



PBCS Manual Doc 9869

Global Operational Data Link (GOLD)
Familiarization with Performance Based Communications
and Surveillance (PBCS) Workshop
Dakar, Senegal 11-15 September 2017

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Federal Aviation
Administration

Overview

- PBCS Manual – Doc 9869 Development
- What Problem Does This Address
- Annex 11 Requirement
- Scope and Contents
- Framework and Contents
- Operational Data Link Specific Working Group
PBCS Project Team and job card
- Planned Updates and schedule

Historical Background (1)

- In 1997, the Air Navigation Commission (ANC) tasked the Automatic Dependent Surveillance Panel (renamed in 2000 as the Operational Data Link Panel — OPLINKP) to develop the operational concept of required communication performance (RCP).
- In 2001, the OPLINKP completed its document entitled Concept of Required Communication Performance, and the ANC solicited comments thereon from ICAO Contracting 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 program to develop a Manual on Required Communications Performance (RCP) and, as necessary, Standards and Recommended Practices (SARPs) and procedures relating to the use of RCP in the provision of air traffic services.

Historical Background (2)

- In 2007, the ICAO North Atlantic (NAT) and Asia-Pacific (APAC) Regions began collaborating on a global issue concerning the increased use and dependency of commercial communication services in the provision of air traffic services.
- By 2008, the NAT Systems Planning Group (SPG) concluded to develop an RCP Implementation Plan that would propose to mandate RCP in the NAT Region by 2015.
 - The NAT and APAC Regions also agreed to develop common guidance material, which later became widely known by two separate documents:
 - The Global Operational Data Link Document (GOLD)
 - Second edition was published in April 2013,
 - The Satellite Voice Guidance Material (SVGM),
 - First edition was published in July 2012.

Historical Background (3)

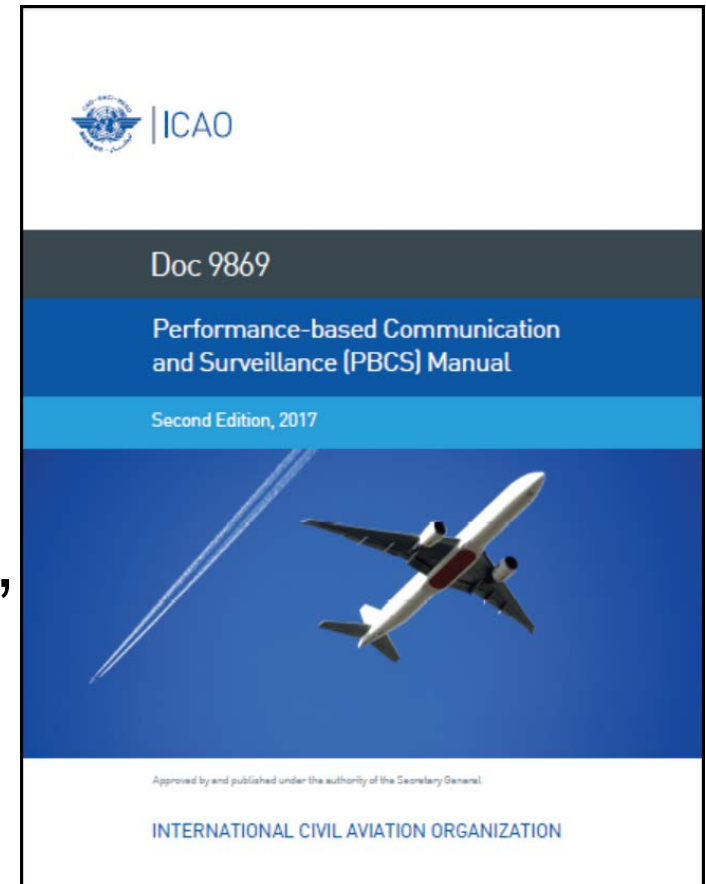
- In 2008 the ANC approved a work program to reconvene the OPLINKP.
 - The work program included the need to update the Manual on RCP (Doc 9869) to take into account significant advances by ICAO Contracting States and regions, in the areas of qualification and monitoring, commercial service contracts/agreements and operational approvals, and to avoid regional or State-specific criteria being imposed on aircraft operators and aircraft/avionics manufacturers.
- In 2010, OPLINKP reconvened where it agreed to progress an amendment to Doc 9869 that would rename it the Performance-Based Communication and Surveillance (PBCS) Manual,
 - The scope was expanded to incorporate parts of the GOLD and SVGM, and other material that had been developed by the regions since 2007.

Historical Background (4)

- The second meeting of the OPLINKP (OPLINKP/2, Montréal, October 2014) agreed on the proposed amendments to include a provision for PBCS in Annex 6, Annex 11, and PANS, and the second edition of the Performance-Based Communication and Surveillance (PBCS) Manual.

Performance-Based Communications and Surveillance (PBCS) Manual Doc 9869

- Second Edition is the current version
- Published June 2017
- Supersedes Manual On RCP, previous draft versions, and other guidance documents



What Problem Does This Address?

Why do we need PBCS?

- PBCS is needed to ensure operator systems and infrastructure meet global required performance
- Operational improvements using CPDLC and ADS-C depend on the intended and expected communications, surveillance, and navigation requirements
- Responsibility has been identified to ensure safety and performance targets are met
- PBCS provides the required framework to quantify system performance.

ICAO Requirement

Annex 11 Air Traffic Services: Paragraph 2.27.5

Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that **an acceptable level of safety will be met and users have been consulted**. When appropriate, the responsible authority **shall ensure that adequate provision is made for post-implementation monitoring** to verify that the defined level of safety continues to be met.

Note.— When, due to the nature of the change, the acceptable level of safety cannot be expressed in quantitative terms, the safety assessment may rely on operational judgement

Scope and Purpose (1)

Doc 9869 Foreward

- The PBCS Manual provides guidance and information concerning PBCS operations and is intended to facilitate uniform application of Standards and Recommended Practices contained in:
 - Annex 6 — Aircraft Operations
 - Annex 10 — Aeronautical Telecommunication
 - Annex 11 — Air Traffic Services
- The provisions in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)
- And when necessary, the Regional Supplementary Procedures (Doc 7030).

Scope and Purpose (2)

Doc 9869 Chapter Foreward

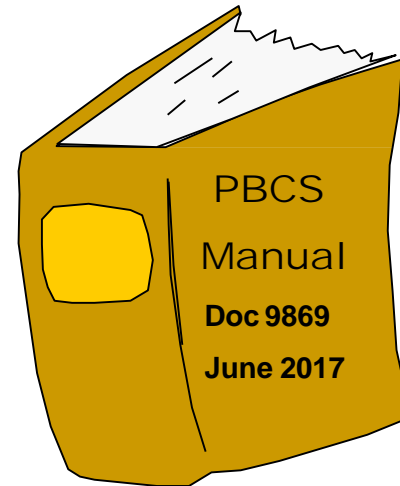
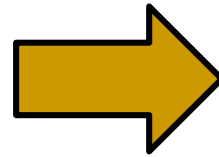
- Intended to improve safety and maximize operational benefits by promoting the PBCS concept and its general application to emerging technologies for communication and surveillance supporting ATM operations.
- The PBCS concept provides a framework for managing communication and surveillance performance in accordance with globally accepted required communication performance (RCP) and required surveillance performance (RSP) specifications.
- The RCP/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.
 - PBCS concept allows for new RCP/RSP specifications for other purposes.

PBCS Framework

- **PBCS provides a framework for**
 - Prescribing criteria for communication and surveillance systems
 - Showing that these systems comply with the prescribed criteria

- **The ICAO PBCS Provision**

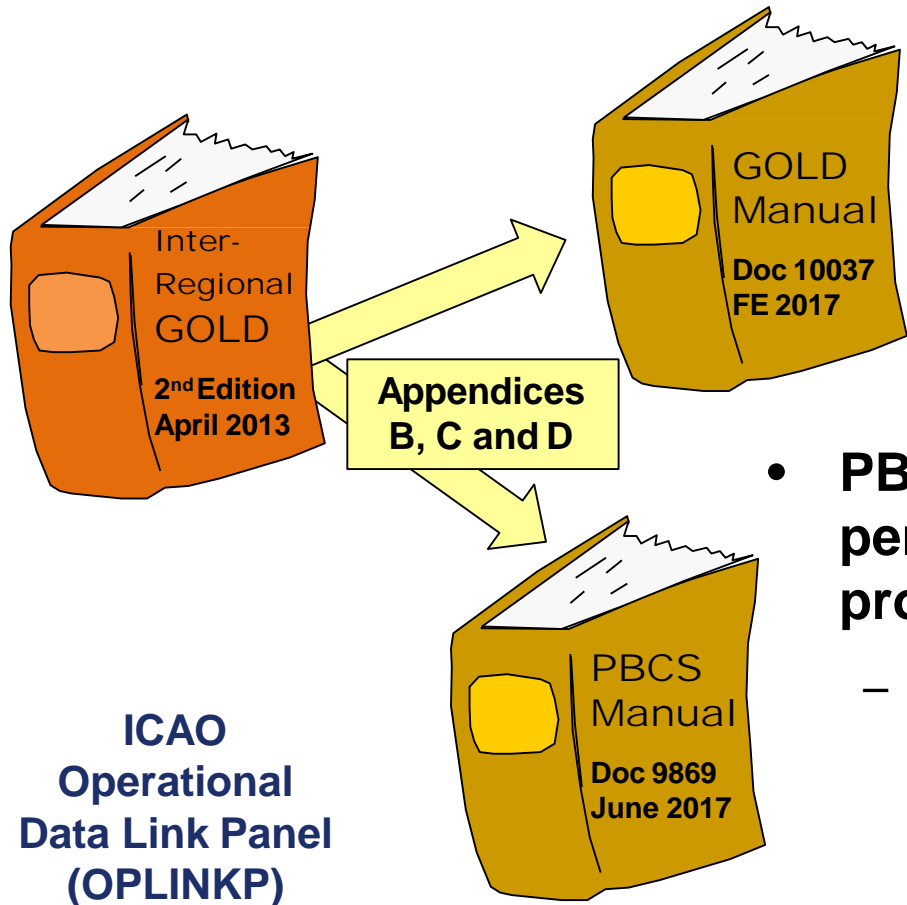
Supported by guidance material



• **Formerly the Manual on RCP**

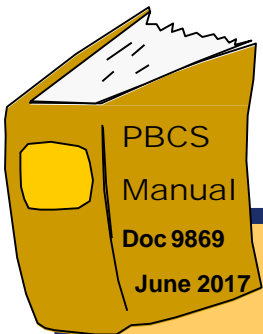
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ICAO Manuals



- **GOLD Manual (Doc 10037) CPDLC / ADS-C**
 - Preparation and readiness – for ANSP and Operator
 - Procedures – for Controller and flight crew
- **PBCS Manual (Doc 9869), performance-based concept that provides global framework**
 - To prescribe criteria for communication and surveillance capabilities that are applicable to the air traffic operations in relevant airspace
 - To show that the different components of the system comply with prescribed criteria

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PBCS Manual (Doc 9869) Contents

Information	Background	Foreword
	Publications, Acronyms, Glossary	
	PBCS concept	Chapter 1
Guidelines	Developing an RCP/RSP specification	Chapter 2
	Applying an RCP/RSP specification	Chapter 3
	Complying with an RCP/RSP specification	Chapter 4
	Establishing State policies	Section 4.2
	Initial compliance, flight plan filing	Section 4.3, 4.4
	Continued operational compliance	Section 4.5
	PBCS Implementation Plan – Checklist	Appendix A
Supporting Guidelines	RCP specifications	Appendix B
	RSP specifications	Appendix C
	PBCS monitoring (CPDLC and ADS C)	Appendix D
	PBCS monitoring (SATVOICE)	Appendix E

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State Safety Oversight Framework

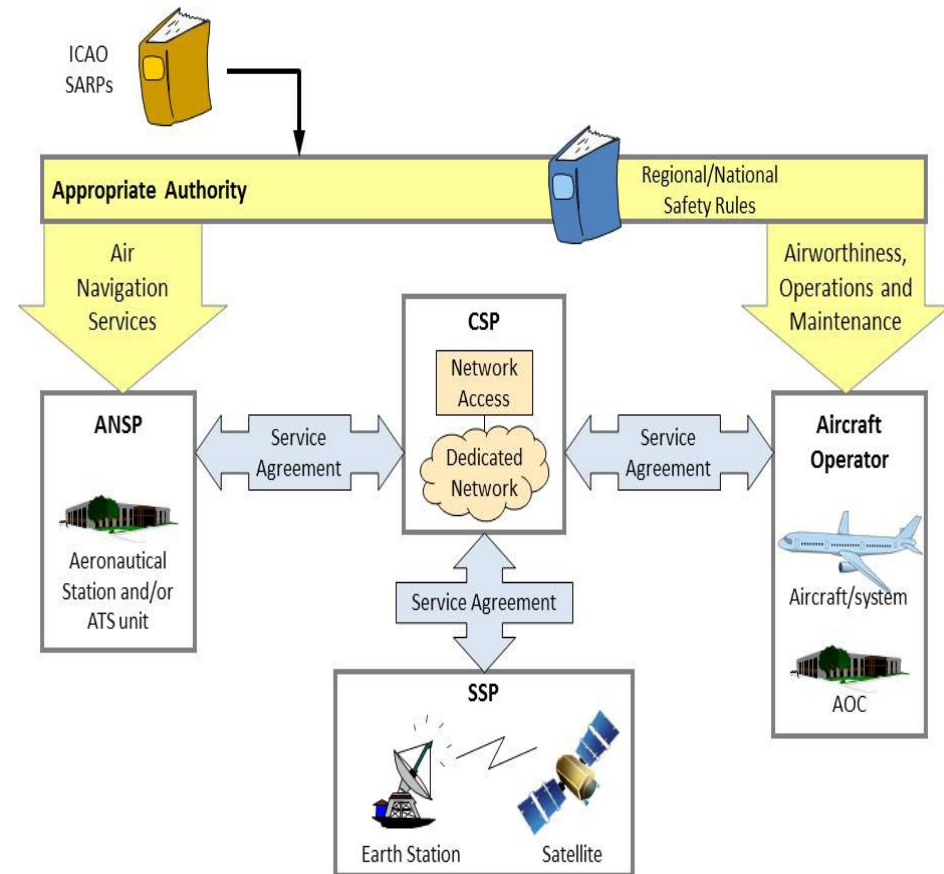
Means of compliance guidance → Doc 9869

- **Initial compliance**

- ANSP
- Operator, aircraft and system
- ANSP and Operator oversee CSP/SSP via service agreements

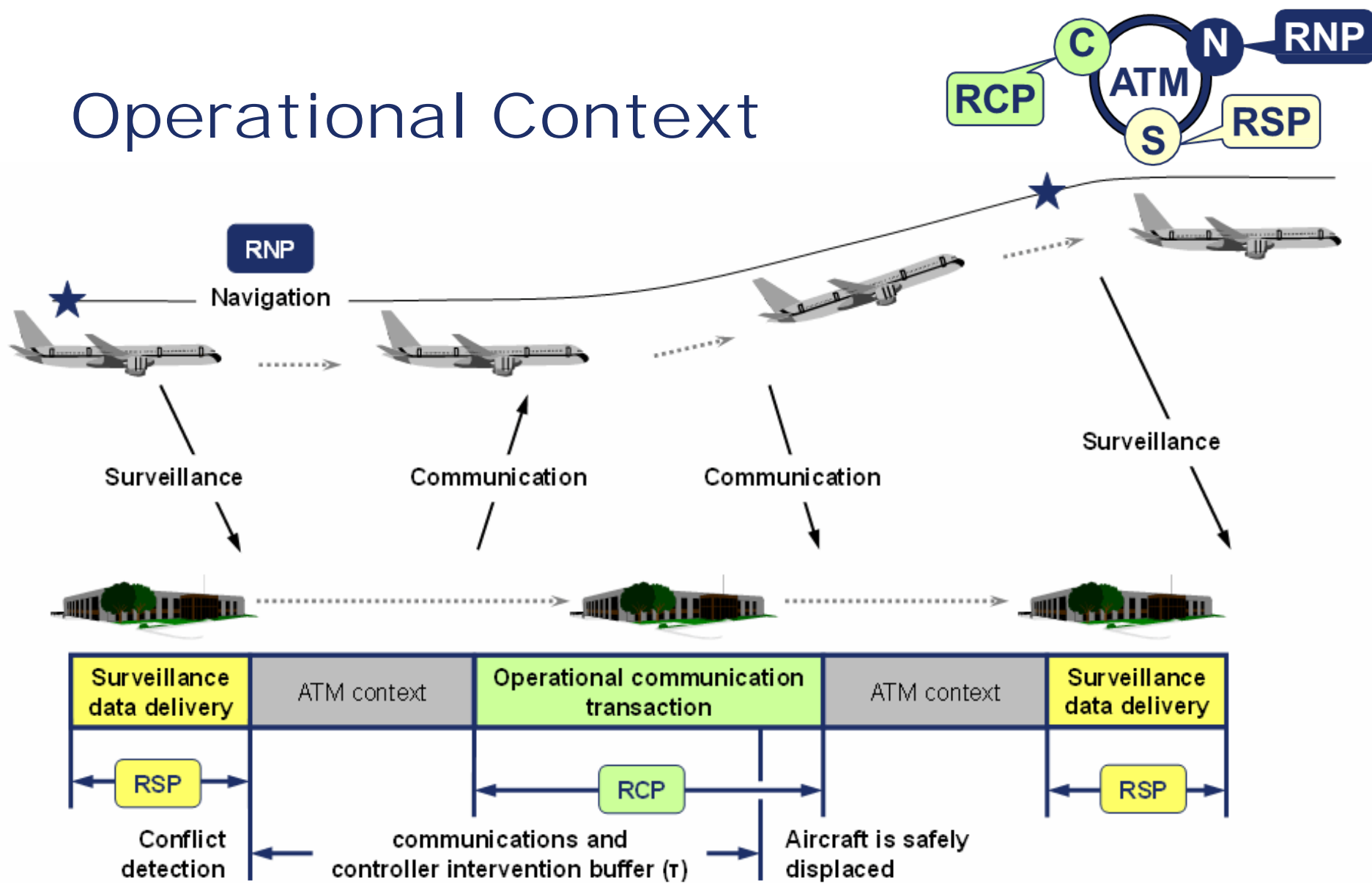
- **Post-implementation monitoring**

- Component and sub-component analysis
- Change management
- Continuous improvement – corrective action



9869 Figure 1-2

Operational Context



9869 Figure 2-1 Operational Context

ICAO ANWP Job Card

CP-OPDLWG.002.01

- **Problem Statement** - PBCS Manual needs to be updated to:
 - Include guidance for a global issues/resolution database
 - New required communication performance (RCP) and required surveillance performance (RSP) specifications
 - Clarify the relationship among PBC, PBN and PBS
 - Other refinements as experience is gained in the use of the Manual.

- **Expected Benefit** - Completing this job card will:
 - Promote **global harmonization** and **performance-based approach** to implementations that use existing and/or emerging technologies to provide enhanced communication and surveillance capabilities, while **ensuring the acceptable level of safety**.

PBCS Project Team Updates

- ICAO Doc 9869, 2nd Edition, PBCS Manual officially published in June 2017
- 3rd Edition currently planned for November 2018
- 10 items currently on work program for next and future editions

PBCS PT Work Program

Reference #	Description	Version	Paragraphs	Status
PBCSPT-1	Additional guidance for operational approval process based on experience from the development of State policies	V2	1.7.3-1.7.6, 4.2.3,4.3.3-4.3.4 1.3, 4.2.2, 4.3.1	Targeted for V3
PBCSPT-2	Clarify and improve guidance related to CSP/SSP allocations, notifications, compliance	V2	2.3, 2.4, 4.3.2	Targeted for V3
PBCSPT-3	Additional guidance for Appendix D, including issues/resolution database, data sharing	V2	4.3, 4.5, D.3.3	Targeted for V3
PBCSPT-4	Alignment of PBCS manual & DO-350A/ED228A <ul style="list-style-type: none"> - Availability parameter - Safety requirements 	V2	Listing of publications referenced (page xiv) 2.2, 2.4, 4.3.3, Appendices B, C	Targeted for V3
PBCSPT-5	Support development of RCP/RSP specifications to support B2 and domestic data link operations <ul style="list-style-type: none"> - Take into account RCP130 and RSP160 - RTCA DO 350/ED 228 	V2	Appendices B, C	Targeted for V3

PBCS PT Work Program

Reference #	Description	Version	Paragraphs	Status
PBCSPT-6	Support development of RCP/RSP specifications for application of ASEPS <ul style="list-style-type: none"> - ASEPS RSP Task Force - Feedback to SASP on RCP 	V2	Appendices B, C	Targeted for V3
PBCSPT-7	RCP/RSP specifications to support application of new separation minima as identified by SASP and to support advances in technology and systems			Ongoing/ Future
PBCSPT-8	Updates to align PBN Manual and PBCS Manual <ul style="list-style-type: none"> - Review Doc 9869 and Doc 9613 and identify any inconsistencies or items that need to be addressed to align performance-based concepts across C, N and S - In future possibly combine into one provision - Need diversified drafting group 			Future
PBCSPT-9	Updates to address feedback from existing operations in regional and local implementation programmes			Ongoing/ Future
PBCSPT-10	Inter-panel coordination with RPAS panel - RPAS C2 WG – command control C2 link			Ongoing/ Future

Summary and Questions

- Reviewed the development of the current Performance-Based Communications and Surveillance (PBCS) Manual Doc 9869
 - Evolved from Inter-Regional GOLD and other region work
 - Companion GOLD manual was developed in parallel
 - The GOLD Manual is more operational oriented
 - The PBCS manual contains more technical details
- The ICAO PBCS Manual Doc 9869 intended to improve safety and maximize operational benefits by promoting the PBCS concept and its general application to emerging technologies for communication and surveillance supporting ATM operations
- The guidance provides a framework for managing performance in accordance with globally accepted required communication performance (RCP) and required surveillance performance (RSP) specifications.