VOLUME 4. AIRCRAFT EQUIPMENT AND OPERATIONAL AUTHORIZATIONS

CHAPTER 1. AIR NAVIGATION, COMMUNICATIONS, AND SURVEILLANCE

SECTION 5. SPECIAL AREAS OF OPERATION

201. 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 section 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 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 U.S. operators have political or international sensitivity
- Areas where aircraft with unique performance characteristics require special criteria
- Areas where dual long-range navigation systems are not normally required

203. 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 require improved levels of performance. Significant increases in air traffic over certain busy routes, such as the North Atlantic, can be accommodated efficiently if the ATC separation minimums are reduced to permit more aircraft to fly along, or as close as possible, to the most efficient routings and flight levels. 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 route structure. The options currently available to permit reductions in ATC separation minimums include the use of the following:

- Independent surveillance (ATC radar)
- Automatic Dependant Surveillance (ADS) (data link of the aircraft's present position to the ATC system)
- Reduced lateral separation minimums
- Reduced vertical separation minimums
- Reduced longitudinal separation minimums
- Communication

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

A. 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. Reference part 91 Appendix C and AC 91-70, Oceanic and Other International Operations, as amended. 14 CFR part 91, section 91.705 requires each U.S. operator to acquire FAA approval before conducting any operation in 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

B. The NAT/MNPS represents navigational performance (necessary to reduce the risk of collision) on a internationally established level. While the NAT MNPS airspace currently does not have a published RNP value, it is anticipated that in the future an RNP requirement will be implemented. The MNPS establishes the following

demanding criteria:

(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.

(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.

(3) Each operator cannot have more than 1 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) Each operator cannot have more than 1 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.

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

- Part 91, § 91.706 and Appendix G
- The documents in the operation specifications subsystem (OPSS) guidance subsystem in association with operations specifications (OpSpec) paragraph B046 (authorization for RVSM)
- RVSM section of the FAA web site (www.faa.gov/ats/ato/rvsm1.htm)

C. 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.

(1) Validation flights must be conducted through NAT/MNPS airspace. See FAA Order 8400.10, volume 4, chapter 1, section 2 for guidance on validation flights. Navigation specialists must be consulted prior to proving/validation flights.

(2) Inspectors must assure that requirements of the applicable Advisory Circular(s) and/or other FAA official documentation for Loran-C, Global Positioning System (GPS), or Multi-Sensors (or equivalent) are fully met by the operator before approving any operation in this airspace. All NAT/MNPS approvals are granted by issuing OpSpec paragraph B039 and by adding that area of en route operation to paragraph B050 of the standard OpSpecs.

(3) *Approval for Operations Using GPS in North Atlantic Minimum Navigation Performance Specifications Airspace.* The FAA navigation specialists will provide guidance on process and procedures for confirming the operator's capability to meet the requirements of § 91.705. The operator is not required to collect navigation performance data in NAT/MNPS airspace to apply to Pass/Fail graphs.

D. Maintaining NAT/MNPS Authorization.

(1) In addition to initially meeting MNPS criteria, each operator must continuously maintain the required level of navigational performance. Each gross navigational error (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. Gross navigational errors (GNE) 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 navigation specialists in AFS-400 at headquarters. The navigation specialists in turn review the GNE and contact the appropriate Flight Standards office.

(2) 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:

(a) 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.

(b) If an operator fails to take action to improve navigation performance, action must be initiated to suspend NAT/MNPS authorization (operations specification B039 is rescinded).

(c) 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.

NOTE: It is FAA policy that one of the agency's navigation specialists participate in the investigation of gross navigation errors. These specialists, at their option, may also participate in the evaluation of the actions proposed by the operator to preclude the occurrence of similar errors. AFS-400 must be notified as soon as possible when an inspector and/or a navigation specialist determines that actions should be taken to suspend NAT/MNPS authorization.

207. CANADIAN MNPS AIRSPACE. Certain high altitude airspace in Northern Canada has been designated as MNPS airspace (see the Canadian Aeronautical Information Publication (AIP)). The navigational performance criteria for operation in Canadian MNPS airspace is identical to the criteria for NAT/MNPS airspace.

A. General Criteria. In general, any aircraft/navigation system combination approved for unrestricted operation in NAT/MNPS airspace for a particular operator also meets Canadian MNPS criteria. A particular operator can (under most circumstances) be authorized (without recertification under AC 120-33 (as amended), Operational Approval of Airborne Long-Range Navigation Systems for Flight Within the North Atlantic Minimum Navigation Performance Specifications Airspace) to conduct Canadian MNPS operations with those aircraft and navigation system combinations authorized for that operator in NAT/MNPS airspace. However, due to the unique nature of operations in high latitudes and in areas of magnetic unreliability, approval for Canadian MNPS operation is not automatic. Each proposed operation must be evaluated on its own merits. OpSpec B059, Canadian MNPS, is available for issuance to part 135 certificate holders only. OpSpec B039 would be issued for NAT/MNPS in the part 135 database of the OPSS. OpSpec B039 is available in the part 121 and 125 databases of the OPSS as the policy for authorization for these certificate holders may be conducted and approved concurrently.

B. Special Factors. The following special factors must be considered and carefully evaluated before granting air navigation approvals for operation in Canadian MNPS airspace.

(1) The following directions apply for operators currently authorized to use an aircraft in NAT/MNPS airspace:

(a) A primary means Inertial Navigation System (INS)/Inertial Reference System (IRS)/Inertial Reference Unit (IRU) meeting NAT/MNPS criteria automatically meet Canadian MNPS criteria.

(b) Other LRNS meeting NAT/MNPS criteria automatically meet Canadian MNPS criteria except for operations in the Areas of Magnetic Unreliability (AMU). The LRNS must be evaluated on a case-by-case basis for AMU authorization.

(c) Operations at high latitude airports (greater than 67° N/S) must not be authorized unless INS platform alignment has been successfully demonstrated and approved for those latitudes. If operations are proposed for areas in the Canadian MNPS which falls within the AMU, a validation flight and AMU authorization is required. One of the FAA navigation specialists must be consulted.

(d) Training programs and crew procedures for operations at high latitudes must provide techniques and methods for the following:

- Approaches and departures using appropriate heading references other than magnetic
- Use of ground-based navigational aids (NAVAIDs) oriented to appropriate directional references other than magnetic

(2) The following directions apply for operators who are not currently authorized to use an aircraft and a navigation system combination in NAT/MNPS airspace, but propose to operate in the Canadian MNPS airspace:

(a) The operator's equipment must meet the criteria in the appropriate Advisory Circular (AC) (or equivalent), considering the conditions unique to Canadian MNPS airspace. The Canadian AIP should also be consulted for airspace requirements.

(b) The operator must also meet the special factors specified in B(1) and/or (2), as appropriate.

(c) For the part 121 and 125 certificate holders, Canadian MNPS airspace approvals are granted by adding that area of en route operations to OpSpec B050. For the part 135 certificate holders the Canadian MNPS airspace approvals are granted by issuance of OpSpec B059 and adding that area of en route operations to OpSpec B050. For part 135, OpSpec B039, NAT/MNPS, may or may not be issued, as applicable.

C. References.

- Order 8400.10, volume 3, chapter 9, section 8, Validation Test Requirements;

- Order 8400.10, volume 3, chapter 1, section 2, Automated Operations Specifications Subsystem (OPSS);
- Order 8400.10, volume 3, chapter 1, section 4, opspect B059;
- North Atlantic MNPS Airspace Manual, latest edition (available from the NAT Programme Co-ordination Office (PCO) web site: www.nat-pco.org;
- Aeronautical Information Service (AIS) of NAT ATS Provider States;
- ICAO's Consolidated Guidance and Information Material concerning Air Navigation in the North Atlantic Region (NAT Doc 001), published by the European and North Atlantic Office of ICAO;
- ICAO Regional Supplementary Procedures (Doc. 7030) - NAT/RAC;
- AC 120-33 (as amended), Operational Approval of Airborne Long-Range Navigation Systems for Flight Within the North Atlantic Minimum Navigation Performance Specifications Airspace;

209. CENTRAL EAST PACIFIC (CEP) ROUTE SYSTEM.

A. The Central East Pacific (CEP) system is the organized route system between Hawaii and the west coast of the United States. Several air traffic services routes and associated transition waypoints are within the CEP. Effective February 24, 2000, RVSM and required navigation performance 10 (RNP-10) is required for aircraft operating on the CEP routes. Non-approved aircraft can expect to fly above or below the exclusionary airspace. See AC 91-70 (as amended), Oceanic Operations, and the Alaskan AIP [NOTE: CHECK REFERENCE] as well as the Pacific Supplement for further information.

B. Applicable ATC procedures can be found in FAA Orders 7110.65 (as amended), Air Traffic Control, and 8400.12 (as amended), Required Navigation Performance 10 (RNP-10) Operational Approval, and in ICAO document 7030 (Regional Supplementary Procedures) - PAC/RAC, Annex 2, appendix 3, Document 9574 (RVSM Guidance).

211. AREAS OF MAGNETIC UNRELIABILITY (AMU). Two large areas of en route operation have unique features which significantly complicate air navigation. These two areas are centered around the earth's magnetic poles.

A. Concept. Conventional magnetic compasses sense magnetic direction by detecting the horizontal component of the earth's magnetic field. Since this horizontal component vanishes near the magnetic poles, magnetic compasses are highly unreliable and unusable in an area approximately 1000 nm from each magnetic pole. Within these areas, air navigation tasks are further complicated by very rapid changes in magnetic variation over small distances. For example, when flying between the magnetic North Pole and the true North Pole, a heading of true North results in a magnetic heading of South (a magnetic variation of 180 degrees).

B. Convergence of the Meridians. Since these two major areas of magnetic unreliability also occur near the earth's geographic poles, the convergence of the meridians also presents additional directional complications. When flying "great circle" courses at latitudes greater than 67 degrees, convergence of the meridians can create rapid changes in true headings and true courses with small changes in aircraft position. As a result, relatively small errors in determining the aircraft's actual position can produce very large errors in determining the proper heading to fly and maintain the assigned flight path. When even small errors occur, very large navigation errors can develop over extremely short distances. An extreme example of this phenomenon occurs at the earth's geographic North Pole. Flight in any direction from the exact pole is initially due South (that is, the direction to Russia or the U.S. is South).

C. Special Equipment, Techniques, and/or Procedures. Special navigation equipment, techniques, and/or procedures are critical to operate safely in polar areas, including the two areas of magnetic unreliability. Operations based solely on magnetic references within areas of magnetic unreliability are UNSAFE, UNACCEPTABLE, AND SHALL NOT BE APPROVED. Operations within these areas can only be conducted safely if the primary heading reference is derived from sources other than magnetic.

(1) All INS/IRS/IRU are capable of calculating true North independently from other aircraft systems. INS/IRS/IRU can be approved and safely used for operations in areas of magnetic unreliability and polar areas provided the following conditions are met:

(a) The INS is certified as airworthy for the highest latitude authorized for these operations.

(b) Ground alignment of the INS/IRS/IRU is restricted to those airports where satisfactory alignment has been demonstrated or otherwise approved.

(c) The operator's training programs and crew procedures provide acceptable techniques and methods for the following:

- Approaches and departures using appropriate heading references other than magnetic
- The use of ground-based Navigation Aids (NAVAID), which are oriented to appropriate directional references other than magnetic

NOTE: It is FAA direction and guidance that

inspectors must not approve operations in polar areas and/or areas of magnetic unreliability without the participation and concurrence of one of the agency's navigation specialists.

(2) There is a wide variety of other methods, systems, techniques, and procedures that can be used for navigation in areas of magnetic unreliability and polar areas. However, due to the variety of means and the complexity of air navigation in these areas, specific direction and guidance for these other means of navigation are not provided in this handbook.

NOTE: It is FAA direction and guidance that inspectors must obtain assistance from one of the agency's navigation specialists in evaluating and approving or denying an operator's request to use systems, techniques, or procedures that are not discussed in this section.

D. Boundaries of the Area of Magnetic Unreliability.

(1) For the northern hemisphere, the Canadian AIP establishes the basic boundaries for the area of magnetic unreliability. Canadian Air Navigation Order, as amended, states that no person may operate an aircraft in instrument flight rules (IFR) flight within Canadian northern domestic airspace unless it is equipped with a means of establishing direction that is not dependent on a magnetic source. The special equipment, training, and procedures discussed in this paragraph are required for all operations into the area of northern domestic airspace. The boundaries of this area are shown in figure 4.1.5.2. This area is also outlined on Canadian en route charts. For the purposes of this paragraph, northern domestic airspace is considered to extend from ground level to infinity.

(2) For the southern hemisphere, any operation south of 65 degrees south latitude is considered to be within the area of magnetic unreliability. Any proposal to operate within the area of magnetic unreliability in the southern hemisphere must be reviewed and concurred with by AFS-200 before approval.

E. Approvals. All approvals for operations into areas of magnetic unreliability are granted by issuing OpSpec paragraph B040 and by adding that area of en route operation to paragraph B050 of the standard OpSpecs. A checklist for operations in areas of magnetic unreliability is available in the guidance subsystem in association with OpSpec paragraph B040.

212. NORTH POLAR OPERATIONS. The north polar area of operations is defined as that area that lies north of latitude N 78°00' (see OpSpec A002). The north polar routes across Russia are shown in the Russian Aeronautical Information Publication or in commercial charting publications for Eastern Europe and Eurasia. OpSpec B055 authorizes north polar operations. See volume 3, chapter 1, section 4, Part B, OpSpec B055, North Polar Operations, for more information on this authorization. In general, in addition to the authorization for operations in the areas of magnetic unreliability, the following will be required for authorizing operations in the polar areas.

A. 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.

B. Communication capability. In accordance with part 121, section 121.99 (Communications Facilities), the operator must have effective communications capability with dispatch and with ATC for all portions of the flight route. The operator must show the FAA the communications medium(s) that it intends to use to fulfill these requirements in the north polar area.

(1) The communications medium used must meet FAA regulatory requirements and fulfill policy/procedures established by each Air Traffic Service (ATS) unit providing control on the route of flight. Anchorage Center publishes this information in the U.S. Government Flight Information Publication Supplement for Alaska. Other countries publish ATS policies and procedures in their State Aeronautical Information Publications.

(2) 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.

(3) In areas of satellite coverage, controller-pilot datalink communications (CPDLC) may be used for ATC communications, provided the ATS unit has an approved capability. In addition, provided the capability is approved, HF Datalink 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 (14 CFR part 1) and policy requirements for LRCS. HF voice capability is always required.

(4) 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 consider-

ation the predicted solar flare activity and its effect on communication capability.

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

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

(2) Autothrottle system.

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

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

NOTE: NOTE: See AC 91.21-1 (as amended), Use of Portable Electronic Devices Aboard Aircraft.

(5) Additionally, for Extended-range Operations with Two-Engine Airplanes (ETOPS) aircraft:

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

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

D. The following must be in the approved training programs:

(1) Training on QFE/QNH and meter/feet issues is required for flightcrew and dispatcher training.

(2) Training on fuel freeze (included in maintenance, dispatch, and flightcrew training (special curriculum segments.))

(3) General area and route-specific training on weather patterns and aircraft system limitations.

(4) Training on special considerations, such as diversion decision-making into austere airport environments to include aircraft performance, crash, fire, and rescue (CFR) availability, and passenger support.

(5) Flightcrew training in the use of the cold weather anti-exposure suit.

E. The operator needs to address the following special long-range flightcrew issues:

(1) Long-range flightcrew rest plan submitted to the POI for review and approval.

(2) Multicrew (augmented flightcrews) flight proficiency/currency issues need to be addressed in the training program.

(3) The progression of PIC authority, as designated in the operator's manual.

(4) 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.

F. 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 (AC 120-42 (as amended), Extended Range Operation With Two-Engine Airplanes (ETOPS), provides additional guidance for two-engine airplanes).

G. 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.

H. An FAA-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. AFS-200 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 FAA. 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.

213. 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 general information about these areas and paragraph 155 provides evaluation criteria that must be considered when approving operations in these areas.

A. 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 national airspace system and the navigational performance requirements in many countries are based almost exclusively on nondirectional beacons (NDB). Also, many of the NAVAIDs do not operate continuously. For example, NAVAIDs are shut down from dusk to dawn in certain countries.

B. 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 significantly increases the difficulty of using HF as a prime means of communication with ATC.

C. ATC. The level of air traffic service (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.

(1) *Controlled Airspace.* 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.

(2) *Advisory Airspace.* 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 flight level over a specified VHF frequency. 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.

(3) *Uncontrolled Information Region (UIR) (No Man's Land).* Flight information regions have not been established for a few areas in the world. 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.

D. Metric Flight Levels. The national airspace systems 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 flight levels and flight levels based on feet. For example, a flight level of 10,000 meters represents FL 328 or a flight altitude of 1,000 meters represents an altitude of 3,280 feet.

215. 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.

A. 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.

B. Operations in Advisory Airspace. The operator must show that its training programs and operating procedures permit safe operations in advisory airspace and assure compliance with the "expected" operating practices. The operator must also show that the operation is in compliance with OpSpec paragraph A014.

C. Operations in UIR (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 assure the following:

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

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

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

(4) Reliable information concerning other IFR aircraft operating within this area is available in-flight (e.g., TCAS, ADS-B). This includes "broadcast in the blind" procedures and other "expected" practices.

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

D. 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.

217. OPERATIONS IN RESTRICTED INTERNATIONAL AREAS. Operations by U.S. operators within the sovereign airspace of certain countries have restrictions levied by various agencies of the U.S. Government. The following are examples:

- Commercial trade restrictions
- No-fly zones
- Special Federal Aviation Regulations (SFAR) flight prohibitions
- Restriction of certain transactions related to aircraft services
- Suspension of cargo air operation
- Suspension of passenger-carrying operations to the U.S. because the airport authorities do not maintain and carry out effective security measures.

NOTE: These restrictions frequently specify certain airports, selected routes, and special procedures that must be used.

A. The current list of restrictions and information about the processes and agencies to contact in regard to those restrictions is located on the FAA International Internet web site. The web site can be accessed from the FAA Home Page (www.faa.gov) or the Flight Standards Home Page (www.faa.gov/avr/afshome.htm) under the label of Restricted International Areas. Current web site addresses may be found in the Job Aid for OpSpec B050 in the Operations Specifications Subsystem (OPSS). Since the processes periodically change, the FAA international web site will provide the current list of restrictions and the specific processes for the air carrier to follow.

B. The air carrier should review the current list of restrictions with the POI to confirm what restrictions apply in order for the air carrier to obtain the applicable license and/or exemption for flight operations in that restricted area.

C. It is important that the air carrier be advised to take simultaneous actions with all of the agencies that are necessary for the licenses and/or exemptions for the restricted country or countries in which or over which they are requesting to operate. The POI should advise the air carrier that the FAA does not have control over the process by which other agencies grant licenses. Therefore, the POI should recommend that air carriers make the requests as far in advance as possible of the intended date of flight. It is critical that overflight permits be coordinated in a timely manner and under no circumstances should the operator conduct an overflight of a restricted airspace unless the issuing authority has given approval.

(1) The air carrier is responsible for obtaining the appropriate licenses and/or exemptions from the U.S. Government agency or agencies that impose the restrictions for that country or area.

(2) Except for an SFAR prohibiting flight operations, the POI may issue an amendment to OpSpec paragraph B050 authorizing operations to or over countries or areas on the Restricted International Areas list, provided the air carrier shows that it meets the requirements of 14 CFR part 119, section 119.51(a)(2).

(3) If there is a SFAR that imposes a flight prohibition, and if other federal agencies have imposed restrictions for flights into or over a restricted country or area, before flight operations can be authorized, the air carrier or operator must provide its POI with either:

(a) All applicable written federal agency authorizations and an FAA exemption granting authorization to operate in or over the restricted international area.

(b) Applicable written federal agency authorizations with written FAA approval from the Director of Flight Standards Service (AFS-1).

(4) If an exemption to a SFAR was granted as one of the requirements, the exemption number must be listed in OpSpec A005 and not in OpSpec B050. If approval was granted from AFS-1, the effective and expiration dates of the approval must be noted in the optional nonstandard text of OpSpec A005.

D. If an air carrier requests authorization to conduct operations into or over restricted international areas for which an FAA flight prohibition is <u>not</u> in effect and shows that it meets the requirements of section 119.51(a), the POI should authorize the operation by adding the area of en route operation to OpSpec paragraph B050. Even though the information is not required by 14 CFR to be recorded but an

authorization to operate into or over a restricted international area is required, the POI may request the date of issuance and its expiration date for insertion in the "note" section of OpSpec paragraph B050.

219. REQUIRED NAVIGATION PERFORMANCE (RNP) TYPE IN CLASS II AIRSPACE. The implementation of RNP is part of a worldwide ICAO effort for the implementation of the Future Air Navigation Systems (FANS), CNS, and Air Traffic Management (ATM) concepts.

A. Aircraft/operators that operate on oceanic 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 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.

B. FAA Order 8400.12 (as amended) Required Navigational Performance 10 (RNP-10) Operational Approval, is a guide to RNP-10 aircraft and operator approval in any airspace where RNP-10 navigation criteria is required. Order 8400.12 does not address communications or surveillance requirements that may be specified to operate on a particular route or in a particular area. Those requirements are specified in documents such as Aeronautical Information Publication (AIP) and ICAO Regional Supplementary Procedures (DOC 7030). If an operator requests to deviate from the practices and procedures provided in Order 8400.12, the inspector should forward a request for assistance through the regional Flight Standards division to AFS-400.

C. Current information on RNP-10 (Order 8400.12 and RNP-10 Operational Approval Outline) plans and programs can be obtained by accessing links on the Oceanic Procedures Branch (ATP-120) web site (www.faa.gov/ats/ato/120.htm).

220. REDUCED VERTICAL SEPARATION MINIMUM (RVSM) AIRSPACE. RVSM airspace is any airspace or route where aircraft are separated by 1,000 feet vertically between flight level (FL) 290 and FL 410, inclusive. Generally, aircraft and operators that have not been authorized to conduct RVSM operations cannot operate at FLs where RVSM is applied. Exceptions to this rule are published by individual Air Traffic Service Providers. Air Traffic Service Providers have elected to implement RVSM as a means to provide more fuel/time efficient altitudes and routes to operators and to enhance en route airspace capacity.

A. . RVSM Areas of Operation. The following table shows some examples of major areas where RVSM has been or is planned to be implemented. (For the latest infomrmatin, see the RVSM website, www.faa.gov/ats/ato/rvsm1.htm, and click on the RVSM Status World Wide.)

Area of Operations	Implementation Dates	Flight Levels
North Atlantic MNPS Airspace	March 1997 October 1998 January 2002	FL 330-370 FL 310-390 FL 290-410
Pacific Oceanic Airspace	February 2000	FL 290-390
Australia	November 2001	FL 290-410
West Atlantic Route System	January 2002	FL 290-410
All European Airspace	January 2002	FL 290-410
Western Pacific/South China Sea	February 2002	As published in ATS Documents
Northern Canada	April 2002	FL 290-410
Middle East and Asia South of the Himalayas	November 2003	As published in ATS Documents
Domestic United States, Southern Canadian Domestic Airspace, Caribbean and South America	Planned for January 20, 2005	FL 290-410

B. Inspector Action. . Using the guidance provided in Interim Guidance (IG) 91-RVSM, Approval of Aircraft and Operators for Flight in Airspace Above Flight Level (FL) 290 Where a 1,000 Foot Vertical Separation Minimum is Applied (as amended), inspectors shall ensure that operators and aircraft meet the standards of Title 14 of the Code of Federal Regulations (14 CFR) part 91, appendix G, Operations in RVSM Airspace.

C. Sources of Information. Sources of information on RVSM programs are:

(1) *RVSM Section of the FAA Web Site.* The RVSM home page provides information on RVSM programs in various areas of the world. It provides a link to the Domestic RVSM web page where information is posted on plans and programs to implement RVSM in the domestic United States. It also links to the RVSM Documentation page that provides specific information on aircraft and operator approval for RVSM operations. The RVSM home page can be accessed at: www.faa.gov/ats/ato/rvsm1.htm.

(2) *RVSM Documentation Web Page.* The RVSM Documentation Web Page provides access to regulations, guidance, documents and contacts. This web page is maintained by the Flight Technologies and Procedures Division, AFS-400. It can be accessed at:

(a) www.faa.gov/ats/ato/rvsm1.htm, then clicking on "RVSM Documentation".

(b) In the OPSS in association with OpSpec B046, Operations in RVSM Airspace.

(3) *Regulations.* 14 CFR part 91 section 91.706 applies to RVSM operations outside the U.S. Section 91.180, when published, will apply to RVSM operations within the U.S. Both sections require that the operator and the operator's aircraft comply with the standards of part 91, appendix G and that the operator obtain FAA authorization to conduct RVSM operations. Part 91, appendix G provides basic RVSM standards for aircraft and operator programs. The RVSM Documentation web page provides a link to section 91.706 and appendix G. It will be linked to section 91.180 when it is published.

(4) *Guidance.* FAA Interim Guidance (IG) 91-RVSM, as amended, can be found on the RVSM Documentation Web page. IG 91-RVSM provides an acceptable means to authorize operators and aircraft to conduct flight in RVSM airspace. It provides detailed guidance for aircraft manufacturers, other engineering organizations and operators to follow when developing programs intended to meet the standards of part 91, appendix G.

(a) If an operator requests to deviate from the practices and procedures provided in IG 91-RVSM, the inspector should forward a request for assistance through the Regional Flight Standards Division to AFS-400. AFS-400 will respond after coordination with AFS-200, AFS-300, or AFS-800, as appropriate.

(b) IG 91-RVSM was developed in national and international forums and is used by civil aviation authorities throughout the world. ICAO Document 9574, Edition 2 (Manual on Implementation of a 1,000 ft. Vertical Separation Minimum Between FL 290 and FL 410 Inclusive) cites IG 91-RVSM as an acceptable means for RVSM approval.

D. Overview of the Authorization Process. The POI, PAI, and PMI should coordinate the issue of OpSpecs paragraphs B046 and D092 to grant the operator authority to conduct RVSM operations for a specific aircraft type or group. The FAA will issue the OpSpecs paragraphs if the following conditions exist:

(1) The FAA determines that operator aircraft comply with RVSM standards. For in-service aircraft, the FAA determines that inspections and/or aircraft system modifications are completed as required by the applicable Service Bulletin, Service Letter, Supplemental Type Certificate or other Aircraft Certification Office approved document. For aircraft manufactured RVSM compliant, the FAA determines that the Airplane Flight Manual or Type Certificate Data Sheet contain a statement of RVSM eligibility.

(2) The FAA approves the operator's RVSM maintenance program.

(3) The FAA approves the operator's RVSM operations program.

(4) The FAA accepts the operator's plan to participate in monitoring programs.

(5) If required by the POI in coordination with the PAI and PMI, the operator successfully completes a validation flight.

E. RVSM Authorization Process and Policy.

(1) Coordination Between Inspectors. Before issuing OpSpecs, inspectors must coordinate with the responsible operations, maintenance and avionics inspectors.

(2) *Authorization Process Events.* Paragraph 11 of IG 91-RVSM is entitled "Operational Approval." It provides guidance on the major events in the RVSM authorization process. Also, the "Getting Started" section of the RVSM Documentation web page contains an outline or checklist of the events or steps in the authorization process. It includes references to applicable document paragraphs and sections.

(3) *OpSpecs Actions.* Paragraph 1g(1) of IG 91-RVSM provides the following policy for part 121, 125, and 135 operators: FAA will authorize initial operational approval for RVSM operations by issuing OpSpecs paragraphs B046 and D092. (Specific make/model/series and individual registration numbers are listed in D092). Areas of RVSM operation that are new to the operator will be authorized by adding OpSpec paragraph B046 to the OpSpecs Part B (En route) paragraph B050: "Authorized Areas of En route Operation. Limitations and Provisions." (If you have any questions regarding these OpSpec paragraphs, please contact AFS-260 at 202-267-8166).

(4) *Relationship between RVSM Authorization and*

Horizontal Navigation Authorizations. Currently, in designated oceanic airspaces, operators are required to obtain both RVSM authorization and certain horizontal navigation authorizations. These are separate, specific authorization actions. For example, to operate in North Atlantic Minimum Navigation Performance Specification (NAT MNPS) airspace, operators are required to obtain both RVSM and NAT MNPS authority. In Pacific oceanic airspace, operators are required to obtain both RVSM and Required Navigation Performance 10 (RNP-10) authorization.

(5) *TCAS.* Information on TCAS as it relates to RVSM operations can be found on the RVSM Documentation web page. Part 91 appendix G does not require aircraft be equipped with TCAS for RVSM operations. Appendix G, section 2 does require, however, that if an aircraft is equipped with TCAS II and is used in RVSM operations, then it must be a TCAS II that meets TSO C-119b (Version 7.0) or a later version. TCAS equipage requirements can be found in parts 121, 125, 129, and 135.

(6) *Determining Aircraft RVSM Compliance.* The phrases "determining aircraft RVSM compliance" and "initial RVSM airworthiness approval" both appear in RVSM documents to indicate that the FAA has determined that the operator's aircraft comply with appendix G RVSM standards.

(a) *Inspector Guidance.* The Airworthiness Inspector's Handbook (FAA Order 8300.10), Volume 2 and IG 91-RVSM, paragraph 11d provide guidance on inspector determination that aircraft are RVSM compliant. IG 91-RVSM Paragraph 11d(1) and (2) discuss the documents that the operator must submit to the FAA to show that in-service aircraft or aircraft manufactured RVSM-compliant are in compliance with the RVSM requirements of part 91, appendix G.

(b) For most in-service aircraft, the RVSM airworthiness documents take the form of Service Bulletins, Service Letters or Supplemental Type Certificates. These documents contain requirements that are specific to individual aircraft types or groups and generally require inspections and/or hardware or software modifications. The operator must submit documents to the FAA to show that the required actions have been completed for each airframe that will operate in RVSM airspace.

(c) For aircraft manufactured RVSM-compliant, the Airplane Flight Manual or Type Certificate Data Sheet must contain statements that show the aircraft to be eligible for RVSM operations.

(7) *PTRS Codes.* When the inspector determines that individual operator airframes are RVSM compliant, the PTRS must be updated and the airframes listed in OpSpecs paragraph D092 or an LOA, as appropriate. See paragraph G below for PTRS action.

(8) *RVSM Maintenance Program Approval.* FAA Order 8300.10, Volume 2 contains airworthiness inspector guidance for the evaluation and approval of an operator's RVSM maintenance program. Also, IG 91-RVSM paragraph 10 contains guidance on the content of maintenance programs.

(9) *Operations Program Approval.* Evaluation of operations programs should be completed in conjunction with the evaluation of maintenance programs. IG 91-RVSM, paragraph 11d(3)(4) provides specific guidance on the process and policies to be followed for operations program approval.

(a) *Special Emphasis Items for Pilots.* IG 91-RVSM Appendix 4 provides operating practices and procedures applicable to all RVSM operations. Appendix 4, paragraph 7 lists special emphasis items for pilot training.

(b) *Specific Procedures for Oceanic Airspace.* Appendix 5 provides specific practices and procedures for RVSM operations in oceanic airspace.

(c) *Domestic U.S. RVSM Operational Policy/Procedures.* Until operational policy and procedures for RVSM in the domestic United States are published, operators can use IG 91-RVSM, appendix 4 as the basis for their RVSM operations training and operating practices/procedures. Operational procedures such as those for en route failure of RVSM systems in domestic U.S. airspace are planned to be published in the 4/Q 2003. Guidance will be published in the Aeronautical Information Manual and, in addition, AFS-400 will publish and distribute a Sample Pilot Bulletin that can be incorporated into individual operator programs. Operators will be responsible for incorporating this material into their programs prior to conducting RVSM operations in the U.S. The FAA anticipates that operational procedures unique to domestic U.S. airspace will not be extensive.

(10) Validation Tests and Flights.

(a) Interim Guidance 91-RVSM, paragraph 11f provides guidance on the RVSM validation test. In some cases, review of the operator's RVSM application and program documents may suffice for validation test purposes. However, as determined by the Principal Operations (POI), Maintenance (PMI), and Avionics Inspectors (PAI), the final step of the approval process may be the completion of a validation flight. The FAA may accompany the operator on a flight to verify that RVSM operations and maintenance procedures and practices are used effectively. The validation flight may be accomplished during a revenue flight, as determined by the Principal Inspectors on a case-by-case basis.

(b) Validation flights are NOT required to be conducted in conjunction with the monitoring flights described below. Also, the validation flight may be conducted before monitoring requirements are completed.

F. Monitoring Programs

(1) *Objective of Monitoring.* The primary goal of monitoring is to provide a quality control check on the altitude-keeping performance of the wide variety of operators and aircraft. It has been determined that this may be accomplished by sampling a number of airframes of each aircraft type that an operator will operate in RVSM airspace. Altitude-keeping performance data is analyzed to determine that the aircraft fleet, as well as individual operators, exhibit performance that is consistent with RVSM standards.

(2) *Operator Plan and Monitoring Requirements.* In its application for RVSM authority, IG 91-RVSM paragraph 11d(8) calls for each operator to submit a plan to participate in monitoring programs. It further notes that the current monitoring requirements for individual operators in specific RVSM areas of operation are published on the FAA RVSM Documentation website.

NOTE: Operators are no longer required to complete monitoring prior to being granted operational approval.

(3) *Monitoring Procedures.* Monitoring procedures for ground-based and GPS-based monitoring systems are published on the RVSM Documentation web page. Operator aircraft of a specific type or group are monitored after they have been determined to be RVSM compliant. Currently, the operator can have its aircraft monitored by either the ground-based Height Monitoring Unit (HMU) or a portable GPS-based Monitoring Unit (GMU) that can be placed on the aircraft. In the October 2003 time frame, operators may have the option of over flying the FAA ground-based monitoring system called the Aircraft Geometric Height Measurement Element (AGHME).

(4) *FSDO or CMO Notification.* When an operator has successfully completed monitoring requirements for the specific aircraft type or group, the FAA Technical Center Separation Standards Group (ACB-310) will notify the POI and/or PAI.

*G. Inquiries.*Each Regional AFS Division has appointed RVSM Focal Points. A list of the focal points is published on the FAA RVSM Documentation web page. For general questions on RVSM, the appropriate Regional Focal Point should be contacted first. Questions on this handbook material and specific questions on RVSM policy should be directed to (202) 385-4576 at the Flight Technologies and Procedures Division, AFS-400.

221. SPECIAL AREAS WHERE REDUNDANT LONG-RANGE NAVIGATION SYSTEMS ARE USUALLY NOT REQUIRED. Certain special areas have been identified where long-range navigation can be conducted with a single long-range navigation system (S-LRNS).

*A. Concept.*The provisions of §§ 91.511, 125.203, 121.351, and 135.165 related to Class II navigation do not specifically require redundant or dual long-range navigation systems. The primary Class II navigation requirements are related to the level of navigational performance necessary for the control of air traffic. The objective of requirements for redundant navigational systems is to permit the flight to continue to navigate to the degree of accuracy necessary for the control of air traffic in the event a failure occurs in the navigational system being used.

B. Operations can also be safely conducted in much larger areas using a combination of redundant ICAO standard NAVAIDs and a single long-range navigational system (S-LRNS). These operations consider the availability of ICAO standard NAVAIDs, the lateral separation minimums applied by ATC (the navigational performance required), the length of the route or route segment, the complexity of the route structure, and the density of the air traffic. Approval of the use of a single long-range navigation system may be granted by the issuance of OpSpec B054, Class II Navigation Using S-LRNS. It should be noted in OpSpec B050, in association with the applicable areas of operation.

C. The West Atlantic Route System (WATRS), Caribbean Sea, and Gulf of Mexico routes are special case routes in which the use of an S-LRNS may be authorized for Class II navigation. These routes are located offshore in the WATRS control area, the Caribbean, and Gulf of Mexico control areas as shown on en route charts and described in section 91.511.

NOTE: The WATRS is defined as North Atlantic Ocean west of a line that extends from 44^{o} 47' 00"N/ 67^{o} 00'00"W to 39^{o} 00'00"N/ 67^{o} 00'00"W to 38^{o} 30' 00"N/ 60^{o} 00'00" W south along the 60^{o} 00'00" W longitude line to the point where the line intersects with the northern coast of South America.

(1) FAA Order 7400.2C, Procedures for Handling Airspace Matters, establishes the areas in which these operations are conducted to serve aircraft operations between U.S. territorial limits and oceanic control area/flight information region boundaries and/or domestic flights that operate in part over the high seas.

(2) *Special Provisions for the WATRS, Caribbean Sea, and Gulf of Mexico.* The unique nature of the WATRS, the Caribbean Sea, and the Gulf of Mexico permits operations with turbine-powered airplanes and certain offshore helicopter operations to be safely conducted with a single approved long-range navigation system, in accordance with section 91.511(f).

D. Special Provisions for Certain Routes in NAT/MNPS Airspace. Special contingency routes have been established in limited portions of NAT/MNPS airspace where aircraft equipped to use standard ICAO NAVAIDs can operate with

an S-LRNS. These routes are specified in the International Flight Information Manual. Operations over these routes can be authorized, provided the operator shows that the long-range navigation system/aircraft combination used and the operational procedures used meets NAT/MNPS requirements AC 120-33. The approval is granted in accordance with paragraph B054 of the OpSpecs and by adding that area of en route operation to paragraph B050 of the standard OpSpecs.

E. Operational Approval for S-LRNS.

(1) All Class II navigation operations must be conducted so the aircraft is continuously navigated to the degree of accuracy established by ATC for operations in that airspace where applicable requirements are in force. For areas where these accuracy and navigation performance standards have NOT been formally established, the long-range navigation system must be used to continuously navigate the aircraft so that the crosstrack and/or the alongtrack errors will not equal or exceed 25 nautical miles at any point along the flight plan route specified in the ATC clearance.

(2) The navigation system must be operational, as required by OpSpec paragraphs B039 (NAT/MNPS).

(3) Before conducting any operations authorized by OpSpec paragraph B054 the flightcrew must be qualified, in accordance with the certificate holder's approved training program for the system and procedures being used.

(4) Before entering any airspace requiring the use of a LRNS, the aircraft position shall be accurately fixed and recorded using airways navigation facilities or ATC radar. After exiting this airspace, the aircraft position shall be accurately fixed and the LRNS error must be determined and logged in accordance with the operator's approved procedures.

(5) An LRNS fix may be substituted for a required en route ground facility when that facility is temporarily out of service, provided the approved navigation system has sufficient accuracy to navigate the aircraft to the degree of accuracy required by ATC over that portion of the flight.

(6) At dispatch, at least one of the navigation systems listed below must be installed and operational:

(a) At least one independent INS. INS and IRS must be approved in accordance with part 121, Appendix G.

(b) At least one flight management system/navigation sensor combination (or equivalent) where the navigation system must be suitable for the route to be flown. Multisensor systems must be approved in accordance with the guidance contained in AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors.

(c) At least one independent IFR approved GPS navigation system approved in accordance with one of the following:

i. The guidelines for operational approval of GPS to provide the primary means of Class II navigation in oceanic and remote areas of operation apply (see AC 90-94, Guidelines for using Global Positioning System Equipment for IFR En Route and Terminal Operations and for Nonprecision Instrument Approaches in the U.S. National Airspace System.) The guidelines must be followed with the exception that the operational control restrictions related to fault detection and exclusion (FDE) does not apply. This is because S-LRNS operations in oceanic/remote areas have only been approved on short duration routes with options available to use other navigation aids in the event of LRNS malfunction.

ii. The guidelines for using GPS for IFR en route and terminal operations and for nonprecision instrument approaches in the U.S. national airspace system apply. These guidelines allow for single GPS units that have receiver autonomous integrity monitoring (RAIM) capability and are approved for IFR operations to serve as the S-LRNS on oceanic routes where an S-LRNS is allowed.

(7) *Loss or Malfunction.* Flightcrew procedures must be in place in the event of the loss of the S-LRNS after dispatch. The certificate holder must ensure that the pilots are trained on procedures to continue to navigate and to communicate with ATC in the event of S-LRNS malfunction.

(8) *RNP type specified.* Currently, there are no RNP type areas or routes where S-LRNS operations are authorized. Should such routes be authorized in the future, applicable guidance to that effect will be released.

F. Other Special Areas. Inspectors cannot authorize operations with S-LRNS in any other areas of operation without the review and concurrence of the navigation specialists and AFS-200. When a request to operate with S-LRNS in areas not described in this paragraph is received, inspectors must request assistance from one of the agency's navigation specialists. If the responsible inspector and the navigation specialist determine that the proposed operation can be safely conducted, a request for review and concurrence should be forwarded, through Regional Flight Standards Division, to AFS-200. In general, the required justification for the request and the ability to comply with the limitations and provisions set forth in the applicable guidance and OpSpec B054 for the authorization of the S-LRNS in another area will be necessary for this consideration.

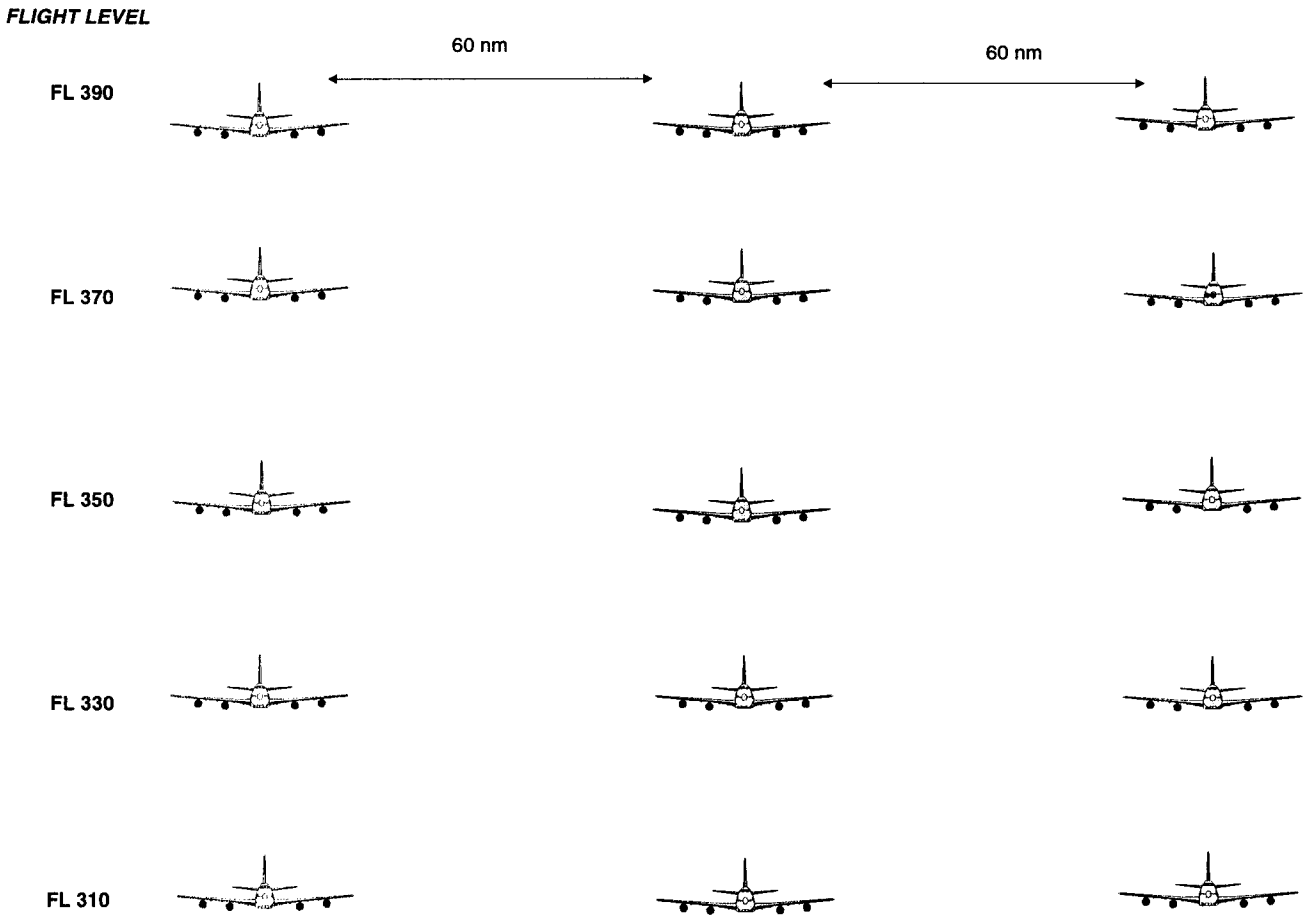
223. Q ROUTES. The Q Routes being published require either GPS or DME/DME updating. The route widths are conventional + 4 nautical miles. It is expected that the RNAV will be updating with GPS or DME/DME to obtain

this accuracy. DMEs along Q Routes are being identified to support the routes and operators need to be aware that only DMEs that re part of the NAS can be used (normally no TACANS) and if DMEs are in test mode radiating a signal they may not be used in navigation solution.

224. - 284. RESERVED.

FIGURE 4.1.5.1.

ILLUSTRATION OF NORTH ATLANTIC (NAT/MNPS) RECTANGULAR SEPARATION



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

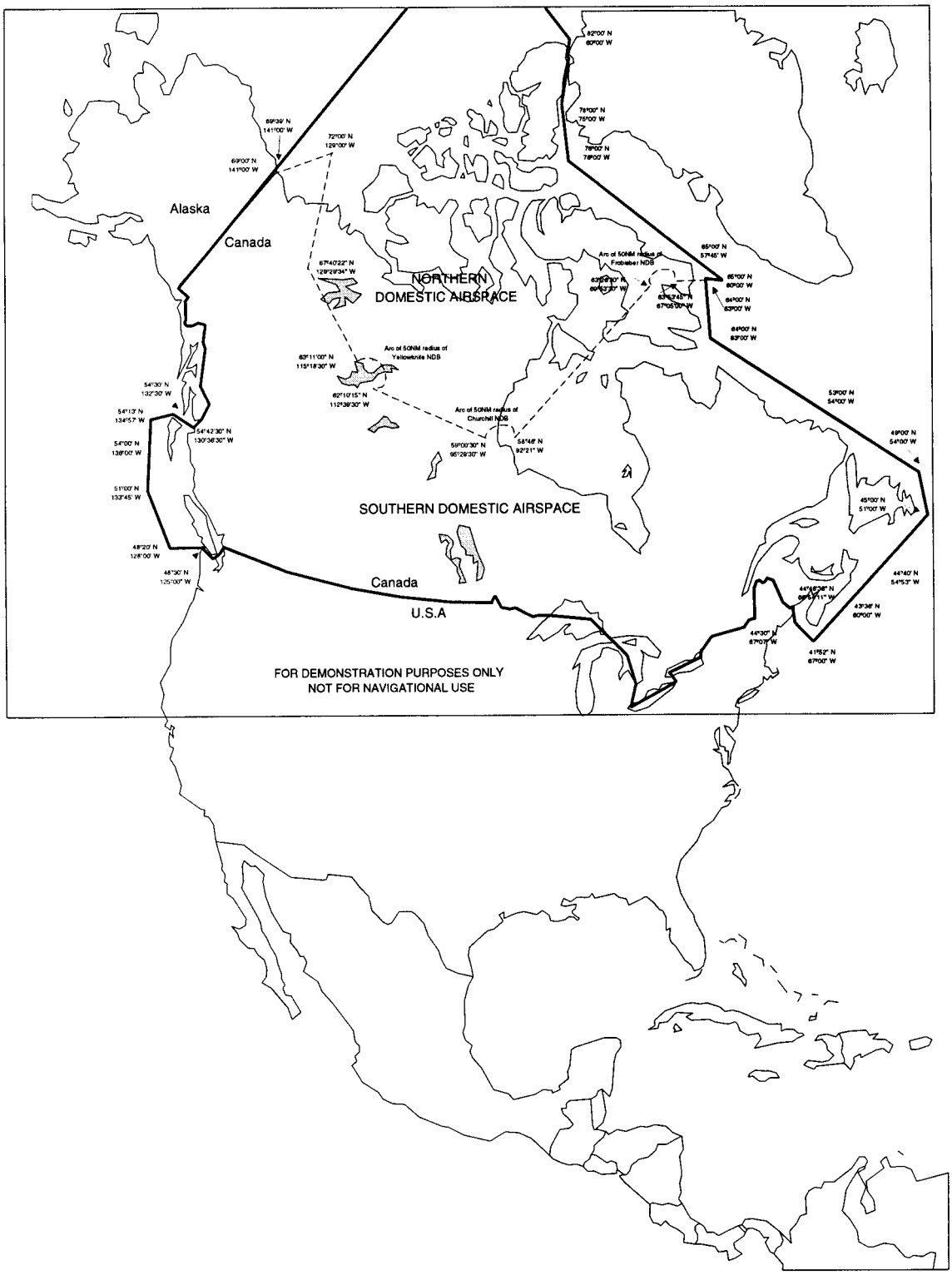
A. Lateral Separation. Lateral separation between co-altitude aircraft (aircraft at the same flight level) is 60 nm.

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

FIGURE 4.1.5.2
CANADIAN DOMESTIC AIRSPACE



[PAGES 4-85 THROUGH 4-106 RESERVED]