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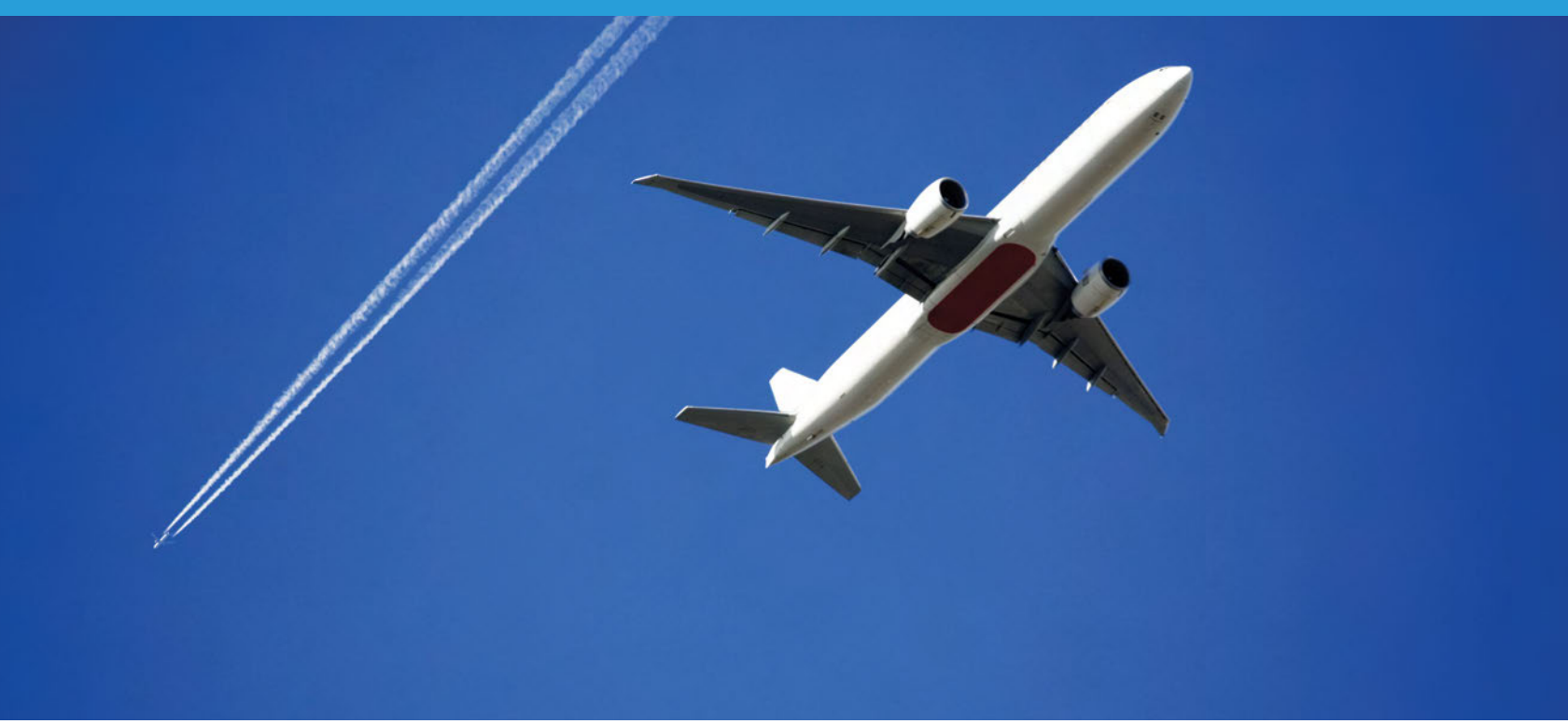
Doc 9869

Performance-based Communication and Surveillance (PBCS) Manual

Second Edition, 2017



Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
No.	Date	Entered by

CORRIGENDA		
No.	Date	Entered by

FOREWORD

HISTORICAL BACKGROUND

In 1983, the Council of the International Civil Aviation Organization (ICAO) established the Special Committee on Future Air Navigation Systems (FANS) which was tasked to study, identify and assess new technologies, including the use of satellites, and propose recommendations for the future development of air navigation for civil aviation. The FANS Committee determined that the development of new systems were required to overcome the limitations of conventional systems, thereby expanding air traffic management (ATM) capabilities on a global scale.

In September 1991, 450 representatives from eighty-five ICAO Member States and thirteen international organizations gathered at ICAO Headquarters in Montréal, Canada, for the Tenth Air Navigation Conference (AN-Conf/10) to consider and endorse the concept of a future air navigation system, as developed by the FANS Committee, that would meet the needs of the civil aviation community well into the next century. The FANS concept, which came to be known as the communications, navigation, surveillance/air traffic management (CNS/ATM) systems concept, involves a complex and interrelated set of technologies, dependent largely on satellites.

The endorsement of the CNS/ATM systems concept reached at AN-Conf/10 signalled the beginning of a new era for international civil aviation and paved the way for the activities related to the planning and implementation of new systems around the world.

The fourth meeting of the Aeronautical Mobile Communications Panel (AMCP/4, Montréal, April 1996) recognized the absence of objective criteria to evaluate communication performance requirements. The objective criteria needed were a set of values for parameters which would be based on the operational requirements for communication systems in the various phases of flight. The panel agreed that there was an urgent need to assess the existing technical options of communication systems against such a set of parameter values. The term “required communication performance (RCP)” type was used to denote a set of values for these parameters.

When reviewing the report of AMCP/4 in 1997, the Air Navigation Commission (ANC) tasked the Automatic Dependent Surveillance Panel (ADSP) (renamed in 2000 as the Operational Data Link Panel — OPLINKP) to develop the operational concept of RCP.

In 2001, the OPLINKP completed the document entitled *Concept of Required Communication Performance*, and the ANC solicited comments thereon from ICAO Member States. The comments received indicated broad support for the RCP concept. In light of the comments received, in 2002 the ANC amended the OPLINKP work programme to develop a *Manual on Required Communications Performance (RCP)* (Doc 9869) and, as necessary, Standards and Recommended Practices (SARPs) and procedures relating to the use of RCP in the provision of air traffic services.

In 2003, the Eleventh Air Navigation Conference (AN-Conf/11) endorsed recommendations to:

a) continue the development of SARPs, procedures and guidance material on RCP; and

b) investigate areas for further work including: determine the relationship of the RCP concept to separation studies and interoperability; standardize RCP types and allocations; ensure the adequacy of air traffic service (ATS) functions and procedures for new CNS/ATM environments; and establish requirements for safety performance monitoring.

The first meeting of the OPLINKP (OPLINKP/1, Montréal, September 2005) agreed on the proposed amendments to include a provision for RCP in Annex 6 — *Operation of Aircraft,* Annex 11 — *Air Traffic* Services, *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), and the first edition of the *Manual on Required Communication Performance (RCP)* (Doc 9869).

In 2007, the ICAO North Atlantic (NAT) and Asia-Pacific (APAC) Regions began collaborating on the global issue of increased use and dependency of commercial communication services in the provision of air traffic services. The companies providing these services decided to eliminate certain components of the system for economic reasons that conflicted with the needs for aviation safety. The NAT and APAC Regions recognized that the issue should be examined at the global level, but due to urgency, also at the regional level, since communication is an integral part of regional implementation plans. Both regions held special meetings to address the issue.

By 2008, the NAT Systems Planning Group (SPG) concluded to develop an RCP Implementation Plan proposing to mandate RCP in the NAT Region by 2015. The NAT and APAC Regions also agreed to develop common guidance material, which became known as: the *Global Operational Data Link (GOLD) Manual* (Doc 10037), of which the second edition was published in April 2013; and the *Satellite Voice Guidance Material (SVGM)*, with the first edition published in July 2012.

In 2008, the ANC approved a work programme to reconvene the OPLINKP, and tasked the panel to update the *Manual on Required Communication Performance (RCP)* (Doc 9869) by taking into account significant advances by ICAO Member States and regions, in the areas of qualification and monitoring, commercial service contracts/agreements and operational approvals, thereby also avoiding the imposition of regional or State-specific criteria on aircraft operators and aircraft/avionics manufacturers.

In 2010, OPLINKP reconvened and agreed to develop an amendment to Doc 9869, renaming it to the *Performance-based Communication and Surveillance (PBCS) Manual*, and expanding its scope by incorporating parts of the GOLD and SVGM, and other material that was developed by the regions since 2007.

An RCP type, which had been used in the first edition to denote a set of values for specific parameters, is not used in the second edition. An RCP type provided a means for the AMCP to assess different technologies. However, a means was also needed to specify and allocate operational, functional, safety and performance criteria and ensure actual CNS/ATM system performance. As a result, the operational criteria and associated allocations are now included in globally accepted RCP specifications. In addition, the second edition of Doc 9869 includes required surveillance performance (RSP) specifications to provide the operational, functional, safety and performance criteria for surveillance capability.

The RCP and RSP specifications are described within the performance-based communication and surveillance (PBCS) framework, thereby providing the means to prescribe the appropriate RCP and RSP specifications and initially qualify different subsystems, as well as manage operational (end-to-end) system performance in continued operations.

The second meeting of the OPLINKP (OPLINKP/2, Montréal, October 2014) agreed on the proposed amendments to include provisions for PBCS in Annex 6, Annex 11, Annex 15, PANS-ATM (Doc 4444) and PANS-ABC (Doc 8400) and the second edition of Doc 9869.

The amendments to Annexes and PANS were adopted/approved by the Council with an applicability date of 10 November 2016 and a draft PBCS manual developed by the OPLINKP was updated aligning it with the final PBCS provisions in the Annexes and PANS.

SCOPE AND PURPOSE

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.

This second edition, formerly the *Manual on Required Communication Performance (RCP)*, was restructured as follows:

a) Background information, purpose of the manual and explanation of terms was moved from Chapter 1 to the “Foreword”.

b) Chapter 1 was renamed from “Introduction” to “Performance-based communication and surveillance (PBCS) concept”. This chapter provides information on the PBCS concept, including differences with performance-based navigation (PBN); the relationship of the PBCS concept to State safety management responsibilities; the PBCS framework; RCP and RSP specifications supporting ATM operations; and developing, applying and complying with an RCP/RSP specification.

c) Chapter 2 was renamed from “Overview of RCP” to “Developing an RCP/RSP specification”. This chapter provides guidance on developing an RCP/RSP specification, which includes operational criteria in terms of RCP/RSP times; RCP/RSP continuity; RCP/RSP availability; RCP/RSP integrity and associated functional and safety requirements; and allocations to different components of the system.

d) Chapter 3 was renamed from “Determining an RCP type” to “Applying an RCP/RSP specification”. This chapter provides guidance on applying an RCP/RSP specification, which includes the prescription of the communication and surveillance capability supporting specific ATM operations in specific airspace, associated operational approvals, and post-implementation monitoring.

e) Chapter 4 was renamed from “Prescribing an RCP type” to “Complying with an RCP/RSP specification”. This chapter provides guidance on establishing policies, procedures and criteria for State approvals and on complying with an RCP/RSP specification, which includes: initial compliance determination and State approvals for aircraft systems; air navigation services provider (ANSP) systems and aircraft operators; flight plan requirements; and continued operational compliance — PBCS monitoring programmes.

f) Chapter 5, which was entitled “Complying with an RCP type”, was incorporated into the above-mentioned Chapter 4.

g) Appendix A was renamed from “Glossary of terms” to “PBCS Implementation Plan — Checklist”. The glossary of terms was moved to the preliminary portion of the manual. Appendix A now includes guidance — and a checklist—that lists tasks and other aspects for consideration in the development of a local or regional PBCS implementation plan.

h) Appendix B was renamed from “Checklist for RCP application” to “RCP specifications”. The checklist was replaced by a new checklist that is contained in Appendix A. Appendix B now contains a “merged” version of the RCP specifications taken from the regional guidance material (GOLD and SVGM), Appendix B in each document. These specifications are considered a requirement when they are prescribed or guidance if applied only to PBCS monitoring programmes.

i) Appendix C was renamed from “Example of determining an RCP type” to “RSP specifications”. The example was deleted. Appendix C now contains a “merged” version of the RSP specifications taken from the regional guidance material (GOLD and SVGM), Appendix C in each document. These specifications are considered a requirement when they are prescribed or guidance if applied only to PBCS monitoring programmes.

j) A new Appendix D, “Post-implementation monitoring and corrective action (CPDLC and ADS-C),” was added. Appendix D contains the guidance on post-implementation monitoring at ANSP, regional and inter-regional levels, taken from GOLD, Appendix D. The material was simplified and is structured differently from that provided in the GOLD.

k) A new Appendix E, “Post-implementation monitoring and corrective action (SATVOICE),” was added. Appendix E contains the guidance on post-implementation monitoring at ANSP, regional and inter-regional levels, taken from the SVGM, Appendix D.

The following personnel and organizations should be familiar with relevant aspects of its contents: regulators, airspace planners, aircraft operators, flight operations officers/flight dispatchers, ANSPs, aeronautical stations, communication services providers (CSPs), satellite service providers (SSPs), radio operators, training organizations, regional/local monitoring entities, automation specialists and radio facilities, aircraft manufacturers and equipment suppliers.

The guidance supports the following activities:

a) States’ roles and responsibilities in relation to the following:

   1) safety oversight of air navigation services;

   2) operational approval (e.g. flight crew training and qualifications); and

   3) design approval of aircraft data link systems;

b) development of agreements and/or contractual arrangements between ANSPs and aircraft operators and their respective CSPs;

c) development of operational procedures; and

d) operational monitoring, analysis, and exchange of operational data among appropriate entities, such as regional monitoring entities, States, ANSPs, and CSPs.

FUTURE DEVELOPMENTS

In order to keep this manual relevant and accurate, suggestions for its improvement regarding format, content or presentation are welcome. Any such recommendation or suggestion will be examined and, if found suitable, will be included in regular updates to the manual. Regular revision will ensure that the manual remains both pertinent and accurate. Comments on this manual should be addressed to:

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