RNAV to RNP Instrument Approach Chart Depiction

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- ICAO Provisions
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BACKGROUND

- The emergence of PBN is having a major impact on all aspects of the aviation industry. However, inconsistencies with the aeronautical charts, the PBN operational approvals and the avionics displays have created confusion for pilots and air traffic controllers.

- As a result, ICAO has decided to rationalize the chart-naming convention in order to remove the inconsistencies and align the aeronautical approach charts with the PBN operations approval. This will reduce the confusion and provide a simpler and clearer method for procedure naming and a standardized approach to aeronautical charting.

BACKGROUND

- Currently, the PBN approach procedure naming convention is not standardized throughout the world and is inconsistent with the PBN navigation specifications. Examples of differing naming conventions used by States include RNAV (GPS) RWY XX, RNAV (GNSS) RWY XX, RNAV (RNP) RWY XX.

- In reviewing the PBN navigation specifications, it became readily apparent that any approach using GNSS was in fact an RNP approach due to the requirement for on-board monitoring and alerting. Consequently, all RNAV (GNSS) approach procedures are RNP procedures.

ICAO PROVISIONS

- The amendment 6 to the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, DOC 8168) (date of applicability 13 November 2014) introduced procedure design criteria and charting requirements to support PBN.

- The new ICAO Circular 336 provides guidance to assist States and other stakeholders with the transition from RNAV to RNP approach chart identification. This circular provides the necessary guidance to States on how to make that transition.

NAMING CONVENTION CHANGES

- As a transition, until 30 November 2022, approach charts depicting procedures that meet the RNP APCH navigation specification criteria must include either the term RNP or RNAV (GNSS) in the identification (e.g. RNP RWY 23 or RNAV (GNSS) RWY 23). However, from 1 December 2022, only the term RNP will be permitted.

- Until 30 November 2022, approach charts depicting procedures that meet the RNP AR APCH navigation specification criteria must include either the term RNP (AR) or RNAV (RNP) in the identification (e.g. RNAV (RNP) RWY 23). However, from 1 December 2022, only the term RNP (AR) will be permitted.

EXAMPLES

Existing naming	Interim naming	Final naming
RNAV (GPS) RWY 23	RNAV$_{(GNSS)}$ RWY 23	RNP RWY 23
RNAV (GNSS) RWY 23	RNAV$_{(GNSS)}$ RWY 23	RNP RWY 23
RNAV (RNP) RWY 23	RNAV$_{(RNP)}$ RWY 23	RNP RWY 23 (AR)

- *States may decide to go directly from the current naming convention that is used to the final convention*

CHART IDENTIFICATION

- The chart identification must include the runway identification for straight-in landing (RNP RWY 23)

- For circling procedure; a letter designator (a, b, c, etc.); example: RNP A

- When more than one PBN approach procedure exists for the same runway: e.g. RNP Z RWY 23, RNP Y RWY 23

CHART IDENTIFICATION PARENTHETICAL SUFFIX (FOR EXCEPTIONAL CONDITIONS)

Condition	Suffix	Examples
Procedure has only an LPV line of minima	LPV only	RNP RWY 23 (LPV only) RNAV$_{(GNSS)}$ RWY 23 (LPV only)
Procedure has only an LNAV/VNAV line of minima	LNAV/VNAV only	RNP RWY 23 (LNAV/VNAV only) RNAV$_{(GNSS)}$ 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) RNAV$_{(GNSS)}$ RWY 23 (LPV, LNAV/VNAV only)
Procedure has only an LP line of minima	LP only	RNP RWY 23 (LP only) RNAV$_{(GNSS)}$ RWY 23 (LP only)

- *The text in the parenthesis that is part of the procedure identification does not form part of the ATC Clearance.*

PBN Requirement Box

- When amending/publishing PBN approach procedures, additional procedure requirements must be provided as chart notes. 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 that are not included in the core navigation specification.

Navigation specification	Optional requirements
RNP APCH	RF required
RNP AR APCH	RF required RNP <0.3 Missed approach RNP <1
Advanced RNP	RNP <1 in initial and intermediate segment
RNP 0.3	RF required

NEW PBN CHART DESIGNATION
(WITH PBN REQUIREMENTS BOX)

| INSTRUMENT APPROACH CHART – ICAO | SBAS Ch 40123 W27A | AERODROME ELEV 30 m HEIGHTS RELATED TO THR RWY 27L - ELEV 20 m | APP 119.1 TWR 118.1 | DONLON/INTL (EADD) RNP RWY 27L |

← Chart identification

RNP APCH ← PBN requirements box

| INSTRUMENT APPROACH CHART – ICAO | SBAS Ch 40123 W27A | AERODROME ELEV 30 m HEIGHTS RELATED TO THR RWY 27L - ELEV 20 m | APP 119.1 TWR 118.1 | DONLON/INTL (EADD) RNP Z RWY 27L (LPV ONLY) |

← (LPV only)

RNP APCH

| INSTRUMENT APPROACH CHART – ICAO | SBAS Ch 40123 W27A | AERODROME ELEV 30 m HEIGHTS RELATED TO THR RWY 27L - ELEV 20 m | APP 119.1 TWR 118.1 | DONLON/INTL (EADD) RNP Y RWY 27L (LNAV/VNAV ONLY) |

← (LNAV/VNAV only)

RNP APCH

| INSTRUMENT APPROACH CHART – ICAO | SBAS Ch 40123 W27A | AERODROME ELEV 30 m HEIGHTS RELATED TO THR RWY 27L - ELEV 20 m | APP 119.1 TWR 118.1 | DONLON/INTL (EADD) RNP X RWY 27L (AR) |

← (AR)

RNP AR
RF required

IMPACT OF CHANGE

- Air navigation service providers (ATS)
- Charting houses/AIS
- Data Integrators (Jeppesen, Lufthansa system, etc.)
- Aircraft/Avionic Manufacturers (FMS Databases, etc.)
- Aircraft operators/Airlines
- Pilots/Air Traffic Controllers
- Training Institutes
- Instrument procedure design organizations
- State regulators
- General aviation
- Airport authorities
- Military

CHANGE MANAGEMENT CONSIDERATIONS

No	Item	Requirement	Remarks
1	**Chart identification**	Existing RNAV approach charts will be renamed to either RNAV(GNSS) RWY XX or directly to RNP RWY XX.	States must determine timeline for change and priority. States may amend as part of cyclic maintenance of the procedure. May require changes to automation software.
2	**Chart — PBN requirements box**	PBN requirements box has to be added to each PBN approach chart, where appropriate.	States must determine timeline for change and priority. States may amend as part of cyclic maintenance of the procedure. May require changes to automation software.
3	**Pilot training**	Training information for pilots.	May be accomplished through pilot bulletins and reinforced through simulator training sessions.
4	**Air traffic control officer (ATCO) training**	Training information for ATCOs providing airport terminal service.	May be accomplished through ATCO bulletin. Training must be conducted prior to the change in the charts for the airports in the terminal area.

CHANGE MANAGEMENT CONSIDERATIONS

No	Item	Requirement	Remarks
5	**Databases**	Existing databases may have to be amended to reflect new charting change.	Database providers will address as required.
6	**Procedure design software**	Procedure design software may have to be amended to reflect charting change.	Instrument procedure design organizations will address as required.
7	**Charting houses**	Charts will have to be changed as per numbers 1 and 2. States would issue changes to AIP which would require charting houses to react.	This has to be closely coordinated between the State's AIS organization and charting houses.
8	**Aircraft flight manual (AFM)**	The AFM may need to be amended to reflect RNP approval.	Air operators to address as required.
9	**Operations (OPS) approval**	Current OPS approval may have to be amended to reflect RNP approach authorization.	Regulator may have to issue clarification.

STATES' TRANSITION PLAN

- The State transition plan will provide stakeholders with the necessary information including timelines to allow them to prepare for the charting change.

- The State transition plan will be developed based on the input from the consultation with the stakeholders, while understanding the timelines detailed in Amendment 6 to PANS-OPS, Volume II, Part III, Section 5, Chapter 1

MITIGATION PROCESS

	Description	Responsible
1. Preparation	Develop an ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called an RNP approach. As well, the differentiation in case of multiple RNAV approaches to the same runway is addressed through the duplicate naming convention (Z, X, Y) in PANS-OPS	ICAO
2. Preparation	Develop aeronautical information circular (AIC) on the charting identification change or file a difference to PANS-OPS in the State AIP.	State AIS
3. Preparation	Develop pilot bulletin/guidance/training material that addresses the charting change and possible scenarios that the pilot may face.	Operator
4. Preparation	Develop ATCO bulletin/guidance/training material that addresses the charting change.	ANSP
5. Implementation	Conduct pilot training prior to the commencement of the conversion of chart identification.	Operator
6. Implementation	Conduct ATCO training prior to aeronautical information regulation and control (AIRAC) date for the conversion of chart identification.	ANSP
7. Implementation	Convert all RNAV and/or GPS approach procedures at an airport to RNAV(GNSS) and/or RNAV(RNP) identification (as applicable) at the same time (one AIRAC cycle/date), or convert all existing RNAV and/or GPS approaches at an airport directly to RNP identification at the same time (one AIRAC cycle/date).	Charting House/AIS, ANSP
8. Notification	Advise ICAO when conversion of existing RNAV approach procedures is completed.	AIS

ACTION BY THE MEETING

- The meeting is invited to:
  - Note the information provided in this presentation;
  - Invite States to develop their national transition plan for the RNAV to RNP chart depiction, taking into consideration the provisions of the amendment 6 to the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, DOC 8168) and the new ICAO Circular 336.

- *Appendix A: ICAO Circular 336; RNAV to RNP charting*

North American
Central American
and Caribbean
(NACC) Office
MexicoCity

South American
(SAM) Office
Lima

ICAO
Headquarters
Montreal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Office
Bangkok

Thank You

Cir 336
AN/195

Area Navigation (RNAV) to Required Navigation Performance (RNP) Instrument Approach Chart Depiction

International Civil Aviation Organization

Cir 336
AN/195

Area Navigation (RNAV) to Required Navigation Performance (RNP) Instrument Approach Chart Depiction

**Approved by the Secretary General
and published under his authority**

International Civil Aviation Organization

FOREWORD

The emergence of performance-based navigation (PBN) is having a major impact on all aspects of the aviation industry. However, inconsistencies with the aeronautical charts, the PBN operational approvals and the avionics displays have created confusion for pilots and air traffic controllers.

As a result, ICAO has decided to rationalize the chart-naming convention in order to remove the inconsistencies and align the aeronautical approach charts with the PBN operations approval. This will reduce the confusion and provide a simpler and clearer method for procedure naming and a standardized approach to aeronautical charting.

It will take time for States to convert all of their existing area navigation (RNAV) procedures to required navigation performance (RNP) in order to transition from the current naming convention to the new designation. States therefore need to develop a transition plan that addresses all stakeholder needs, issues and concerns. This circular provides the necessary guidance to States on how to make that transition.

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GLOSSARY

DEFINITIONS

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.

RNAV operations. Aircraft operations using area navigation or RNAV applications. RNAV operations include the use of area navigation for operations which are not developed in accordance with the *Performance-based Navigation (PBN) Manual* (Doc 9613).

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

ACRONYMS AND ABBREVIATIONS

AFM	Aircraft flight manual
AIC	Aeronautical information circular
AIP	Aeronautical information publication
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical information service
ALARP	As low as reasonably practical
ASBU	Aviation system block upgrade
ATCO	Air traffic control officer
CAT	Category
DME	Distance measuring equipment
FMS	Flight management system
GNSS	Global navigation satellite system
GPS	Global positioning system
HIRA	Hazard identification and risk analysis
IFPP	Instrument Flight Procedures Panel
ILS	Instrument landing system
INTL	International
LOC	Localizer
OPS	Operations
PBN	Performance-based navigation
RNAV	Area navigation

RNP	Required navigation performance
RWY	Runway
SMS	Safety management system
VHF	Very high frequency
VOR	VHF omni-directional radio range

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Chapter 1

INTRODUCTION

1.1 OVERVIEW

1.1.1 Purpose

The purpose of this circular is to provide guidance to civil aviation authorities regarding the transition from area navigation (RNAV) to required navigation performance (RNP) approach procedure identification, in accordance with Amendment 6 to Doc 8168, *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS), Volumes I and II. In particular, it provides States with direction on how to develop a transition plan that considers all stakeholder requirements, as well as hazards, risks and mitigations regarding the implementation. Although the timeline for conversion is 8 years (2022), States should plan to complete the transition as soon as possible and not wait until 2022.

1.1.2 Target audience

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 air operators, air navigation service providers, data houses, procedure design organizations, charting organizations and aircraft manufacturers with addressing applicable aspects of the conversion in relation to their specific areas of responsibility. Civil aviation authorities and stakeholders may use this circular as:

   a)   a guide to the development of individual State transition plans; and

   b)   a checklist to ensure all aspects of transition are addressed.

1.1.3 Structure

Chapter 1 — *Introduction* presents the purpose, background and context with references to other appropriate ICAO publications and guidance material.

Chapter 2 — *Change management considerations* presents the safety management system (SMS) principles and considerations that were used in determining hazard, risks and mitigations with the proposed change in approach procedure chart identification.

Chapter 3 — *Consultation* identifies stakeholders that should be consulted regarding the proposed change. It also identifies consultation and communication strategies.

Chapter 4 — *Transition plan* details the requirement for a transition plan and the key elements and activities.

1.2   BACKGROUND

1.2.1   Currently, the PBN approach procedure naming convention is not standardized throughout the world and is inconsistent with the PBN navigation specifications. Examples of differing naming conventions used by States include RNAV (GPS) RWY XX, RNAV (GNSS) RWY XX, RNAV (RNP) RWY XX. The Instrument Flight Procedures Panel (IFPP) was tasked to resolve the inconsistency and make recommendations for a standard naming convention.

1.2.2   In reviewing the PBN navigation specifications, it became readily apparent that any approach using GNSS was in fact an RNP approach due to the requirement for on-board monitoring and alerting. Consequently, all RNAV (GNSS) approach procedures are RNP procedures. The IFPP then recommended that PANS-OPS be amended to reflect this and that all approaches using global navigation satellite system (GNSS) be named RNP approaches, and that current RNP authorization required procedures be designated RNP (AR). The IFPP also identified the need for a PBN box on the chart to indicate the navigation specification that is applicable (i.e. RNP APCH, RNP AR APCH, Advanced RNP, RNP 0.3). Optional additional requirements for the PBN box were also identified. The IFPP then considered the impact on industry for this change and recommended an applicability date of 2028, which is in line with the aviation system block upgrade (ASBU) Block 3 upgrade.

1.2.3   ICAO assessed the planned implementation in view of the existing inconsistencies and through a safety management process and expert team (the RNAV-RNP depiction taskforce), revised the planned implementation date to 2022. This decision was based on States applying a transition plan that included mitigations to reduce risks to aviation. Additional information on the safety management process is included in Chapter 2.

1.3   DESCRIPTION OF CHARTING CHANGE

1.3.1   As stated previously, procedures that are currently named RNAV and meet the PBN specification of RNP APCH or RNP AR APCH will be designated RNP. This change will be fully implemented by 1 December 2022 (see Appendix B).

1.3.2   As a transition, until 30 November 2022, approach charts depicting procedures that meet the RNP APCH navigation specification criteria must include either the term RNP or RNAV (GNSS) in the identification (e.g. RNP RWY 23 or RNAV (GNSS) RWY 23). However, from 1 December 2022, only the term RNP will be permitted (see Table 1-1).

1.3.3   Until 30 November 2022, approach charts depicting procedures that meet the RNP AR APCH navigation specification criteria must include either the term RNP (AR) or RNAV (RNP) in the identification (e.g. RNAV (RNP) RWY 23). However, from 1 December 2022, only the term RNP (AR) will be permitted (see Table 1-1).

Table 1-1.   Examples of charting change

Existing naming	*Interim naming*	*Final naming*
RNAV (GPS) RWY 23	RNAV$_{(GNSS)}$ RWY 23	RNP RWY 23
RNAV (GNSS) RWY 23	RNAV$_{(GNSS)}$ RWY 23	RNP RWY 23
RNAV (RNP) RWY 23	RNAV$_{(RNP)}$ RWY 23	RNP RWY 23 (AR)

1.3.4   States may decide to go directly from the current naming convention that is used to the final convention.

1.3.5   The chart identification must include the runway identification for straight-in landing or a letter designator (a, b, c, etc.) for circling procedure (see PANS-OPS, Volume II, Part 1, Section 4, Chapter 9). An example would be RNP A.

1.3.6   When more than one PBN approach procedure exists for the same runway, the duplicate identification criteria defined in PANS-OPS, Volume II, Part 1, Section 4, Chapter 9 shall apply (e.g. RNP Z RWY 23, RNP Y RWY 23).

1.3.7   When a PBN approach procedure is combined with another PBN approach procedure on the same chart, the multiple procedure criteria as defined in PANS-OPS, Volume II, Part 1, Section 4, Chapter 9 applies.

1.3.8   The identification must also include a parenthetical suffix when exceptional conditions occur as described in Table 1-2.

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) RNAV$_{(GNSS)}$ RWY 23 (LPV only)
Procedure has only an LNAV/VNAV line of minima	LNAV/VNAV only	RNP RWY 23 (LNAV/VNAV only) RNAV$_{(GNSS)}$ 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) RNAV$_{(GNSS)}$ RWY 23 (LPV, LNAV/VNAV only)
Procedure has only an LP line of minima	LP only	RNP RWY 23 (LP only) RNAV$_{(GNSS)}$ RWY 23 (LP only)

1.3.9   When amending or publishing new PBN approach procedures, additional procedure requirements must be provided as chart notes. 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 that are not included in the core navigation specification as specified in Table 1-3. An example is shown in Figure 1-1.

Table 1-3.   PBN requirements box

Navigation specification	*Optional requirements*
RNP APCH	RF required
RNP AR APCH	RF required RNP <0.3 Missed approach RNP <1
Advanced RNP	RNP <1 in initial and intermediate segment
RNP 0.3	RF required
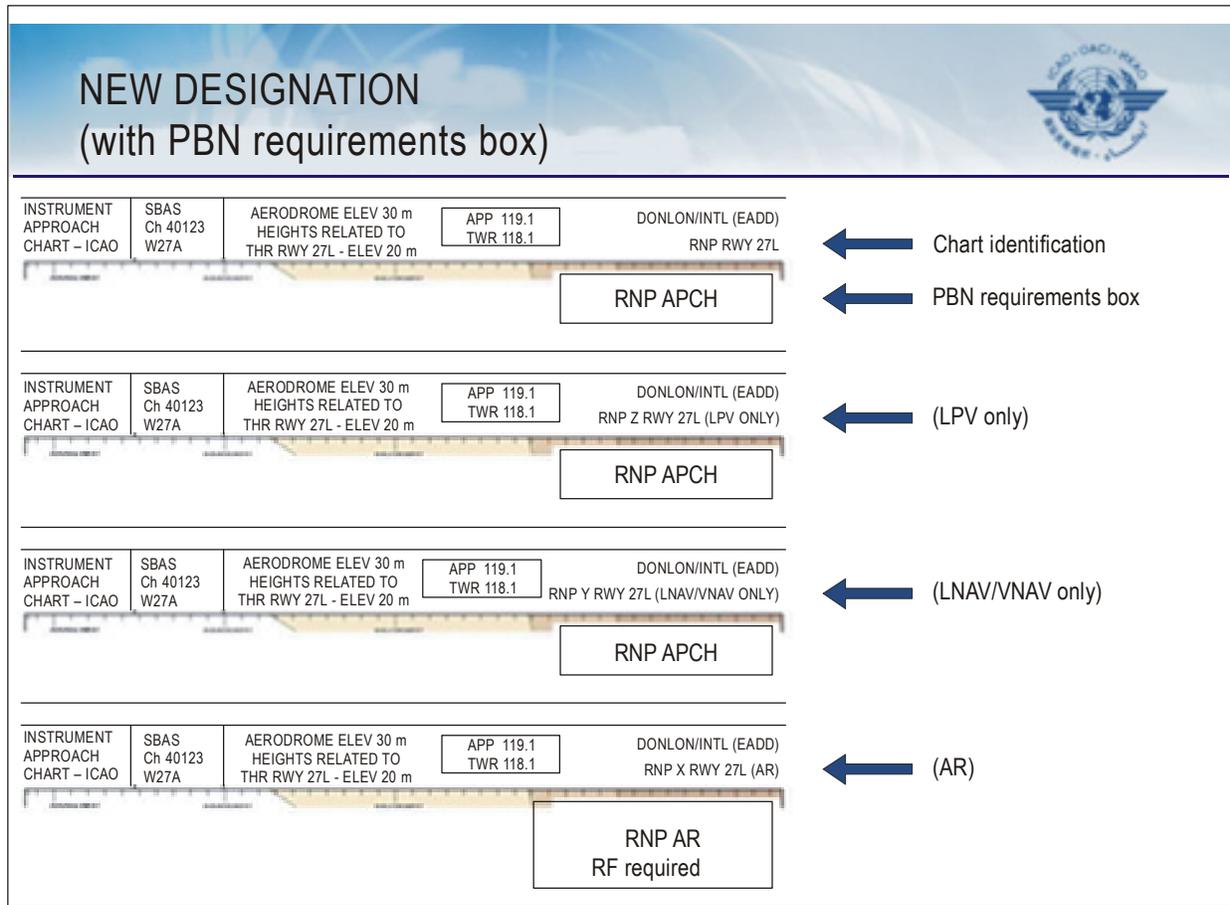
Figure 1-1.   New PBN chart designation (with PBN requirements box)

1.4   IMPACT OF CHANGE

There are many organizations impacted by the change, as it will require amendment to existing charts, internal documentation, databases and in some cases training programmes. The impact has to be considered in the transition plan and timelines for conversion. Table 1-4 indicates issues to be considered under change management.

1.5   REQUIREMENT FOR A STATE TRANSITION PLAN

1.5.1   The feedback from stakeholders on the impact of the chart naming change indicates that many stakeholders (regulators, data houses, aircraft manufacturers, airlines and aircraft operators, air navigation service providers and avionics manufacturers) may or will be affected. Pilots and air traffic controllers will need training on the new chart identification prior to publication. Consequently, each State needs to consult with these organizations to understand how they will be impacted and to determine the commencement date of publication of the procedures with the new chart identification.

Table 1-4.   Change management considerations

No.	Item	Requirement	Remarks
1	Chart identification	Existing RNAV approach charts will be re-named to either RNAV$_{(GNSS)}$ RWY XX or directly to RNP RWY XX.	States must determine timeline for change and priority. States may amend as part of cyclic maintenance of the procedure. May require changes to automation software.
2	Chart — PBN requirements box	PBN requirements box has to be added to each PBN approach chart, where appropriate.	States must determine timeline for change and priority. States may amend as part of cyclic maintenance of the procedure. May require changes to automation software.
3	Pilot training	Training information for pilots.	May be accomplished through pilot bulletins and reinforced through simulator training sessions.
4	Air traffic control officer (ATCO) training	Training information for ATCOs providing airport terminal service.	May be accomplished through ATCO bulletin. Training must be conducted prior to the change in the charts for the airports in the terminal area.
5	Databases	Existing databases may have to be amended to reflect new charting change.	Database providers will address as required.
6	Procedure design software	Procedure design software may have to be amended to reflect charting change.	Instrument procedure design organizations will address as required.
7	Charting houses	Charts will have to be changed as per numbers 1 and 2. States would issue changes to aeronautical information publication (AIP) which would require charting houses to react.	This has to be closely coordinated between the State's aeronautical information service (AIS) organization and charting houses.
8	Aircraft flight manual (AFM)	The AFM may need to be amended to reflect RNP approval.	Air operators to address as required.
9	Operations (OPS) approval	Current OPS approval may have to be amended to reflect RNP approach authorization.	Regulator may have to issue clarification.

1.5.2   The State transition plan will identify and address stakeholder needs, issues and concerns and lay out the actions and timelines to meet the 1 December 2022 target date. For some States the transition will be simple and completed within a short time period; for other States who have a significant number of PBN procedures to be converted, as well as a large number of impacted stakeholders, transition planning may be more complex and require greater consultation. As a result, there is no specific requirement for a State's transition plan.

1.5.3   Whether the transition plan is simple or complex, it is necessary to assist all stakeholders to prepare and be ready for the publication and operational application of the new procedures.

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CHAPTER 2

CHANGE MANAGEMENT CONSIDERATIONS

2.1   INTRODUCTION

In aviation, the proper management of change to the systems is critical as even the most minor adjustment can have major consequences. Change management takes a structured approach to ensuring that the change is smoothly and successfully implemented without creating other unforeseen consequences. As aviation is a complex area of activity with many interdependencies, the use of proper change management processes will ensure that aviation safety is not jeopardized.

2.2   SAFETY MANAGEMENT SYSTEM (SMS) PRINCIPLES

2.2.1   ICAO provides guidance to all aviation authorities on the implementation of SMS regulatory structures and has provided guidance material and tools to assist with implementation, including the *Safety Management Manual* (Doc 9859). The focus of SMS is on managing aviation safety and ensuring that any new risks to aviation that are introduced by a change are identified and, if necessary, mitigated to as low as reasonably practical (ALARP). By using the SMS process outlined in Doc 9859, States will ensure that implementation of change will be successful from a safety standpoint.

2.2.2   Regarding the implementation of the charting change, States should undertake a hazard identification and risk assessment (HIRA) that involves all stakeholders. By doing so, the needs, issues and concerns can be included in the transition plan.

2.3   HAZARDS, RISKS AND MITIGATIONS

2.3.1   A high-level predictive hazard log HIRA to determine the hazards, assess the risks, and identify general mitigations to reduce the risk to ALARP is attached as Appendix C. States should review these hazards, risks and mitigations to determine whether they apply to their situation when they conduct their own HIRA on the charting change.

2.3.2   It should be understood that pilots and ATC personnel use the published (charted) approach procedure to communicate approach clearances. For example, if the chart reads "RNAV Z RWY 23", the ATCO will state "Air Canada 456 is cleared the RNAV Z RWY 23". Changing the chart from RNAV to RNP can be mitigated through issuance of an OPS bulletin to ATCOs. For pilots, an OPS bulletin as well as updates to recurrent and simulator training may be required.

2.3.3   It should also be noted that current flight management system (FMS) procedure labels seldom reflect the charted approach naming convention for both conventional and RNAV approaches. As well, FMS procedure labels vary among manufacturers. This problem causes confusion for pilots today when they attempt to retrieve the approach from the FMS. Pilots are already trained to find the required guidance to fly the correct procedure in the FMS.

2.3.4   Table 2-1 shows that discrepancies between the chart identification and what the pilot can select from the FMS already exist. Furthermore, the pilot also has to select the appropriate arrival for the approach procedure that he has been cleared to fly. Changing the chart identification (from RNAV to RNP) does not increase the present workload; in fact, in most cases it will simplify chart identification.

Table 2-1.   Chart identification/FMS comparison

Current chart identification	*Location/airport*	*Initial FMS menu selection*
ILS DME 1 RWY 23L ILS DME 2 RWY 23L	Mexico City, MMMX Mexico City, MMMX	ILS 23L
ILS DME RWY 27R CAT II/III ILS DME RWY 27R	LONDON HEATHROW, UK LONDON HEATHROW, UK	ILS 27R
ILS OR LOC RWY 28L ILS RWY 28L (SA CAT II) ILS PRM RWY 28L	SAN FRANCISCO INTL SAN FRANCISCO INTL SAN FRANCISCO INTL	ILS 28L
ILS OR LOC RWY 26L LOC DME RWY 26R ILS OF LOC RWY 04L	MIAMI INTL MIAMI INTL JFK NEW YORK	ILS 26L LOC 26R ILS 04L, OR LOC 04L
VOR RWY 19L VOR/DME RWY 1 VOR/DME OR GPS RWY 19	SAN FRANCISCO INTL RONALD REAGAN WASHINGTON RONALD REAGAN WASHINGTON	VOR 19L VOR 01 VOR 19, OR RNV 19
RNAV (GPS) RWY 9	MIAMI INTL	RNV 09 (WITH RNP VALUES)

2.4   SEQUENCING OF MITIGATIONS

2.4.1   With any change, it is important that mitigations are implemented in a sequential, logical manner to ensure that no new hazards are inadvertently created. The consultation process will help determine the sequence based on input from all the stakeholders. The sequencing of the mitigations will be a key aspect of the transition plan, as it will determine the overall timeline of the implementation, including start and end dates.

2.4.2   The HIRA identified the following additional mitigations that should be considered in transition planning (see Table 2-2).

Table 2-2.   Additional mitigations

Mitigation no.	Description	Responsibility
1. Preparation	Develop an ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called an RNP approach. As well, the differentiation in case of multiple RNAV approaches to the same runway is addressed through the duplicate naming convention (Z, X, Y) in PANS-OPS.	ICAO
2. Preparation	Develop aeronautical information circular (AIC) on the charting identification change or file a difference to PANS-OPS in the State AIP.	State AIS provider
3. Preparation	Develop pilot bulletin/guidance/training material that addresses the charting change and possible scenarios that the pilot may face.	Aircraft operators
4. Preparation	Develop ATCO bulletin/guidance/training material that addresses the charting change.	ANSPs
5. Implementation	Conduct pilot training prior to the commencement of the conversion of chart identification.	Aircraft operators
6. Implementation	Conduct ATCO training prior to aeronautical information regulation and control (AIRAC) date for the conversion of chart identification.	ANSPs
7. Implementation	Convert all existing RNAV and/or global positioning system (GPS) approach procedures at an airport to RNAV$_{(GNSS)}$ and/or RNAV$_{(RNP)}$ identification (as applicable) at the same time (one AIRAC cycle/date), or convert all existing RNAV and/or GPS approaches at an airport directly to RNP identification at the same time (one AIRAC cycle/date). This ensures that there are no inconsistencies between various RNAV approach chart identifications at an airport.	State AIS provider, charting houses, ANSPs
8. Notification	Advise ICAO when conversion of existing RNAV approach procedures is completed.	State AIS provider

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CHAPTER 3

CONSULTATION

3.1 PURPOSE

3.1.1 Consultation in this context is the process by which stakeholders' input on matters affecting them is sought. Its main goals are improving the efficiency, transparency and stakeholder involvement in aviation change management, leading to a consensus on the implementation and, in this case, the transition plan.

3.1.2 The purpose of the consultation is to draw out the needs, issues and concerns from each stakeholder regarding the proposed change to the chart naming convention. This process allows all stakeholders to provide their input on how the change will impact them and the issues that they will have to deal with.

3.2 METHODOLOGY

The input from the stakeholders on the planned change to the chart naming convention can then be included in the transition plan. An overview of the methodology is shown in Figure 3-1.

Notification of planned charting change	Stakeholder input assessment	Hazard identification and risk analysis (if required)	Consultation finalization
Initial notification of the proposed change and timelines	Needs, issues and concerns identified as well as limiting factors. HIRA conducted for specific concerns		Consensus on way forward and timelines
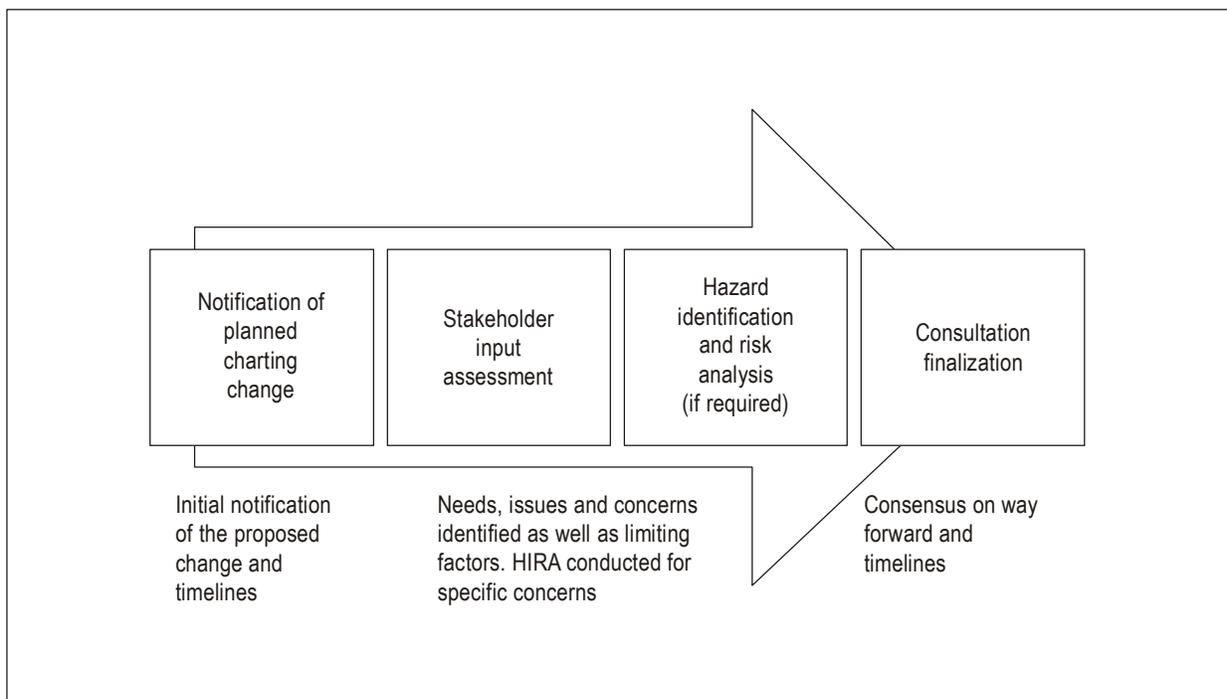
Figure 3-1.   Methodology for change to the chart naming convention

3.3   ORGANIZATIONS AND STAKEHOLDERS

The following list of organizations may need to be involved with the consultation:

a)   Air navigation service providers;

b)   Aircraft operators;

c)   General aviation;

d)   Airport authorities;

e)   Military;

f)   Charting houses;

g)   Database providers;

h)   Instrument procedure design organizations; and

i)   State regulators.

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CHAPTER 4

TRANSITION PLAN

4.1   DESCRIPTION

4.1.1   The State transition plan will provide stakeholders with the necessary information including timelines to allow them to prepare for the charting change.

4.1.2   The State transition plan will be developed based on the input from the consultation process while understanding the timelines detailed in Amendment 6 to PANS-OPS, Volume II, Part III, Section 5, Chapter 1, as follows:

> "1.4.2.2   Until 30 November 2022, approach charts depicting procedures that meet the RNP APCH navigation specification criteria shall include the term RNAV$_{(GNSS)}$ in the identification (e.g. RNAV$_{(GNSS)}$ RWY 23) or, alternatively, as described in 1.4.2.3.
>
> *Note.— ICAO Circular 336 provides guidance to assist States and other stakeholders with the transition from RNAV to RNP approach chart identification.*
>
> 1.4.2.3   From 1 December 2022, charts depicting procedures that meet the RNP APCH navigation specification criteria shall include the term RNP in the identification (e.g. RNP RWY 23). The identification shall also include a parenthetical suffix when exceptional conditions occur as described in Table III-5-1-1.
>
> . . .
>
> 1.4.2.4   Until 30 November 2022, charts depicting procedures that meet the RNP AR APCH navigation specification shall include the term RNAV$_{RNP}$ in the identification (e.g. RNAV$_{RNP}$ RWY 23) or, alternatively, as described in 1.4.2.5.
>
> *Note.— ICAO Circular 336 provides guidance to assist States and other stakeholders with the transition from RNAV to RNP approach chart identification.*
>
> 1.4.2.5   From 1 December 2022, charts depicting procedures that meet the RNP AR APCH navigation specification shall include the term RNP in the identification with a parenthetical suffix (AR). (e.g. RNP RWY 23 (AR))."

4.1.3   This direction provides States with the option of proceeding from their current RNAV chart depiction directly to the final state and the RNP chart identification. For example, if the current chart identification is RNAV (GPS) RWY 23, changing the chart identification first to RNAV (GNSS) RWY 23 and then to RNP RWY 23 may be considered excessive and costly work for no apparent benefit by the stakeholders and, therefore, conversion directly to RNP may be the preferred option.

4.1.4   States must decide whether they will implement a one-step or a two-step transition process.

Note.— Not all States will need a detailed transition plan as the number of RNAV approach procedures that require amending may be such that conversion can be completed in a short timeframe. However, specific elements are required including transition process, notifications, schedule, commencement date, and completion date.

4.1.5   An example outline of a State transition plan is attached at Appendix A.

4.2   ELEMENTS/MAJOR ACTIVITIES CHECKLIST
(see Table 4-1)

Table 4-1.   Elements/major activities checklist

Action	*Rationale*
1. Determine whether to implement a one-step or two-step process.	A one-step process will reduce the workload by half.
2. Identify the number of procedures to be amended.	This will help determine how long the full conversion will take. Determine the maximum number of procedures that can be converted at each cycle.
3. Identify the airports impacted and the priority for change.	By identifying the airports affected, priority can then be determined. It may be that international airports with a few RNAV procedures will be converted first, as it will be easier and quicker to accomplish.
4. Conduct consultation.	Issue change notification. Determine any needs, issues and concerns that will impact implementation and the timelines. Conduct HIRA if necessary and determine mitigations.
5. Develop transition plan.	Incorporate mitigations. Conversion of all RNAV approach procedures at an airport should be completed in one publication cycle. This will reduce any confusion for ATC and for aircraft operators.
6. Develop and issue notifications.	In accordance with AIP and Annex 15 — *Aeronautical Information Services*, issue notifications for the approaches that will be converted and the timeframe.
7. Conduct conversion of RNAV approaches to RNP approaches in accordance with transition plan and notifications.	In accordance with the AIRAC cycle, convert the RNAV approach procedures to RNP approach procedures and publish as appropriate.
8. Repeat steps 2-6 for a two-step process.	

_____

APPENDIX A

EXAMPLE OUTLINE OF A STATE TRANSITION PLAN

1. Introduction/background

2. Purpose of the plan

3. Description of the change

4. Airports/procedures impacted

5. Results of consultation

6. Mitigations

7. Implementation methodology/process

8. Schedule and timeline

9. Notifications

10. Summary

_____

APPENDIX B

EXTRACT FROM AMENDMENT 6 TO PANS-OPS (DOC 8168), VOLUME II, REGARDING CHART IDENTIFICATION

"**1.4** ~~RNAV~~ APPROACH

. . .

1.4.2   Chart identification

1.4.2.1   The chart shall be identified in accordance with Annex 4, 11.6~~, and shall include the term RNAV~~.

1.4.2.2   ~~RNP~~ Until 30 November 2022, approach charts depicting procedures that meet the RNP APCH navigation specification criteria shall include the term RNAV$_{(GNSS)}$ in the identification (e.g. RNAV$_{(GNSS)}$ RWY 23) or, alternatively, as described in 1.4.2.3.

Note.—   ~~Charting requirements for RNP procedures that meet the RNP AR APCH navigation specifications are contained in the~~ Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual (Doc 9905).

Note.— ICAO Circular 336 provides guidance to assist States and other stakeholders with the transition from RNAV to RNP approach chart identification.

1.4.2.3   ~~Other RNAV approach procedures shall include the radio navigation aid or sensor upon which the approach procedure is based, in parentheses in the identification.~~ From 1 December 2022, charts depicting procedures that meet the RNP APCH navigation specification criteria shall include the term RNP in the identification (e.g. RNP RWY 23). The identification shall also include a parenthetical suffix when exceptional conditions occur as described in Table III-5-1-1.

Table III-5-1-1.   Conditions when suffix shall be applied in chart designation

Condition	*Suffix*	*Example*
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)

1.4.2.4   Until 30 November 2022, charts depicting procedures that meet the RNP AR APCH navigation specification shall include the term RNAV~RNP~ in the identification (e.g. RNAV~RNP~ RWY 23) or, alternatively, as described in 1.4.2.5.

Note.— ICAO Circular 336 provides guidance to assist States and other stakeholders with the transition from RNAV to RNP approach chart identification.

1.4.2.5   From 1 December 2022, charts depicting procedures that meet the RNP AR APCH navigation specification shall include the term RNP in the identification with a parenthetical suffix (AR). (e.g. RNP RWY 23 (AR)).

1.4.2.4 6   The chart identification shall include the runway identification for straight-in landing, or a letter designator (a, b, c, etc.) for circling approach (see Part I, Section 4, Chapter 9).

1.4.2.5 7   When more than one ~~RNAV~~ PBN approach procedure ~~(regardless of navigation specification or sensor type)~~ exists for the same runway, the duplicate identification criteria defined in Part 1, Section 4, Chapter 9 apply. When ~~an RNAV~~ a PBN approach procedure is combined with another PBN approach procedure on the same chart, the multiple procedure criteria defined in Part 1, Section 4, Chapter 9 apply.

Note.— The text in parentheses that is part of the procedure identification does not form part of the ATC clearance.

~~1.4.3   *Chart notes*. RNAV related requirements concerning equipment, operation or navigation functionality shall be charted as a note.~~

~~For example:~~

~~"dual GNSS required" or "IRU required"~~

~~or~~

~~"RF required".~~

1.4.3   *Chart notes*. When amending or publishing new PBN approach procedures, additional procedure requirements shall be provided as chart notes. PBN items shall 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 that are not included in the core navigation specification as specified as follows:

a)   Navigation specifications:

— RNAV 1

— RNP 1

— RNP APCH

— RNP AR APCH

— Advanced RNP

— RNP 0.3

b)   Optional requirements:

— RNP APCH: RF required

—   RNP AR APCH: RF required, RNP <0.3, Missed approach RNP < 1

—   Advanced RNP: RNP < 1 in initial and intermediate segment

—   RNP 0.3: RF required.

1.4.4   Depiction

1.4.4.1   Any RF requirement shall be charted in accordance with paragraphs 1.3.4 and 1.3.5 above.

1.4.4.2   Different ~~required~~ RNP ~~levels~~ navigation accuracy requirements on different initial segment legs ~~must~~ shall be charted with a note. The required note may be charted with the applicable leg, or as a procedure note with reference to the applicable leg. If the same RNP ~~value~~ navigation accuracy applies to all initial and intermediate segments, then a general procedure note should be used as indicated in 1.4.3.

1.4.5   Minima

Minima for ~~RNAV~~ approach procedures shall be labelled on the chart as follows:

~~a)   non-precision approach procedures: "LNAV"; and~~

~~b)   approach procedures with vertical guidance (APV):~~

~~1)   SBAS LNAV/VNAV performance level and Baro-VNAV: "LNAV/VNAV"; and~~

~~2)   SBAS APV I/II performance level: "LPV".~~

Minima label	*Associated navigation specification*
LNAV	RNP APCH
LNAV/VNAV	RNP APCH
LP	RNP APCH
LPV	RNP APCH
RNP 0.x	RNP AR APCH

. . ."

APPENDIX C

HAZARD LOG — RNAV TO RNP
APPROACH CHART IDENTIFICATION

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
Flight operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation)	Crew confused about whether approved to fly the procedure.	• Distraction in the cockpit • Increased R/T between pilot and controller • Pilot selects incorrect procedure from the database • Aircraft may be flown outside protected area • Leads to catastrophic accident	PBN BOX on chart indicates RNP APCH or RNP AR. Where there is only one RNAV procedure published (either RNAV$_{(GNSS)}$ or RNAV$_{(RNP)}$), there is no confusion. Where there is more than one RNAV procedure (e.g. an RNAV$_{(GNSS)}$ and an RNP (AR)) to a runway, they are differentiated by letters 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 an RNAV Z or RNP Z approach to a certain runway. FMS would indicate RNV or RNAV Z – Z provides confirmation of correct procedure.	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNAV approaches to the same runway goes through the duplicate naming convention (Z, X, Y). Pilot bulletin/guidance/ training material that addresses possible scenarios during the transition. Convert all RNAV$_{(GNSS)}$ approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle).
Flight operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure	Crew confused about which procedure to select	• Distraction in the cockpit • Increased R/T between pilot and controller • Pilot selects incorrect procedure from the database • Aircraft may be flown outside protected area • May lead to possible accident or incident	PBN BOX on chart indicates RNP APCH or RNP AR. There would be only on RNAV Z or RNP Z approach to a certain runway. FMS would indicate RNV or RNAV Z – Z provides confirmation of correct procedure. Where more than one procedure exists to a runway, they are differentiated by letters.	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNAV approaches to the same runway goes through

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
	designation)				the duplicate naming convention (Z, X, Y). Pilot bulletin/guidance /training material that addresses possible scenarios during the transition. Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle).
Flight operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation)	Where only one RNAV$_{(GNSS)}$ approach is published to the same runway, ATC may clear for an RNP approach.	• Mismatch exists between clearance and the chart • Possible need for clarification between pilot and ATC (additional R/T) – initial phase only	There is only one RNAV approach published and selection will not result in an incorrect approach flown. Even if cleared for an RNP approach while the chart shows RNAV$_{(GNSS)}$ selection of this approach is allowed. If confused, pilot can still refuse the RNAV or RNP clearance and request conventional approach.	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNAV approaches to the same runway goes through the duplicate naming convention (Z, X, Y). Explain clearly that an RNAV$_{(GNSS)}$ is the same as RNP due to the GNSS requirement for the approach phases and hence the internal on-board monitoring and alert limit set at 0.3 NM. In short, explain that RNAV$_{(GNSS)}$ = RNP and that pilot is allowed to select the RNAV approach when cleared for an RNP approach.
Flight operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach	Where an RNAV$_{(GNSS)}$ and an RNAV$_{(RNP)}$ procedure are published for the same runway, crew confused about whether approved to fly the procedure if cleared for RNP approach in both	• Distraction in the cockpit • Increased R/T between pilot and controller • Pilot may fly procedure that he is not authorized to fly: – aircraft may be flown outside protected area • Pilot selects incorrect procedure from the database	PBN BOX on chart indicates RNP APCH or RNP AR. For a runway with a single RNAV or RNP procedure published today, confusion is minimized. For multiple RNAV procedures to the same runway, there would be only one RNAV$_{(GNSS)}$ Z or one RNP Z approach to a certain runway.	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
	chart identification (as procedure designation).	cases.	• May lead to possible accident or incident	FMS would indicate RNV or RNAV Z – Z provides confirmation of correct procedure. Where more than one procedure exists to a runway, they are differentiated by letter ("Z").	multiple RNAV approaches to the same runway goes through the duplicate name convention (Z, X, Y). Refer to pilot bulletin/guidance /training material that addresses possible scenarios during the transition. Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle).
Flight operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	Crew is flying multiple legs and could encounter RNAV at one airport and RNP at the next and so on.	• Distraction in the cockpit • Increased R/T between pilot and controller • Pilot may fly procedure that he is not authorized to fly: – aircraft may be flown outside protected area • Pilot selects incorrect procedure from the database • May lead to possible accident or incident	PBN BOX on chart indicates RNP APCH or RNP AR. There would be only one RNAV$_{(GNSS)}$ Z or one RNP Z approach to a certain runway. FMS would indicate RNV or RNAV Z – Z provides confirmation of correct procedure. Where more than one procedure exists to a runway, they are differentiated by letter ("Z").	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNAV approaches to the same runway goes through the duplicate naming convention (Z, X, Y).
ATC operations	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	ATC confusion with mixed terminology at airport.	• In non-surveillance airspace, ATC clears pilot for approach – Pilot responds RNAV Z RWY XY when ATC has chart that indicates RNP Z RWY XY (vice versa) • In surveillance airspace, ATC clears aircraft for RNP Z RWY XY, when pilot has RNV or RNAV Z RWY XY in database/avionics • Increased R/T • Delay in providing approach clearance • Clearing the aircraft for the wrong approach • Possible loss of separation	ATC will clear the aircraft for the approach as identified on the chart. Pilot will comply or request different procedure.	Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle). Refer to ATCO bulletin/guidance /training that addresses possible scenarios during the transition. Refer to pilot bulletin/guidance /training material that addresses possible scenarios during the transition.

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
Flight planning	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	Flight plan indicates RNP capability, yet approach procedure identification indicates RNAV.	Pilot and ATC confusion regarding approval in relation to chart depiction	ATC will clear the aircraft for the approach as identified on the chart and/or as per the flight plan capability. If confused, will clear for the conventional or confirm with pilot. Pilot will comply or request different procedure.	Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle). ATCO bulletin/guidance /training that addresses possible scenarios during the transition. Pilot bulletin/guidance /training material that addresses possible scenarios during the transition.
A/C certific-ation	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	AFM does not reflect RNP.	• Legally, pilot cannot fly RNP procedure • Procedure is not accepted by pilot • Increased R/T • Pilot cleared for conventional approach • Additional instructions	Pilot requests non-RNP procedure.	Change to AFM.
Airborne database, flight operations database, charting database (EFB)	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	Databases cannot differentiate (until ARINC 424 is changed) between RNP and RNAV approach chart identification.	• Procedure in database, but not in agreement with the chart (identified differently) • Pilot confusion/distraction	There would be only one RNAV X, Y or Z or RNP X, Y or Z approach identified to a certain runway.	Pilot bulletin/guidance /training material that addresses possible scenarios during the transition. Changes to ARINC 424.
		All databases are not harmonized.	• Pilot confusion/distraction		Pilot bulletin/guidance /training material that addresses possible scenarios during the transition.
		424 does not have RNP Code but has a RNP AR code.	• Procedure in database as RNV or RNAV • Not in agreement with	Same as for database. There would be only on RNAV X,Y	Changes to ARINC 424.

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
			chart • Confusion for data houses and vendors • Pilot confusion/distraction	or Z or RNP X,Y or Z approach identified to a certain runway.	
Charting	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	Some charts will be identified as RNP and some as RNAV as they are amended over a set transition time period.	• Pilot confusion	PBN BOX on chart indicates either RNP APCH or RNP AR. Where more than one procedure exists to a runway, they are differentiated by letters (X, Y and Z). Key mitigation is the letter identifier when there is more than one PBN approach to a runway.	Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle). Pilot bulletin/guidance /training material that addresses possible scenarios during the transition
		RNAV Z RWY 27L will now read RNP Z RWY 27L	• Pilot confusion – discrepancy between chart and FMS (i.e. RNV or RNAV Z RWY 27L)	PBN BOX on chart indicates either RNP APCH or RNP AR. Key mitigation is the designation "Z" which indicates correct approach loaded. Confusion removed. ALARP.	
		Some RNAV procedures are based on DME/DME/IRU.	• Pilot confusion	Very minimal number of procedures exist today. ICAO provisions do not recognize this type of procedure. Aircraft that are GNSS-equipped can perform these procedures safely. Aircraft that are not GNSS-equipped are not authorized to fly RNP procedures.	ICAO circular would indicate that these procedures do not meet ICAO provisions, the RNP APCH or AR specifications and should be removed. States remove procedures from AIP.
Avionics	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification	For some avionics, both RNAV and RNP procedures would be displayed as RNV or RNAV (8 character display limitation).	• Pilot confusion • Procedure not available to some operators • PBN box information cannot be displayed from database • Procedure cannot be flown	As situation exists today, current defenses control safety risks (i.e. RNAV (RNP) Z RWY 25 would be displayed as RNAV or RNV Z RWY 25). Avionics would reflect either: RNV or RNAV Z RWY XY. The key mitigation is the designator "Z". Chart would reflect RNAV Z RWY XY or RNP Z RWY XY.	Convert all RNAV approach procedures at an airport to RNP designation at the same time (i.e. in the same AIRAC cycle).

Type of operation/ activity	Generic hazard	Specific components of the hazard	Hazard-related consequences	Existing defences to control safety risks and safety risk index	Further action to reduce safety risks and resulting safety risk index
	(as procedure designation)				
State regulatory material	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	State regulations restrict use of RNP procedures which involves understanding public RNP, RNP AR and non-standard RNP.	RNP chart identified procedures cannot be used. Airport accessibility reduced. Increased diversions.	Pilot requests non-RNP procedure.	ICAO circular that addresses both approach classification and chart identification to explain that an RNAV with GNSS as sensor meets the RNP requirements and is therefore called RNP, and that the differentiation in case of multiple RNAV approaches to the same runway goes through the duplicate naming convention (Z, X, Y). Amendment to State regulations, orders and circulars.
OPS approval	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation.	OPS approval does not reflect RNP capability – may not reflect the capability to fly all existing RNAV approach procedures, not just RNP AR which may already be in the OPS approval.	Aircraft not approved for RNP operations.	Pilot does not accept RNP operation and requests non-RNP procedure. EASA AMC 20-27 and 20-27 already address RNP procedures.	Amendment to OPS approval. Pilot bulletin/guidance /training material that addresses possible scenarios during the transition.
Synchro-ization	During the transition period, there is simultaneous availability of both RNAV$_{(GNSS)}$, RNAV$_{(RNP)}$ and RNP approach chart identification (as procedure designation).	Chart and navigation database production as well as avionics will not be synchronized.	• Chart and database do not agree • Updating ARINC 424 databases does not automatically mean a similar update to avionics displays • Pilot confusion • Harmonization reduced	Both chart and navigation database amendments should coincide with a single AIRAC cycle for a given procedure to a given runway.	Industry documentation needs to be aligned with change (ARINC, RTCA, Eurocae, SAE, etc.). ICAO documentation needs to be amended: Annex 4 — *Aeronautical Charts*, PANS-OPS (Doc 8168), *Aeronautical Chart Manual* (Doc 8697).

— END —