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Civil Aviation Circular (CAC-OPS) 03/2020

**SUBJECT: REQUIREMENTS FOR OPERATION OF AIRCRAFT
IN NORTH ATLANTIC HIGH LEVEL AIRSPACE (NAT HLA)**

1. Glossary

ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance – Broadcast
ADS-C	Automatic Dependent Surveillance – Contract
ATA	Actual Time of Arrival
ATC	Air Traffic Control
CPDLC	Controller Pilot Data Link Communications
ETA	Estimated Time of Arrival
FAA	Federal Aviation Administration
FDE	Fault Detection and Exclusion
FL	Flight Level
FMC	Flight Management Computer
FMS	Flight Management System
GLONASS	Global Orbiting Navigation Satellite System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
INS	Inertial Navigation System
IRS	Inertial Reference System
LRNS	Long Range Navigation System
MASPS	Minimum Aircraft System Performance Specifications
MEL	Minimum Equipment List
MNPS	Minimum Navigation Performance Specifications
NAT	North Atlantic
NAT HLA	North Atlantic High Level Airspace
OTS	Organized Track System
PBCS	Performance Based Communication and Surveillance
PBN	Performance Based Navigation
RAIM	Receiver Autonomous Integrity Monitoring
RNAV	Area Navigation
RNP	Required Navigation Performance
RVSM	Reduced Vertical Separation Minimum
RLatSM	Reduced Lateral Separation Minimum
SSR	Secondary Surveillance Radar
TC	Type Certificate
UTC	Coordinated Universal Time

2. INTRODUCTION

2.1 Rule 143 Sub rule 2(c) of Civil Aviation Rules, 1984 stipulates that Navigation Equipment for flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specification (MNPS) are prescribed, an aeroplane shall be provided with navigation equipment which:

- i) Continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along the track; and
- ii) Has been authorized by the Chairman for MNPS operations concerned.

2.2 In accordance with the NAT HLA to PBN Transition Plan for the ICAO North Atlantic Region, with effect from 04 February 2016 that airspace formerly known as the "North Atlantic Minimum Navigational Specifications Airspace" (MNPSA), but excluding the BOTA (Brest Oceanic Transition Area) and SOTA (Shannon Oceanic Transition Area) areas and with the addition of the BODO Oceanic FIR (FL285- 420 inclusive), is re-designated as the "North Atlantic High Level Airspace"(NAT HLA). However, recognizing that ICAO Annex 6 allows for a "minimum navigation performance specification" to be regionally specified in Regional Supplementary Procedures Doc 7030, it has been determined to maintain reference to a "MNPS" in the NAT Region within NAT Doc 7030(NAT Regional Supplementary Procedures) and in the guidance material Doc 007 (North Atlantic Operations and, Airspace Manual) within particular contexts. Thus, approvals initially issued to operate in the NAT MNPSA are referred to as "NAT MNPS" approvals and approvals issued to operate in the NAT HLA are referred to as "NAT HLA MNPS" approvals. Otherwise, except in respect of historical references, from Edition 2016 of document NAT Doc.007 and subsequently, previous references to "Minimum Navigation Performance Specifications" and "MNPS" are replaced by "North Atlantic High Level Airspace Specifications" and "NAT HLA".

2.3. This Circular (CAC-OPS) lays down the requirements concerning operations and airworthiness approval of navigation equipment in NAT HLA Airspace. The requirements stipulated in this Circular must be complied with by operators intending to operate their airplanes in NAT HLA airspace.

2.4. The CAC-OPS is consistent with Rule 143 Sub rule 2(c) of CAR'84. The contents of this document are consistent with the provisions of ICAO Annex 6 Part 1, Chapter 7 (Navigation Para 7.2.2, 7.2.3, 7.2.4, 7.2.5 & 7.2.6), ICAO Doc 7030 and NAT Doc 007 on the subject.

2.5. The contents of this CAC-OPS is in addition to applicable ANO(OPS) A.8, ANO(OPS)A.9, ANO(OPS)E.10 & ANO(AW)E.6



3. NAT HLA AIRSPACE

3.1 A large portion of the airspace of the North Atlantic Region, through which the majority of these North Atlantic crossings route between FL285 and 420 inclusive, is designated as the NAT High Level Airspace (NAT HLA). Within this airspace a formal Approval Process by the State of Registry of the aircraft or the State of the Operator ensures that aircraft meet defined NAT HLA Standards and that appropriate crew procedures and training have been adopted. The lateral dimensions of the NAT HLA airspace include the following Control Areas (CTAs): REYKJAVIK, SHANWICK (excluding SOTA & BOTA), and GANDER, SANTA MARIA OCEANIC, BODO OCEANIC and the portion of NEW YORK OCEANIC EAST which is north of 27° N.

3.2 The main reference document for operations in NAT HLA is NAT Doc007 - Guidance concerning Air Navigation in and above the NAT HLA which is required to be complied by all operators in this airspace.

4. GENERAL REQUIREMENTS

4.1 No person or operator shall operate Bangladesh registered aircraft in air space designated as NAT HLA unless:

- (a) The operator is authorized by CAAB to perform such operations;
- (b) The aircraft has approved navigation performance capability to maintain within the requirements laid down for NAT HLA in NAT Doc 007 - Guidance concerning Air Navigation in and above the NAT HLA (V.2020.1 or current edition as applicable);
- (c) The crew have been trained for NAT HLA and RVSM operations.

4.2 Presently NAT HLA requirements are applicable in the North Atlantic Airspace (NAT). However, NAT HLA requirements may be imposed in any other airspace by the ATS providers. Specifications may not be exactly similar to that of NAT HLA. To meet, the accuracy requirements for navigation in the particular NAT HLA Airspace, appropriate equipment shall be installed for such operations. Individual approval is required for each aircraft and the operator to operate in each NAT HLA airspace as and when such areas are notified and operator wishes to operate in such airspace.

4.3 Special arrangements for the penetration of NAT HLA airspace by non- NAT HLA approved aircraft in accordance with NAT Doc 007 (V.2020.1 or current edition as applicable).

4.4 Special arrangements for the penetration of NAT HLA airspace by non- RVSM approved aircraft in accordance with NAT Doc 007 (V.2020.1 or current edition as applicable).



5. HORIZONTAL NAVIGATION REQUIREMENTS FOR UNRESTRICTED MNPS AIRSPACE OPERATIONS

5.1 Longitudinal Navigation

Longitudinal separation between subsequent aircraft following the same track(in-trail) and between aircraft on intersecting tracks in the NAT HLA are assessed in terms of differences in ATAs/ETAs at common waypoints. The longitudinal separation minima currently used in the NAT HLA are thus expressed in clock minutes. The pre-flight procedures for any NAT HLA operation must include a UTC time check and resynchronization of the Master Clock (typically the FMS). List of acceptable time sources for this purpose have been promulgated by NAT ATS provider states.

5.2 Lateral Navigation

5.2.1 For approvals, the navigation system accuracy requirements for NAT MNPSA/HLA operation should only be based on the PBN specifications, RNP 10 (PBN application of RNAV 10) or RNP 4.

5.2.2 Additionally, in order for the 50 NM's lateral separation minimum to be utilized in the New York Oceanic East the following navigation performance criteria must also be met by aircraft with RNAV 10 (RNP 10) Approvals:

- (a) the proportion of the total flight time spent by aircraft 46 km (25 NM) or more off the cleared track shall be less than 9.11×10^{-5} ; and
- (b) The proportion of the total flight time spent by aircraft between 74 and 111 km (40 and 60 NM) off the cleared track shall be less than 1.68×10^{-5} .

And similarly the additional criteria which must be met by aircraft approved as RNP 4 are as follows:

- (c) the proportion of the total flight time spent by aircraft 28 km (15NM) or more off the cleared track shall be less than 5.44×10^{-5} ; and
- (d) The proportion of the total flight time spent by aircraft between 44 and 67 km (24 and 36 NM) off the cleared track shall be less than 1.01×10^{-5} .

Note: In December 2015 the first phase of North Atlantic trials of reducing the lateral separation minimum to 25 NM was commenced. In this "RLatSM" Phase 1(reduced lateral separation minima),25 NM lateral separation is implemented by establishing ½ degree spacing between two specified core OTS tracks and a central track, within the vertical limits applicable to the airspace associated with the NAT Region Data Link Mandate. Only aircraft with the appropriate Required Navigation Performance (RNP4) approval and operating Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data Link

Communications (CPDLC), are permitted to operate on these ½ degree spaced tracks. Special procedures in respect of planning and operating on these tracks have been developed and promulgated via the AIS of the participating States i.e. Canada, Iceland and the United Kingdom. Operators intending to participate in these trials will need to ensure that advanced appropriate pilot and dispatcher training is undertaken.

5.2.3 Furthermore, when granting approval for operations in NAT HLA airspace on the basis of PBN navigational standards, States of Registry should also ensure that in-flight operating drills are approved which include mandatory navigation cross-checking procedures aimed at identifying navigation errors in sufficient time to prevent the aircraft inadvertently deviating from the ATC-cleared route.

Note: In Summary: From February 2016 the NAT MNPSA is re-designated as NAT HLA. Previously granted MNPS Approvals are valid for NAT HLA operations. Milestone 2 of the MNPS to PBN NAT transition plan was achieved in January 2015. From that date all new North Atlantic MNPS Operational Approvals should have been based upon RNAV 10 (RNP 10) or RNP 4 navigation specifications. Previously issued 6.3NM based MNPS Approvals will continue to be valid for NAT HLA operations but it is important to note that their longevity will be limited. Since subsequently, from January 2020, Milestone 4 of the MNPS to PBN NAT Transition Plan will take effect and the NAT HLA airspace will be re-designated for "PBN Based Operations" and thus from then Aircraft Approvals based on the earlier 6.3NM MNPS standard will no longer be valid.

6. AIRCRAFT SYSTEM/EQUIPMENT REQUIREMENTS

In order to consider each aircraft for unrestricted operation in the NAT HLA CAAB approval may presently be granted to an aircraft equipped as follows:

(a) with at least two fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following: one Inertial Navigation System (INS); one Global Navigation Satellite System (GNSS); or one navigation system using the inputs from one or more Inertial Reference System (IRS) or any other sensor system complying with the NAT HLA requirement;

Note 1: Currently the only GNSS system fully operational and for which approval material is available, is GPS.

Note 2: A GPS installation must be approved as follows:

If the two required LRNSs are both GPS, they must be approved in accordance with the current version of FAA Advisory Circular AC-20-138D Appendix 1. AC-20-138 requires that GPS systems used in Oceanic airspace must have a Fault Detection and Exclusion (FDE) function. States other than the USA may see their own standards for operational approval of GPS to

provide Primary Means of Navigation in Oceanic and remote areas but in all cases these approvals will include the requirement to carry out Pre-Departure Satellite Navigation Prediction Programs. If, however, GPS serves as only one of the two required LRNSs, then it must be approved in accordance with FAA TSO- C129 or later standard as Class A1, A2, B1, B2, C1 or C2, or with equivalent European Aviation Safety Programme (EASA) documentation ETSO-C129

(a) In this instance CAAB insists upon the need for the conduct of pre- departure satellite navigation prediction programs (viz. FDE/RAIM).

(b) Each LRNS must be capable of providing to the flight crew a continuous indication of the aircraft position relative to desired track;

(c) It is also highly desirable that the navigation system employed for the provision of steering guidance is capable of being coupled to the autopilot;

Note: Some aircraft may carry two independent LRNS but only one FMCS. Such an arrangement may meet track keeping parameters but does not provide the required redundancy (in terms of continuous indication of position relative to track or of automatic steering guidance) should the FMCS fail; therefore, in order to obtain NAT HLA certification, dual FMCS is required to be carried. For example: a single INS is considered to be one LRNS; and an FMCS with inputs from one or more IRS/INS is also considered to be a single LRNS.

(d) Since MNPS Airspace is now designated as RVSM airspace at all levels (i.e. FL 290-410 inclusive) specific State RVSM Approval is also required to operate within NAT HLA. RVSM approvals prescribe both airworthiness requirements to ensure aircraft height-keeping performance in accordance with the RVSM Minimum Aircraft System Performance Specification (MASPS), and also crew operating procedures;

(e) Aircraft operating in RVSM Airspace are required to be compliant with the altimetry MASPS and hold an issued approval. RVSM operations are required to be conducted in MNPS airspace and the following additional equipment shall also be installed:

i) Two fully serviceable independent primary altitude measurement systems;

ii) One automatic altitude-control system;

iii) One altitude-alerting device;

iv) A functioning Mode-C SSR Transponder. v) ADS-C and CPDLC (for RLatSM).

(f) Carriage of standby navigation equipment shall be governed by ICAO Annex 6 Part I and Part II – Chapter 7; and



(g) Any other equipment which meet MNPSA accuracy criteria and is acceptable to Chairman CAA may be installed.

7. OPERATIONAL REQUIREMENT

7.1 Each operator shall develop NAT HLA operational procedures in accordance with NAT Doc 007 - Guidance concerning Air Navigation in and above the NAT HLA (V.2020.1 or current edition as applicable).

7.2 Each operator shall have a system of evaluation and recording Inertial Navigation System radial errors and ensure that such defects when reported are duly rectified.

8. TRAINING REQUIREMENTS

8.1 Introduction

8.1.1 The operating crew shall be adequately trained and kept proficient for operation of aircraft in NAT HLA and shall be fully aware of the procedures to be followed. During operations in NAT HLA if there is any failure, the pilot shall inform the concerned ATC immediately and comply with their instructions. Operators shall ensure that appropriate guidance is provided to all flight dispatchers in accordance with NAT Doc 007 (V.2020.1 or current edition as applicable).

8.1.2 All initial NAT HLA training courses must be approved by the MFSR, CAAB prior to use and the syllabus incorporated in the Operations Manual. Recurrent training is required on an annual basis. The following items detailed below should be standardized and incorporated into training programmes and operating practices and procedures.

8.2 Flight Crew Training

The following items should be included in flight crew training (initial and recurrent) programmes:

- (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.

9. MAINTENANCE REQUIREMENTS:

9.1 All equipment/systems pertaining to NATHLA shall be maintained in accordance with the CAAB Approved Maintenance Program (AMP). Operator shall ensure that the AMP is approved taking into consideration the aspect of MNPS operations, relevant recommendations of TC holders and the relevant requirements of CAAB are reflected into the AMP.

9.2 Operator shall ensure that the relevant procedure(s) in regard to control and perform the required maintenance action (s) is/are incorporated into the Maintenance Control Manual (MCM) or Continuing Airworthiness Maintenance Exposition (CAME) and/or Maintenance Organization Exposition (MOE) as required (if any) by TC holder and/or CAAB for the MNPS operation.

9.3 Operator shall ensure that personnel involved in maintenance and/or CAMO activities are provided appropriate initial and continuation training necessary for MNPS operation as per the procedure (s) established in compliance with the sub-para-9.2.

10. MINIMUM EQUIPMENT LIST (MEL)

Each operator shall reflect requirements of minimum navigation systems for NAT HLA in their MEL.


11. VALIDATION FLIGHT(S)

The contents of the NAT HLA application and programmes may be sufficient to validate the aircraft. However, the final step of the approval process may require a validation flight through NAT HLA by a CAAB Flight Operations Inspector to verify that all relevant procedures are applied effectively. If the performance is satisfactory, operational approval for NAT HLA may be granted.



12. Approval

Approval to operate in NAT HLA will be granted as by inclusion in the AOC issued by the CAAB for commercial operators and a Letter of Authorization for General Aviation operators. Each aircraft for which the operator is granted authority will be listed.



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