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INTERNATIONAL CIVIL AVIATION ORGANIZATION

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PBCS Seminar
Standards and Recommended Practices (SARPs) and Guidance Materials related to PBCS

ICAO APAC ATM

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and Recommended Practices
Annex 11 to the Convention on In
Air Traffic Services
Air Traffic Control Service
Flight Information Service
Alerting Service
Fifteenth Edition, July 2018
This edition supersedes, on 8 November 2018, all previous ed
For information regarding the applicability of the Standards a
Practices, see Foreword.
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ICAO
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Annex 6 to the Convention on International Civil Aviation
Operation of Aircraft
Part I — International Commercial Air Transport — Aeroplanes
Twelfth Edition, July 2022
This edition supersedes, on 3 November 2022, all previous editions of Part I of Annex 6.
For information regarding the applicability of the Standards and Recommended
Practices, see the Foreword.
INTERNATIONAL CIVIL AVIATION ORGANIZATION


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Doc 4444
PROCEDURES FOR AIR NAVIGATION SERVICES
Air Traffic M
Sixteenth Edition, 2016
This edition supersedes, on 10 November 2016,
INTERNATIONAL CIVIL AVI
ICAO
Doc 9869
Performance-based Communication
and Surveillance (PBCS) Manual
Second Edition, 2017
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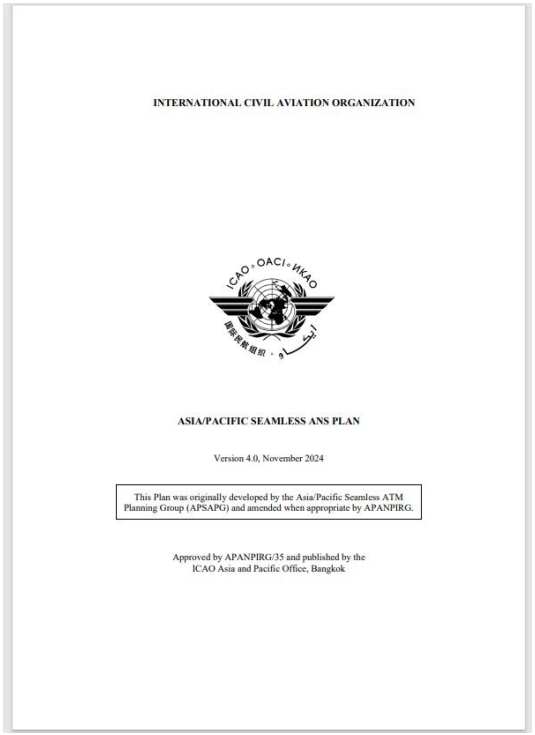
INTERNATIONAL CIVIL AVIATION ORGANIZATION


INTERNATIONAL CIVIL AVIATION ORGANIZATION
ICAO • OACI • ИКАО
ASIA/PACIFIC SEAMLESS ANS PLAN
Version 4.0, November 2024
This Plan was originally developed by the Asia/Pacific Seamless ATM
Planning Group (APSAPG) and amended when appropriate by APANPIRG.
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Annex 11 Air Traffic Services

2.8 Performance-based communication (PBC) operations

2.8.1 In applying performance-based communication (PBC), RCP specifications shall be prescribed by States. When applicable, the RCP specification(s) shall be prescribed on the basis of regional air navigation agreements.

Note. — In prescribing an RCP specification, limitations may apply as a result of communication infrastructure constraints or specific communication functionality requirements.

2.8.2 The prescribed RCP specification shall be appropriate to the air traffic services provided.

Note.— Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869).*

Annex 11 Air Traffic Services

2.9 Performance-based surveillance (PBS) operations

2.9.1 In applying performance-based surveillance (PBS), RSP specifications shall be prescribed by States. When applicable, the RSP specification(s) shall be prescribed on the basis of regional air navigation agreements.

Note.— In prescribing an RSP specification, limitations may apply as a result of surveillance infrastructure constraints or specific surveillance functionality requirements.

2.9.2 The prescribed RSP specification shall be appropriate to the air traffic services provided.

2.9.3 Where an RSP specification has been prescribed by States for performance-based surveillance, ATS units shall be provided with equipment capable of performance consistent with the prescribed RSP specification(s).

Note.— Information on the PBCS concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869).*

Annex 11 Air Traffic Services

3.3.5.2 Where RCP/RSP specifications are applied, programmes shall be instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives. The scope of monitoring programmes shall be adequate to evaluate communication and/or surveillance performance, as applicable.

Note.— Guidance material relating to RCP and RSP specifications and monitoring of communication and surveillance performance is contained in the Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869).*

3.3.5.3 ***Recommendation.*** *— Arrangements should be put in place, through interregional agreement, for the sharing between regions of data and/or information from monitoring programmes.*

Annex 11 Air Traffic Services

6.1 Aeronautical mobile service (air-ground communications)

6.1.1 General

6.1.1.1 Radiotelephony and/or data link shall be used in air-ground communications for air traffic services purposes.

Note.— Requirements for ATS units to be provided with and to maintain guard on the emergency channel 121.5 MHz are specified in Annex 10, Volumes II and V.

6.1.1.2 Where an RCP specification has been prescribed by States for performance-based communication, ATS units shall, in addition to the requirements specified in 6.1.1.1, be provided with communication equipment which will enable them to provide ATS in accordance with the prescribed RCP specification(s).

Note.— Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (*Doc 9869*).

6.1.1.3 When direct pilot-controller two-way radiotelephony or data link communications are used for the provision of air traffic control service, recording facilities shall be provided on all such air-ground communication channels.

Note.— Requirements for retention of all automatic recordings of communications in ATC are specified in Annex 10, Volume II, 3.5.1.5.

6.1.1.4 Recordings of communications channels as required in paragraph 6.1.1.3 shall be retained for a period of at least thirty days.

Annex 6 Operation of Aircraft (Part I)

CHAPTER 7. AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

7.1 COMMUNICATION EQUIPMENT

7.1.4 The State of the Operator shall, for operations where an RCP specification for PBC has been prescribed, ensure that the operator has established and documented:

a) normal and abnormal procedures, including contingency procedures;

b) flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;

c) a training programme for relevant personnel consistent with the intended operations; and

d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.

7.1.5 The State of the Operator shall ensure that, in respect of those aeroplanes mentioned in 7.1.3, adequate provisions exist for:

a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with Annex 11, Chapter 3, 3.3.5.2; and

b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RCP specification(s).

Annex 6 Operation of Aircraft (Part I)

7.3 SURVEILLANCE EQUIPMENT

7.3.3 The State of the Operator shall, for operations where an RSP specification for PBS has been prescribed, ensure that the operator has established and documented:

a) normal and abnormal procedures, including contingency procedures;

b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;

c) a training programme for relevant personnel consistent with the intended operations; and

d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

7.3.4 The State of the Operator shall ensure that, in respect of those aeroplanes mentioned in 7.3.2, adequate provisions exist for:

a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with Annex 11, Chapter 3, 3.3.5.2; and

b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specification(s).

PANS-ATM Doc 4444

5.4.2.9 PERFORMANCE-BASED LONGITUDINAL SEPARATION MINIMA

5.4.2.9.1 Within designated airspace, or on designated routes, separation minima in accordance with the provisions of this section may be used.

5.4.2.9.2 The following separation minima may be used for aircraft cruising, climbing or descending on:

a) the same track; or

b) crossing tracks, provided that the relative angle between the tracks is less than 90 degrees.

Separation minima	*RNP*	*RCP*	*RSP*	*Maximum ADS-C periodic reporting interval*
93 km (50 NM)	10	240	180	27 minutes
	4	240	180	32 minutes
55.5 km (30 NM)	2 or 4	240	180	12 minutes
37 km (20 NM)	2 or 4	240	180	192 seconds (3.2 minutes)
5 minutes	2 or 4 or 10	240	180	14 minutes

Note.— The 192 seconds (3.2 minutes) maximum ADS-C periodic reporting interval is intended for use during application of the 37 km (20 NM) separation minimum between specific aircraft pairs and is not intended for use as a default periodic reporting interval for all aircraft. Attention is drawn to the guidance regarding ADS contract – periodic in the Global Operational Data Link (GOLD) Manual *(Doc 10037).*

AN-CONF/14

The AN-Conf/14 was held from 26 August to 6 September 2024 in Montreal, Canada. The conference, themed “Performance Improvement Driving Sustainability”, aimed to build global consensus on performance initiatives addressing environmental challenges and technological change. Senior officials from ICAO Member States, along with invited observers, participated in plenary discussions, supported by information sessions. The conference produced high-level technical recommendations for the ICAO Council and the 42nd Assembly. It served as a bridge between the 41st and 42nd Sessions, helping to reprioritise ICAO’s work and align efforts with the long-term goal of net-zero carbon emissions by 2050, while enhancing global aviation safety, efficiency, and resilience.

https://www.icao.int/Meetings/anconf14/Pages/default.aspx

AN-CONF/14

Recommendation 3.1/1 – Project 30/10 - Optimized implementation of longitudinal separation minima

That States:

a) within the processes of the planning and implementation regional groups, actively collaborate with neighbouring States to implement Project 30/10 – implementation of longitudinal separations of 55.5 km (30 NM) or less in oceanic and remote airspace, and 19 km (10 NM) or less elsewhere;

that ICAO:

b) through the planning and implementation regional groups, develop regional action plans for the implementation of Project 30/10;

c) support inter-regional collaboration for a harmonized implementation of Project 30/10; and

d) consider other minimum service level procedures, via a framework, for implementation in oceanic and remote airspace.

Asia/Pacific Seamless ANS Plan ver4.0

Air Traffic Management

Note: ATM system design (including ATS communication and surveillance, ATC separation minimum, aircraft speed control and ATC training) should be planned and implemented to support optimal aerodrome and enroute operations determined by the capacity expectations for the runway(s) and airspace concerned.

7.37 All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, taking into account such factors as:

a) the automation of the ATM system, including automated hand-off between sectors;

b) the capability of the ATC communications system; the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points;

c) and ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.

Note 1: the delivery of ATC services should be based primarily on the CNS/ATM capability. When using Annex 10 compliant ATS surveillance, 5 NM (en-route) or 3 NM (terminal) surveillance-based separations should be authorised within ATC sectors. At the TOC points in such environments, 5-10 NM should be authorised with auto hand-off and surveillance data-sharing or overlapping coverage at the TOC point, and 5-20 NM without auto hand-off, as determined by an appropriate safety assessment.

Note 2: the efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems (regarding ATM contingency operations, refer to the Regional ATM Contingency Plan).

https://www.icao.int/APAC/Documents/Asia%20Pacific%20Seamless%20ANS%20Plan%20Version%204.0.pdf

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Application of ATC Separation Minimums

Since 2017, ICAO Regional Office issued several State Letters to track the effectiveness of the Seamless Air Navigation Services (ANS) element implementation related to the use of tactical (ATC surveillance-based and datalink-supported) ATC separation minimums.

ATC spacing between aircraft at the same level, as it is theoretically applied within FIRs and inbound at FIR TOC points, is assessed based on the following criteria:

- Category R - Acceptable standard: ≤ 50 NM
- Category S - Acceptable standard: 5 NM
- Category T - Acceptable standard: 5 NM

Application of ATC Separation Minimums

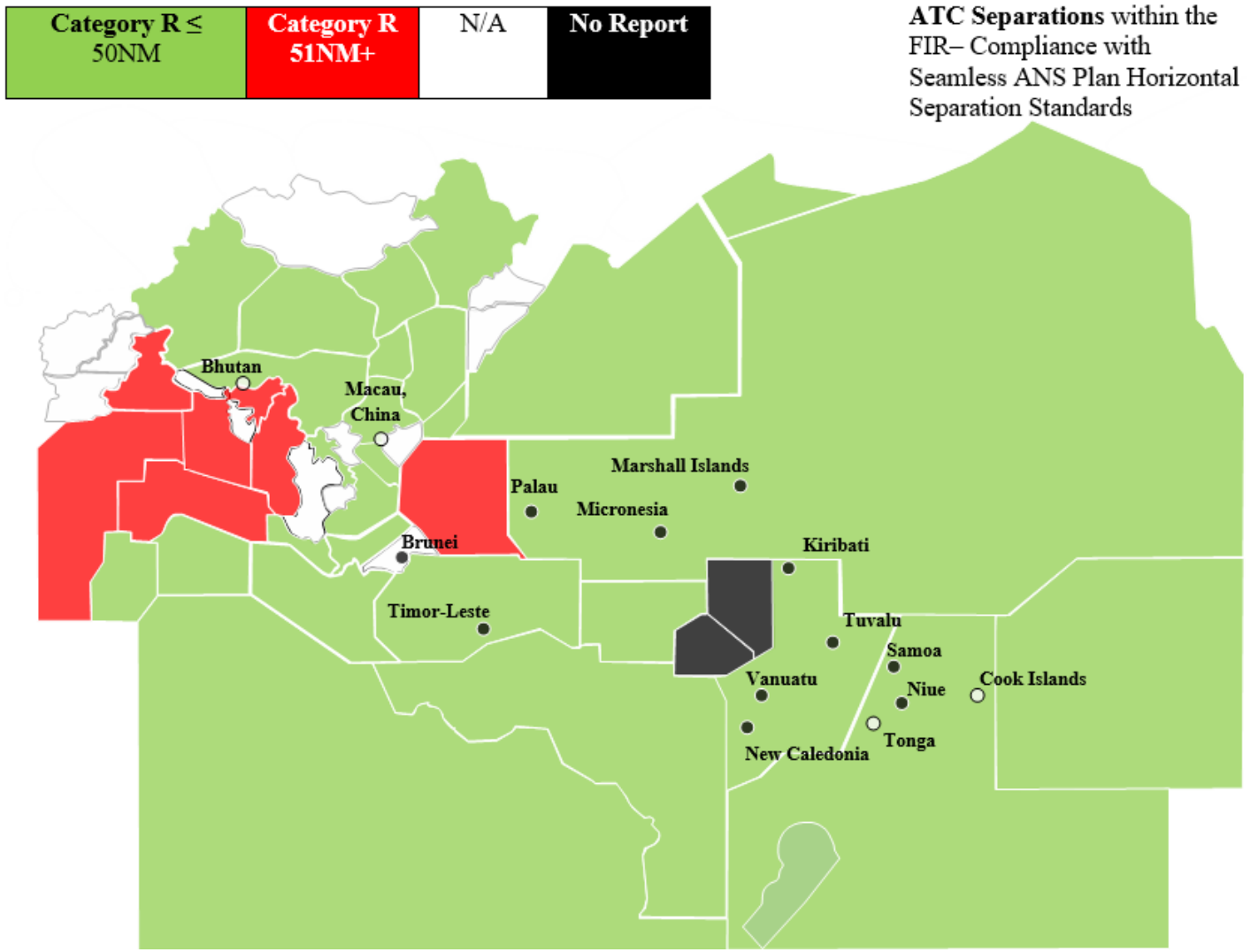

Figure 1: Category R Horizontal Separation Minimums within the FIR (as of Aug 2024)

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Application of ATC Separation Minimums

Three categories of separations at Inbound FIR TOC points shown below and the total number of TOC points.

- Category R/S → R TOC- Acceptable standard: ≤ 50 NM
- Category R → S TOC - Acceptable standard: ≤ 50 NM
- Category S → S TOC - Acceptable standard: ≤ 10 NM

Application of ATC Separation Minimums

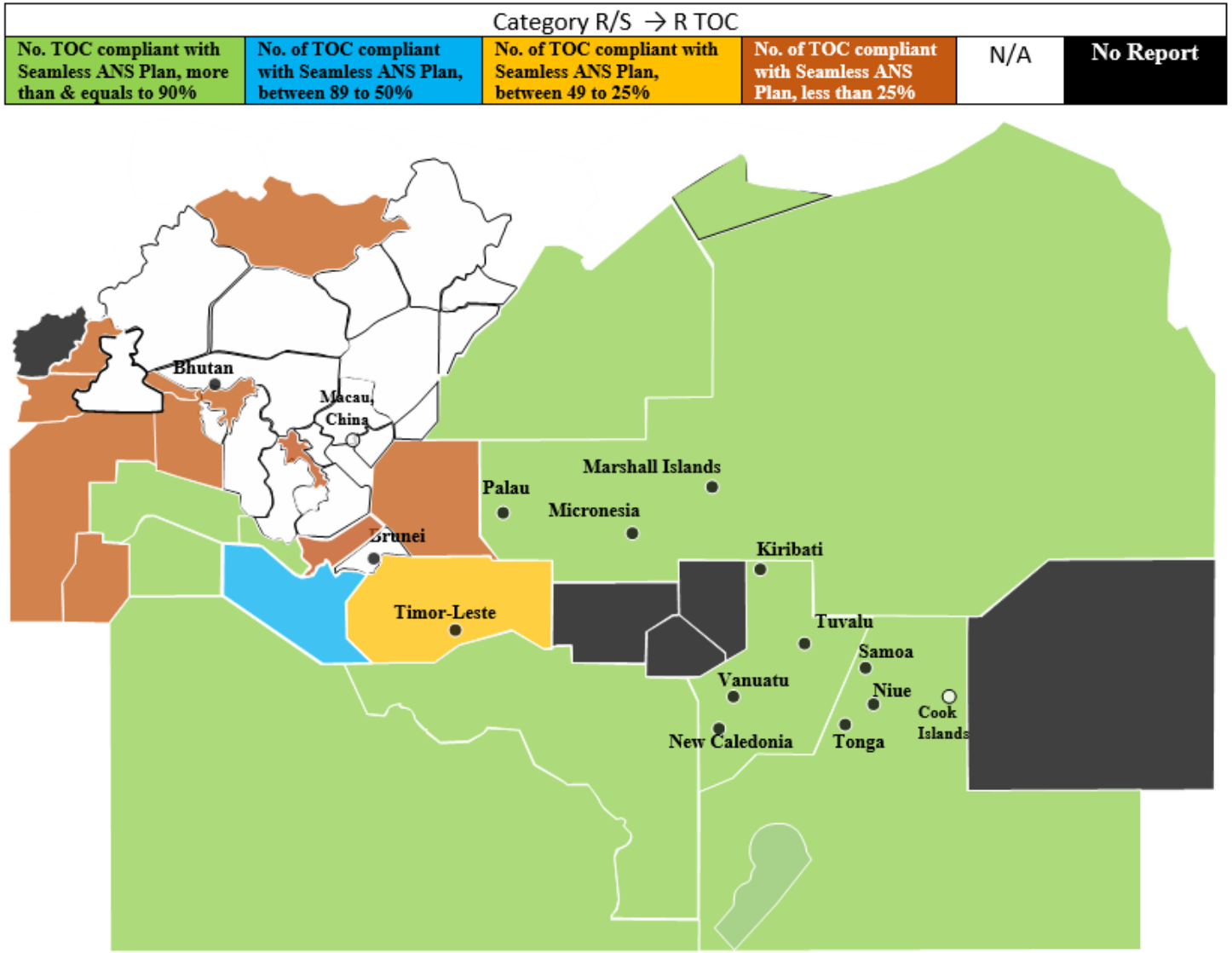

Figure 2: Category R/S → R TOC ATC Horizontal Spacing at Inbound FIR TOC points (as of Aug 2024)

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Application of ATC Separation Minimums

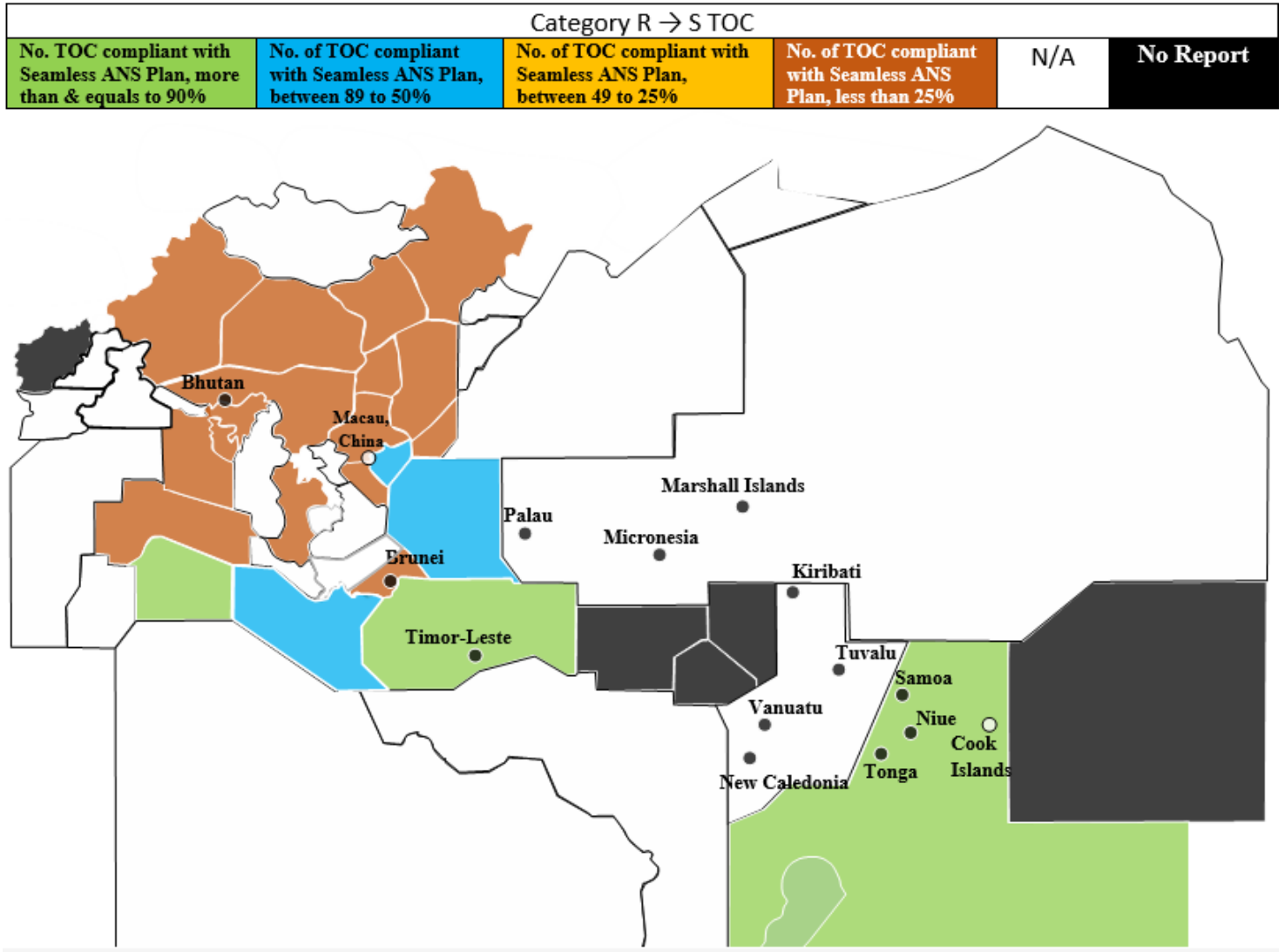

Figure 3: Category R → S TOC ATC Horizontal Spacing at Inbound FIR TOC points (as of Aug 2024)

Application of ATC Separation Minimums

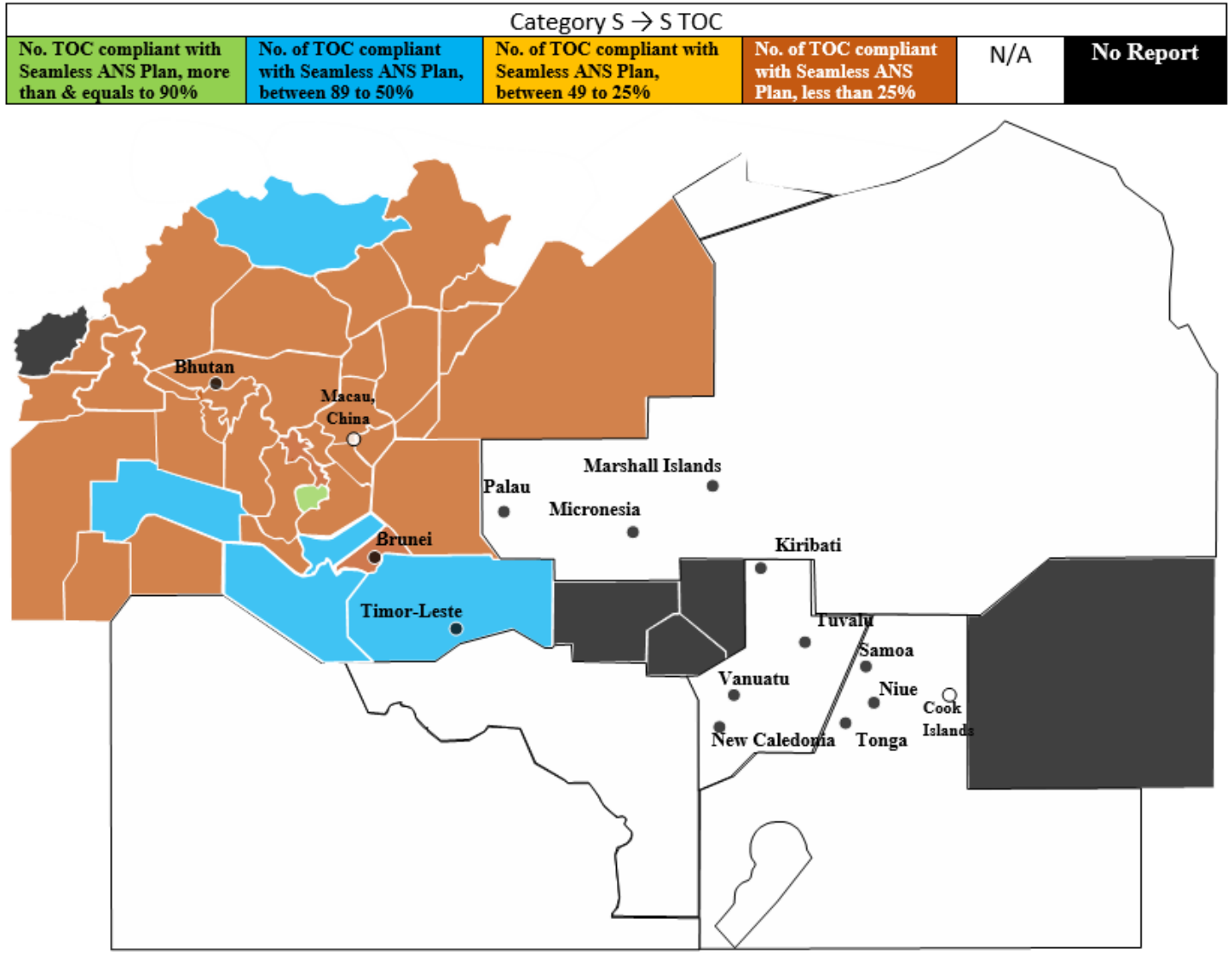

Figure 4: Category S → S TOC ATC Horizontal Spacing at Inbound FIR TOC points (as of Aug 2024)

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Doc 9869 *PBCS Manual*

This manual provides guidance and information concerning PBCS operations and is intended to facilitate the uniform application of the SARPs contained in Annex 6, Annex 11, Annex 15, PANS-ATM (Doc 4444), PANS-ABC (Doc 8400) and, when necessary, the Regional Supplementary Procedures (Doc 7030).

This guidance material is also intended to improve safety and maximize operational benefits by promoting the PBCS concept and its general application to diverse and emerging technologies for communication and surveillance supporting ATM operations. The PBCS concept provides a framework for managing communication and surveillance performance in accordance with globally accepted RCP and RSP specifications.

The RCP and RSP specifications included are intended initially for automatic dependent surveillance — contract (ADS-C), controller-pilot data link communications (CPDLC) and satellite voice (SATVOICE) communications supporting ATM operations in airspace, where procedural separations are being applied. However, the PBCS concept allows for new RCP and RSP specifications for other purposes. For example, the manual could be updated to include a new RSP specification that is intended for automatic dependent surveillance – broadcast (ADS-B) supporting an ATM operation.

Procedures for GNSS and Data Link Disruption Ad Hoc Group

The ATM/SG/12 acknowledged the significance of GNSS interference and its major impact on Air Traffic Services (ATS) and airspace users. As a result, it was advised that States/Administrations develop standard operating procedures for air traffic controllers to manage GNSS interference, as well as reporting processes for airspace users to the relevant ATS.

Decision ATM/SG/12-8: Establish Procedures for GNSS and Data Link Disruption Ad Hoc Group

That, ATM/SG establishes the Procedures for GNSS and Data Link Disruption Ad Hoc Group, to:

1. *collect data on GNSS and data link disruption in APAC region; and*
2. *develop the procedures for GNSS and data link disruption that include (but not limited to) the need for:*

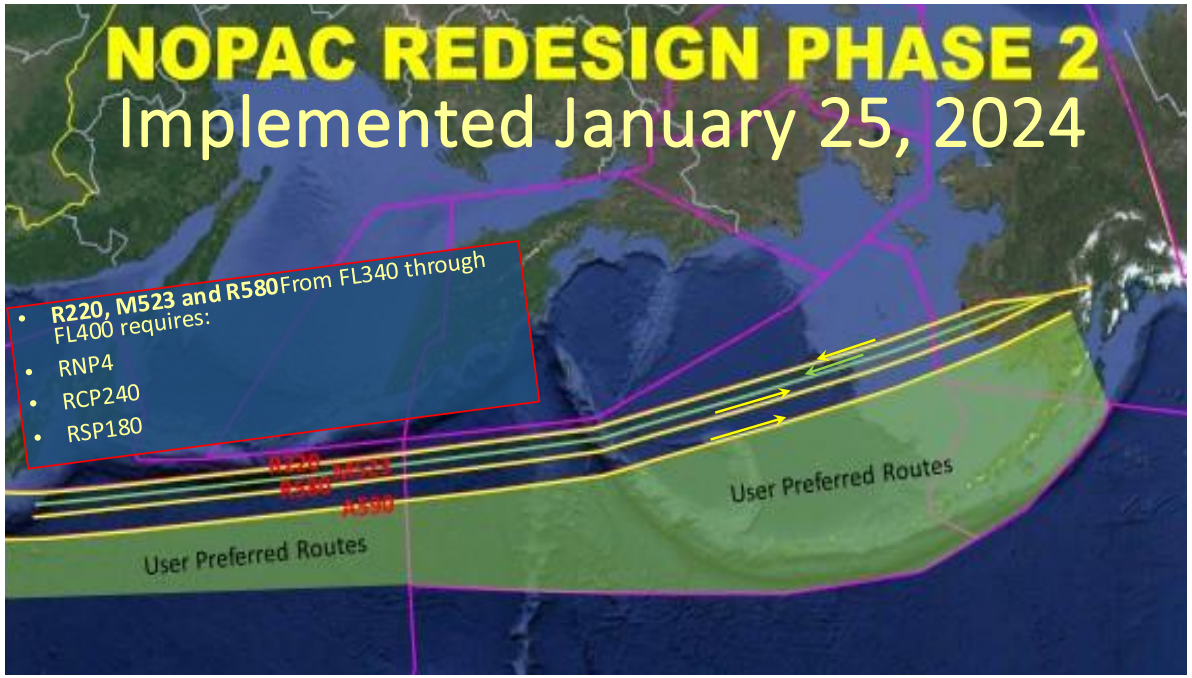
a) reporting process by airspace users to ATS units; and

b) sharing of information between stakeholders.

https://www.icao.int/APAC/Meetings/Pages/2024-ATM-SG-12.aspx

North Pacific (NOPAC) Route System Redesign

JCAB, FAA, and IATA jointly led the NOPAC Redesign Project to enhance efficiency in the NOPAC Route System. The initiative introduced new ATS routes with 23 NM lateral separation and, in Phase 2, enabled more UPRs by compressing airspace. The project ensured compliance with RCP 240, RSP 180, and RNP 4, with approximately 95% of NOPAC aircraft approved for PBCS/RNP 4 operations.



https://www.icao.int/APAC/Meetings/Pages/2024-ATM-SG-12.aspx

Thank You!

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