CHAPTER 35

EVALUATION OF AOC HOLDERS FOR AUTHORISATION TO CONDUCT OPERATIONS IN SPECIAL NAVIGATION AREAS OF OPERATION (MNPS, RVSM, RNP-10 E.T.C)

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1.0 GENERAL

Special areas of operation are geographic areas having unique characteristics that require the use of special equipment, procedures, and/or techniques to safely conduct flight operations. These special areas also include operational situations when the application of standard criteria is not sufficient and other than standard criteria are more appropriate and can be safely used. This chapter provides direction and guidance for the evaluation and approval or denial of an operator's request to conduct operations in these special areas of operation. Special areas of operation include the following:

- Areas requiring high levels of performance due to a reduction in separation standards;
- Areas where navigation by magnetic reference is unreliable and/or inappropriate;
- Areas where metric altitudes/flight levels (FL) are used (altitudes in meters);
- Areas where communication difficulties are frequently encountered;
- Areas where air traffic control (ATC) difficulties are frequently encountered;
- Areas where operations by Nigeria operators have political or international sensitivity;
- Areas where aircraft with unique performance characteristics require special criteria; and
- Areas where dual long-range navigation systems (LRNS) are not normally required.
- GENERAL

2.0 REFERENCES:

(a) Nig. CARs Part 5, 7,8 & 9

(b) FAA 8900.1 Chapter 37

(c) FAA Order 8400.12A

3.0 AREAS REQUIRING HIGH LEVELS OF PERFORMANCE.

In special areas of operation, the ATC system supports a reduction in separation standards. This reduction in separation standards requires improved levels of performance. Significant increases in air traffic over certain busy routes, such as U.S.

National Air Space (NAS), European Domestic Airspace, and the North Atlantic, can be accommodated efficiently if the ATC separation minimums are reduced to permit more aircraft to operate in the same airspace, at the same time. However, this reduction in separation minimums can only be safely accomplished through significant improvements in ATC capabilities and the performance of all aircraft operating within that segment of airspace. The options currently available to permit reductions in ATC separation minimums include the use of the following:

- Independent surveillance (ATC radar),
- Automatic Dependent Surveillance (ADS) (data link of the aircraft's present position to the ATC system),
- Improved traffic flows through the use of time-based metering,
- Reduced lateral separation minimums,
- Reduced vertical separation minimums,
- Reduced longitudinal separation minimums, and
- Communication.

4.0 NORTH ATLANTIC MINIMUM NAVIGATION PERFORMANCE SPECIFICATIONS AIRSPACE (NAT/MNPS).

4.1 **General.** The NAT/MNPS, as implemented in the North Atlantic Region, is a demanding standard. Safety of flight in this airspace is critically dependent on each operator achieving and continuously maintaining a high level of navigation accuracy. The references are Nig. CARs Part 8.8.1.21 and NCAA Advisory Circular NCAA-AC-OPS, Oceanic Operations, current edition. Nig. CARs Part 7.4 and 8.8.1.21 requires each Nigerian operator to acquire Nigeria Civil Aviation Authority approval before conducting any operation in minimum navigation performance specification (MNPS) airspace. The operator must obtain this approval for each airplane and navigation/system combination used for operations in this airspace. To obtain MNPS approval, the operator must show compliance with the following conditions:

- Each aircraft is suitably equipped and capable of meeting the MNPS standards.
- The operator has established operating procedures that ensure MNPS standards are met.
- The flightcrews are trained and capable of operating to MNPS requirements.

4.2 **Navigational Performance.** The NAT/MNPS represents navigational performance (necessary to reduce the risk of collision) on an internationally established level. (See Figure 1.) While the NAT/MNPS airspace currently does not have a published Required Navigation Performance (RNP) value, it is anticipated that in the future an RNP requirement will be implemented. The NAT/MNPS predates the implementation of RNP, but is consistent with RNP principles. The MNPS establishes the following demanding criteria:

4.2.1 The average lateral deviation (for any cause) cannot be greater than 6.3 nautical miles (NM) from the centerline of the assigned route over any portion of the route.

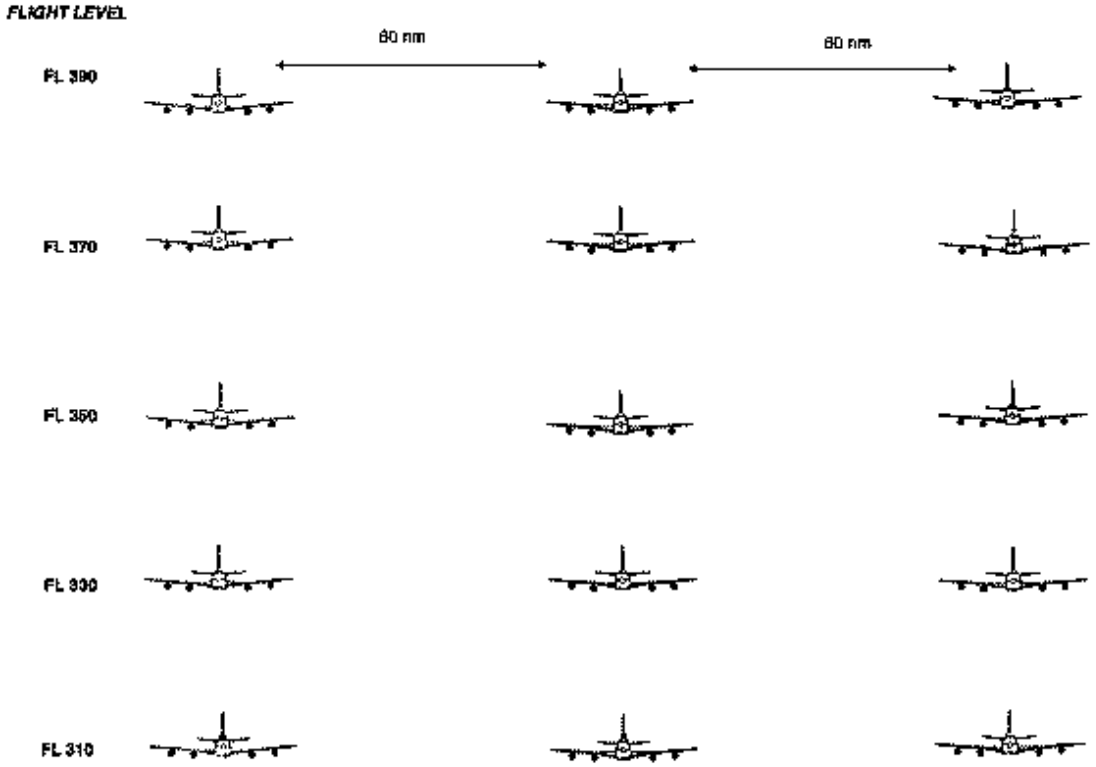
4.2.2 Ninety-five percent of all of the lateral displacements (for any cause) from the centerline of the assigned route cannot be greater than 12.6 NM for all flights over any portion of that route.

4.2.3 Each operator cannot have more than one lateral deviation (for any cause) of 30 NM or more in 1,887 flights in the NAT/MNPS airspace. When errors of these magnitudes occur, the aircraft has failed to navigate to the degree of accuracy required for the control of air traffic.

4.2.4 Each operator cannot have more than one lateral deviation (for any cause) which is within ±10 NM of a multiple of the separation minimums applied in 7,693 flights in the NAT/MNPS airspace. NAT/MNPS airspace routes are separated by 60 NM. If an error of 50-70 NM occurs, the aircraft has blundered into the airspace of an adjacent route. Errors of these magnitudes are extremely serious. The potential for a collision is high because the resulting flight path can overlap the flight path assigned to another aircraft (possibly coming from the opposite direction).

NOTE: Operational history in NAT/MNPS airspace clearly shows that most serious navigational errors are directly related to operator/pilot error. Equipment malfunction and equipment accuracy are usually not the primary cause for these errors. Most of these serious errors are caused by the flightcrew navigating very precisely to the wrong place while believing that the aircraft is complying with the “currently effective” ATC clearance.

Figure 1 Illustration of NAT/MNPS Rectangular Separation



NORTH ATLANTIC MNPS SEPARATION STANDARDS. Aircraft are separated by one of the following methods:

A. Lateral Separation. Lateral separation between co-altitude aircraft (aircraft at the same flight level) is 60 nm.

B. Vertical Separation. Vertical separation between aircraft on the same track is 2,000 feet.

C. Longitudinal Separation. Basic longitudinal separation between aircraft on the same track is 10 minutes. If an aircraft is flying faster than the aircraft behind it (mach advantage), than this criteria may be reduced.

NOTE: Separation standards may be changed. Consult Regional Supplementary Procedures (ICAO Document 7030/3) for current standards applied in the NAT Region

4.3 **Reduced Vertical Separation Minimum (RVSM).** RVSM is implemented at various FLs within the MNPS. Operations at these FLs have demanding vertical height-keeping performance requirements in addition to the NAT/MNPS navigation requirements. See the following for specific RVSM guidelines and requirements:

- Nig. CARs Part 8,

4.4 **Initial NAT/MNPS Approvals.** Each operator, and each aircraft and navigation system combination must be approved before operating in NAT/MNPS airspace. Each operator must demonstrate (validate) that it can meet MNPS standards before receiving approval.

4.4.1 Validation flights must be conducted through NAT/MNPS airspace. See TGM Volume 3, Operations Handbook Chapter 15, for guidance on validation flights.

4.4.2 Inspectors must ensure that requirements of the applicable AC(s) and/or other NCAA official documentation for long-range navigation-C system (LORAN-C), global positioning system (GPS), or multisensors (or equivalent) are fully met by the operator using those systems before approving any operation in this airspace. All NAT/MNPS approvals are granted by issuing OpSpec paragraph B, Operations within North Atlantic (NAT) Minimum Navigation Performance Specifications (MNPS) Airspace, and by adding that area of en route operation to paragraph B, Authorized Areas of En Route Operation, Limitations, and Procedures, of the standard OpSpecs.

4.4.3 All operations using GPS in NAT/MNPS airspace must be approved. The operator is not required to collect navigation performance data for GPS in NAT/MNPS airspace to apply to pass/fail graphs.

4.5 **Maintaining NAT/MNPS Authorization.** In addition to initially meeting MNPS criteria, each operator must continuously maintain the required level of navigational performance. Each gross navigational error (GNE) (errors 25 NM or more) has a significant impact on flight safety in this airspace and must be fully investigated in a timely manner. The cause of each error must be identified and effective action must be taken to prevent reoccurrence of similar errors. GNEs are detected by ATC and reported to one of the regional monitoring agencies of the world. The regional monitoring agency then provides the notification of the GNE to not only the operator that made the GNE but also to the Authority. When an inspector learns of a GNE by one of his/her operators, the inspector must immediately contact the operator and advise that the GNE will be investigated. The inspector must ensure that the operator takes timely corrective action. After this notification, inspectors must determine the effectiveness of the operator's actions as follows:

4.5.1 If it is determined that an operator's actions will prevent the occurrence of similar errors, the operator should be permitted to continue NAT/MNPS operations with close surveillance of the operator's navigational performance. If similar errors occur (in subsequent operations) more frequently than permitted by the standard, stronger action must be taken.

4.5.2 If an operator fails to take action to improve navigation performance, action must be initiated to suspend NAT/MNPS authorization (OpSpec B is rescinded).

4.5.3 If it is determined that an operator's actions to improve navigational performance are inadequate or otherwise unsatisfactory, the operator must be notified that the corrective action is unacceptable. When an operator does not implement a satisfactory solution in a timely manner, the action must be initiated to suspend NAT/MNPS authorization and could include enforcement action.

5.0 NORTH POLAR OPERATIONS.

The north polar area of operations is defined as that area that lies north of latitude N 78°00' (see OpSpec A, Definitions and Abbreviations). The north polar routes across Russia are shown in the Russian AIP or in commercial charting publications for Eastern Europe and Eurasia. OpSpec B authorizes north polar operations. In general, in addition to the authorization for operations in the AMUs, the following will be required for authorizing operations in the polar areas.

5.1 Fuel Freeze Temperature. A procedure must be established to determine the fuel freeze temperature of the actual fuel load on board the aircraft that requires coordination between maintenance, dispatch, and assigned flightcrew. The operator may develop a fuel freeze analysis program in lieu of using the standard minimum fuel freeze temperatures for specific types of fuel used.

5.2 Communication Capability. In accordance with Nig. CARs Part 9 Communications facilities—domestic and flag operations, the operator must have effective communications capability with dispatch and with ATC for all portions of the flight route. The operator must show the NCAA the communications medium(s) that it intends to use to fulfill these requirements in the north polar area.

(a) The communications medium used must meet NCAA regulatory requirements and fulfill policy/procedures established by each ATS unit providing control on the route of flight. Other countries publish ATS policies and procedures in their State AIPs.

(b) High frequency (HF) voice has been considered the primary communications medium in the North Polar Area. However, other mediums may be used as a supplemental means in accordance with the applicable policy. For example, although HF voice remains primary for communications with Anchorage Center, in areas where there is satellite coverage, satellite communication (SATCOM) voice may be used as a back-up to communicate with ARINC Radio and in non-routine situations to establish direct pilot-controller voice communications.

(c) In areas of satellite coverage, Controller-Pilot Data Link Communications (CPDLC) may be used for ATC communications, provided the ATS unit has an approved capability. In addition, provided the capability is approved, HF data link may also be used to fulfill communications requirements with ATS units having the capability and with airline dispatch. Inspectors must ensure the operators meet the regulatory Nig. CARs Part 7and policy requirements for long-range communication systems (LRCS). HF voice capability is always required.

(d) It is recognized that SATCOM may not be available for short periods during flight over the North Pole, particularly when operating on some designated polar routes. Communication capability with HF radios may also be affected during periods of solar flare activity. For each dispatched polar flight, the operator must take into consideration the predicted solar flare activity and its effect on communication capability.

5.3 Minimum Equipment List (MEL). Before receiving NCAA authority to conduct polar operations, the MEL must indicate that the following systems/equipment is required for polar operations dispatch:

(a) Fuel quantity indicating system (FQIS) (to include fuel tank temperature indicating system).

(b) Auto throttle system.

(c) Communication system(s) relied on by the flightcrew to satisfy the requirement for effective communication capability.

(d) Except for all-cargo operations, expanded medical kit to include automated external defibrillators (AED).

NOTE: See NCAA-AC-OPS005, Use of Portable Electronic Devices Aboard Aircraft.

(e) For Extended Operations (ETOPS) aircraft:

(i) All MEL restrictions for 180-minute operations are applicable.

(ii) Auxiliary power unit (APU) - for two-engine airplanes (including electrical and pneumatic supply to its designed capability)

5.4 Training Program Requirements. The following must be in the approved training programs:

- Training on Barometric pressure for Standard Altimeter Setting (QNE)/ Barometric pressure for Local Altimeter Setting (QNH) and meter/feet issues is required for flightcrew and dispatcher training.
- Training on fuel freeze (included in maintenance, dispatch, and flightcrew training (special curriculum segments.))
- General area and route-specific training on weather patterns and aircraft system limitations.
- Training on special considerations, such as diversion decision-making into austere airport environments to include aircraft performance, crash, fire, and rescue availability, and passenger support.
- Flightcrew training in the use of the cold weather anti-exposure suit.

5.5 Special Flight Crew Issues for Long-range Operations. The operator needs to address the following special long-range flightcrew issues:

- Long-range flightcrew rest plan submitted to the principal operations inspector (POI) for review and approval.
- Multicrew (augmented flightcrews) flight proficiency/currency issues need to be addressed in the training program.
- The progression of pilot in command (PIC) authority, as designated in the operator's manual.
- A minimum of two cold weather anti-exposure suits will be required to be on board so that outside coordination at a diversion airport with extreme climatic conditions can be accomplished safely.

5.6 En Route Polar Diversion Alternate Airport Requirements. Operators are expected to define a sufficient set of polar diversion alternate airports, such that one or more can be reasonably expected to be suitable and available in varying weather conditions (NCAA-AC-OPS042) Extended Range Operation with Two-Engine Airplanes (ETOPS), provides additional guidance for two-engine airplanes).

5.7 Aircraft and Passenger Recovery Plans. A recovery plan is required that will be initiated in the event of an unplanned diversion. The recovery plan should address the care and safety of passengers and flightcrew at the diversion airport and include the plan of operation to extract the passengers and flightcrew from that airport.

5.8 Validation Flights. An NCAA-observed validation flight is required in which the operator exercises its reaction and recovery plan in the event of a diversion to one of its designated en route polar diversion alternate airports. The exercise of the operator's reaction and recovery plan may also be completed prior to the validation flight. The Authority will give favorable consideration to a request by the operator, through the POI, to conduct the validation flight in a passenger revenue status only if the operator's reaction and recovery plan has been previously demonstrated to the satisfaction of the NCAA. If the operator elects to demonstrate its reaction and recovery plan as part of and during the validation flight, the flight cannot be conducted in a passenger revenue status. The carriage of cargo revenue is permissible in this case and encouraged, for airplane weight and balance purpose.

6.0 AREAS WITH SIGNIFICANT COMMUNICATIONS AND/OR ATC DIFFICULTIES.

The levels of sophistication in communication, navigation, and ATC capabilities in certain areas of operation outside North America and Europe vary widely. The following subparagraphs provide evaluation criteria that must be considered when approving operations in these areas.

6.1 NAVAIDs. The ground-based facilities that are implemented to support air navigation in some of these areas are based on antiquated technology and frequently experience reliability problems. The NAS and the navigational performance requirements in many countries are based almost exclusively on non-directional radio beacons (NDB). Also, many of the NAVAIDs do not operate continuously. For example, NAVAIDs are shut down from dusk to dawn in certain countries.

6.2 **Communication.** The primary means of en route communication with ATC in many areas of operation is almost exclusively HF radio. Atmospheric noise created by extensive thunderstorm activity in tropical areas and aurora activity in polar areas significantly increases the difficulty of using HF as a prime means of communication with ATC.

6.3 **ATC.** The level of ATS varies from radar based services (equivalent to domestic U.S. operations) to a total absence of any ATC. Flight information regions (FIR) have been established in most areas of the world. Specific ICAO member states have been assigned the responsibility of providing ATS in these FIRs. There are wide variations in the ATC services available. En route ATC radar is not available in all countries and ATS may rely heavily on position reports and airborne navigation performance capabilities for the separation of aircraft. Various levels of ATS provided in these areas are as follows:

NOTE: It is critical that flightcrews understand that subtle terminology differences and language barriers may exist in foreign countries where they operate. For example, crews must ensure they understand whether the altimeter setting issued by ATC is in hectopascals (millibars) or inches of mercury.

(a) Within controlled airspace, ATC provides ATC service to prevent collisions between aircraft and to expedite and maintain an orderly flow of air traffic. This also includes air traffic advisory services and those alerting services related to weather and search and rescue.

(b) Within advisory airspace, air traffic advisory service is available to provide separation, to the extent possible, between aircraft operating on IFR flight plans. It is important to understand that this is an advisory service (similar to a Flight Service Station (FSS)), not a control service (prevention of collision). In advisory airspace, flightcrews are provided information concerning the location of other aircraft. Prevention of collision is the responsibility of the PIC. Terrain clearance is also the responsibility of the PIC. The ATS available also include those alerting services related to search and rescue. In certain areas, special reporting procedures called “broadcasts in the blind” have been established to assist pilots in avoiding other aircraft. At designated intervals, each pilot broadcasts the aircraft’s position, route, and FL over a specified very high frequency (VHF). Awareness of the proximity of other aircraft is obtained by maintaining a continuous listening watch on the specified frequency. This procedure is an “expected” practice in large portions of Northwestern Africa (including the Dakar FIR) and South America (including most Brazilian airspace). In many of these areas, the “broadcast in the blind” procedure is used to augment the separation of IFR aircraft.

(c) Flight information regions have not been established for a few areas in the world. These are commonly called uncontrolled information regions or no man’s land. The largest of these areas is in the South Atlantic Ocean, annotated as “No FIR.” Flight information services also do not exist in the high altitude structure in other large areas (above the top of controlled airspace). Within no man’s land, aircraft separation (prevention of collision) is entirely the responsibility of the PIC. Advice and information for the safe and

efficient conduct of flights is not provided from an ATS unit. An ATS unit does not provide alerting services related to search and rescue.

6.4 Metric FLs. The NAS in the CIS, many Eastern European countries (former Eastern Bloc countries), and some mainland Asian countries are based on the use of metric flight altitudes/levels. Operations within these areas require special procedures for conversion charts between metric FLs and FLs based on feet. For example, a FL of 10,000 meters represents FL 328 or a flight altitude of 1,000 meters represents an altitude of 3,280 feet.

7.0 EVALUATION CRITERIA FOR AREAS WITH COMMUNICATIONS AND ATC DIFFICULTIES.

POIs must evaluate, on a case-by-case basis, all proposals to conduct operations in the sovereign airspace of countries that are not equivalent or similar to the U.S. NAS.

7.1 General Criteria. The operator must show (considering factors unique to the proposed area of operation) that safe operations can be conducted within the area of operation and that the facilities and services necessary to conduct the operation are available and serviceable during the period when their use is required. The operator must also show that the proposed operation is in full compliance with the requirements in part B of the OpSpecs that are applicable to that operation.

7.2 Operations in Advisory Airspace. The operator must show that its training programs and operating procedures permit safe operations in advisory airspace and ensure compliance with the “expected” operating practices. The operator must also show that the operation is in compliance with OpSpec Paragraph A, IFR En Route Operations in Class G Airspace.

7.3 Operations in Uncontrolled Information Regions (No Man’s Land). Since ATC, air traffic advisory, flight information, and alerting services are not available from ATS units when operating within these areas, the operator must show that acceptable, alternative means are available to ensure the following:

(a) The appropriate organization can be notified in a timely manner when search and rescue aid is needed.

(b) Changes in significant weather information can be provided to the flightcrew in a timely manner.

(c) Changes in the serviceability of the required navigation aids are available to the flightcrew and the operator’s operational control system.

(d) Reliable information concerning other IFR aircraft operating within this area is available in-flight (e.g., Traffic Alert and Collision Avoidance System (TCAS), Automatic Dependent Surveillance-Broadcast (ADS-B)). This includes “broadcast in the blind” procedures and other “expected” practices.

(e) The required navigation facilities necessary to safely conduct the operation are available and serviceable.

7.4 Role of Navigation Specialists. The uniqueness of operations in advisory airspace and in no man's land usually requires assistance from persons with special navigational knowledge, skills, and expertise. Inspectors are expected to request the assistance of these specialists when evaluating proposals to conduct operations outside controlled airspace.

8.0 RNP IN CLASS II AIRSPACE.

The implementation of RNP is part of a worldwide ICAO effort for the implementation of the Future Air Navigation System (FANS), Communication, Navigation, and Surveillance (CNS), and air traffic management (ATM) concepts.

8.1 General. Aircraft/operators that operate on routes where RNP separation standards are applied must be approved by the State of the operator or registry, as appropriate, as capable of navigating to prescribed RNP standards (e.g., RNP-10 for the entire route on which RNP-10 is required). Other separation standards are projected to require different RNP types (e.g., 30 NM lateral separation is projected to require Required Navigation Performance 4 (RNP-4)). The implementation of more stringent RNP and other CNS capabilities is part of an ICAO coordinated effort to introduce separation standards that will enable more efficient ATM while maintaining acceptable levels of safety. Benefits to users are increased availability of fuel/time efficient altitudes, routes and enhanced airspace capacity, and controller flexibility.

8.2 Operational Approval in Oceanic Airspace Where RNP-10 Is Required.

8.2.1 Background.

(i) States and operators are implementing RNP as part of a worldwide ICAO effort to implement the FANS, CNS, and ATM concepts. To support this effort, in 1998, the Pacific oceanic planning groups began a phased implementation of 50 NM lateral separation in Pacific oceanic airspace. In addition, 50 NM longitudinal separation has also been introduced for aircraft that are equipped with the required CNS equipment. In accordance with ICAO Document 7030, aircraft/operators that operate on routes where these separation standards are applied must be approved by the State of operator or registry, as appropriate, as capable of navigating to RNP-10 for the entire route on which RNP-10 is required.

NOTE: This navigation performance requirement is similar to MNPS over the Atlantic which is equivalent to Required Navigation Performance 12 (RNP-12).

(ii) The first oceanic airspace where RNP-10 and 50 NM lateral separation were implemented was the NOPAC Route System. Implementation in additional Pacific oceanic areas proceeded over the next two years.

(iii) Other separation standards require different RNP types (e.g., 30 NM lateral separation requires RNP-4). The implementation of more stringent RNP and other CNS capabilities is part of an ICAO coordinated effort to introduce separation standards that will enable more efficient air traffic management while maintaining acceptable levels of safety. Benefits to users are increased availability of fuel/time efficient altitudes, routes and enhanced airspace capacity, and controller flexibility.

8.2.2 Policy.

(i) FAA Order 8400.12A is a guide to RNP-10 aircraft and operator approval in any airspace where RNP-10 navigation criteria is required. The FAA has determined that Order 8400.12A provides acceptable criteria and processes for an operator to obtain authority to operate specific aircraft/navigation systems in areas or on routes where RNP-10 is required.

(ii) CNS requirements, policy and guidance for operation in oceanic airspace can be found on the Oceanic Operations Standards Group Web site (http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/en-route/oceanic/).

(iii) Operator applications for RNP-10 approval must be evaluated in accordance with Order 8400.12A and any additional criteria specified in this appendix. If an operator requests to deviate from the practices and procedures provided in Order 8400.12A.

(iv) AOC holders are approved for RNP-10 by the issuance of standard OpSpec paragraphs.

(v) Nig. CARs Part 8 general aviation operators will be approved through the issuance of automated operator LOA, Operations in RNP Airspace or, for short-term operations, LOA, Flight in Special Areas of Operation for Short-Term Operations. LOAs should be issued using the guidance in this handbook and Order 8400.12A.

8.3 The principal inspectors should inform their certificate holders that this appendix contains the approval process for RNP-10 authorization. The steps in this process should be followed when an operator seeks authority to operate an airplane type/LRNS combination in Class II navigation areas where RNP-10 is applied and the operator has not previously received RNP-10 approval for that specific airplane type/LRNS combination. Normally, if an operator has received initial Class II navigation/RNP-10 approval for a specific airplane type/LRNS combination, that operator should not be required to re-apply for approval to conduct Class II navigation/RNP-10 operations on additional routes or areas.

(i) The POI and the certificate holders may find it easier to use Order 8400.12A if they are aware that Appendix 8 is an index to the Order. The certificate holder should be made aware that references to the

appropriate subparagraphs and sections of Order 8400.12A are indicated in subparagraphs below:

(ii) Order 8400.12A, paragraph 9 provides guidance on the content of an operator's RNP-10 application. The application should contain the items listed in subparagraphs below. Subparagraphs provide additional detail on application items.

(a) Airworthiness documents that establish the proposed aircraft/navigation system group, its RNP-10 approval status, and a list of airframes in that group.

(b) Approved or requested RNP-10 time limit for aircraft for which INS or IRU are the only source of long-range navigation (LRN).

(c) Documentation establishing the RNP-10 area of operations or routes for which the specific aircraft/navigation system is eligible.

(d) Documentation that the operator has adopted operating practices and procedures related to RNP-10 operations.

(e) Documentation showing that the pilot and, if applicable, dispatcher knowledge of RNP-10 operating practices and procedures will be adequate.

(f) Documentation that appropriate maintenance practices and procedures have been adopted.

(g) MEL updates, if applicable.

(h) Operating history that identifies past problems and incidents, if any, and actions taken to correct the situation.

(i) Awareness of the necessity to follow up action after navigation error reports, and the potential for removal of RNP-10 operating authority.

(iii) In accordance with Order 8400.12A, paragraph 11, the operator must show the aircraft/navigation system groups that will be presented for approval of RNP-10 operations and provide a list of airframes that are determined to be in the specific aircraft/navigation system groups to be evaluated.

(iv) Order 8400.12, paragraph 12A, Determining Aircraft Eligibility, requires that for aircraft navigation systems which have been approved by an

aircraft certification authority to RNP-10 or better, the operator must provide appropriate sections of the Aircraft Flight Manual (AFM) that address RNP, including any associated time limits for INS and IRU navigation systems.

(v) Order 8400.12A, paragraph 12b(4), Aircraft Equipped with Global Positioning Systems (GPS) Approved to Primary Means of Navigation Standards, requires that for aircraft equipped with GPS, where such GPS units are the only systems for LRN, the operator must show that it is approved in accordance with paragraph 12b(4). An RNP-10 time limit is not applicable.

(vi) Order 8400.12A, paragraph 12b(5), Multisensor Systems Integrating GPS (with GPS Integrity Provided by Receiver Autonomous Integrity Monitoring (RAIM)), requires that for multisensor systems incorporating GPS, the operator must show that systems are approved and operated in accordance with paragraph 12b(5). An RNP-10 time limit is not applicable.

(vii) GPS Equipage In Combination With Another Approved LRNS (e.g., INS or IRU); Reference the current editions of AC 90-94, Guidelines for using Global Positioning System Equipment for IFR En Route and Terminal Operations and for Non-precision Instrument Approaches in the U.S. National Airspace System; and AC 20-138, Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment. The operator must show that aircraft equipped with GPS and one or more approved LRNS are installed and operated in accordance with AC 90-94, and AC 20-138. An RNP-10 time limit is not applicable.

(viii) Order 8400.12A, paragraph 12b(1), (2), and (3) require the operator to show that INS or IRU installation is approved in accordance with paragraph 12b(1), (2) or (3). Unless the operator takes action to extend the approved navigation system time limit and/or plans to update the system en route, a baseline RNP-10 time limit of 6.2 hours, starting at the time the system was placed in navigation mode, is applicable. See paragraph 4-107B3)k) on extending navigation system time limit and paragraph 4-107B3j)*1*c. on en route updating.

(ix) Order 8400.12A, paragraph 12c, Aircraft Eligibility Through Data Collection, (Eligibility Group 3) specifies that for navigation systems not approved under existing criteria, the operator may demonstrate RNP-10 eligibility through data collection in accordance with paragraph 12c using the processes detailed in Order 8400.12, appendices 1 or 6.

(x) Order 8400.12A, paragraph 15e, Route Evaluation for RNP-10 Time Limits for Aircraft Equipped with only INSs or IRUs, requires the operator to show the routes or areas where it is eligible to operate if restrictions (e.g., INS RNP-10 time limit) apply to navigation systems. In accordance with paragraph 15e, the operator can conduct a one-time evaluation of

eligibility to fly in an RNP-10 area of operations or on specific RNP-10 routes or may elect to evaluate on a per-flight basis.

(a) For one-time evaluation of a specific RNP-10 area or track system, aviation safety inspectors (ASI) should expect the operator to accomplish the following:

(i) Calculate the longest distance from either departure airports or en route update points (if applicable) to the point at which the aircraft will begin to navigate by reference to VHF omni-directional range station (VOR), distance measuring equipment (DME), NDB, or comes under ATC radar surveillance.

(ii) As detailed in paragraph 15e, using 75 percent probability wind component, convert this distance to en route time.

(iii) As detailed in paragraph 12e, if navigation systems are to be updated en route, adjust the base line RNP-10 time limit approved for the specific operator navigation system to account for update accuracy.

- Subtract 0.3 hour from the baseline for DME/DME.
- Subtract 0.5 hour from the baseline for VOR/DME.
- Subtract 1 hour from the baseline for manual update.

(iv) Compare calculated en route time to the navigation system RNP-10 time limit (adjusted for en route update, if applicable) to determine if the airplane is eligible for the operation.

(v) If the aircraft navigation system is found eligible for operation on the specific routes evaluated, then the RNP-10 area of operations or routes on which RNP-10 operations can be conducted are established. If the aircraft navigation system is not found eligible for operation on all routes evaluated, then the operator will need to designate routes for which it is eligible or take action to gain approval for an extended RNP-10 time limit. See paragraph 4-104 B3)k).

(b) Order 8400.12A, paragraph 15e(6), Calculation of Time Limit for Each Specific Flight. For a per-flight evaluation of eligibility to fly a specific RNP-10 route, follow the steps shown in paragraph 4-107B3)j)*1.*, using flight plan winds to determine en route time. If the RNP-10 time limit is exceeded, the flight must be re-routed or delayed.

(xi) Order 8400.12A, paragraph 12d, Obtaining Approval for an Extended Time Limit for INS or IRU Systems, specifies how the operator can show eligibility for an extended time limit by:

1. Obtaining approval from an appropriate Aircraft Certification Office, or

2. Conducting operational data collection using the processes established in appendix 1 or 6 of Order 8400.12A.

(xii) Order 8400.12A, paragraph 14, Continuing Airworthiness (Maintenance Requirements), specifies that the certificate holder must provide documentation that appropriate maintenance practices and procedures have been adopted.

(xiii) Order 8400.12A, paragraph 13, MEL, requires the operator to revise the MEL to address any new operating requirements.

(xiv) Operations Programs.

1. FAA Order 8400.12A, paragraphs 9a(5), 12f, 12g, 15, and appendices 4 and 7 (if applicable).

   (a) AOC holders must provide revisions to manuals and checklists to show the adoption of the RNP-10 operating practices and procedures contained in the reference paragraphs and sections listed in paragraph 4-107B3)n).

   (b) If applicable, general aviation operators should show appropriate sections of the AFM relating to RNP-10 aircraft/navigation system eligibility.

2. Order 8400.12A, paragraphs 9a(4), 12f, 12g, 15, and appendices 4 and 7 (if applicable).

   a. AOC holders should show that training programs have been updated to include the practices in Order 8400.12A, paragraphs 12f and/or 12g (if applicable), paragraph 15, and appendices 4 and 7 (if applicable). Part 125 initial and recurrent pilot testing programs should be updated with applicable information from these paragraphs.

   b. In accordance with Order 8400.12A, appendix 4, paragraph 5b, general aviation operators must show during the application process that pilot knowledge of paragraphs 12f and 12g (if applicable), paragraph 15, and appendices 4 and 7 (if applicable) will be adequate. appendix 4, paragraph 5b contains options for general aviation operators to fulfill this requirement.

(xv) The Authority may authorize a certificate holder to deviate from the RNP-10 requirements in subparagraph c of OpSpec B for a specific flight in designated RNP-10 airspace if the ATS provider determines that the airplane may be provided appropriate separation and the flight will not interfere with, or impose a burden on other operators. For operations under such authority, the certificate

holder shall not take off for flight in designated RNP-10 airspace, unless the following requirements of subparagraphs b and d of B are met:

1. If fuel planning is predicated on en route climb to FLs where RNP-10 is normally required, an appropriate request must be coordinated with the ATS provider in advance of the flight.

2. The appropriate information blocks on the ICAO flight plan filed with the ATS provider show that the airplane and/or certificate holder is not approved for RNP-10 as specified in the certificate holders OpSpec B.

3. For these flights either of the following conditions must be met:

    a. At least one of the navigation system configurations listed below must be installed and operational:

    b. At least two independent INS.

    c. At least two flight management system/navigation sensor combinations (or equivalent).

    d. At least two independent approved GPS navigation systems acceptable for primary means of Class II navigation in oceanic and remote areas.

    e. At least two approved independent LRNS from the list below:

    - INS.
    - Flight management system/navigation sensor combination (or equivalent).
    - GPS navigation system approved for Class II navigation in oceanic and remote areas.

(xvi) Order 8400.12A, paragraph 9b, Evaluation of Application, Conditions for Removal of Authorization, and Error Reports. The operator should indicate awareness of the provisions of paragraph 9b for operator follow-up action on reported navigation errors and of the potential to remove RNP-10 operating authority.

(xvii) Validation Tests and Validation Flights for AOC holders, reference TGM Volume 3, Operations Handbook Chapter 15, Proving and Validation Tests.

1. The following is intended to provide broad guidance for establishing requirements for validation tests and/or validation flights. The POI should consider each application on its own merit and volume 3, chapter 29. Consult with the regional Flight Standards division (RFSD), as necessary.

2. Validation testing requires that ASIs evaluate operator programs and documents in accordance with the guidance in this section.

3. The following is provided as guidance for ASIs to consider in determining whether or not validation flights are required.

    a. For operators with previous Class II navigation experience with the same navigation equipment as that being proposed for RNP-10 approval, evaluation of the applicant's programs and documents should normally suffice. A validation flight should not normally be required.

    b. For operators with previous Class II navigation experience navigating with an LRNS other than that being proposed for RNP-10 approval, evaluation of the applicant's programs and documents is required. A validation flight should normally be required. If conducted in Class I airspace, the validation flight may be conducted in revenue service. If conducted in Class II airspace, it must be non-revenue with the exception that cargo may be carried.

    c. For operators with no previous Class II navigation experience proposing to operate where RNP-10 is required, evaluation of the operator's programs and documents is required. A validation flight should be required and should be conducted in Class II airspace. It should be a non-revenue flight with the exception that cargo may be carried.

4. Conditions for Validation Flights.

    a. At least one flight should be observed by an NCAA ASI.

    b. A demonstration of any required dispatch procedures must be conducted for routes or areas where RNP-10 is required.

    c. The flight(s) should be of adequate duration for the pilots to demonstrate knowledge of dispatch requirements, capability to navigate with the system, and to perform the normal and non-normal procedures.

8.4 FSG Portal entries will be made.