



International Civil Aviation Organization

**The Sixth Meeting of the APANPIRG ATM Sub-Group
(ATM/SG/6)**

Hong Kong, China, 30 July – 03 August 2018

Agenda Item 4: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

PBCS OPERATIONAL APPROVAL

(Presented by the Secretariat)

SUMMARY

This paper presents information on regulatory authorization requirements of Annex 6 – *Operation of Aircraft* for Performance-Based Communications and Surveillance (PBCS)

1. INTRODUCTION

1.1 Annex 6 – Operation of Aircraft Parts I, II and II include provisions relating to Performance-Based Communications and Surveillance (PBCS), specifically detailing the Standards and Recommended Practices for aircraft operations dependent upon Required Communications Performance (RCP) and Required Surveillance Performance (RSP).

1.2 For ease of reference the examples used in this paper are taken from Annex 6 Part I – *International Commercial Air Transport – Aeroplanes*. Equivalent references may also be found in Annex 6 Part II – *International General Aviation – Aeroplanes* and Part III – *International Operations – Helicopters*.

2. DISCUSSION

FIT-Asia Discussion and Outcomes

2.1 The Eighth Meeting of the Future Air Navigation Services (FANS) Interoperability Team – Asia (FIT-Asia/8, Bangkok, Thailand, 26 to 29 June 2018) discussed the need for the establishment of a PBCS Operational Approvals Database to support airspace safety monitoring activities undertaken by the Regional Airspace Safety Monitoring Advisory Group (RASMAG).

2.2 It was noted by the FIT-Asia/8 meeting that Annex 6 does not require the issuance of a specific operational approval for RCP and RSP. This was quite different from, for example, Reduced Vertical Separation Minimum, which requires specific operational approval to be included in the Operations Specifications associated with the Air Operator Certificate (AOC).

Annex 6 Operation of Aircraft Requirements PBCS Provisions

2.3 However, the following standards from Annex 6 Part I (and equivalent standards in Annex 6 Parts II and III) apply:

7.1.3 For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), an aeroplane shall, in addition to the requirements specified in 7.1.1:

- a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);
- b) have information relevant to the aeroplane RCP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
- c) have information relevant to the aeroplane RCP specification capabilities included in the MEL.

7.3.2 For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirements specified in 7.3.1:

- a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
- b) have information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
- c) have information relevant to the aeroplane RSP specification capabilities included in the MEL.

2.4 The Annex 6 standards applicable to RCP or RSP operations include the requirement that the relevant information is included in the flight manual or other documentation approved by the State of Design or State of Registry, and that the information relevant to the aeroplane specification is included in the Minimum Equipment List (MEL).

2.5 Annex 6 also includes requirements for State of the Operator to ensure the operator has established and documented procedures, flight crew qualification and proficiency requirements, a training and appropriate maintenance procedure, and to ensure that the State has made adequate provisions for receiving communications and surveillance performance reports and for taking immediate corrective action where performance does not meet the RCP or RSP specification.

2.6 The full Annex 6 Part I Chapter 7 provisions for aeroplane communication, navigation and surveillance equipment, including RCP and RSP, are provided in **Attachment A**.

ICAO Headquarters Comments on Annex 6 Provisions

2.7 ICAO Asia/Pacific Regional Office sought further advice on the matter of operational approvals from the technical experts in ICAO Headquarters.

2.8 ICAO Headquarters stated that the phrase “The State of the Operator shall ensure...” implies an authorization using an approval method which can be accomplished by submitting to the regulatory authority, for approval, an amendment to the Operations Manual. (Note also Annex 6 Part I, 7.3.2 b) and c), in paragraph 2.3 above.)

ICAO Doc 9869 PBCS Manual

2.9 ICAO Doc 9869 PBCS Manual provides further information on operational approvals for PBS and PBC operations, including the following definition:

Operational Approval. An authorization which entitles an operator, owner or pilot-in-command to undertake or continue a flight operation. States may use the following methods to issue operational approvals:

Approval. An explicit action by the State of the Operator/State of Registry to authorize an application to undertake a proposal to modify a flight operation that has been submitted by, or on behalf of, an operator or owner. The approval attests top compliance with the applicable provisions.

Specific approval. An approval with is required to be documented in the operations specifications for commercial air transport operations or in the list of specific approvals for international general aviation operations.

Acceptance. A written or implicit acknowledgement of consensus by a State on a notification submitted by the operator. A State's approval is implicit if it does not issue a written response to the operator with a certain period of time following the submission of the notification.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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CHAPTER 7. AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

7.1 COMMUNICATION EQUIPMENT

7.1.1 An aeroplane shall be provided with radio communication equipment capable of:

- a) conducting two-way communication for aerodrome control purposes;
- b) receiving meteorological information at any time during flight; and
- c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note.— The requirements of 7.1.1 are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

7.1.2 The radio communication equipment required in accordance with 7.1.1 shall provide for communications on the aeronautical emergency frequency 121.5 MHz.

7.1.3 For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC) , an aeroplane shall, in addition to the requirements specified in 7.1.1:

- a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);
- b) have information relevant to the aeroplane RCP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
- c) have information relevant to the aeroplane RCP specification capabilities included in the MEL.

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).

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).

7.2 NAVIGATION EQUIPMENT

7.2.1 An aeroplane shall be provided with navigation equipment which will enable it to proceed:

- a) in accordance with its operational flight plan; and
- b) in accordance with the requirements of air traffic services;

except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

7.2.2 For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements specified in 7.2.1:

- a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s);
- b) have information relevant to the aeroplane navigation specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of the Design or State of Registry; and
- c) have information relevant to the aeroplane navigation specification capabilities included in the MEL.

Note.— Guidance on aeroplane documentation is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

7.2.3 The State of the Operator shall, for operations where a navigation specification for PBN 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 the appropriate navigation 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 the appropriate navigation specifications.

Note 1.— Guidance on safety risks and mitigations for PBN operations, in accordance with Annex 19, are contained in the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).

Note 2.— Electronic navigation data management is an integral part of normal and abnormal procedures.

7.2.4 The State of the Operator shall issue a specific approval for operations based on PBN authorization required (AR) navigation specifications.

Note.— Guidance on specific approvals for PBN authorization required (AR) navigation specifications is contained in the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).

7.2.5 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which:

- a) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and
- b) has been authorized by the State of the Operator for the MNPS operations concerned.

Note.— The prescribed minimum navigation performance specifications and the procedures governing their application are published in the Regional Supplementary Procedures (Doc 7030).

7.2.6 For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, an aeroplane:

- a) shall be provided with equipment which is capable of:
 - 1) indicating to the flight crew the flight level being flown;
 - 2) automatically maintaining a selected flight level;
 - 3) providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft); and
 - 4) automatically reporting pressure-altitude;
- b) shall be authorized by the State of the Operator for operation in the airspace concerned; and
- c) shall demonstrate a vertical navigation performance in accordance with Appendix 4.

7.2.7 Prior to granting the RVSM approval required in accordance with 7.2.6 b), the State shall be satisfied that:

- a) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Appendix 4;
- b) the operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and
- c) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Note.— An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

7.2.8 The State of the Operator, in consultation with the State of Registry if appropriate, shall ensure that, in respect of those aeroplanes mentioned in 7.2.6, adequate provisions exist for:

- a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with Annex 11, 3.3.5.1; and

- b) taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied.

7.2.9 The State of the Operator that has issued an RVSM approval to the operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

Note.— Monitoring data from any regional monitoring programme established in accordance with Annex 11, 3.3.5.2, may be used to satisfy the requirement.

7.2.10 All States that are responsible for airspace where RVSM has been implemented, or that have issued RVSM approvals to operators within their State, shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

Note 1.— These provisions and procedures need to address both the situation where the aircraft in question is operating without approval in the airspace of the State, and the situation where the operator for which the State has regulatory oversight responsibility is found to be operating without the required approval in the airspace of another State.

Note 2.— Guidance material relating to the approval for operation in RVSM airspace is contained in the Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

7.2.11 The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with 7.2.1 and, where applicable, 7.2.2, 7.2.5 and 7.2.6.

Note.— Guidance material relating to aircraft equipment necessary for flight in airspace where RVSM is applied is contained in the Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

7.2.12 On flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes.

7.3 SURVEILLANCE EQUIPMENT

7.3.1 An aeroplane shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

7.3.2 For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirements specified in 7.3.1:

- a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
- b) have information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
- c) have information relevant to the aeroplane RSP specification capabilities included in the MEL.

Note 1.— Information on surveillance equipment is contained in the Aeronautical Surveillance Manual (Doc 9924).

Note 2.— Information on RSP specifications for performance-based surveillance is contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

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).

7.4 INSTALLATION

The equipment installation shall be such that the failure of any single unit required for communication, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communication, navigation or surveillance purposes.

7.5 ELECTRONIC NAVIGATION DATA MANAGEMENT

7.5.1 The operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the State of the Operator has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the existing equipment. The State of the Operator shall ensure that the operator continues to monitor both the process and products.

Note.— Guidance relating to the processes that data suppliers may follow is contained in RTCA DO-200A/EUROCAE ED-76 and RTCA DO-201A/EUROCAE ED-77.

7.5.2 The operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary aircraft.