

ADVISORY CIRCULAR

No. : AC-28-01-005

Date : 1 March 2016

A. SUBJECT.

Minimum Navigation Performance Specification (MNPS) Approval

B. PURPOSE.

This Advisory Circular (AC) provides guidance for Air Operator Certificate (AOC) holder/applicant to obtain MNPS approval.

C. STATUS.

This is the third edition of AC - 28 - 01 - 005, dated 1 March 2016, and it will remain current until withdrawn or superseded.

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E. REFERENCES.

The following documents were used as reference material:

- ICAO Consolidated Guidance Material NAT Region (Sixth Edition) (NAT Doc. 001, T13.5 N).
- ICAO Annexes, PANS/RAC (Doc. 4444).
- ICAO Regional Supplementary Procedures (Doc. 7030).
- FAA (US) North Atlantic MNPS Airspace Operations Manual.

MNPS APPROVAL

1.0 Background.

- 1.1 The basic system used for traffic flow in the North Atlantic became so congested during the 1970s that a more stringent system was designed to alleviate the problem. This newer system included Minimum Navigation Performance Specifications (MNPS), the North Atlantic Organized Track System (OTS), and the North Atlantic Track Structure (NATS). Two traffic flows were developed; a westbound flow departing Europe in the morning and an eastbound flow departing North America in the evening. The effect of these flows has been to concentrate most of the traffic uni directionally, peak westbound traffic operating between 1130 UTC and 1900 UTC and peak eastbound traffic between 0100 UTC and 0800 UTC.
- 1.2 The concept of MNPS has been accepted and will be further adopted on a world-wide basis by ICAO and regional authorities. The objective of MNPS remains to ensure a safe aircraft operation and to derive maximum economic benefit from the improved accuracy of navigation as demonstrated by technological advances. The concept of MNPS will gradually be expanded to other areas such as the Oceanic airspace in the Pacific, and the recent European B-RNAV area is a similar concept. An implicit condition of MNPS is that all operators must maintain the specified operating standards and be aware of the inherent obligations of the MNPS requirements.

2.0 NAT MNPS Defined Area.

- 2.1 MNPS vertical dimension airspace is that portion of the North Atlantic airspace between FL275 and FL400. The MNPS lateral dimensions are between the latitudes 27° N to the North Pole. MNPS airspace is bounded in the east by the eastern boundaries of control areas (CTA) Santa Maria Oceanic, Shanwick Oceanic, Reykjavik, and in the west by the western boundary of CTA's Reykjavik, Gander Oceanic and New York Oceanic excluding the area west of 60° W and south of 38° N. The area south of 51° to the south west of Ireland is designated as the Shannon Oceanic Transition area (SOTA) and is part of the MNPS airspace.

3.0 MNPS Airspace Accuracy Requirements.

- 3.1 **Navigation.** Aircraft conducting flights within the volume of airspace specified shall have a navigation performance capability such that:
 - a. The standard deviation of later track errors shall be less than 6.3 NM (11.7 km). This can be interpreted as a need for aircraft to remain within 12.6 NM (23 km) off track for 95% of the time.

- b. The proportion of the total flight time spent by aircraft between 30 NM (55.6 km) off the cleared track shall be less than one hour per 2000 flight hours.
- c. The portion of the total flight time spent by aircraft between 50 and 70 NM (92.6 and 129.6 km) off the cleared track shall be less than one hour per 8000 flight hours.
- d. Such navigation performance capability shall be verified by the State of Registry or the State of the aircraft operator.

3.2 Altimetry. In opposite directions, the separation requirements are 1000 ft (305 meters) vertical to FL 290 and 2000 ft (610 meters) vertical above FL 290. Where RVSM airspace is in force, the altimetry and level keeping accuracy requirement of AC Number 09 RVSM Approval applies.

4.0 Application & Approval Process.

4.1 All Jordanian registered aircraft that plan to fly across the North Atlantic MNPS airspace require an approval by CARC. This approval is granted to the Operator by a letter of approval and as an Operations Specification with the AOC, which must be carried in the aircraft library and produced on demand. This paragraph gives detailed guidance on the required content of operational practices and procedures. It also describes the steps in the operational approval process and the granting of approval to operate in MNPS airspace. The Operations Specification, of the AOC, will be amended to include MNPS.

4.2 To process an application, CARC needs to be satisfied that;

- a. Operational program is adequate. Flight crew training as well as operations manuals will be evaluated. Approval will be required for each Operator and each aircraft group.
- b. Airworthiness issues are satisfactorily addressed. Approval will be required for each aircraft group, and non-group aircraft, to be used in MNPS operations.

5.0 Content of an Operator's MNPS Application. The following describes the material that an Operator should provide to CARC for evaluation, preferably at least 60 days before the intended start of MNPS operations. The requirement can be met by completing the form "MNPS Certification Conformity Report" to the satisfaction of CARC.

5.1 Airworthiness.

5.1.1 Airworthiness Documents. Documentation such as the Aircraft Flight Manual (or supplement) should be available to show that the aircraft has been approved either for MNPS or RNP by the appropriate airworthiness authorities (State of Manufacture).

5.1.2 Description of Aircraft Equipment. A description of the aircraft navigation equipment appropriate to operations in an MNPS environment, Acceptable aircraft navigation equipment:

- a. Consists of two fully serviceable Long Range Navigation Systems (LRNs), which consist of either:
 - (1) Two inertial navigation systems, or
 - (2) Two flight management systems (FMS) with two inertial reference systems (IRS), or
 - (3) Two approved global positioning systems (GPS), or
 - (4) One INS and one FMS/IRS, or
 - (5) One INS and one approved GPS, or
 - (6) One FMS/IRS and one approved GPS.
- b. Must be capable of providing a continuous indication to the flight crew of the aircraft position relative to track, and
- c. Should be coupled to the automatic pilot.

5.1.3 Maintenance. At the time application is made for operational approval, the Operator should submit a maintenance program for approval.

5.1.4 Minimum Equipment List. Minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL), and should include items pertinent to operating in MNPS airspace.

5.2 Navigation Accuracy Records. As a guide all navigation equipment approved for RNP routes or better would normally be acceptable to CARC. The Operator of an aircraft, for which there is not a specific RNP limitation or approval in the Aircraft Flight Manual, must compile with navigation accuracy data.

- 5.3 Training Programs and Operating Procedures.** All Operators should submit training syllabi and other appropriate material to CARC to show that the operating practices, procedures and training items related to MNPS operations are incorporated in training programs in the initial, and where appropriate, recurrent training program. The related training programs and operating procedures should cover flight planning, pre-flight procedures, aircraft procedures for entry, in-flight and contingency procedures, and flight crew training procedures.
- 5.4 Operations Manuals and Checklists.** The operations manuals and checklists should be revised to include information/ guidance on standard operating procedures.
- 5.6 Review and Evaluation of Applications.** Once the application has been submitted and CARC Operations and Airworthiness are satisfied with the information provided, CARC will continue with the approval process.
- 5.7 Validation Flight.** The content of the MNPS application and programs may be sufficient to validate the aircraft. However, the final step of the approval process may require a validation flight through MNPS airspace by CARC Flight Operations Inspector to verify that all relevant procedures are applied effectively. If the performance is satisfactory, operational approval for MNPS airspace may be granted. If the performance is not adequate, then approval will be delayed.
- 5.8 Approval.** Approval to operate in MNPS airspace will be granted by a letter of Approval issued by CARC and the Operations Specifications page of the AOC. This will be issued as a MNPS approval. Each aircraft for which the Operator is granted authority will be listed in the letter of Approval and OPS Specifications. Approvals will be valid until revoked by CARC.
- 6.0 Conditions for Removal of MNPS.**
- 6.1 Equipment Tolerances.** The incidence of track keeping errors that can be tolerated in an MNPS environment is small. It is incumbent upon each operator to take immediate action to rectify the conditions that cause an error. The Operator should also report the event to CARC within 72 hours, through the appropriate channels with initial analysis of causal factors and measures taken to prevent further events. The requirement for follow up reports will be determined by CARC.

6.2 Operators Actions. The Operator should make an effective, timely response to each track keeping error. CARC may consider removing MNPS operational approval if the Operator response to a track keeping error is not effective or timely. CARC will also consider the operator's past performance record in determining the action to be taken. If an Operator shows a history of operational and/or airworthiness errors, then approval may be removed until the root causes of these errors are shown to be eliminated and MNPS programs and procedures effective.

7.0 Operating Procedures.

7.1 Flight Planning. During flight planning the flight crew should pay particular attention to conditions that may affect operation in MNPS airspace. These include, but may not be limited to:

- a. Verifying that the aircraft equipment is approved for MNPS operations.
- b. Reported and forecast weather on the route of flight.
- c. Minimum equipment (MEL) requirements pertaining to track keeping systems.
- d. If required for the specific aircraft group, accounting for any aircraft operating restriction related to MNPS airworthiness approval.
- e. The letter “X” in item 10 will indicate MNPS approval.

7.2 In-Flight Procedures. Operating procedures contained in the Operations Manual must contain relevant guidance information for in-flight procedures. Contingency procedures for equipment failure and navigation inaccuracies prior to, and after entry, must be addressed.

7.3 Post Flight Procedures. The operator must create a mechanism whereby pilots log the navigation accuracy at the completion of a flight. In making technical entries for a malfunction or inaccuracy in a track keeping system, the pilot should provide sufficient detail to enable an effective and timely repair.

8.0 Training Requirements.

8.1 Introduction. All initial MNPS training courses must be approved by CARC prior to use the syllabus incorporated in the Operators Manual. Recurrent training is required on an annual basis. The following items detailed below should be standardized and incorporated into training programs and operating practices and procedures. This document is written for all users of MNPS airspace, and as such it is recognized that some material may not be necessary for larger public transport aircraft Operators as certain items may already be adequately standardized in existing procedures. New technology may also remove the need for certain actions required of the flight crew. If this is so, then the intent of this guidance will be considered met.

8.2 Flight Crew Training. The following items should also be included in flight crew training programs:

- a. Knowledge, understanding and compliance of standard ATC phraseology and track messages used in each area of operations.
- b. MNPS procedures for NAT (and other areas when applicable).
- c. Changes to charting and documents to reflect MNPS.
- d. Navigation equipment required to be operational for flight in designated MNPS airspace, limitations associated with the RNAV equipment.
- e. Flight planning requirements.
- f. Entry, in-flight and exit requirements and procedures.
- g. Contingency procedures for system failures or navigation inaccuracies.
- h. Position error log and notification requirements.
- i. Operations Manual information and procedures; and
- j. Operating procedures to include pre flight procedures, in flight procedures and post flight procedures.

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