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OPERATIONS CIRCULAR

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Subject: Performance Based Communication and Surveillance (PBCS)

1. INTRODUCTION

1.1 This Operations Circular (OC) provides guidance for aircraft operators on the plan to implement Performance-Based Communication and Surveillance (PBCS) in accordance with the ICAO provisions to support the Performance-Based Reduced Lateral Separation Minima (RLatSM) & Reduced Longitudinal Separation Minima (RLongSM) application using Data Link in Air Traffic Services, (e.g. OTS of NAT HLA is required to have RLatSM of 23 NM and RLongSM of 05 Minutes).

1.2 PBCS is a concept that enables the management of communication and surveillance capabilities by prescription of Required Communication Performance (RCP) and Required Surveillance Performance (RSP) specifications in Future Air Navigation System (FANS 1/A) data link operations using Controller Pilot Data-link Communications (CPDLC) and Automatic Dependent Surveillance (ADS).

1.3 This OC is based on the ICAO Provisions and amendments to Annexes 4, 6 (Parts I, II, III), 10 (Volumes II, III), 11, 15, PANS-ATM (Doc 4444) and PANS-ABC (Doc 8400) on PBCS, including new Standards and Recommended Practices (SARPs) and related guidance material, Performance-Based Communication and Surveillance (PBCS) Manual (Doc 9869) and Global Operational Data Link (GOLD) Manual (Doc 10037).

1.4 When ATS operation is predicated on communication and surveillance performance, RCP and RSP specifications provide operational requirements and allocations that apply to infrastructure as well as aircraft and operations. For example:

a) RCP 240 includes a four-minute time requirement for a controller capability to intervene with an aircraft. This requirement is specified from when the controller

initiates the communication, to when the controller receives the operational response from the flight crew; and,

b) RSP 180 includes an accuracy requirement on the “position at time” based on the prescribed RNP/RNAV specification and \pm one-second accuracy on Coordinated Universal Time (UTC). It also includes a time requirement from when the aircraft is at the compulsory reporting point, to when the report is received by the controlling ATS unit.

Note: RCP 240 and RSP 180 also include requirements associated with continuity, service availability, integrity and functionality.

1.5 The new separation standard is expected to result in reduction in fuel burn and consequently reduction in greenhouse gas emissions through an increased likelihood of flights being able to operate at their optimum flight levels. This will have the added benefit of allowing return on operator investment in aircraft avionics.

2. APPLICABILITY

This OC is applicable to Commercial Air Transport and General Aviation aircraft in PBCS designated airspaces.

3. DEFINITIONS

Following definitions are used for the purpose of this OC:

a) **Actual Communications Performance (ACP):** The portion of communication transaction time that is monitored against the required communication monitored performance (RCMP) values provided by the RCP specification.

b) **Actual Surveillance Performance (ASP):** The portion of surveillance data delivery time that is monitored against the required surveillance monitored performance (RSMP) values provided by the RSP specification.

c) **Aeronautical Telecommunication Network Baseline 1 (ATN B1):** ATN B1 generally means that the data link system on an aircraft, the ATSU ground system, and communication service provision comply with the standard as adapted by Eurocontrol Specification on Data Link Services (EUROCONTROL-SPEC-0116). ATN B1 consists of the following data link applications:

- (i) Context management (CM) for Data Link Initiation Capability (DLIC); and
- (ii) Limited Controller Pilot Data Link Communications (CPDLC) for Air Traffic Service (ATS) communications management (ACM), ATS clearance (ACL), and ATC microphone check (AMC).

d) **Automatic Dependent Surveillance-Broadcast (ADS-B):** It is a function on an aircraft or surface vehicle that broadcasts position, altitude, vector and other information for use by other aircraft, vehicles and by ground facilities. It has become the main application of the ADS principle. The ADS-B system architecture is

composed of aircraft avionics and a ground infrastructure. On board avionics determine the position of the aircraft, typically by using the Global Navigation Satellite Systems (GNSS) and transmitting this and additional information about the aircraft to ground stations for use by ATC; to ADS-B equipped aircraft; and to other aviation service providers.

e) Automatic Dependent Surveillance – Contract (ADS-C): A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated and what data would be contained in the reports.

f) Future Air Navigation System (FANS 1/A): FANS 1/A generally means that the data link system on an aircraft, the Air Traffic Services Unit (ATSU) ground system, and communication service provision comply with the standard. In certain cases, specific reference is made to a particular type of FANS 1/A aircraft as follows:

- (i) FANS 1/A+ means that the aircraft completely complies with Revision A of the standard, which includes message latency monitor; and
- (ii) FANS 1/A ADS-C means that the aircraft complies with AFN and ADS-C applications, but does not include the CPDLC application.

g) Performance-Based Communications (PBC): ATS communication services and capability based on performance requirements for air traffic service provision, aircraft and flight operations along an ATS route, on an instrument approach procedure or in a designated airspace.

Note: Communication performance requirements are allocated to system components in an RCP specification in terms of communication transaction time, continuity, availability, integrity, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

h) Performance-Based Communications and Surveillance (PBCS) Operation: Air Traffic Management (ATM) or aircraft operation to which an RCP and/or RSP specification has been prescribed.

i) Performance-Based Surveillance (PBS): ATS surveillance services and capability based on performance requirements for air traffic service provision, aircraft and flight operations along an ATS route, on an instrument approach procedure or in a designated airspace.

Note: Surveillance performance requirements are allocated to system components in an RSP specification in terms of surveillance data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

j) Required Communication Monitored Performance (RCMP): An RCP allocation that specifies the maximum time against which ACP is assessed.

k) Required Communication Performance (RCP) specification: A set of requirements for air traffic service provision, aircraft capability, and operations needed

to support performance-based communication within a defined airspace.

Note 1: ICAO Doc 9869 and Appendix B of GOLD document for RCP specifications may be referred.

Note 2: The term RCP, defined by ICAO as “a statement of performance requirements for operational communication in support of specific ATM functions”, is used to align the concept of PBC with the concept of PBN. The term RCP is now used in the context of a specification that is applicable to the prescription of airspace requirements, qualification of ATS provision, aircraft capability, and operational use, including post-implementation monitoring (e.g. RCP 240 refers to the criteria for various components of the operational system to ensure that an acceptable intervention capability for the controller is maintained).

l) Required Surveillance Performance (RSP) specification: A set of requirements for air traffic service provision, aircraft capability, and operations needed to support performance-based surveillance within a defined airspace.

Note 1: ICAO Doc 9869 and Appendix C of the GOLD document for RSP specifications may be referred.

Note 2: The term RSP is used in the context of a specification that is applicable to the prescription of airspace requirements, qualification of ATS provision, aircraft capability, and operational use, including post-implementation monitoring (e.g. RSP 180 refers to the criteria for various components of the operational system to ensure an acceptable surveillance capability for the controller is maintained).

m) Required Surveillance Monitored Performance (RSMP): An RSP allocation that specifies the maximum time against which ASP is assessed.

n) Special Authorization (SA): The authorizations, conditions and limitations associated with the air operator certificate (AOC) and subject to the conditions in the operations manual.

4. ABBREVIATIONS

ACP	Actual Communications Performance
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-C	Automatic Dependent Surveillance – Contract
AFM	Aircraft Flight Manual
AIP	Aeronautical Information Publication
AOC	Air Operator Certificate
ANSP	Air Navigation Service Provider
ASP	Actual Surveillance Performance
ATM	Air Traffic Management
ATN B1	Aeronautical Telecommunication Network Baseline 1
ATS	Air Traffic Service
CARs	Civil Aviation Requirements

CPDLC	Controller-Pilot Data Link Communications
CSP	Communications Service Provider
COM	Company Operations Manual
FANS 1/A	Future Air Navigation System (1 = Boeing, A = Airbus)
GOLD	Global Operational Data Link Document
DDPG	Dispatch Deviation Procedure Guide
HMI	Human-machine interface
ICAO	International Civil Aviation Organization
MEL	Minimum Equipment List
MMEL	Master Minimum Equipment List
NAT HLA	North Atlantic High Level Airspace
OTS	Organised Track System
PBC	Performance-based Communications
PBCS	Performance-Based Communications and Surveillance
PBN	Performance-based Navigation
PBS	Performance-based Surveillance
RCP	Required Communications Performance
RNP	Required Navigation Performance
RSP	Required Surveillance Performance
RTCA	Radio Technical Commission for Aeronautics
SA	Special Authorization
SATVOICE	Satellite Voice
SOP	Standard Operating Procedures
SSP	Surveillance Service Provider
STC	Supplemental Type Certificate
TC	Type certificate

5. AIRCRAFT ELIGIBILITY

5.1 The aircraft manufacturer or equipment supplier should demonstrate that aircraft system meets the Required Communication Performance (RCP)/Required Surveillance Performance (RSP) specifications allocated to the aircraft system as contained in the PBCS Manual (Doc 9869).

Note 1: For FANS 1/A CPDLC and ADS-C aircraft system, the Safety and Performance Requirements Standard for Air Traffic Data Link Services in Oceanic and Remote airspace (RTCA DO-306/EUROCAE ED-122) is equivalent to RCP240, RCP400, RSP180 and RSP400 contained in the PBCS Manual (Doc 9869, 2nd Edition).

Note 2: FAA AC20-140A or later satisfy the requirement for RCP240/400, RSP 180/400.

5.2 Demonstration of compliance with the RCP and RSP specifications should be specific to the aircraft type. The demonstrated compliance with RCP/RSP specifications may be documented in one of the following documents:

- a) Type Certificate (TC);
- b) Supplemental Type Certificate (STC);

- c) Aeroplane Flight Manual (AFM), AFM Supplement, or other acceptable document; or
- d) Compliance statement from the manufacturer, which has been approved by the State of Design and accepted by the State of Registry or DGCA, if different.

Note: The State of the operator can issue an authorisation based on the compliance statement issued by aircraft manufacturer as listed above or based on other alternative means of compliance that are acceptable to the State.

5.3 In addition to the indication of compliance with specific RCP/RSP specifications, the aircraft manufacturer or equipment supplier should document any associated operating limitations, information and procedures in the AFM or other appropriate documents.

5.4 The aircraft manufacturer or equipment supplier should identify any specific items related to PBCS capability in the master minimum equipment list (MMEL) and/or minimum equipment list (MEL).

Note: When required for the intended operation, operators will adopt provisions for certain specific systems to be operational at dispatch. The MEL should be amended to highlight the impact of losing an associated system/sub-system on data link operational capability.

6. OPERATOR ELIGIBILITY

6.1 The operator should demonstrate that aircraft system is capable of meeting the applicable RCP/RSP specifications prescribed for intended operation and ensure that aircraft system is properly maintained to continue to meet the applicable RCP/RSP specifications.

6.2 The Operator shall establish standard operating procedures (SOPs) for flight crew and other relevant personnel (flight dispatchers and maintenance engineers). The SOPs should include both normal and non-normal (contingency) procedures for the data link systems used in the PBCS operations addressing the following:

- a) Pre-flight planning requirements including MELs, eligible flight plan filing;
- b) Actions to be taken in the data link operation, to include specific RCP/RSP required cases;
- c) Actions to be taken for the loss of data link capability while in and prior to entering the airspace requiring specific RCP/RSP specifications;
- d) Problem reporting procedures to the local/regional PBCS monitoring agency.
- e) Specific regional requirements, if applicable.

6.3 Training on Data Link and PBCS Operations

6.3.1 Flight Crew

- a) Data link communications system theory (relevant to operational use)
- b) AFM and AFM Supplement limitations
- c) Normal pilot response to data link communication messages

- d) Message elements in the message set used in each environment
- e) Required Communication Performance (RCP)/Required Surveillance Performance (RSP) specifications and their performance requirements
- f) Implementation of performance-based reduced separation with associated RCP/RSP specifications or other possible performance requirements associated with their routes
- g) Other ATM operations involving data link communication services
- h) Both normal and non-normal (contingency) procedures
- i) Data link communication failure/problem and reporting

Note 1: *If flight crew has already trained on data link operations, additional training only on PBCS is required, addressing a basic concept and requirements that have direct impact on overall data link performance required for provisions of air traffic services (e.g. reduced separation).*

Note 2: *Training may be provided through training material and other means that simulate the functionality.*

6.3.2 Dispatchers/Flight Operations Officers

- a) Proper use of data link and PBCS flight plan designators
- b) Air traffic service provider's separation criteria and procedures relevant to RCP/RSP specifications
- c) MEL remarks or exceptions based on data link communications
- d) Procedures for transitioning to voice communication and other contingency procedures related to the operation in the event of abnormal behaviour of the data link communication
- e) Coordination with the ATS unit related to or following a special data link communication exceptional event (e.g. log-on or connection failures)
- f) Contingency procedures to transition to a different separation standard when data link communication fails.

6.3.3 Engineering and Maintenance Personnel

- a) Data link communication equipment including its installation, maintenance and modification
- b) MEL relief and Procedures for return to service authorizations
- c) Correction of reported non-performance of data link system

Note: *Operators unsure of required maintenance procedures for data link communication-related equipment should contact field service representatives of their aircraft manufacturer.*

7. **OPERATIONAL APPROVAL**

7.1 Aircraft operators will be granted operational approval for communication and/or surveillance capability including aircraft equipage for operations where RCP and/or RSP specification.

7.2 RCP and RSP specification will be prescribed for aircraft operators when

applying for PBCS approval, which needs to be supported by aircraft systems, infrastructure and supporting datalink.

7.3 The RCP/RSP specification shall be endorsed in Operations Specifications for each aircraft.

7.4 The operator shall have required PBN, CPDLC and ADS approvals in accordance with respective Operations Circular.

7.5 The operator should ensure that the procedures, systems and services in operations and maintenance programmes meet the allocated criteria in interoperability standards and RCP/RSP specifications.

7.6 The specific items related to PBCS capability must be included in the MEL/DDPG.

7.7 The required communications and surveillance systems must be operational, and flight crew must report any failure or malfunction of ADS-C/ADS-B or CPDLC equipment to ATC as soon as it becomes apparent.

8. ATC FLIGHTPLAN FILING

When filing RCP/RSP capabilities, operators should ensure the planned use of associated communication and surveillance capabilities for the flight, which will be in accordance with regulations, polices, and procedures in control area as published by the applicable States in Aeronautical Information Publication (AIP) (or equivalent publications). Operators should ensure the appropriate 'descriptors' to denote Performance-Based Communication and Surveillance (PBCS) capabilities included in the International Civil Aviation Organization (ICAO) flight plan.

In Item 10 of the flight plan, the aircraft operator should insert one or more descriptors, as appropriate, as per guidance contained in Appendix 2 of Doc 4444 – PANS-ATM to identify an aircraft's CPDLC and RCP capability. For example, Item 10 of Flight Plan must contain the following:

Descriptors	System
J1	CPDLC ATN VDL Mode 2
J2	CPDLC FANS 1/A HFDL (Optional)
J3	CPDLC FANS 1/A VDL Mode 0/A
J4	CPDLC FANS 1/A VDL Mode 2
J5	CPDLC FANS 1/A SATCOM (INMARSAT)
J6	CPDLC FANS 1/A SATCOM (MTSAT)
J7	CPDLC FANS 1/A SATCOM (Iridium)
M1	ATC RTF SATCOM (INMARSAT)
M2	ATC RTF (MTSAT)
M3	ATC RTF (Iridium)
P1	CPDLC RCP 400
P2	CPDLC RCP 240
P3	SATVOICE RCP 400

At Item 18 of the Flight Plan, SUR/RSP180 should be inserted to show the capability of the RSP180 performance requirement and indication of RNAV / RNP capabilities followed by PBN/____. For example: For RNAV (RNP) 10 PBN/A1 and RNP 4, PBN/L1.

9. SAFETY OVERSIGHT AND WITHDRAWAL OF RCP/RSP AUTHORISATION

9.1 In order to assess the actual communication and surveillance performance of its fleet against RCP/RSP specification, the operator needs to establish a procedure either internally, or via the PBCS Charter to determine corrective action and report, analyse and resolve problems. The non-compliance should be reported to DGCA without any delay and will require corrective action with a predetermined time frame based on the severity of the deficiency and magnitude of non-compliance.

9.2 Aircraft Operators shall not operate such non-compliant aircraft on PBCS tracks until corrective action is completed. However, such aircraft may be operated on non-PBCS tracks. Operators must inform DGCA about corrective action taken in due course of time.

Sd/-
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