



# Status of PBCS Implementation

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## ISPACG/31 FIT/24

6 March 2017

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Federal Aviation  
Administration

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# ICAO Documentation

## Provisions for PBCS – Effective 10 November 2016

Document ID	Description
<b>Annex 6</b>	Operation of Aircraft
<b>Part I</b>	Commercial Air Transport - Aeroplanes
<b>Part II</b>	General Aviation - Aeroplanes
<b>Part III</b>	Operations - Helicopters
<b>Annex 11</b>	Air Traffic Services
<b>Annex 15</b>	Aeronautical Information Services
<b>Doc 4444</b>	PANS – Air Traffic Management
<b>Doc 8400</b>	PANS – Abbreviations and Codes



## Supporting Guidance Material – Publication targeted for Nov 2016, Still Pending Completion of ICAO Editing

Document ID	Description
<b>Doc 9869</b>	Performance-based Communication and Surveillance (PBCS) Manual, Edition 2
<b>Doc 10037</b>	Global Operational Data Link (GOLD) Manual, Edition 1
<b>Doc 10063</b>	Manual on Monitoring the Application of Performance-Based Horizontal Separation Minima, Edition 1

**PBCS approval required to be eligible to participate in the following horizontal separation minima in accordance with ICAO PANS-ATM (Doc 4444):**

<b>Dimension of separation</b>	<b>Separation Minima</b>	<b>RSP requirement</b>	<b>RCP requirement</b>	<b>Associated navigation requirement</b>
Lateral	<b>42.6 km (23 NM)*</b>	180	240	RNP4
Performance-based Longitudinal	<b>5 minutes</b>	180	240	RNP2 or RNP4 or RNP10
Performance-based Longitudinal	<b>55.5 km (30 NM)</b>	180	240	RNP2 or RNP4
Performance-based Longitudinal	<b>93 km (50 NM)</b>	180	240	RNP4 or RNP10

\* Also applicable to existing and future applications of 30NM lateral separation minima

**Airspace using or planning to use one or more of the above**

- PAC FIRs: Anchorage, Auckland, Brisbane, Fukuoka, Nadi, Oakland; Port Moresby, Santiago, Tahiti,
- NAT FIRs: Gander, Shanwick, Reykjavik, New York, Santa Maria
- Bay of Bengal routes: M300, N571, P570, P574; L301, L507, L510, L759, M770, N563, N877, N895, P628, P646 and P762
- South China Sea routes: N892, L625, N884, M767

# NAT IMPLEMENTATION



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# Global PBCS Implementation

## NAT Region

### NAT SPG Conclusion 52/19 – PBCS Operator Requirements in the NAT Region

- ✦ That, in view of the ICAO amendments on performance-based communications and surveillance (PBCS) and reduced separations with applicability date in November 2016 and ongoing NAT implementations, the ICAO Regional Director, Europe and North Atlantic, urge States of the Operator (or Registry) to take appropriate measures to develop, establish and implement necessary policies and procedures to ensure that their operators conducting flights in the NAT Region can be compliant with PBCS requirements, by **29 March 2018**.

### NAT SPG Conclusion 52/20 – RCP/RSP Flight Plan Designators

- ✦ That, the NAT States/ANSPs that plan to apply 42.6 km (23 NM) lateral separation minimum and/or 55.5 km (30 NM), 93 km (50 NM) and/or 5-minute longitudinal separation minima implement the capability to process and apply ICAO PBCS flight plan designators to determine aircraft eligibility for performance-based horizontal separation by **29 March 2018**.



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# NAT PBCS Project Team

- Final reports submitted to **IMG/49** and **SOG/15**
- Final meeting held on **16 November 2016**
- Disband date: **31 December 2016**
- Remaining work to be completed by NAT contributory groups:
  - ✦ Finalize PfA to the NAT Regional Supplementary Procedures (**Doc 7030/5**)
  - ✦ Develop amendment proposal to North Atlantic (NAT) Operations and Airspace Manual (**NAT Doc 007**), to ensure consistency with the NAT SUPPs
  - ✦ Revise the existing **NAT common AICs** in accordance with the NAT SUPPs

# NAT PBCS Information Sharing Project Team

- **NAT SOG/15** created a new project team to help establish a mechanism for distributing PBCS monitoring results from ANSPs to States of the Operator/Registry for operational approval
  - First meeting planned for early March 2017
- c) the NAT SOG creates a new project team specifically to;
- i. develop proposals on potential mechanisms to enable providing the relevant information (e.g. PBCS results showing non-conformity and/or corrective action) from its source (e.g. ANSP) to the State of the Operator or Registry and NAT airspace users to RMAs outside NAT Region;
  - ii. Report to NAT IMG/50 and NAT SOG/16;

# ASIA-PAC IMPLEMENTATION



# Global PBCS Implementation Asia-Pac Region

## Conclusion APANPIRG/27-7: PBCS Operator Requirements

- + That, States are urged to take appropriate measures to develop, establish, implement and promulgate, through advisory circular or other relevant State instrument, necessary policies and procedures to enable operators conducting flights in airspace where separations are dependent on performance-based communication and surveillance (PBCS) to start using required communication performance (RCP) / required surveillance performance (RSP) indicators in the flight plan as soon as possible. This should take into account:
  - a) time for the operator to comply with the States' policies; and
  - b) the need for the State to distribute data from PBCS monitoring programs, as necessary.

## Conclusion APANPIRG/27-8: State Implementation of ICAO Provisions for PBCS

- + That, States which apply or plan to apply 30 NM and/or 50 NM longitudinal separation minima and/or 23 NM lateral separation minimum are urged to:
  - a) implement the ATM system capability to process and use ICAO PBCS flight plan indicators to determine aircraft eligibility for performance-based separation by not later than **29 March 2018**; and
  - b) apply common implementation dates using RCP/RSP indicators to establish performance-based separation in adjacent airspace, supported by joint submission of Proposals for Amendment (PfA) to ICAO Doc 7030 – Regional Supplementary Procedures.

## Conclusion APANPIRG/27-9: Asia/Pacific Region PBCS Transition Strategy

- + That, the Asia/Pacific Region PBCS Transition Strategy at **APANPIRG/27/WP/7 Attachment A** [Also provided as Attachment B to this paper] be endorsed, and posted on the Asia/Pacific Regional Office website.

# FAA IMPLEMENTATION



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# FAA AC 90-117

## Timeline

- **9 Nov 2016** – draft sent to various organizations for informal comments
- **23 Nov 2016** – FAA Document Control Board comment period complete
  - ✦ Comments received from AWOs/SAOs, ANG-E61, Universal Avionics, NetJets, Airbus, Air Services New Zealand, Iceland, Transport Canada, FAA Data Comm Program, Volpe
- **13 Dec 2016** – completed comment adjudication
- **14 Dec 2016** – new draft sent to AFS-400 for signature
  - ✦ Once approved, DCB forwards latest draft to tech writers
- **Early Mar 2017** – document posted for 30-day public comment and FAA formal coordination
- **Mar/Apr 2017 - AC published**
- **Apr/May 2017** - FAA inspector guidance, authorization templates (A056) and a compliance matrix published
- **Mar 2018** – First implementation of PBCS

# FAA AC 90-117

## Overview

Includes:

**Ch 1** – General

**Ch 2** – Data Link Communications Overview

**Ch 3** – Aircraft Eligibility

**Ch 4** – Communication Service Providers (CSP)

**Ch 5** – Operational Use of Data Link Communication

**Ch 6** – Performance Monitoring

**Ch 7** – Training

**Ch 8** – Reports

Appendix A – Foreign Operators

Appendix B – Data Link Communications MEL and MMEL Provisions

Appendix C – Summary of Airspace Requirements

Appendix D – Flight Planning

Appendix E – Voice Phraseology

Appendix F – CPDLC Uplink and Downlink Tables

Appendix G – Terminology and Acronyms



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# FAA AC 90-117

## Highlights

### Is my aircraft eligible?

- ✦ Statement of compliance (SOC)
  - Interop - System, subnetworks, performance (FANS, VDLM2, RCP24)
- ✦ Actual performance monitoring data
  - Pass – performance acceptable (compliant)
  - Fail – performance unacceptable (noncompliant)
  - Insufficient data – SOC info accepted until enough data gathered

### Do I have the required CSP service agreements?

- ✦ Failure notifications – notify operator/ATSU of any failure affecting ops
- ✦ Recording data link messages – 30 days
- ✦ CSP integrity
  - Pass messages without manipulating info protected by aircraft/ATSU error detection codes
  - Must not reconstitute or regenerate any of the error detection codes
- ✦ RCP/RSP CSP allocation requirements for requested performance

# FAA AC 90-117

## Highlights

### Performance monitoring

- ✦ Operators must incorporate a performance monitoring process that includes their CSP.
- ✦ Operator must address substandard performance whether the source of that report is from the operator's monitoring program, the FAA or foreign authority.
- ✦ If ACP/ASP does not meet 95%, the operator notified and should not continue data link at the associated performance level (**i.e. should not file associated P code and RSP code**) until the issue is resolved via corrective action plan.
- ✦ If ACP does not meet 99.9% criteria at better than 99.0%, the operator is notified to investigate and initiate corrective action.
- ✦ FAA monitoring website supporting approvals will be implemented

# Sample Website Report for US Operators

[https://www.faa.gov/air\\_traffic/separation\\_standards/PBCS](https://www.faa.gov/air_traffic/separation_standards/PBCS) Monitoring

Time period for PBCS monitoring data: <b>January - December 2016</b>						
Monitoring data obtained from: <b>Oakland, Achorage, New York Oceanic Airspace</b>						
RSP180/RCP240 required for application of 50NM/30NM/5-minute longitudinal and 23-30NM lateral						
<u>ICAO Flight Plan Filing Requirements</u>						
		<b>RSP180</b>	<b>RCP240</b>	<b>None</b>		
Field 10a:			P2	None		
Field 18:		SUR/RSP180		None		
<b>Note:</b>	<b>None</b> indicates not meeting RSP180 or RCP240 95% criteria					
	<b>Not enough data</b> for RCP Approval: If RSP Approval = 180, default to 240					
	<b>Not enough data</b> for RSP or RCP Approval: Contact AFS-470 for more information					
CHDO	FAA Designator	ICAO Operator/Type	Operation Type (CFR Part)	# Airframes Observed	RSP Approval	RCP Approval
SW21	AALA	AAL/A332	121	15	180	240
SW21	AALA	AAL/A333	121	9	180	240
SW21	AALA	AAL/B738	121	25	None	Not enough data
SW21	AALA	AAL/B752	121	30	180	240
SW21	AALA	AAL/B763	121	44	180	240
SW21	AALA	AAL/B772	121	47	180	240
SW21	AALA	AAL/B77W	121	20	180	240
SW21	AALA	AAL/B788	121	16	180	240
SW21	AALA	AAL/B789	121	4	180	Not enough data
NM02	ASAA	ASA/B738	121	14	None	240
NM02	ASAA	ASA/B739	121	20	None	240
GL23	KCSA	CKS/B744	121	13	180	240
SO27	DALA	DAL/A332	121	11	180	240
SO27	DALA	DAL/A333	121	28	180	240
SO27	DALA	DAL/B744	121	9	180	240
SO27	DALA	DAL/B752	121	67	None	240
SO27	DALA	DAL/B763	121	62	180	240
SO27	DALA	DAL/B764	121	21	180	240
SO27	DALA	DAL/B772	121	8	180	240
SO27	DALA	DAL/B77L	121	10	180	240

# ICAO Doc 4444 Amendment

## Appendix 2 – FLIGHT PLAN

- Item 10:
  - ✦ ~~P1–P9 Reserved for RCP~~
  - ✦ **P1 CPDLC RCP 400**
  - ✦ **P2 CPDLC RCP 240**
  - ✦ **P3 SATVOICE RCP 400**
  - ✦ **P4–P9 Reserved for RCP**
- Item 18:
  - ✦ SUR/ **Indicate** ~~include~~ surveillance equipment and capabilities not specified in Item 10 b). **Indicate as many RSP specification(s) as apply to the flight, using designator(s) with no space. Multiple RSP specifications are separated by a space. Example: RSP180 RSP400.**

# Current Plans for ATOP System Update

- The system shall provide the capability to set a unique 30/30 flag for aircraft that meet the following criteria:
  - ✦ The aircraft is a turbojet, and
  - ✦ Has an RNP qualifier (R) in Field 10A of its ICAO flight plan, and
  - ✦ Has “PBN/L1” in Field 18 of its ICAO flight plan, and
  - ✦ Has the **defined RCP equipment codes in Field 10A**, and
  - ✦ Has the defined “J” equipment codes in Field 10A, and
  - ✦ Has the **defined RSP in Field 18 subfield SUR**, and
  - ✦ Has an active CPDLC connection, and
  - ✦ Has an active ADS contract with a periodic reporting interval less than or equal to the adapted 30/30 interval, and
  - ✦ The most recently received ADS position report for the flight contain a Figure of Merit (FOM) that meets or exceeds the adapted minimum RNP4 threshold

# Considerations for Field 10A

- When multiple P-codes are present in system parameter, the presence of **any of the defined codes** will be satisfy the PBCS requirement.
- When multiple J-codes are present in the system parameter, the presence of **any one of the defined codes** will satisfy the PBCS requirement.

# Considerations for Field 18

- SUR/ subfield designator contains variable length freetext
- Performs a string search to determine if there is a match
  - ✦ Spaces (or no spaces) would not be a problem
- Also supports filings that contain multiple instances of SUR/, which will be consolidated and separated by a space
  - ✦ e.g. “SUR/260B SUR/RSP180 SUR/TCAS EQUIPPED” will be combined and what we will send downstream will be “SUR/260B RSP180 TCAS EQUIPPED”

# Projected Implementation Dates

- **September 2017:** System updates planned to be implemented in ATOP
- **29 March 2018:** System to be “turned on” and used for determining operations eligible for applicable separation standards in line with NAT and APAC regional conclusions

# GLOBAL DATA SHARING



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# Data sharing to support State approvals

- States that do not provide ATC in oceanic airspace need access to oceanic performance results to inform RCP/RSP approvals
  - ✦ INITIAL approvals to support 29 March 2018 implementation
  - ✦ Continued monitoring
- Propose to leverage existing FANS CRA/DLMA website to share monitoring data (currently provides access to all data link stakeholders to log problem reports)
  - ✦ <http://www.fans-cra.com/>
- Propose to leverage existing communication network of Regional Monitoring Agencies (RMAs) and En-route Monitoring Agencies (EMAs) to provide interface between ANSPs and States

# What role can RMAs/EMAs play in PBCS monitoring?

- RMAs were established to facilitate the system performance monitoring both during implementation planning and the post-implementation operational use of RVSM
  - ✦ Currently an extensive network of communication between RMAs and their States of responsibility (Worldwide: **13** RMAs → **198** States)
  - ✦ Significant expertise in tracking and sharing approvals, and in monitoring performance and sharing results
- Proposed RMA/EMA tasks related to PBCS
  1. Inform States of website containing monitoring data to inform initial and ongoing RCP/RSP approvals, and how to obtain secure access
  2. Collect and maintain RCP/RSP approvals from States in pre-specified format building on existing RMA approvals database
  3. Where applicable, receive notifications of non-compliance and coordinate with respective RMA, States, Operators to resolve performance issues affecting approval status

# Next steps...

- Inform ANSPs about proposal for data sharing and seek regional agreement on process and important dates (next slide)
  - ✦ ISPACG FIT: **6-10 March 2017**
  - ✦ NAT TIG: **2-6 April 2017**
  - ✦ NAT PBCS Information Sharing (IS) Project Team: **early March**
- Reach out to RMAs to request dissemination of information to their respective States about how to access monitoring data
  - ✦ PARMO within role as RMA/EMA for Pacific airspace to send email to all RMAs/EMAs with information on how to access monitoring data
  - ✦ Follow up with paper to RMA Coordination Group (CG) meeting: **22-26 May 2017**
  - ✦ FIT-Asia: **3-5 July 2017**
  - ✦ RASMAG (Asia-Pac RMAs/EMAs/States): **10-13 July 2017**

# Important Dates

- **30 September 2017**: Request ANSPs upload first set of data covering **Jan-Jun 2017** by this date
- **28 February 2018**: Request all States complete PBCS approvals for requesting operators by this date
- **29 March 2018**: ANSPs and Operators ready for full global implementation of PBCS

# Considerations

- Privacy concerns by oceanic ANSPs for data sharing
  - ✦ Some ANSPs may chose not to provide data on website
- Ability of RMAs to take on additional tasks in time for initial approvals
  - ✦ Current tasks specific to Reduced Vertical Separation Minima (RVSM) and additional tasks may require additional resources and/or additional coordination/directives with PIRGs
- Different performance observed for different ANSPs
  - ✦ States should ensure RSP180/RCP240 requirements are met in **ALL** applicable airspace for a particular operator
- When non-compliance is detected, ANSP notifies RMA associated with the State of the operator through the “Designated RMA” (e.g. NAT CMA for NAT ANSPs) and files problem report (PR) with DLMA/CRA if further investigation needed

ANSPs → Designated RMA → RMA → State of Operator/Registry → Operator

# FAA Monitoring Results

- PBCS monitoring results compiled for Anchorage, New York, Oakland for period **January to December 2016**
  - ✦ Any aircraft observed using ADS-C and/or CPDLC assessed against RSP180 and RCP240 if greater than 100 data points
    - Not all aircraft observed will be seeking RSP180/RCP240 approval
- Results organized by airframe and by ICAO operator/ICAO aircraft type pair
  - ✦ 6,205 unique airframes observed from 85 States
    - 2,661 (43%) IGA airframes
  - ✦ 364 ICAO operator/ICAO aircraft type pairs



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# FAA Monitoring Results Summary

## Jan-Dec 2016

Performance Category	All Unique Airframes	ICAO Oper/AcType Pairs	IGA Airframes
Meet RSP180 and RCP240	677	207	12
Meet RSP180 but not RCP240	-	-	-
Meet RCP240 but not RSP180*	18	4	-
Meet RSP180 but less than 100 data points for ACP	3,624	140	1,241
Do not meet RSP180 and less than 100 data points for ACP*	244	13	81
Do not meet RSP180 or RCP240*	1	-	-
Have less than 100 data points for ASP and ACP	1,641	-	1,327
<b>Total</b>	<b>6,205</b>	<b>364</b>	<b>2,661</b>



\*Would likely result in no initial approval for RSP180/RCP240



# ICAO Oper/ACT Pairs not meeting RSP180 and/or RCP240

State	ICAO Oper/ACT	Oakland						Anchorage						New York					
		ADS-C count	% < 90 sec	% < 180 sec	ACP count	% < 180 sec	% < 210 sec	ADS-C count	% < 90 sec	% < 180 sec	ACP count	% < 180 sec	% < 210 sec	ADS-C count	% < 90 sec	% < 180 sec	ACP count	% < 180 sec	% < 210 sec
AZERBAIJAN	AHY/B788	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	257	85%	95%	1	100%	100%
CANADA	ACA/A319	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	486	94%	98%	5	100%	100%
FINLAND	FIN/A343	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	118	83%	83%	5	100%	100%
FRANCE	FWI/B744	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	272	94%	95%	12	92%	100%
SWEDEN	BLX/B763	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	744	94%	98%	15	100%	100%
UK	BAW/A318	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	360	93%	96%	1	100%	100%
US	AAL/B738	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	310	91%	92%	2	100%	100%
US	ASA/B738	31,308	94%	98%	1,583	97%	97%	228	92%	99%	1	100%	100%	-	0%	0%	-	0%	0%
US	ASA/B739	10,732	94%	98%	605	96%	97%	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%
US	DAL/B752	35,290	92%	97%	595	96%	97%	215	98%	100%	3	100%	100%	22,414	94%	97%	364	98%	98%
US	DJT/B752	-	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	185	86%	92%	-	0%	0%
US	FDX/B763	-	0%	0%	-	0%	0%	347	94%	97%	7	100%	100%	58	93%	100%	1	100%	100%
US	GTI/BLCF	346	92%	97%	11	100%	100%	13,187	98%	99%	344	99%	100%	2,530	97%	99%	74	97%	100%
US	UAL/B753	474	87%	90%	-	0%	0%	-	0%	0%	-	0%	0%	108	69%	77%	-	0%	0%
US	UPS/B741	7,298	96%	98%	-	0%	0%	17,128	94%	97%	-	0%	0%	-	0%	0%	-	0%	0%
US	UPS/B76N	8,078	95%	98%	-	0%	0%	18,526	95%	98%	-	0%	0%	1,187	94%	97%	-	0%	0%
VIET NAM	HVN/B789	10	90%	90%	-	0%	0%	20	85%	85%	-	0%	0%	105	90%	91%	-	0%	0%

## Airframes not meeting RSP180 and/or RCP240 by State

State	<u>Total</u> airframes not meeting RSP180 and/or RCP240	<u>IGA</u> airframes not meeting RSP180 and/or RCP240
BERMUDA	4	2
BRAZIL	3	2
CANADA	20	3
CHILE	2	
CHINA	7	2
ETHIOPIA	2	
FRANCE	2	1
GERMANY	4	
HONG KONG, CHINA	10	3
ITALY	1	1
JAPAN	1	
JORDAN	2	
LIECHTENSTEIN	1	1
NEW ZEALAND	1	1
NIGERIA	1	
QATAR	2	
REPUBLIC OF KOREA	4	
SOUTH AFRICA	1	
SWEDEN	1	
TURKEY	4	
UAE	1	
UNITED KINGDOM	5	2
UNITED STATES	161	44
Unknown (Military)	23	19
<b>Grand Total</b>	<b>263</b>	<b>81</b>

# ICAO PBCS PROJECT TEAM



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# PBCS 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**.

# Status of PBCS PT

- PBCS Manual, **Edition 3** targeted for agreement in May 2018, publication in Nov 2018
- ICAO PBCS PT Meetings
  - ✦ First virtual meeting – *18 January 2017*
  - ✦ Next virtual meeting – *13 March 2017*
  - ✦ OPDLWG/4 meeting – *22-26 May 2017*
- Current Focus Areas:
  - ✦ Section 4.2.3, **State safety oversight of an aircraft operator** – provide additional guidance based on existing policies, e.g. FAA AC 90-117
  - Section 4.3.2, **Communication services provision** – Need more specific guidance related to CSPs
  - ✦ RCP/RSP for domestic data link/Baseline 2
  - ✦ Inter-panel task force developing RSP for ASEPS
  - ✦ RPASP – required link performance for remotely piloted aircraft

# ACTION BY MEETING

- The meeting is invited to:
  - ✦ Note and provide comment on the information provided;
  - ✦ Provide input to data sharing proposal and details on slides 23-25; and
  - ✦ Agree to timeline listed on slide 26.