sequencing**

4.2.5.1 Sequencing refers to the ordering – in time – of State slots allocated to the State or State cluster, to undertake the chart identification change.

- Responsibility for sequencing State slots lies with **the ICAO regional office working together with the Member States within that region**. Adjacent States or State clusters should receive adjacent State slots.
- **State slots should not be planned by the regional office to overlap**. If overlaps become inevitable, then coordination is required at the regional level.

4.2.6 Example

4.2.6.1 Table 4-1 shows an example based on above considerations, using ICAO EUR Region.

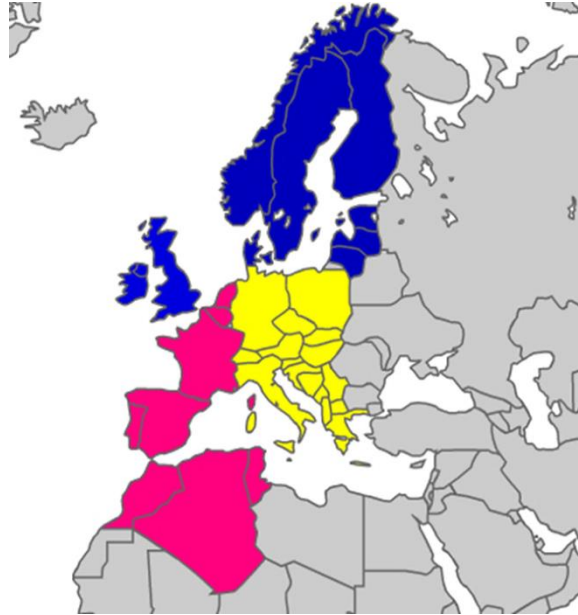


Figure 4-1. Map equivalent of Table 4-1 State clusters within a region – example using ICAO EUR and MID

Table 4-1. State clusters and sequencing within a region – example using ICAO EUR Regions

SAMPLE of geographic clustering for ICAO EUR-NAT & MID Regions	H2/2017	H1/2018	H2/2018		H2/2019		H2/2019		30 NOVEMBER 20xx
	Q3/4 2017	Q1/2 2018	Q3/2018	Q4/2018	Q1/2019	Q2/2019	Q3/2019	Q4/2019	
AIRAC CYCLES <i>incl.>></i>	n/a	n/a	7-9	10-12	1-3	4-6	7-9	10-12	
BLOCK 1: Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Norway, Sweden, the United Kingdom.	ICAO REG OFFICES: Develop outline of regional transition plan	ICAO REG OFFICES: Stakeholder buy-in and transition plan finalization							
BLOCK 2: Algeria, Andorra, Belgium, France, Luxembourg, Monaco, Morocco, the Netherlands, Spain, Portugal, Tunisia.									
BLOCK 3: Albania, Austria, Bosnia and Herzegovina, Croatia, Czech Republic, Egypt, Germany, Greece, Hungary, Italy, Malta, Montenegro, Poland, Slovakia, San Marino, Slovenia, Switzerland, the Former Yugoslav Republic of Macedonia.									

A State slot allocated by an ICAO regional office for affecting the RNP chart identification change, cannot be comprised of non-adjacent States (or State clusters) within the regional cluster.

4.3 THE PROCESS

4.3.1 With the diversity and different levels of complexity in each State, each ICAO region must, together with its stakeholders, plan the regional transition, and obtain agreement within the region-related State clustering, State slots and sequencing.

4.3.2 The following process is envisaged:

1. Each ICAO region develops its transition plan (including the identification of State clusters, the required duration of State slots per State or State cluster as well as potential sequencing of State clusters within the regional slot. This is done with all stakeholders within that ICAO region. Through stakeholder consultation and collaborative regional planning, the ICAO regional office determines the cumulative duration needed by the region or regional clusters and identifies the sought after regional slot.
2. The ICAO regional office follows the process in Chapter 3 to obtain the regional slot for the ICAO region or regional clusters.
3. Once the regional slot is obtained from the ICAO PBN Programme Office (through the process in Chapter 3), the ICAO regional offices will communicate this to the States within its region and preparation made for implementing the chart naming change in accordance with the regional transition plan. This preparation will include the issuing of State slots and proper sequencing of State clusters.

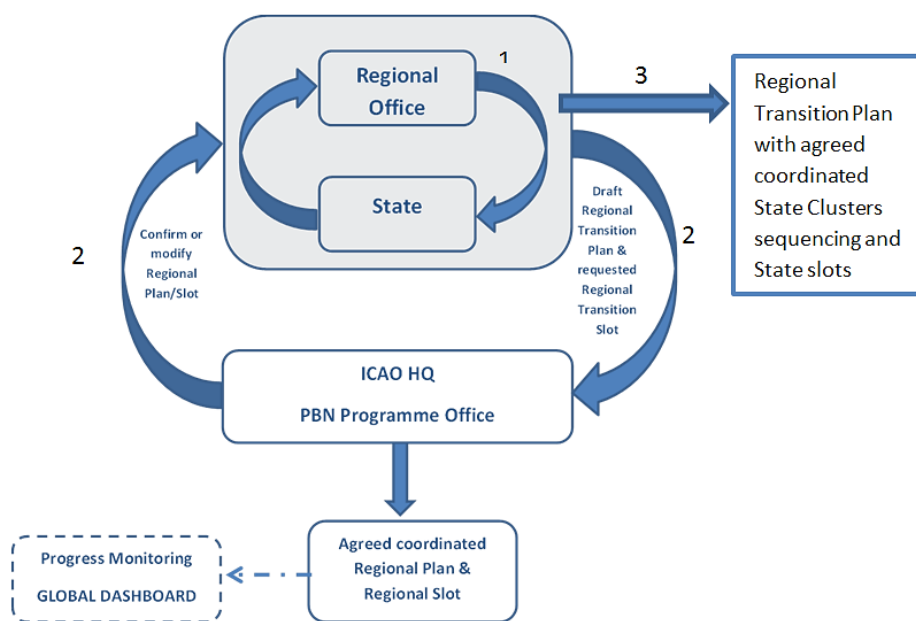


Figure 4-2. Global, regional and State coordination process

4.3.3 Figure 4-2 shows the sequence of the process. This commences with the regional office discussing with their States to develop a draft plan for the region (1). This draft plan is then sent to the PBN Programme Office in ICAO for coordination with other regions and available regional slots (2). Where required, changes to the regional plan may be suggested by the PBN Programme Office in order to fit with the proposed plans of other regions (2). Once agreed, the regional plan is then updated and a slot is attributed (3) in the **global dashboard** for tracking of the transition process.

4.3.4 The ICAO regional office thus plays the critical role of regional programme manager. It must ensure that communication flows smoothly with the ICAO PBN Programme Office as well as with States and all stakeholders within its region. Effectively, the ICAO regional offices are the key trigger to the entire process. When the regional offices set to work, both the ICAO PBN Programme Office and the Member States within the region, can set to work in synchrony.

4.4 REGIONAL STAKEHOLDERS

4.4.1 Regional stakeholders to be consulted include:

- State regulatory authorities
- air navigation service providers
- all airspace users including aircraft operators; general, business and military aviation, etc.
- training organizations
- airport authorities
- military service providers
- charting houses
- database providers
- instrument procedure design organizations
- regional consultation groups (operational and technical)
- regional organizations and agencies
- adjoining ICAO regions

4.4.2 Airspace users must be drawn in at both the regional and State levels, and kept active/informed through the regional planning process.

4.5 REGIONAL TRANSITION PLAN ACTIVITIES

4.5.1 Within twelve months of circular publication, the ICAO regional office, as each regional programme manager, is to have developed the outline of its own initial draft of the regional transition plan. The plan will include clustering of States within its region, the sequencing of implementation clusters, and identifying the number of procedures, the required duration and the desired slot timeframe. Stakeholder consultation is required from the outset and early initiation will provide the maximum preparation time. The draft regional transition plan will be sent to the ICAO PBN Programme Office for coordination and issuance of a regional slot. Eventually, the regional transition plan is updated and approval is requested from the ICAO PBN Programme Office (refer to Chapter 3).

4.5.2 Subsequent ICAO regional office activities following agreement of the regional transition plan include:

- Achieve stakeholder acceptance of the regional transition plan. This plan will be finalized and formally agreed between stakeholders. The required duration and slot will be unambiguous and agreed between stakeholders.
- Publish a communication plan notifying States within the region of the transition slot for changing to RNP charting and the process to be followed. This communication plan will also indicate the frequency of communication to be made in the region, and the communications to be made by stakeholders.
 - o communicate with the PBN Programme Office (provide a schedule of communication)
 - o communicate with the key stakeholders
 - o communicate with the wider aeronautical community within the region

-
- Agree on the roles and responsibilities of each stakeholder.
 - Formalize MoUs with support to be provided by regional organizations.
 - Provide input to the global PBN transition plans dashboard showing the State clusters within the region as well as a regional granularity indicating the level of progress in a particular State cluster, e.g. red (not started), amber (nearing 50 per cent of the region has switched) to green (entire region switchover completed).
-

CHAPTER 5

EXAMPLE OF STATE TRANSITION PLANNING

5.1 INTRODUCTION

5.1.1 In terms of transition planning, the *critical transition plan* is the ICAO *regional* transition plan: this is the coordination mechanism to reduce the period that pilots operating within the ATM system of an ICAO region are exposed to a mix of old and new chart identification. It also takes into account the time frame coordinated with each State of the region to guarantee completion of the activity within the dedicated period at each State level.

5.1.2 The key to success lies in the critical role played by the ICAO PBN Programme Office, the ICAO regional offices, PIRGs, and States.

The transition plan at the State level is the key element for a safe and coordinated activity reducing the delays (economy and safety), and the risks (safety), at State and regional levels mainly, but not only for ATCOs and pilots.

5.1.3 This chapter aims at providing elements for the definition of a State strategy that fits best with the goal, taking into account the State structure of the procedure design service, the local knowledge and the required means (design, training, communication). Not all States face the same challenges or contain the same regulatory structures. Individual State challenges need to be handled at the appropriate regional level. This chapter provides guidance to support States in the development of State transition plans. It also describes required activities (direct and indirect) that should be performed by the State and stakeholders to help reach their goals in a sustainable manner, compliant with the regional strategy and with safety and consistency.

5.2 STATE TRANSITION PLAN AND PROCEDURE CHART IDENTIFICATION PROJECT

5.2.1 The State transition plan describes the strategy decided at the State level in coordination with all stakeholders. It proposes a timeframe compliant with the regional transition plan. It describes roles and all the tasks to be performed by the associated stakeholders to implement the strategy. It assesses the risks to achieving the target date and provides mitigation that can reduce or eliminate the impact of delays at the regional level.

5.2.2 The State is responsible for the procedure chart identification project. It is suggested that a team be created with a manager to lead all activities associated with the project.

5.3 ADDITIONAL CONSIDERATIONS AT THE STATE LEVEL

The State strategy is established based on geographical clustering and/or operational elements. These may relate to traffic flows, local operator requests, limitations and constraints. They should also consider adjacent States and bordering terminal manoeuvring areas (TMAs) that may have initiated changes.

5.4 PROJECT TEAM

5.4.1 Depending on the scale and complexity of the change relating to procedure chart identification, various stakeholders may need to be involved. In some instances, it may be necessary to create a project team which is described in this chapter as a “state transition task force” to drive the two streams of activities:

- 1) Strategic State transition plan including:
 - developing the State strategy
 - drafting the State transition plan
 - communicating with the ICAO regional office
- 2) Implementation State transition plan including:
 - executing the State transition plan
 - communicating with the ICAO regional office
 - communicating with State airspace users

5.4.2 The strategic State transition plan stream would be responsible for determining the geographic clustering, the volume of change, an appropriate organization, the time required and the information to be transmitted. It is also responsible for communicating relevant information between the national stakeholders of the State transition plan and with the stakeholders at the regional transition plan level. The means of communication, both at national and regional levels, will be thoroughly described in the State transition plan.

5.4.3 The implementation State transition stream is involved with actual implementation activities.

5.4.4 **Strategic State transition stream**

5.4.4.1 *Assessment of the volume of change*

5.4.4.1.1 Depending on the number of affected charts, individual States may or may not decide to conduct the change of procedure chart identification with other planned changes that may normally occur in the targeted AIRAC cycle(s). The change of the procedure chart identification project should include this assessment. The project manager should be aware from the start of the project of all other changes planned for the State target AIRAC cycle. Knowing the volume will permit planning of the production at AIS and data house levels. Consequently, this affects the publication strategy.

5.4.4.1.2 In addition, a prioritization scheme must be coordinated with ANSP(s) within the State.

5.4.4.1.3 A strategy can be to freeze an AIRAC cycle to the change of procedure identification excluding any other changes in the AIP.

5.4.4.2 *Defining change priorities*

5.4.4.2.1 In addition to the geographical clustering of areas (see 5.4.4.4) where a change of procedure chart identification is to be applied, there may be a need to prioritize airports affected by the change. Some methods of prioritizing between airports within the same geographic “zone” are:

- a) major terminal areas;
- b) regional airports; and
- c) other airports.

5.4.4.2.2 Prioritization should not contradict the principles referred to in 5.4.4.4.

5.4.4.3 *Timing*

5.4.4.3.1 Each State, depending on the number of affected charts published and the means used to conduct the change of procedure identification and any associated activities (training of ATCOs, communication to State operators, etc.), will determine the time required to complete the project, and request a desired slot for implementation.

5.4.4.3.2 Following coordination, the ICAO regional office will allocate a slot to the State during which the change of procedure chart identification for affected instrument approach procedures (IAPs) must occur. The State strategy will be developed to meet the assigned slot. Each State will launch its change of the procedure chart identification project in sufficient time to meet the State targeted AIRAC cycles.

Note.— Emergency alert notifications will need to be communicated to the regional office for any changes that cannot be accomplished and/or that require delay.

5.4.4.4 *Geographic clustering*

5.4.4.4.1 In some States the high number of charts may require publication of new charts during sequential AIRAC cycles. Splitting the State geographically is one option (see Figure 5-1). However, additional principles should be followed to ensure overall system coherency:

- For ATM purposes, all procedures within an entire terminal manoeuvring area (TMA) should be changed simultaneously, particularly when approach control services are provided by the same entity. Where this applies to a cross-border TMA, clear coordination should be carried out between States.
- A geographic method could be based on a simple division of the State: West part of country/central part of country, etc.

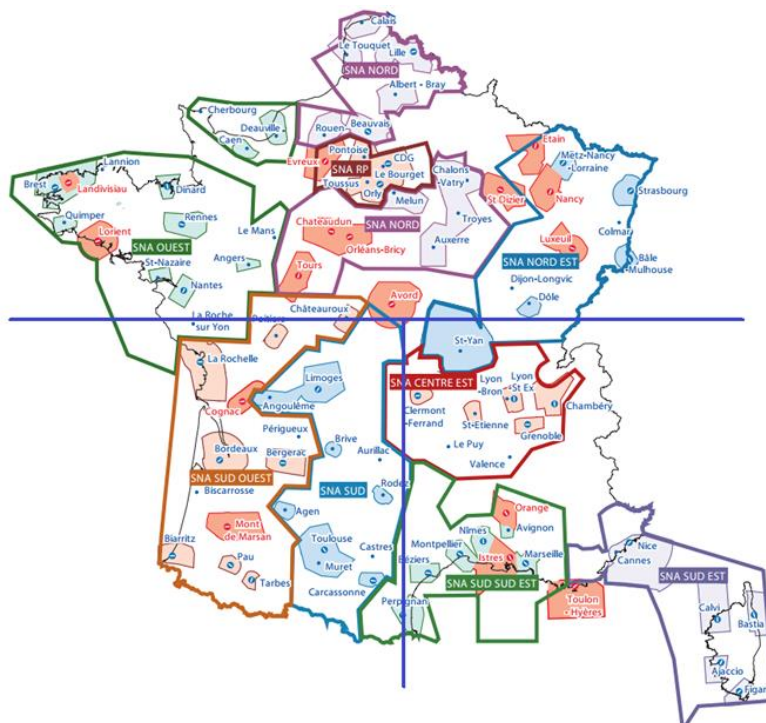


Figure 5-1. Map of strategic geographical clustering within a State

5.4.4.5 Organizational methods

5.4.4.5.1 To address the large volume of chart changes required over few AIRAC cycles, consideration may be given to modifying the usual procedure chart publication process. The procedure design service may be provided in various ways. The examples below describe two methodology options:

- 1) The single resource to provide procedure design services. The service is centralized and used to deliver the procedure design service in compliance with the quality assurance process of the ANSP:
 - a) this single resource prepares a list of charts requiring a change of procedure chart identification. This list displays the old and new names as well as the PBN requirements box content for each of the affected charts;
 - b) after agreement with AIS, and with approval from the national supervisory authority (NSA), the list of charts is accepted as a record to support the change. It is then provided to AIS to perform the official change of procedure chart identification, instead of the draft IAP as is normally required for publication (see *The Quality Assurance Manual for Flight Procedure Design* (Doc 9906), Volume 1 — *Flight Procedure Design Quality Assurance System*); and
 - c) approval of the change of procedure chart identification is also conducted by the State authority through the list, and not using the actual modified draft IAPs.
- 2) The ANSP relies on different resources (internal or external) to provide procedure design services. Or there are many ANSPs within the State and each has its own entity for procedure design service. Consequently, the service is not centralized but the different procedure design entities are qualified to deliver procedure design services in compliance with the quality assurance process of the ANSPs:
 - a) the change is prepared by each procedure design entity based on a geographical organization decided by the ANSPs, or based on any other method agreed by all stakeholders and described in the State transition plan to attribute the work to be done. The change of procedure identification is produced under new IAPs including the PBN box;
 - b) these new charts are approved individually by the NSA and each of them is recorded with the documents associated with each instrument approach procedure affected by the change; and
 - c) each draft chart is sent to the AIS according to the timeframe agreed to at the State level by all stakeholders and described in the State transition plan.

5.4.4.5.2 These two methodologies described above may be combined to produce other ways of implementing the change of procedure chart identification. The entity considered by the State organization as data originator is identified as an important participant in the process. However, to ease the process of global change, and only for the purpose of the change of procedure chart identification project, a single data originator may be agreed to support the publication of this change in the IAP publication.

Note 1.— (Primarily associated with option 1 above): As soon as the AIS is working on a draft chart to implement the change of procedure identification and PBN box, the modified chart should be frozen. Any other changes on that procedure requiring charting should be considered for delay until the updated chart, including the new procedure identification and PBN box, is published on the assigned AIRAC cycle in accordance with the agreed regional plan. Caution should be applied if the AIS commences a procedure chart identification process early, as this may interrupt the introduction of other procedure chart modifications that may be required.

*Note 2.— Publication of **new** affected procedures should be carefully prepared by the State and communicated to the ANSP during the time of the new procedure chart identification change. The State should consider publishing the procedures with the new chart identifications, in accordance with the principles established for the transition plans contained in this circular, to avoid in the future the need to amend charts published under the old identifications.*

Note 3.— In order to reduce delays associated with the change, some stakeholders may decide to launch a dedicated organization of the activity. Such dedicated organization could include:

- *NSA creating a dedicated body to provide approval;*
- *NSA requiring the dedicated material to perform the approval (list, charts, etc.); and*
- *ANSP creating or using a unique entity to create all the new draft of charts.*

Note 4. — Consider adapting the maintenance cycle of the procedures to accommodate the process for procedure chart identification changes within the allocated slot. Such consideration could lead to either:

- *conduct required maintenance activity of impacted procedure **before** starting change of chart identification process; and*
- *delay maintenance activity **until the end** of the change of chart identification period.*

This may require regulatory approval.

Note 5. — The procedure chart identification change should not (after agreement by the NSA) affect the procedure periodic review.

5.4.4.6 *Information transmission*

5.4.4.6.1 The final goal of the State is to make available to all users the new procedure chart identification and PBN requirement box information associated with affected IAPs. If this information is provided via an AIC, including a list of old and new charts names and associated PBN box contents, that may be sufficient for data houses to prepare instrument approach charts and update the on-board data-bases used by pilots.

5.4.4.6.2 Consequently, after agreement between the State and ICAO regional office, a list could be provided via AIC to inform the data houses and other stakeholders of the anticipated changes. The agreement could also provide a longer notification period than usual, so that data houses are aware of the expected AIRAC change volumes. This does not alter the usual AIP processes for chart publication.

5.4.4.6.3 The strategic roles and responsibilities are shown in Table 5-2 below.

5.4.5 **Implementation State transition stream**

5.4.5.1 The implementation State transition stream is involved with supporting actual implementation and rollout.

5.4.5.2 The implementation activities are also shown in Table 5-2 below, in the right hand column.

Table 5-2. State strategic and implementation set of activities

Stakeholders	Role in the strategic State transition plan	Role in the implementation State transition plan
State regulatory authority	- Manage the State transition plan development - Lead the State transition task force - Ensure the consistency of the State transition plan with the regional transition plan - Ensure efficient communication means at both national and regional stakeholders levels when the processes are going on	- Monitor the progress of State transition plan implementation during the State transition period - Periodically report to the ICAO regional project manager and to users - Communicate with AIS and data houses - Provide all generic documents supporting the implementation - Monitor the mitigation means until the end of the project
National Supervisory Authority (NSA)	- Participate in consultation activity - Approve State transition plan including: - Strategy (geographical clustering and defined priority) and working method (see 5.4.4.5) - State safety assessments (see 5.5.5) - Planning - Approve training for ATCO and pilots based on generic training material provided by the ICAO regional office	- Approve AIP modification proposals - Approve delivery of training for ATCOs and pilots
State AIS/AIM	Attend State transition task force meetings	- Implement and publish approved AIP modification proposals in the State AIP
ANSP(s) / other data originators	Attend State transition project team meetings	- Implement procedure chart identification changes - Update ATCO operating procedures - Develop ATCO training/briefing sessions
Aircraft operators / general aviation	Participate in consultation activity run by the task force	- Update SOPs - Develop dedicated training/briefing sessions
Data houses	Participate in consultation activity run by the task force, as necessary.	- Communicate with AIS - Implement approved AIP modification proposals in the data house publications
ICAO regional office State transition plan project manager	- Check and ensure consistency of the State transition plan with the regional transition plan - Provide generic training material for ATCOs and pilots	- Monitor progress of the State transition plan implementation via reports from the State transition plan project manager - Communicate with State transition project managers - Monitor the mitigation means at regional level until the end of the regional project

5.5 GENERAL ROADMAP (ACTIVITIES, SEQUENCING AND INTERDEPENDENCIES)

5.5.1 Appendix B — *Sample State activities and responsible actors* provides an example of the different activities that may be conducted during the change process of procedure chart identification. It covers the period from the development of the State transition plan to the operational use of the new procedure chart identification by the users.

5.5.2 Appendix C — *Sample State interdependencies and sequencing* provides an example of the interdependencies between activities and the sequencing between them. They are described generically, as several solutions/interactions are possible depending on each State organization and strategy.

5.5.3 Sample tables provided in Appendices B and C may be adapted to suit the State environment.

5.5.4 **State safety assessment of the chart identification change**

5.5.4.1 The project includes two safety assessments:

- 1) **State transition plan safety assessment:** identify causes associated with change of identification process of mismatching the State target AIRAC cycle partially or totally and to propose mitigations means to avoid or reduce the risk and management of this change among other changes.
- 2) **Change of procedure identification generic safety assessment:** identify risks associated with the change of procedure identification and to propose mitigation means on a generic basis.

5.5.4.2 Refer to Appendix A for sample hazard identification and mitigations associated with the procedure chart identification change.

5.6 CONCLUSIONS

5.6.1 Many parameters influence the way the change chart identification process is defined and implemented at State level among which the number of existing PBN charts already published, the number of RNP AR procedures already published and the structure of the State organization for the design of the procedure and the AIS data origination. This is why methods described in this chapter must be considered as examples only since they would not fit with existing State organizations for IFR procedure publication.

5.6.2 Differences lead to the increase or decrease of the time slot associated with a State with the change chart identification from the ICAO regional office strategy. The time slot is discussed and approved by the State before being published at the ICAO regional level.

5.6.3 However, this is not the case with the hazard identification and the mitigations means (see Appendix A) which have to be considered equally for States with many PBN procedures and for States with few existing PBN procedures.

APPENDIX A

HAZARD IDENTIFICATION AND RISK MITIGATION

1. The following hazard log tables identify available defences/actions to reduce the probability and/or severity of the hazard's foreseeable consequences related to the procedure chart identification change.

2. The hazard log tables have to be read in light of the following **assumptions**:

- a) this risk assessment addresses the transition from area navigation (RNAV) to required navigation performance (RNP) approach procedure chart identification. It does not address the existing complexity related to the use of RNAV_(GNSS) procedure chart identification name for RNP APCH procedure;
- b) during the transition period, there is simultaneous availability of both RNAV_(GNSS), RNAV_(GPS), RNAV_(RNP) and RNP procedure chart identification (as procedure designation);

Note.— RNP APCH operations are currently depicted on RNAV_(GPS) chart in Germany and the United States. As a result, this case has to be considered in this assessment even if no impact is foreseen on cockpit displays and phraseology. In addition, this risk assessment does not address the RNAV approach based on DME/DME/IRU.

- c) aircraft are certified and operators are currently flying RNAV_(GNSS) procedure chart;
- d) charts and navigation database are updated within a single AIRAC cycle for a given procedure to a given runway; and
- e) existing FMS and cockpit displays (PFD/ND) are not modified.

3. In order to avoid misunderstanding of the reader, the following wording is proposed in the hazard log tables:

- “RNP APCH” and “RNP AR APCH” when addressing the procedure type. Example: “RNP APCH and RNP AR APCH procedures are charted as RNP RWY xx.”
- “RNAV” and “RNP” when addressing the procedure chart identification. Example: “Crew is flying multiple legs and could encounter RNAV charts at one airport (existing naming) and RNP charts at the next (final naming) and so on.”
- “RNP approach” when addressing the clearance provided by the ATCO. Example: “Where only one RNP APCH procedure charted RNAV_(GNSS) is published to the same runway, ATC may clear for an ‘RNP approach’.”

4. In order to provide the reader with a clear overview of the five identified hazards and the most important defences/actions which are required to ensure a safe implementation of the change, the list of the hazards and some of the main additional requirements to implement (mandatory defences/actions), are provided in the following tables:

N°	Table A-1. Hazards identification
1	Crew confusion when selecting the appropriate chart during approach preparation
2	Crew confused about whether they are approved to fly the procedure
3	Crew confused about which procedure to select in the FMS
4	ATC confusion with mixed terminology at the airport or in a controlled terminal area (for more than one airport)
5	With final naming, existing RNP APCH / RNP AR APCH procedures cannot be flown

Table A-2. Most important defences/actions	Responsible
State transition plan implementation	ICAO, State
Charts promulgated in the State AIP shall comply with ICAO regulation regarding: • The procedure chart identification • The minima box label if published • The suffix letter rule: Where there is more than one RNP APCH or RNP AR APCH procedure to a runway, they are differentiated by letters in line with current criteria (Z/Y). • The PBN box on chart which indicates “RNP APCH” or “RNP AR APCH”	State AIS
Pilot bulletin / guidance / training material/tools that address possible scenarios during the transition and associated identification in the FMS. <i>Note.— To ensure the efficiency of this mitigation, it should be supported by the development of some international guidance materials addressing especially pilot issues regarding the implementation of this change (detailed scenarios).</i>	Airspace user
ATCO bulletin/guidance /training that addresses possible scenarios during the transition. <i>Note.— To ensure the efficiency of this mitigation, it should be supported by the development of some international guidance materials addressing especially ATCO issues regarding the implementation of this change (detailed scenarios).</i>	State
Charting houses shall comply with the naming convention and minima box label as promulgated in the AIP.	Data house

5. One table is provided for each hazard and contains:

- the hazard identification as well as the related description and assumptions, if any;
- the hazard-related consequences, corresponding existing defences to reduce the severity of the risk and possible additional actions required. Consequences and actions (existing and future) are linked: for a selected row, actions for reducing the gravity of the consequence are described; and
- the hazard-related causes, corresponding existing defences to reduce the probability of occurrence and possible additional actions. Causes and actions (existing and future) are linked: for a selected row, actions for reducing the probability of the cause are described.

6. The tables are intended to be used by States to conduct a safety risk assessment in accordance with their SSP. Where this assessment identifies that the risk is too high, the proposed mitigations from the table can be used to reduce the risk to a tolerable level.

Table A-3. Hazard 1: Confusing naming of charts

Description: Before arriving at the aerodrome, the crew selects a set of charts depending on the weather conditions, approval, availabilities of runway, etc. With the new naming, the pilot encounters difficulty selecting appropriate charts based on the name of the chart as they are not clearly identified.		
Foreseeable consequences of hazard	Existing defences to reduce risk severity	Further action to reduce risk severity
Increased complexity of the chart selection task. Increased discussion between pilots: • Increase the time to take actions (late descend decision, etc.) • Side effect on the closely related tasks Increase in stress for the pilot due to continuous doubt regarding the expected selection. Reduction of the number of RNP APCH procedures flown due to feedback from flight analysis supervisor authority.	Pilot briefing on the RNP chart naming change (Information) with significant exposure (on ground and in flight).	Pilot operating procedures defining the appropriate operating procedures in case of confusion (only for major operators).

Cause of hazard	Existing defenses to reduce hazard probability	Further action to reduce hazard probability
RNP APCH and RNP AR APCH procedures are charted as RNP RWY xx	Where there is more than one RNP APCH or RNP AR APCH procedure to a runway, they are differentiated by letters in line with current criteria (Z/Y). However, this suffix alone is not sufficient to avoid pilot confusion when selecting the chart. The pilot has to open the chart to check the PBN box information on chart ("RNP APCH" or "RNP AR APCH").	
	Naming convention in the AIP is: RNP RWY xx for RNP APCH and RNP RWY xx (AR) for RNP AR APCH. The distinction is based on the brackets "(AR)".	Charting houses shall comply with the naming convention promulgated in the AIP: RNP RWY xx for RNP APCH and RNP RWY xx (AR) for RNP AR APCH. Attention will be focused on the brackets « (AR) ».
LNAV, LNAV/VNAV and LPV minima are charted as RNP RWY xx	Naming convention in the AIP enables user to identify if all the minima are not supported on the same chart: RNP RWY xx (LPV only), RNP RWY xx (LNAV/VNAV only), RNP RWY xx (LPV, LNAV/VNAV only), RNP RWY xx (LP only).	
Some charts will be identified as RNP and some as RNAV as they are amended over a set transition time period. (existing/ final naming) (see Hazard: Crew confused about which procedure to select in the FMS.).		
Selection of both RNAV STAR charts and RNP RWY xx charts can create confusion for the pilot who can wrongly assume that the chart identification change did not occur and the approach is an RNP AR APCH procedure.	Naming convention for STAR charts and SID charts described in PANS OPS remains unchanged (e.g. include the term RNAV or RNP, depending on the navigation specification). Naming convention in the AIP is: RNP RWY xx for RNP APCH and RNP RWY xx (AR) for RNP AR APCH. The distinction is done based on the brackets "(AR)". PBN box on chart indicates "RNP APCH" or "RNP AR APCH"	Pilot bulletin / guidance / training material that addresses possible scenarios during the transition and that the change affects only the approach chart name and not the SID and STAR charts.

Table A-4. Hazard 2: Crew confused about whether they are approved to fly the procedure

Description: When hearing the ATIS message or at the first radio contact with the controller (30 minutes before the approach), crew doesn't understand if the procedure is an RNP APCH or RNP AR APCH and consequently, they don't know if they are approved to perform the approach.		
Foreseeable consequences of hazard	Existing defences to reduce risk severity	Further action to reduce risk severity
Distraction in the cockpit. Increased radiotelephony (R/T) between pilot and controller due to for example possible need for clarification between pilot and ATC (initial phase only).	If confused, pilot can still refuse the "RNAV" or "RNP" clearance and request conventional approach.	Pilot operating procedures defining the appropriate operating procedures in case of confusion (only for major operators). Depending on the local environment, It could be required through the pilot operating procedure to refuse the procedure in case of confusion.
Pilot refuses the approach and request a conventional approach: Increase of ATC workload		
Pilot selects incorrect procedure from the database/pilot may fly procedure that the pilot is not approved to fly, i.e. RNP AR APCH procedure: - Inappropriate crew actions - Aircraft may be flown outside protected area (lateral and vertical) - Possible controlled flight into terrain (CFIT)	Before flying the procedure, the pilot has to cross-check information to identify the procedure : check of the name ("(AR)" identification on the chart), check of the trajectory specificities (e.g., RF leg display if any). Only procedures for which the operator has approval should be in the navigation database.	
Cause of hazard	Existing defences to reduce hazard probability	Further action to reduce hazard probability
Crew used to associate "RNP" to RNP AR APCH procedure. With new identification and transition, possible use of RNP for RNP APCH procedure in the chart, FMS identifications and phraseology. Where RNP APCH and RNP AR APCH procedures are published for the same runway with new naming convention, crew confused about whether approved to fly the procedure if cleared for "RNP" approach in both cases.	RNP APCH and RNP AR APCH procedures are always charted on separate charts and identified due to the suffix letter. PBN box on chart indicates "RNP APCH" or "RNP AR APCH". Naming convention in the AIP is: RNP RWY xx for RNP APCH and RNP RWY xx (AR) for RNP AR APCH. The distinction is made based on the brackets "(AR)".	Pilot bulletin / guidance / training material that addresses possible scenarios during the transition and the associated requirements (RNP AR requirements only if there is "RNP AR" in the PBN box) --> Pilot information only (knowledge level) <i>Note.—Defences regarding the conversion at the same time of the name of the procedures at an airport is not retained here, as it does not improve the RNP APCH procedure vs RNP AR APCH procedure chart identification.</i>
Where RNP APCH and an RNP AR APCH procedure are published for the same runway (with the existing naming convention: RNAV _(GNSS) and RNAV _(RNP)), crew confused about whether approved to fly the procedure if cleared for "RNP" approach in both cases.	ATC will clear the aircraft for the approach as identified on the chart. <i>Note.— Defences regarding the suffix letter are not retained here, as it does not enable user to identify the type of the procedure, RNP APCH vs RNP AR APCH procedure, only based on the chart</i>	

Where only one RNP APCH procedure charted RNAV _(GNSS) is published to the same runway, ATC may clear for an “RNP” approach (see Hazard: Crew confused about which procedure to select in the FMS).	<i>identification. However, it is a defence to ensure the link between the chart and the cockpit information (see Hazard: Crew confused about which procedure to select in the FMS).</i> <i>In addition, the fact that there is only one approach does not minimize the risk of confusion between RNP APCH vs RNP AR APCH procedures chart identification, as the term RNP does not enable the pilots to know if they are approved or not.</i> <i>However, it is a defence to ensure the link between the chart and the cockpit information (see Hazard: Crew confused about which procedure to select in the FMS).</i>	
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Table A-5. Hazard 3: Crew confused about which procedure to select in the FMS

Description: Inconsistency between clearance, chart and cockpit information. Crew doesn't know which approach to select among the several possible approaches in the FMS. Alternatively, crew understands which approach they are cleared for but cannot match the selected approach with the display information (PFD/ND). Assumption: Aircraft/crew approved to perform the procedure. Issue related to aircraft/crew approbation is addressed in previous hazard.		
Foreseeable consequences of hazard	Existing defences to reduce risk severity	Further action to reduce risk severity
Distraction in the cockpit. Increased R/T between pilot and controller due to, for example, possible need for clarification between pilot and ATC (initial phase only).		Pilot operating procedures defining the appropriate operating procedures in case of confusion (only for major operators).
Pilot refuses the “RNP” approach cleared by the ATCO and request a conventional approach: Increase of ATC workload		Depending on the local environment, It could be required to refuse the procedure in case of confusion.
Pilot selects incorrect procedure from the database: - Increase of the pilot workload: If the information on the navigation display confirms the trajectory is not the one expected, the pilot will have to select another approach increasing the complexity of the operation. - Side effect on the closely related tasks - Additional workload to ensure	If there is only one RNP APCH procedure published, selection will not result in an incorrect approach flown. Standard operating procedures: Cross-check of the on-board information (charts and displays) but the efficiency of this mitigation mean is limited.	

all part of the previous selected procedure are removed from the FMS “memory” • The trajectory is not the one expected by the pilot or the ATC • Pilot or ATC can decide to abort the procedure if necessary <i>Note.— As it is assumed that aircraft/ crew are approved to perform the procedure, the consequence “Aircraft may be flown outside protected area” is not retained here.</i>		
Cause of hazard	Existing defences to reduce hazard probability	Further action to reduce hazard probability
Some charts will be identified as RNP (new naming) and some as RNAV (either RNAV_(GNSS) and/or RNAV_(RNP)) as they are amended over a set transition time period (existing / final naming). For some avionics, both RNP APCH and RNP AR APCH procedures would be displayed as RNV or RNAV (8 character display limitation). <i>Note.— the issue is the confusion between RNP APCH and RNP AR APCH whatever the name of the chart (RNAV or RNP).</i> Databases cannot differentiate between RNP AR APCH and RNP APCH chart identification => Procedure in database, but not in agreement with the chart (identified differently).	For a runway, where there is only one RNP APCH or RNP AR APCH procedure published, there is no confusion or confusion is minimized. Where there is more than one RNP APCH or RNP AR APCH procedure to a runway, they are differentiated by a suffix letter in line with current criteria. (If there is confusion, this is due to the fact that the suffix methodology is insufficiently known and is unrelated to RNP.): There would be only one RNAV Z or RNP Z chart to a certain runway promulgated in the AIP. For FMS which are able to manage the suffix letter (Z), the FMS would indicate RNVZ or RNAVZ. In addition the pilot would use on-board a chart with the same identification as the one promulgated in the AIP (RNAV Z or RNP Z). The suffix letter (Z) indicated on both chart and FMS provides confirmation of correct procedure. For some FMS which are not able to manage the suffix letter (Z), only one procedure will be proposed to the pilot FMS selection and named RNV or RNAV (without the suffix letter). So additional defences have to be considered in this case: • Which of the multiple procedures is coded into that database is up to commercial agreements between the operator (customer) and the packed	Pilot bulletin / guidance / training material that addresses possible scenarios during the transition and associated identification in the FMS. Pilot will communicate with the ATCO using the approach name identified on the chart/ In case of new procedure published, the new naming convention shall be applied to all RNAV procedure (existing and new) associated to this runway end. Convert all RNAV charts (RNAV_(GNSS) and RNAV_(GPS) charts) at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle) to ensure the efficiency of the suffix designator: There would be only one RNAV X, Y or Z or RNP X, Y or Z chart identified to a certain runway --> to be considered in the State transition plan.
Crew is flying multiple legs and could encounter RNAV charts at one airport (existing naming) and RNP charts at the next (final naming) and so on.	Convert all RNAV charts (RNAV_(GNSS) and RNAV_(GPS) charts) at regional level (TMA) to RNP designation at the same time (i.e. in the same AIRAC cycle) --> to be considered in the State transition plan.	

	database supplier. • The chart set used on-board would be also customized to contain only the procedure available in the FMS. This chart would be identified with the suffix letter (RNAVZ or RNPZ). The “Z” letter indicated only on the chart provides confirmation of correct procedure. • The on-board operations manual (OM) would indicate the procedure available in the FMS (and related minima) as well as the link with the corresponding chart. <i>Note.— PBN Box information is depicted on the chart and not displayed in the cockpit. So this defence is not retained here as it does not improve the link between the chart and the cockpit information. However, it is a defence for the chart identification (see Hazard: Crew confused about whether approved to fly the procedure).</i>	
FMS is able to manage the suffix letter but this information is not provided on the other display (PFD/ND).		Pilot bulletin / guidance / training material that addresses possible scenarios during the transition and associated identification in the FMS.
RNP values displayed on the FMS (list of waypoints on the FPLN page) for a RNP APCH procedure.	According to ICAO provisions, RNP values are not promulgated for RNP APCH in coding table proposal.	Charting houses shall not code RNP values for RNP APCH procedure.
“RNP” term (with or without RNP value) displayed in the minima box on the chart of an RNP APCH procedure.	According to ICAO provisions, minima box associated to RNP APCH procedure does not contain the “RNP” term but only LP, LNAV, LNAV/VNAV or LPV terms.	Charting houses shall not promulgate minima box associated to RNP APCH procedure with RNP term; only LP, LNAV, LNAV/VNAV or LPV shall be considered.

Table A-6. Hazard 4: ATC confusion with mixed terminology at airport or in controlled terminal area (for more of one airport)

Description: Controller is confused about the different existing identifications of the procedures and therefore gives an inappropriate clearance or does not understand the characteristics of the cleared approach. This confusion can come from ANSP information (chart) or pilot through the R/T.		
Foreseeable consequences of hazard	Existing defences to reduce risk severity	Further action to reduce risk severity
In controlled airspace, ATC clears aircraft for RNP Z RWY XY, when pilot has RNV or RNAV Z RWY XY in database/avionics and different information on the chart: • Crew confused about which approach they are cleared for. • Pilot confusion regarding approval in relation to chart depiction. • Increased R/T due to for example possible need for clarification between pilot and ATC (initial phase only). • ATC confusion. <i>Note.— In non-controlled airspace, as no ATC clearance is provided to the pilot, there is no risk of confusion between ATCO and pilot.</i> Delay in providing approach clearance Clearing the aircraft for the wrong approach: • The trajectory is not the one expected by pilot or ATC (final and missed approach). • Pilot or ATC can decide to abort the procedure if necessary.	If confused, ATC will clear for the conventional or confirm with pilot. Pilot will comply or request different procedure.	
Cause of hazard	Existing defences to reduce hazard probability	Further action to reduce hazard probability
ATC operating procedures are not updated in accordance with chart release.	In accordance with Doc 9906, <i>The Quality Assurance Manual for Flight Procedure Design</i>, ATC are part of the flight procedure process (consultation, safety assessment, etc.) and ATC operating procedures have to be updated before the operational implementation.	This change has to be classified as a major change and requires adapted measures (ATC awareness, etc.).
Crew and controllers do not use the same terminology to identify the approach: Crew uses approach name displayed on the charts provided by different charting houses whereas ATCO uses AIP source which may have an identification different from the ones published by charting houses.	ATCO will clear the aircraft for the approach as identified on the chart published in the State AIP.	Charting houses must use the same chart identification as the one promulgated in the AIP. Pilot will communicate with the ATCO using the approach name identified on the chart provided by charting houses.

		Pilot bulletin / guidance / training material that addresses possible scenarios during the transition ATCO bulletin/guidance /training that addresses possible scenarios during the transition.
There are several RNP APCH and RNP AR APCH procedures on a same runway with a mix of RNAV and RNP identification.	For a runway where there is only one RNP APCH or RNP AR APCH procedure published, there is no confusion. Where there is more than one RNP APCH and/or RNP AR APCH procedure to a runway, they are differentiated by letters in line with current criteria. (If there is confusion, this is because the suffix methodology is insufficiently known and is unrelated to RNP.): • There would be only one RNAV Z or RNP Z approach chart to a certain runway. FMS would indicate RNP Z or RNAV Z. "Z" provides confirmation of correct procedure. • Key mitigation is the letter identifier when there is more than one RNP AR APCH or RNP APCH procedure to a runway.	Convert all RNAV charts (RNAV_(GNSS) or RNAV_(GPS) charts and RNAV_(RNP) charts) at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle) to ensure the efficiency of the suffix designator: There would be only one RNAV X, Y or Z or RNP X, Y or Z chart identified to a certain runway --> to be considered in the State transition plan. ATCO bulletin/guidance /training that addresses possible scenarios during the transition.
ATCO responsible to deliver approach service to several airports (national or international) with different chart identification logics.	The <i>Procedures for Air Navigation Services — Air Traffic Management</i> (PANS-ATM, Doc 4444) does not specify prescriptive terms to be used in clearances. The requirement (see 12.3.3.2) is to read the clearance for the approach as indicated on the chart. This ensures they will always clear the aircraft using the name of the procedure as promulgated.	Convert all RNAV charts (RNAV_(GNSS) or RNAV_(GPS) charts and RNAV_(RNP) charts) at a regional level (TMA) to RNP designation at the same time (i.e. in the same AIRAC cycle) --> to be considered in the State transition plan. ATCO bulletin/guidance /training that addresses possible scenarios during the transition.

Table A-7. Hazard 5: With final naming, existing RNP APCH / RNP AR APCH procedures may not be approved for use

Description: The chart identification is not in tune with the State regulation. Therefore, pilots are not allowed to fly these procedures until the documents are updated.		
Foreseeable consequences of hazard	Existing defences to reduce risk severity	Further action to reduce risk severity
Procedure is not accepted by pilot Increased R/T. Pilot cleared for conventional approach. Additional instructions. RNP chart identified procedures cannot be used. Airport accessibility reduced. Increased diversions.	Pilot requests conventional procedure.	
Cause of hazard	Existing defences to reduce hazard probability	Further action to reduce hazard probability
State regulations restrict use of RNP procedures which involves RNP AR and non-standard RNP	Pilot requests conventional procedure	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV _(GNSS) chart corresponds to an RNP APCH procedure which meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNP APCH and RNP AR APCH procedures to the same runway goes through the duplicate naming convention (Z, X, Y). Amendment to State regulations, orders and circulars.

6. Note that some causes/mitigations were not retained in this hazard log table related to:

- **ARINC 424:** ARINC 424 does currently provide approach type indicators to distinguish between RNP APCH and RNP AR APCH procedures but all FMS are not able to process this information.
- **Flight plan:** Flight plan information about RNP capability is currently not available neither at the pilot's level nor at the controller's level. In addition, if the controller could use such information to communicate with pilots, it could create confusion for the pilot in case of inconsistency between flight plan and chart information.
- **Operational approval/AFM:** OPS approvals are conducted on the basis of navigation specifications and not on chart names. If the crew is approved for RNP APCH, then the AFM and operations manual will need to clearly state this.
- **ATC mismatch between clearance and chart:** ATC clears the aircraft based on the chart identification (PANS-ATM, Doc 4444, 12.3.3.2). No confusion exists between the chart and the clearance.
- **ATC hazard in non-controlled airspace:** In non-controlled airspace, as no ATC clearance is provided to the pilot, there is no risk of confusion between the ATCO and the pilot.

APPENDIX B

SAMPLE STATE ACTIVITIES AND RESPONSIBLE ACTORS

Activities/Duration	Tasks	Description of the Task	Responsible Actors
State Transition Task Force creation	Choose a project manager	A project manager is nominated to supervise the State change of procedure identification project. The project manager: a) is in charge of the development of the State transition plan and of the monitoring of the plan implementation (achievement of the planning objectives and mitigations means implementation); b) is the focal point for all concerned stakeholders regarding the change of procedure identification project and reports to the ICAO regional project manager; c) is also the leader of the State transition task force dedicated to the development of the State transition plan; and d) ensures the consistency of the State transition plan with the regional transition plan.	State regulatory authority
	Create a task force	A State transition task force is nominated to develop the State transition plan and the related strategy and working methods. This working group is composed of members from: - the State regulatory authority (leader); - the State AIS/AIM; - the ANSP(s)/other data originator; - the military authority; and - the appropriate data houses as needed. Specific considerations regarding this working group are highlighted in 5.4.	State regulatory authority

Activities/Duration	Tasks	Description of the Task	Responsible Actors
State transition plan development - between 3 and 6 months depending on the complexity of the State organization and the volume of change	Consult the stakeholders	Each actor involved in the change of procedure identification or concerned by the change is consulted in order to identify constraints in terms of geographical strategy deployment, planning, human resources, working methods and safety issues. All stakeholders listed in the table provided in 5.4.5 are part of the consultation activity except the ICAO regional project manager. Their constraints should already be addressed in the regional transition plan which is used as input for the State transition task force activities.	State transition task force
	Define a State strategy and working methods	Based on the regional transition plan and the outputs of the consultation activity, a State strategy (geographical clustering and defined priority) and working methods are developed. Specific considerations are highlighted: - in 5.4.4 for the strategy definition; and - in 5.4.4.5 for the working methods: Generic documents could be developed by the task force to support the working methods. Based on the volume of the change, the strategy definition can also specify the nature of the changes considered for the State target AIRAC cycle. Specific considerations on the nature of the change are highlighted in 5.4.4.1. The strategy and working methods are approved by the State supervisory authority.	State transition task force
	Develop State safety assessments	As highlighted in 5.5.4, two State safety assessments are developed by the task force to address the risk related to the change of procedure identification at the State level: - a State transition plan safety assessment; and - a change of procedure identification generic safety assessment. This second safety assessment can be based on the hazard log provided in the frame of this circular but must take into account the State particularities. Outputs of both safety assessments can impact the strategy and working methods definition as well as the planning definition. Both safety assessments are approved by the State supervisory authority. The change of procedure identification generic safety assessment is provided to ANSP(s) to support the implementation.	State transition task force
	Define an implementation planning	Based on the strategy and working methods definition, a State planning is developed to address the implementation of a State change of procedure identification. This planning must comply with the regional transition plan and data house constraints. Specific considerations on the timing are highlighted in 5.4.4.3	State transition task force

Activities/Duration	Tasks	Description of the Task	Responsible Actors
	Develop the State transition plan	The State transition plan is developed by the task force based on the previous tasks. This document is intended for each actor involved in the change of procedure identification or concerned by the change. The State transition plan addresses the: - change of procedure identification context (ICAO requirement, global/regional transition plan, State target AIRAC cycle, etc.); - State strategy; - working methods; and - implementation planning. State transition plans should consider including the States' military authorities as stakeholders in their transition plan.	State transition task force
	Approve of the State transition plan	In order to approve the State transition plan, the State supervisory authority: - validate the strategy, working methods and planning with regards of the other changes impacting the State AIP; - approve of the State safety assessments; and - approve the generic training documents.	State supervisory authority
	Communicate the State transition plan	Once approved, the State transition plan is sent to all stakeholders involved in the change of procedure identification or concerned by the change. Communication to the ICAO regional project manager is also done. ANSP(s), being involved since the beginning of the strategy/planning definition, is able to implement the plan in short term following this communication. This step corresponds to the time zero for the implementation activity.	State regulatory authority
Implementation of the State transition plan by the ANSP(s)/ other data originator - At least 3 months	Identify the impact on the AIP	A list of the RNP APCH and RNP AR APCH charts promulgated in the State AIP or on-going at the time zero is established according to the specific considerations highlighted in 5.4.4.1 and 5.4.4.2. In addition, other AIP publications (coding table, other charts, other AIP pages, etc.) are also listed.	Procedure design service(s)
	Implement the change	The implementation of the change of procedure identification implies to: - modify mainly the chart identification and, the PBN box; and - update the documentation related to the procedure concerned by the change of procedure identification (design report, verification/validation report, local safety assessment report, etc.). Generic documents developed by the State transition task force can be used as input for the local implementation (e.g. safety assessment). The outputs of this task are: - AIP modification proposals; and - update of the documentation related to the procedure. This task is conducted according to the working methods defined in the State transition plan. Several	Procedure design service(s)

Activities/Duration	Tasks	Description of the Task	Responsible Actors
		solutions are possible depending on the volume of AIP modifications and available resources (see 5.4.4.5).	
	Validate the AIP modification proposals	Modifications on the concerned charts should be validated according to process described in <i>The Quality Assurance Manual for Flight Procedure Design</i> (Doc 9906).	Procedure design service(s).
	Approve the AIP modification proposals	Each procedure concerned by the change of procedure identification requires prior approval by the State supervisory authority. This task is conducted according to the working methods defined in the State transition plan. Several solutions are possible depending on the volume of AIP modifications and available resources (see 5.4.4.5)	State supervisory authority
	Sent the change request to AIS	Once AIP modification proposals are approved, the change is requested by the data originator to AIS. This task is conducted according to the working methods defined in the State transition plan. Several solutions are possible depending on the volume of AIP modifications and available resources (see 5.4.4.5)	Data originator
Implementation of the State transition plan by the AIS/AIM - between 1.5 and 3 months depending on the volume of the change	Receive the change request from the data originator	The communication of the State transition plan enables the AIS to anticipate the planning issues. Once the approved AIP modification proposals are received, the AIS can define a detailed implementation planning and the resources allocation.	AIS
	Communicate with data houses	As soon the approved AIP modification proposals are received, a communication to data houses is done by AIS, through an AIC for example, according to the method and delay agreed between each other (see 5.4.4.3).	AIS
	Implement the change	The AIS transposed the approved AIP modification proposals in the State AIP.	AIS
	Publish the change in the AIP	Once internally verified, the State AIP including the change of procedure identification is promulgated according to the delay agreed with the data houses (see 5.4.4.3).	AIS
Implementation of the State transition plan by the data houses - 2 months	Receive the change request	Communication of the State transition plan enables the data houses to anticipate planning issues. Once the approved AIP modification proposals received from AIS, the data houses can define a detailed implementation planning and the resources allocation.	Data houses
	Communicate with AIS	In case of questions or issues, the AIS is the focal point for the data houses.	
	Implement the change	- Implement the approved AIP modification proposals in the data house publications. - Validate the data house publications with the official State AIP including the change of procedure identification.	Data houses

Activities/Duration	Tasks	Description of the Task	Responsible Actors
	Publish the change in data house publications	The publication of the change in the data house publications must comply with the State target AIRAC cycle defined in the regional transition plan.	Data houses
Implementation of the State transition plan by the operational users - 1 month	ATCO training / briefing	Communication of the State transition plan enables the ATCO training services to anticipate the planning and the communication to ATCO. This task consists of: - planning of training/briefing; - development of the training/briefing material based on generic training material provided by the State transition task force; and - update of the ATCO operating procedure. The ATCO training/briefing should occur only a few weeks before the State target AIRAC cycle in order to limit ATCO confusion. The delivery of the ATCO training should be approved by the State supervisory authority.	ANSP
	Pilot training / briefing	Communication of the State transition plan enables the pilot training services to anticipate the planning and the communication to pilots. This task consists in the: - planning of training/briefing; - development of the training/briefing material based on generic training material provided by the State transition task force; and - update of the pilot operating procedure. The pilot training/briefing should occur in sufficient time before the State target AIRAC cycle in order to limit pilot confusion.	Aircraft operators/ general aviation
	Entry into service of the change	At the effective date, ATCO and pilot should use the same procedure identification and should be able to understand the capacity required to perform the procedure.	—
Periodic activities - all along the State transition period	Monitor	This task consists in the monitoring of: - the progress of State transition plan implementation all along the State transition period to notify AIS and data houses in case of delay; and - the implementation of the mitigation means until the end of the project.	State transition task force
	Report	Periodically report to the ICAO regional project manager and to users	State transition task force

APPENDIX C

SAMPLE STATE INTERDEPENDENCIES AND SEQUENCING

Table C-1. Interdependencies – an example illustrating the interactions between the main actors and activities

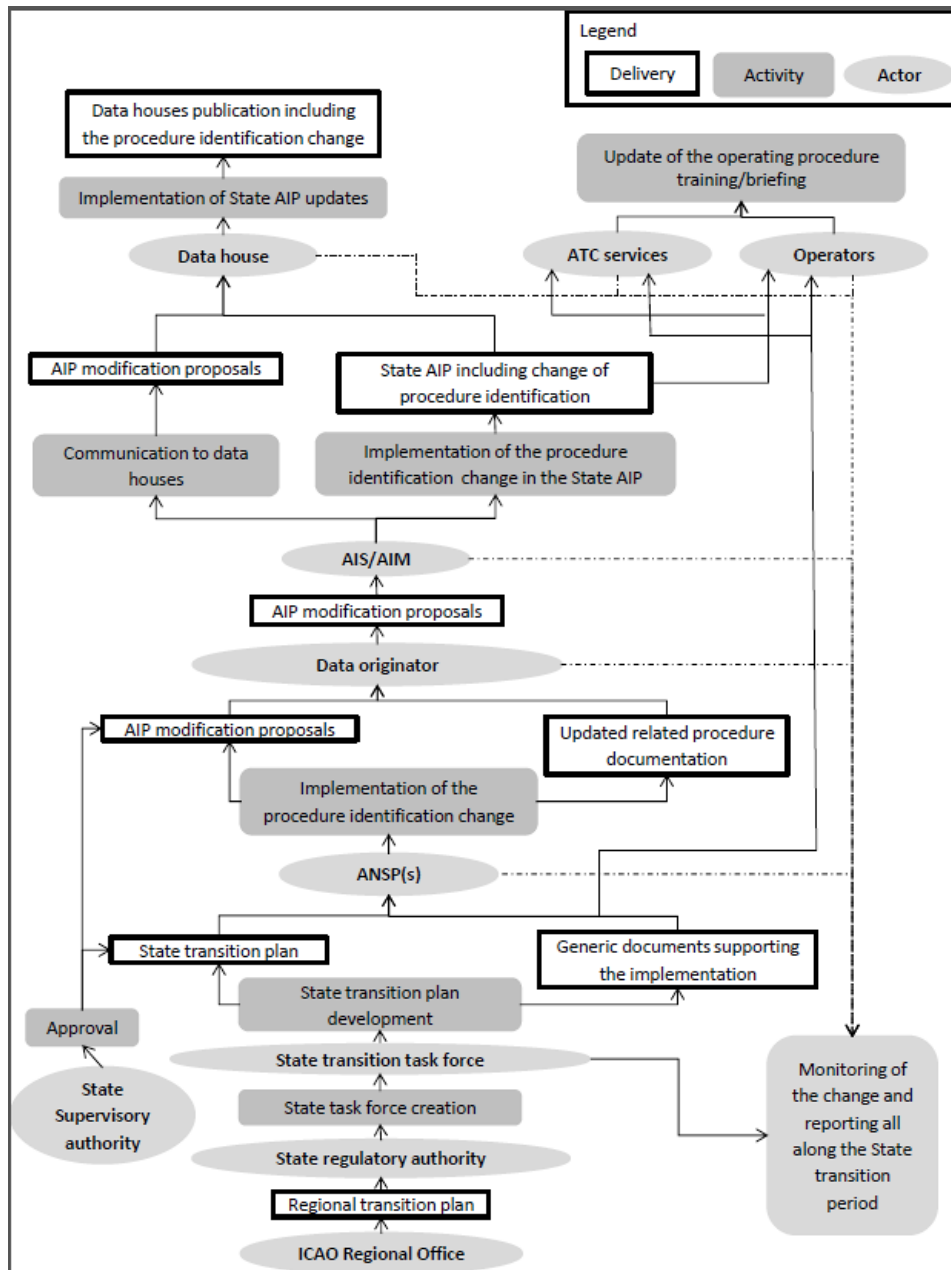


Table C-2. Sequencing – an example illustrating the sequence of main activities

	2018				2019			
Months								
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Regional transition plan								
State Transition Task Force creation								
State transition plan development								
National transition plan								
Generic documents supporting the implementation								
Implementation of the procedure identification change by ANSP(s)								
AIP modification proposals								
Updated related procedure documentation								
Implementation of the procedure identification change by AIS								
Communication to Data houses								
State AIP including the procedure identification change								
Implementation of State AIP updates by Data houses								
Data Houses IAC charts including change of chart identification								
Update of the pilot/ATCO operating procedure								
Pilot/ ATCO Training/briefing								
Monitoring and reporting								

— END —

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APPENDIX C

PBN Chart Naming Transition Status/Estatus de la transición del nombre de la carta PBN

States and Territories accredited to the ICAO NACC Regional Office

	PBN Aerodromes	PBN Approaches	RNAV (GNSS)*	RNAV (RNP)	RNP	RNP (AR)
Antigua and Barbuda	1	1	1	0 1	0	0 / 0.0%
Bahamas	9	17	17	0 17	0	0 / 0.0%
Barbados	1	2	2	0 2	0	0 / 0.0%
Belize	1	1	1	0 1	0	0 / 0.0%
Bermuda	1	2	2	0 2	0	0 / 0.0%
British Virgin Islands	1	2	2	0 2	0	0 / 0.0%
Canada	519	1627	1576	51 1627	0	0 / 0.0%
Cayman Islands	2	4	4	0 4	0	0 / 0.0%
Costa Rica	1	3	1	0 1	0	2 / 66.7%
Cuba	14	27	6	2 8	19	19 / 70.4%
Dominican Republic	8	17	17	0 17	0	0 / 0.0%
El Salvador	1	8	0	8 8	0	0 / 0.0%
Grenada	1	2	2	0 2	0	0 / 0.0%
Guatemala	1	7	0	7 7	0	0 / 0.0%
Haiti	3	6	5	1 6	0	0 / 0.0%
Honduras	4	5	4	1 5	0	0 / 0.0%
Jamaica	2	4	4	0 4	0	0 / 0.0%
Mexico	12	25	25	0 25	0	0 / 0.0%
Nicaragua	1	2	2	0 2	0	0 / 0.0%
Puerto Rico	6	10	10	0 10	0	0 / 0.0%
Saint Kitts and Nevis	1	2	2	0 2	0	0 / 0.0%
Saint Lucia	2	3	3	0 3	0	0 / 0.0%
St Vincent and Grenadines	2	3	3	0 3	0	0 / 0.0%
Trinidad and Tobago	1	2	2	0 2	0	0 / 0.0%
Turks and Caicos Islands	1	2	2	0 2	0	0 / 0.0%
United States	2981	6986	6595	391 6986	0	0 / 0.0%
US Virgin Islands	2	3	3	0 3	0	0 / 0.0%

-END -

* Includes RNAV (GPS)

February 2018 data