U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Oceanic and Remote Continental Airspace Operations

Date: 2/1/19 **AC No:** 91-70B
Initiated by: AFS-400 **Change:** 1

1. PURPOSE OF THIS ADVISORY CIRCULAR (AC). The Federal Aviation Administration (FAA) ("we") developed this AC to provide general information and guidance for commercial and General Aviation (GA) operators ("you") planning flights in oceanic and remote continental airspace. This guidance includes the authorizations you need for operations in such airspace outside the continental United States (CONUS).

2. PRINCIPAL CHANGES. This change aligns this AC with the Future of Flight Standards reorganization. This change also adds standard information in Chapter 1 and updates references, hyperlinks, and formatting throughout the AC.

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Robert C. Carty
Deputy Executive Director, Flight Standards Service

U.S. Department of Transportation
Federal Aviation Administration

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Subject: Oceanic and Remote Continental Airspace Operations

Date: 10/4/16 **AC No:** 91-70B

Initiated by: AFS-400 **Change:**

This advisory circular (AC) contains general information and detailed guidance for operators planning flights in oceanic and remote continental airspace, including authorizations needed for operations outside the continental United States (CONUS). This includes Performance-based Navigation (PBN) and Special Areas of Operation (SAO). The Federal Aviation Administration (FAA) revised this AC to focus on the evolving operations in airspace where air traffic control (ATC) provides procedural control. This AC is laid out in a chronological format, beginning with foundational information, followed by information on the training, authorizations, and equipment required to operate most efficiently in this airspace, and finishing with flight planning, flight execution, and contingency operations guidance. Our goal is to provide you with a template to guide you through planning and executing flight operations through oceanic and remote continental airspace. Information related to international operations in specific locales has been removed from this AC due to its transitory nature. Some region-specific information has been incorporated into the North Atlantic (NAT) Resource Guide for United States Operators, West Atlantic Route System, Gulf of Mexico, Caribbean Resource Guide for U.S. Operators, and Pacific Resource Guide for U.S. Operators. These online resource guides, along with the FAA Domestic/International Notices to Airmen (NOTAM), provide the most current information available to pilots, aircraft dispatchers and other operational control personnel preparing for oceanic and international operations. We have also included hyperlinks to many documents, available free or for purchase. The dynamics of oceanic and remote continental airspace operations are such that they are constantly evolving, and it is incumbent on you, the operators, to closely monitor any changes.

This AC neither is mandatory nor constitutes a regulation. When this AC uses mandatory language (e.g., “must” or “may not”), it is quoting or paraphrasing a regulatory requirement or prohibition. When this AC uses permissive language (e.g., “should” or “may”), it describes an acceptable means, but not the only means, of conducting that aspect of operations in oceanic and international airspace. However, if you use the means described in the AC, you must follow them in all important respects.

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CHAPTER 1. GENERAL

1.1 Purpose of This Advisory Circular (AC). The Federal Aviation Administration (FAA) ("we") developed this AC to provide general information and guidance for commercial and General Aviation (GA) operators ("you") planning flights in oceanic and remote continental airspace. This guidance includes the authorizations you need for operations in such airspace outside the continental United States (CONUS).

1.2 Audience. We have primarily targeted this AC at operators who do not yet have set procedures for flights through this type of airspace and can use this AC as a guide in developing their own procedures. We are also targeting GA pilots who do not fly regularly in oceanic and remote continental airspace and need a refresher on what to consider before, during, and after such a flight. Most commercial operators have company procedures for operations in oceanic and remote continental airspace. Those procedures have been accepted by FAA inspectors and conform to all relevant regulations and guidance. If you are working for one of these operators, this AC may serve to reinforce your company procedures.

1.3 Where You Can Find This AC. You can find this AC on the FAA's website at http://www.faa.gov/regulations_policies/advisory_circulars.

1.4 What This AC Cancels. AC 91-70A, Oceanic and International Operations, dated August 12, 2010, is canceled. AC 91-70, Oceanic Operations, and the North Atlantic International General Aviation Operations Manual (NAT IGA) are also obsolete.

1.5 Fundamental Changes from Previous Edition. Procedures for operating in oceanic and remote continental airspace are constantly evolving, and you should closely monitor any changes. We revised this AC to point you to the most current sources of international material. In some cases, we refer you to a website. You can also find supplements to this material by starting at https://www.faa.gov or by calling an FAA Special Areas of Operation (SAO) specialist. Contact information for an SAO specialist can be obtained from the responsible Flight Standards (FS) office. You may also be able to find this contact information on the North Atlantic (NAT) Resource Guide for United States Operators, Pacific Resource Guide for U.S. Operators, and West Atlantic Route System, Gulf of Mexico, Caribbean Resource Guide for U.S. Operators. In this AC, we include specific guidance for authorizations and conformance with other FAA policy issues. Host nation Aeronautical Information Publications (AIP) and international Notices to Airmen (NOTAM) also contain the most recent information.

1.6 Related Title 14 of the Code of Federal Regulations (14 CFR) Parts.

- Part 91, §§ 91.1 through 91.21, 91.101 through 91.143, 91.151 through 91.159, 91.167 through 91.193, 91.203, 91.205, 91.209 through 91.217, 91.221, 91.225, 91.227, 91.303 through 91.319, 91.323, 91.509, 91.511, 91.605, 91.609, 91.703 through 91.715, and 91.903; and Appendix G.
- Part 119, §§ 119.59 and 119.63.

- Part 121, §§ 121.11, 121.121, 121.163, 121.339, 121.351, 121.353, and 121.355; and Appendix G.
- Part 125, §§ 125.23, 125.45, 125.51, 125.203, 125.209, and 125.363.
- Part 135, §§ 135.3, 135.43, 135.145, 135.165, 135.167, and 135.183; and Appendix G.

1.7 Related Reading Material (current editions).

1.7.1 RTCA Documents. Available for purchase on the RTCA website at https://www.rtca.org/content/list-available-documents.

1. RTCA/DO-258/ED-100, Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications.
2. RTCA/DO-306/ED-122, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard).

1.7.2 FAA Technical Standard Orders (TSO).

1. TSO-C115, Flight Management System (FMS) Using Multi-Sensor Inputs.
2. TSO-C145, Airborne Navigation Sensors Using The Global Positioning System Augmented by the Satellite Based Augmentation System (SBAS).
3. TSO-C146, Stand-Alone Airborne Navigation Equipment Using The Global Positioning System Augmented by the Satellite Based Augmentation System (SBAS).
4. TSO-C196, Airborne Supplemental Navigation Sensors for Global Positioning System Equipment Using Aircraft-Based Augmentation.

1.7.3 FAA ACs.

1. AC 20-138, Airworthiness Approval of Positioning and Navigation Systems.
2. AC 20-140, Guidelines for Design Approval of Aircraft Data Link Communication Systems Supporting Air Traffic Services (ATS).
3. AC 20-150, Airworthiness Approval of Satellite Voice (SATVOICE) Equipment Supporting Air Traffic Service (ATS) Communication.
4. AC 90-80, Approval of Offshore Standard Approach Procedures, Airborne Radar Approaches, and Helicopter En Route Descent Areas.
5. AC 90-96, Approval of U.S. Operators and Aircraft to Operate Under Instrument Flight Rules (IFR) in European Airspace Designated for Basic Area Navigation (B-RNAV)/RNAV5 and Precision Area Navigation (P-RNAV).

6. AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace.
7. AC 90-114, Automatic Dependent Surveillance-Broadcast Operations.
8. AC 90-117, Data Link Communications.
9. AC 91-85, Authorization of Aircraft and Operators for Flight in Reduced Vertical Separation Minimum (RVSM) Airspace.
10. AC 120-42, Extended Operations (ETOPS and Polar Operations).
11. AC 120-100, Basics of Aviation Fatigue.
12. AC 120-103, Fatigue Risk Management Systems for Aviation Safety.
13. AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.

1.8 AC Feedback Form. For your convenience, the AC Feedback Form is the last page of this AC. Note any deficiencies found, clarifications needed, or suggested improvements regarding the contents of this AC on the Feedback Form.

CHAPTER 2. BACKGROUND INFORMATION FOR OPERATIONS IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE

2.1 The International Civil Aviation Organization (ICAO): Its Relationship to U.S. Aviation. As a charter member of ICAO, the United States has fully supported the organization's goals from its inception in 1947. ICAO works to achieve the highest level of standards and procedures for aircraft, personnel, airways, and aviation services throughout the world. ICAO oversees the international standards ascribed to by its more than 190 Member States for navigation facilities, airports, weather, and radio services. Through active support and participation in ICAO, the FAA strives to improve worldwide safety standards and procedures. ICAO's strategic objectives are to continue to establish and maintain Standard and Recommended Practices (SARP) for the safe and orderly development of international aviation. You should be familiar with the 19 ICAO Annexes, which contain more than 10,000 adopted SARPs.

Note: ICAO Member States are obligated to comply with the international SARPs contained in the 19 Annexes and supporting ICAO documents such as ICAO Document 4444, Procedures for Air Navigation Services—Air Traffic Management, and ICAO Document 7030, Regional Supplementary Procedures.

2.2 ICAO Annexes. Find all ICAO Annexes at the ICAO store at https://store.icao.int.

2.2.1 Annex 1, Personnel Licensing. Provides information on licensing of flightcrews, air traffic controllers, and aircraft maintenance personnel, including medical standards for flightcrews and air traffic controllers.

2.2.2 Annex 2, Rules of the Air. Contains visual flight rules (VFR) and instrument flight rules (IFR) for all operators.

2.2.3 Annex 3, Meteorological Services for International Air Navigation. Provides for meteorological services for international air navigation and reporting of meteorological observations from aircraft.

2.2.4 Annex 4, Aeronautical Charts. Contains specifications for aeronautical charts used in international aviation.

2.2.5 Annex 5, Units of Measurement to be Used in Air and Ground Services. Lists dimensional systems used in air and ground operations.

2.2.6 Annex 6, Operation of Aircraft (3 parts). Specifies minimum standards for below-listed operations throughout the world:

1. Part I, International Commercial Air Transport—Aeroplanes.
2. Part II, International General Aviation—Aeroplanes.
3. Part III, International Operations—Helicopters.

2.2.7 Annex 7, Aircraft Nationality and Registration Marks. Specifies requirements for registration and identification of aircraft.

2.2.8 Annex 8, Airworthiness of Aircraft. Specifies uniform procedures for certification and inspection of aircraft.

2.2.9 Annex 9, Facilitation. Provides for the standardization and simplification of border-crossing formalities.

2.2.10 Annex 10, Aeronautical Telecommunications:

1. Volume I, Radio Navigation Aids. Provides for standardizing communications equipment and systems.
2. Volume II, Communication Procedures Including Those With PANS Status. Standardizes communications procedures.
3. Volume III, Communications Systems. Standardizes communications systems.
4. Volume IV, Surveillance Radar and Collision Avoidance Systems. Standardizes surveillance radar and collision avoidance.
5. Volume V, Aeronautical Radio Frequency Spectrum Utilization. Standardizes aeronautical radio spectrum utilization.

2.2.11 Annex 11, Air Traffic Services. Includes information on establishing and operating air traffic control (ATC), flight information, and alerting services.

2.2.12 Annex 12, Search and Rescue. Provides information on organization and operation of facilities and services necessary for Search and Rescue (SAR).

2.2.13 Annex 13, Aircraft Accident and Incident Investigation. Provides for uniformity in notifying, investigating, and reporting on aircraft accidents.

2.2.14 Annex 14, Aerodromes:

1. Volume I, Aerodrome Design and Operations. Contains specifications for the design and equipment of aerodromes.
2. Volume II, Heliports. Contains specifications for the design and equipment of heliports.

2.2.15 Annex 15, Aeronautical Information Services. Includes methods for collecting and disseminating aeronautical information required for flight operations.

2.2.16 Annex 16, Environmental Protection:

1. Volume I, Aircraft Noise. Contains specifications for aircraft noise certification, noise monitoring, and noise exposure units for land-use planning.

2. Volume II, Aircraft Engine Emissions. Contains specifications for aircraft engine emissions.

3. Volume III, Aeroplane CO_2 Emissions.

2.2.17 Annex 17, Security. Specifies methods for safeguarding international civil aviation against unlawful acts of interference.

2.2.18 Annex 18, The Safe Transport of Dangerous Goods by Air. Contains specifications for labeling, packing, and shipping dangerous cargo.

2.2.19 Annex 19, Safety Management. Describes Safety Management System (SMS) development, regulatory framework, and supporting guidance.

2.3 Applicability of U.S. and International Regulations.

2.3.1 Regulatory Obligations. You must adhere to U.S. regulations, ICAO SARPs, and the "flight and maneuver" regulations of the countries you overfly or in which you land. The Aeronautical Information Publication (AIP) from each country is an important source of information and reference. The U.S. AIP, for example, includes a detailed description of where U.S. aviation regulations differ from ICAO SARPs and procedures. You will see similar listings of "differences" in other State AIPs.

2.3.1.1 You should be especially familiar with ICAO Annex 2 and whichever part of ICAO Annex 6 applies to your operation.

2.3.1.2 Title 14 CFR part 91, § 91.703 stipulates that you are bound by ICAO Annex 2 if you operate your U.S.-registered aircraft outside the United States.

2.3.1.3 In all cases, § 91.703 requires that you follow the rules of the countries that you overfly and those in which you intend to land. If the part of 14 CFR under which you operate conflicts with the rules of the country you are operating over/in, you must follow the rules of that country.

2.3.1.4 According to 14 CFR part 121, § 121.11 and part 135, § 135.3(a)(2), for operations under each respective part, when operating within a foreign country, you must comply with the air traffic rules of the country concerned and any local airport rules that may be in force. You must also follow all rules of that part that are more restrictive than the rules of the foreign country in which you are operating, as long as you can do so without violating the rules of that country.

2.3.2 Differing Airspace Requirements. It is quite possible to transit regions with significantly different procedures in one long-range flight. Therefore, you should familiarize yourself with the equipment and procedural requirements to file and fly in each segment of foreign airspace in which you intend to operate by referencing, for example, the appropriate State's AIP.

2.4 ICAO Guidance Documents and Reference Material. Find the following ICAO documents at the ICAO store at https://store.icao.int.

2.4.1 Guidance Documents. We developed much of the material in this AC from these foundational documents: ICAO Annexes, other ICAO guidance documents, related sections of 14 CFR, and other FAA guidance material.

2.4.2 The Convention on International Civil Aviation. We single out the following articles of ICAO Document 7300/9, Convention on International Civil Aviation, because of their importance in regulating international aviation. If you operate in oceanic and remote continental airspace, you should thoroughly understand them.

- Article 1, Sovereignty.
- Article 12, Rules of the Air.
- Article 29, Documents Carried in Aircraft.

2.4.3 ICAO Recommended Guidance Documents. Similar to our ACs, ICAO's Recommended Guidance Documents provide guidance and information intended to facilitate the uniform application of SARPs contained in the 19 Annexes to ICAO Document 7300/9. Therefore, you should familiarize yourself with the following documents (current editions) prior to undertaking operations in oceanic and remote continental airspace.

Note: Ensure you understand the primacy relationship between the various ICAO documents. For example, ICAO Annex 2 details loss of communications procedures, which it points out you are expected to follow unless amended by regional agreement. In this case, you would then consult ICAO Document 7030 to review the loss of communications guidance for a specific geographical area. FAA principal inspectors (PI) and Special Areas of Operation (SAO) specialists can help you understand the relationship between various ICAO documents.

2.4.3.1 ICAO Document 4444, Procedures for Air Navigation Services—Air Traffic Management. These procedures complement the SARPs contained in ICAO Annex 2 and Annex 11 and specify, in greater detail than in the SARPs, the actual procedures Air Traffic Service (ATS) units apply when providing various services to air traffic.

2.4.3.2 ICAO Document 7030, Regional Supplementary Procedures (SUPPS). For each ICAO region, Document 7030 provides detailed procedures designed to meet those needs of specific areas that are not covered in the worldwide provisions contained in the Annexes and Procedures for Air Navigation Services (PANS) documents. The SUPPS complement the statement of requirements for facilities and services contained in the Air Navigation Plan publications.

2.4.3.3 ICAO Document 8168, Procedures for Air Navigation Services—Aircraft Operations, Volume I, Flight Procedures. Document 8168, Volume I, describes operational procedures for flight operations personnel. It also outlines the various parameters upon which the safety criteria in Volume II, Construction of Visual and Instrumental Flight Procedures, are based in order to illustrate the need for all operational personnel to adhere strictly to the published procedures in order to maintain an acceptable level of safety in operations.

2.4.3.4 ICAO Document 9574, Manual on a 300m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive. Document 9574 provides States' regional planning groups with a basis for the revision of documents, procedures, and programs to enable the maintenance of a 300m (1,000 ft) vertical separation minimum between flight level (FL) 290 and FL 410 inclusive, in accordance with the criteria and requirements developed by ICAO. It provides guidance to State aviation authorities on those measures necessary to ensure that the criteria and requirements are met within their area of responsibility, as well as background information for operators to assist in the development of operating manuals and flightcrew procedures.

2.4.3.5 ICAO Document 9613, Performance-based Navigation (PBN) Manual. This manual provides practical guidance to States, air navigation service providers (ANSP), and airspace users on how to implement Area Navigation (RNAV) and Required Navigation Performance (RNP) applications, and how to ensure that the performance requirements are appropriate for the planned application.

2.4.3.6 ICAO Document 9869, Performance-Based Communication and Surveillance (PBCS) Manual. This guidance material explains the concepts of Required Communication Performance (RCP) and Required Surveillance Performance (RSP), identifies RCP and RSP requirements applicable to the provision and use of ATS, and provides a basis for the application of RCP and RSP in a specified airspace.

2.4.3.7 ICAO Document 10037, Global Operational Data Link (GOLD) Manual. The GOLD Manual addresses data link service provision, operator readiness, controller and flightcrew procedures, performance-based specifications, and post-implementation monitoring and analysis. GOLD provides guidance and information concerning data link operations and is intended to facilitate the uniform application of ICAO SARPs contained in ICAO Annex 2, Annex 10, and Annex 11; the provisions in ICAO Document 4444; and, when necessary, ICAO Document 7030.

2.4.3.8 ICAO Document 10038, Satellite Voice Guidance Material. This document is intended to maximize the operational benefits of Satellite Voice (SATVOICE) implementations by promoting seamless and interoperable SATVOICE operations throughout the world. The document provides

guidance and information concerning SATVOICE communications for aeronautical use and is intended to facilitate the uniform application of ICAO SARPs contained in ICAO Annex 2, the provisions in ICAO Document 4444, and, when necessary, ICAO Document 7030.

2.4.3.9 ICAO NAT Document 007, North Atlantic Operations and Airspace Manual. This document provides information for aircraft operating agencies, pilots, and dispatchers planning and conducting operations in or above the North Atlantic High Level Airspace (NAT HLA) (formerly known as Minimum Navigation Performance Specifications Airspace (MNPSA), effective February 2016). It also offers guidance to the State regulators responsible for the approval/certification/licensing of such aircraft operators, pilots, or dispatchers.

Note: General Aviation (GA) operators flying below NAT HLA should pay particular attention to Chapter 17, Flight Operations Below the NAT HLA, of this document. Information in the North Atlantic International General Aviation Operations Manual (NAT IGA) was incorporated into ICAO NAT Document 007 in 2013. Much of the information previously included in the NAT IGA has been updated and included here. The NAT IGA is no longer maintained as a separate document.

2.4.4 Other References:

1. Applicable FAA Domestic/International Notices to Airmen (NOTAM).
2. U.S. AIP and applicable foreign AIPs. Refer to the current AIP for any States whose airspace you intend to operate in/through. The AIP is the State's official publication that defines and describes the airspace, aeronautical facilities, services, and national rules and practices pertaining to air traffic, particularly if they differ from ICAO SARPs (so-called "differences" are listed in AIPs).
3. Regulations of the foreign countries over which you intend to fly.
4. The customs procedures, cultural considerations, entry and overflight procedures, and health and safety precautions for each country in which you intend to land.
5. The oceanic and remote section of the FAA's Flight Operations Group web page, found at http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs410/oceanic_remote.

2.5 Authorization to Operate in SAOs. SAOs are areas with unique characteristics that require you to use special equipment, procedures, and/or techniques to safely conduct your flight operations. In some SAOs, the ATC system supports an increased airspace capacity by reducing required separation between aircraft. This reduction in separation requires improved levels of performance and in some cases more stringent procedures.

To fly in airspace considered an SAO, you need to obtain an operational authorization from the Administrator in the form of an operations specification (OpSpec), a management specification (MSpec), or a Letter of Authorization (LOA), depending on what part of 14 CFR governs your operations.

1. If you operate under 14 CFR part 121, 125, or 135, you require OpSpecs.
2. GA operators under parts 91 and 125 (including part 125 Letter of Deviation Authority (A125 LODA) holders) may require LOAs.
3. If you are a fractional ownership operator under part 91 subpart K (part 91K), you require MSpecs.
4. You can find a list of common oceanic and remote and SAO-specific OpSpecs/MSpecs/LOAs in Appendix B, Special Areas of Operation and OpSpec/MSpec/LOA. SAO specialists will have the most up-to-date information regarding airspace or capabilities requirements requiring approval.
5. The North Atlantic (NAT) Resource Guide for United States Operators, West Atlantic Route System, Gulf of Mexico, Caribbean Resource Guide for U.S. Operators, and Pacific Resource Guide for U.S. Operators include detailed charts that provide cross references for various oceanic OpSpecs/MSpecs/LOAs and associated guidance documents.

2.6 Authorization Process Relative to SAO. We have developed a five-phase process for you to gain approval for a desired operation. The responsible Flight Standards (FS) office can provide you with the details pertinent to each phase and your specific requirements.

2.6.1 Phase 1. You determine a need for authorization and contact the FAA.

2.6.2 Phase 2. You formally submit a proposal for FAA evaluation.

2.6.3 Phase 3. We evaluate the request and determine what level of demonstration is required. We may conduct the demonstration within the responsible FS office, at your site of operations, or at both facilities.

2.6.4 Phase 4. We observe and evaluate a demonstration of your ability to perform in accordance with your proposal. This is an operational evaluation. If you don't pass, we will notify you at this time.

Note: Flight or line observations are not required for GA LOA applications. For GA operators, we evaluate your application and normally conduct an in-person knowledge validation (tabletop exercise and/or static airplane demonstration).

2.6.5 Phase 5. If you pass the evaluation, we approve your proposal. We will grant approval by issuing an OpSpec/MSpec/LOA.

2.7 Web-Based Operations Safety System (WebOPSS).

2.7.1 WebOPSS Access. WebOPSS is the FAA's regulatory document management system for issuing OpSpecs, MSpecs, and LOAs to air operators as indicated in 14 CFR. Authorized aviation industry personnel can apply for access to WebOPSS through their PIs. WebOPSS access allows industry personnel to view and propose changes to their authorizations, which can expedite applications.

2.7.2 WebOPSS Training. You will require training prior to receiving WebOPSS access. You can accomplish the training either through an FAA inspector or by taking the WebOPSS formal training course through the FAA's Mike Monroney Aeronautical Center (MMAC).

CHAPTER 3. PILOT QUALIFICATION AND TRAINING GUIDANCE FOR INTERNATIONAL, OCEANIC, AND REMOTE CONTINENTAL AIRSPACE OPERATIONS

3.1 Operator/Pilot-in-Command (PIC) Responsibilities—International Operations.

3.1.1 Operator Responsibilities. In Annex 6, ICAO makes the following stipulations for flights outside the jurisdiction of Member States:

1. An operator will ensure that all employees, when abroad, know that they must comply with the laws, regulations, and procedures of those States where they conduct operations.
2. An operator will ensure that all pilots are familiar with the laws, regulations, and procedures pertinent to the performance of their duties prescribed for the areas traversed, the airports used, and the related air navigation facilities.
3. The operator will ensure that other members of the flightcrew are familiar with these laws, regulations, and procedures that are pertinent to the performance of their respective duties in the operation of the aircraft.

3.1.2 PIC Responsibilities. As a PIC conducting flight operations in international airspace, you must:

1. Comply with the relevant laws, regulations, and procedures of the United States.
2. Assume responsibility for the operation and safety of the aircraft and for the safety of all persons aboard your aircraft during flight time.
3. Notify the appropriate Air Traffic Service (ATS) unit, as soon as circumstances permit, of actions you took in an emergency which necessitated immediate action and involved a violation of local regulations or procedures. Ensure they understand that you took this action under your emergency authority as PIC. You must also submit a report on any such violation to the appropriate authority of that State, if required.
4. Notify the nearest appropriate authority, by the quickest means available, in the event of an accident or incident involving the airplane which results in the serious injury or death of any person, or results in substantial damage to the airplane or property.

3.2 Training Requirements for Oceanic and Remote Continental Airspace Operations.

3.2.1 Commercial Operator Training. Operators (other than GA operators) conducting flights in oceanic and remote continental airspace are required to have training approved by the Administrator. Your training programs will receive approval in conjunction with your company's certification and prior to our issuance of OpSpecs or MSpecs.

3.2.2 GA Training. If you are a GA pilot desiring to fly in oceanic and remote continental airspace, you may need operational approval via an LOA (see paragraph 2.5). One or more of the following actions may satisfy the requirements for us to issue an LOA:

1. Completing an operator's oceanic operations training program.
2. Completing a commercial oceanic operations training program.
3. Submitting military training records indicating prior oceanic operations experience.
4. Using other methods indicating that you can safely conduct oceanic operations. Examples could include written testing, oral testing, or evidence of prior experience.

3.2.3 Relevant Subject Matter. The following items are examples of the subject matter with which you should be familiar in order to conduct operations in oceanic and remote continental airspace:

1. Title 14 CFR (applicable parts).
2. ICAO SARPs.
3. ICAO measurement standards.
4. Use of oceanic flight planning charts.
5. Sources and content of international flight publications.
6. Itinerary planning and overflight clearances.
7. Meteorology, including significant weather (SIGWX) charts, prognostic weather charts, tropopause prognostic charts, and Terminal Aerodrome Forecasts (TAF), as well as contingency procedures for weather diversions.
8. Preparation of international flight plans, plotting charts, and operational flight plans/flight logs, to include ETP calculations. These include the Communications, Navigation, and Surveillance capability codes appropriate to your aircraft and your operational authorization.
9. Specific airspace requirements, to include communications, navigation, and surveillance equipment requirements, as well as operational procedures related to Reduced Vertical Separation Minimum (RVSM) and RNP.
10. Long-range, air-to-ground communication procedures, including all data link and satellite communications (SATCOM) voice operations, as applicable.
11. En route and terminal procedures—differences from U.S. procedures.
12. Use of oceanic checklists.
13. Oceanic error risk mitigations.
14. Understanding of Strategic Lateral Offset Procedures (SLOP).
15. Air traffic clearances, to include proper terminology and phraseology.

16. Emergency and contingency procedures (see Appendix F, Special Procedures for In-Flight Contingencies in Oceanic and Remote Continental Airspace), including required emergency equipment, SAR techniques, navigation equipment failure techniques, and communication equipment failure techniques.
17. Specialized training, if conducting operations in areas of magnetic unreliability (AMU), as applicable.
18. Use of polar/remote area checklists.
19. Polar/remote area error risk mitigations.

CHAPTER 4. COMMUNICATIONS, NAVIGATION, AND SURVEILLANCE SYSTEMS GUIDANCE FOR OPERATIONS IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE

4.1 Communications, Navigation, and Surveillance Improvements—Impact on Air Traffic Services (ATS).

4.1.1 Technological Advances. Technological advances in ground-based computers, space-based signals, and aircraft communications, navigation, and surveillance systems all contribute to an air traffic system that provides increased navigational accuracy and allows you and your aircraft to interact more quickly with controllers. These advances have also improved controller-pilot communications, navigation accuracy, and aircraft surveillance reporting. This enhanced communications, navigation, and surveillance capability greatly reduces the errors and retransmissions that hampered oceanic flights just a few years ago. These safety improvements have facilitated corresponding improvements in efficiency and capacity, where aircraft are now allowed to fly closer to each other (separation minima have been reduced). Regional airspace managers continually update equipment requirements, making it incumbent on you to fully understand the current equipment, training, and authorization requirements for any airspace in which you intend to operate.

4.1.2 Automatic Dependent Surveillance-Broadcast (ADS-B). ADS-B supports these improvements by providing a higher update and enhanced accuracy of surveillance information over the current radar-based surveillance systems. ADS-B Out capability will be required, beginning January 1, 2020, for operations throughout much of the U.S. National Airspace System (NAS). A number of other countries are also implementing widespread use of ADS-B.

4.2 Performance-Based Operations.

4.2.1 Measures of Performance. Performance-based operations relies on Required Communication Performance (RCP), Required Navigation Performance (RNP), and Required Surveillance Performance (RSP). It uses these three primary measures of performance to determine required separation between flights, both in radar contact and in oceanic and remote continental airspace. ATS providers determine separation requirements based on a combination of these three performance indicators.

4.2.2 RCP. RCP establishes aircraft/controller communications timeline, equipment, and flightcrew training standards. Generally, you can measure RCP in terms of the timeline required to complete the communication transaction and the continuity, availability, and integrity of the transaction. In oceanic and remote continental airspace, RCP 240 and RCP 400 are the prevalent performance standards.

4.2.2.1 RCP 240 requires a 99.9 percent probability (continuity) the communications transaction will complete in less than 240 seconds (timeline). It also requires a 99.99 percent probability the communication can be initiated (availability) and

no more than 10^{-5} communications transaction malfunctions per flight-hour (integrity).

4.2.2.2 RCP 400 requires a 99.9 percent probability (continuity) the communications transaction will complete in less than 400 seconds (timeline). It also requires a 99.9 percent probability the communication can be initiated (availability) and no more than 10^{-5} communications transaction malfunctions per flight-hour (integrity).

4.2.2.3 For additional details, please see the current editions of the International Civil Aviation Organization (ICAO) Document 10037, Global Operational Data Link (GOLD) Manual, Appendix B, RCP Specifications, and ICAO Document 9869, Performance-based Communication and Surveillance (PBCS) Manual, at https://store.icao.int.

4.2.3 RNP. RNP establishes aircraft navigation accuracy, equipment, and flightcrew training standards. ICAO Document 9613, Performance-based Navigation (PBN) Manual, outlines these standards. Generally, we measure these standards in terms of accuracy, integrity, continuity, availability, and functionality. Oceanic and remote continental airspace ATS providers primarily provide RNP 10- (also known as Area Navigation (RNAV) 10) and RNP 4-based separation minima. RNP 2 applications have also become available for oceanic and remote continental airspace, to be used by individual States as necessary to meet their airspace requirements. In all cases, ATS providers will determine separation minima between adjacent aircraft based on the authorized capability each aircraft operator files in the flight plan.

1. RNP 10 requires an aircraft to be capable of remaining within 10 nautical miles (NM) of centerline 95 percent of the time and within 20 NM 99.999 percent of the time.
2. RNP 4 requires an aircraft to be capable of remaining within 4 NM of centerline 95 percent of the time and within 8 NM 99.999 percent of the time.
3. RNP 2 requires an aircraft to be capable of remaining within 2 NM of centerline 95 percent of the time and within 4 NM 99.999 percent of the time.

4.2.4 RSP. RSP establishes aircraft/controller surveillance timeline and equipment standards. Generally, you can measure RSP in terms of the timeline required to complete the transaction and the continuity, availability, and integrity of the transaction. In oceanic and remote continental airspace, RSP 180 and RSP 400 are the prevalent performance standards.

4.2.4.1 RSP 180 requires a 99 percent probability (continuity) the surveillance transaction will complete in less than 180 seconds (timeline). It also requires a 99.99 percent probability the communication can be initiated (availability) and no more than 10^{-5} communications transaction malfunctions per flight-hour (integrity).

4.2.4.2 RSP 400 requires a 99 percent probability (continuity) the surveillance transaction will complete in less than 400 seconds (timeline). It also requires a 99.9 percent probability the communication can be initiated (availability) and no more than 10^{-5} communications transaction malfunctions per flight-hour (integrity).

4.2.4.3 For additional details, please see ICAO Document 10037, Appendix C, RSP Specifications.

4.2.5 Access to Performance-Based Routes. The communications, navigation, and surveillance capabilities of your crew and equipment determine your eligibility for operations specification (OpSpec)/management specification (MSpec)/Letter of Authorization (LOA) authorizations that enable you to take advantage of the performance-based routes in oceanic and remote continental airspace. The significant improvements in communications, navigation, and surveillance systems have allowed air traffic controllers to reduce separation between aircraft, expanding access to the routes that offer you the maximum savings in time and fuel.

Note: For a list of pertinent OpSpecs/MSpecs/LOAs, please see Appendix B, Special Areas of Operation and OpSpecs/MSpecs/LOAs.

4.3 Voice Communications in Oceanic and Remote Continental Airspace. ICAO Annex 6 (all three parts) requires those airplanes operating under instrument flight rules (IFR) to have installed and approved radio communication equipment capable of conducting two-way communications at any time during the flight. When operating over the high seas, ICAO Annex 2 requires you to equip your aircraft with a functioning two-way radio, to establish two-way radio communications with the appropriate air traffic control (ATC) unit, and to maintain a continuous listening watch on the appropriate radio frequency.

Note: It is not acceptable to depend solely on radio relay operations to satisfy this requirement. The appropriate authority for the airspace where you conduct the flight may prescribe the aeronautical stations and frequencies used for two-way communications.

4.3.1 High Frequency (HF) Radio Communications. HF radios have been in use for almost a century over oceanic and remote continental areas. As technological advances lead to more sophisticated methods of communication, HF equipment has also improved. HF radios now offer digital tuning, compact size, selective calling systems (SELCAL) (see below), and new antenna concepts. Consider the following when using HF communications:

4.3.1.1 HF radio calls are normally relayed electronically, via keyboard and display, to air traffic controllers by a radio operator. There is often a delay between your requests and ATC clearance. The radio operator does not have the authority to approve your request and must coordinate with the appropriate controller for that approval.

4.3.1.2 Communications over HF radio rely heavily on proper radio terminology and scripted reports. Use the published guidance found in en route publications or the Aeronautical Information Manual (AIM) to make sure you deliver messages in the proper format. Speak at a moderate speed using the internationally accepted phraseology. You may find ICAO standard phraseology in ICAO Document 9432, Manual of Radiotelephony. This document and other ICAO reference materials can be found on ICAO's website at https://store.icao.int.

4.3.1.3 If ATC uses the terms "expect" or "when are you able," they have not granted you a clearance. Typically, oceanic radio operators will use the phraseology "ATC clears…" when relaying a clearance.

4.3.1.4 You must read back every clearance received from ATC. Ensure that ATC acknowledges your exact read back to confirm that you correctly heard the instructions.

4.3.1.5 In general, higher frequencies (above 10.0 megahertz (MHz)) work better during daylight and lower frequencies (below 10.0 MHz) at night. It is not uncommon to use several frequencies on one flight while communicating with the same ATS provider.

4.3.1.6 HF communications are dependent on transmitted signals striking the ionosphere and reflecting back to antennae at ground stations. The ionosphere is susceptible to interference from space weather, resulting in periods where HF reception is marginal or unreadable. You may especially notice this phenomenon in polar regions above 60° N or below 60° S and during periods of significant solar activity.

4.3.2 SELCAL. SELCAL is a means to alert an individual aircraft that a ground station wishes to communicate with it. ATS providers can transmit SELCAL signals over very high frequencies (VHF) or HF. The signals produce an audio tone and possibly a cockpit light or message that alerts you to initiate contact with the appropriate ATC unit.

4.3.2.1 The SELCAL codes are controlled by a commercial service and are assigned to a specific aircraft. Since the number of unique SELCAL codes is less than the number of aircraft with SELCAL capability, multiple aircraft could be operating and logged in with the same SELCAL code assignment.

4.3.2.2 When you apply for SELCAL codes for your aircraft, the issuing company will deconflict duplicate codes by region as much as possible. However, aircraft flying in multiple regions may encounter another aircraft using the same code. You must ensure that the SELCAL contact you respond to is intended for your aircraft.

4.3.2.3 Efforts are underway to increase the number of codes by expanding the number of audible tones that make up the system. The newest SELCAL equipment will use alphanumeric instead of the alpha-only codes, increasing

the number of unique identifiers from the current 10,920 to 215,760. Implementation of the new system is expected to begin in the 2017 timeframe. Operators with HF SELCAL systems not compatible with the new alphanumeric codes may continue to encounter other aircraft with duplicate codes.

4.3.2.4 Check HF SELCAL even when your Controller-Pilot Data Link Communication (CPDLC) is working properly. You should do a SELCAL check prior to oceanic entry and then again at each control area (CTA) boundary.

4.3.3 Satellite Voice (SATVOICE). In keeping with ICAO's recognition of SATVOICE as a valid long-range communication system (LRCS), the FAA accommodates SATVOICE through arrangements with the recognized Aeronautical Mobile Satellite Service (Route) (AMS(R)S) providers. Direct SATVOICE contact between the pilot and ATC is currently limited to distress and urgency situations, or other exceptional circumstances only. For oceanic communications service provider relay to ATC, SATVOICE short codes are published in the U.S. Aeronautical Information Publication (AIP). As this technology evolves, ensure that you comply with the latest authorizations. For additional guidance, refer to ICAO Document 10038, Satellite Voice Guidance Material.

4.3.4 Radio Frequency Changes. Radio frequencies are constantly changing. Thus, it is important that you consult the appropriate AIP, current oceanic charts, and commercial en route publications for the most current information.

- ICAO NAT Document 007 describes North Atlantic (NAT) operations, to include communication and navigation procedures in NAT airspace.
- Commercially published navigation charts contain details of communication procedures on inserted panels. Exercise some caution in using this reference, as they may be on a different update cycle than the source documents and therefore could be not completely up to date.

4.4 CPDLC and Automatic Dependent Surveillance-Contract (ADS-C). Since the mid-1990s, data link communications systems have enhanced contact between ATS providers and the flight deck. These communication systems are now widely used throughout the world and have also led to the implementation of Automatic Dependent Surveillance (ADS) systems that further improve ATS capability. CPDLC technology improves communications between aircraft and ATS providers. CPDLC eliminates the often challenging HF voice communications that were the only communication link with oceanic and remote continental airspace air traffic controllers for decades. With CPDLC, you and the controller transfer ATC clearance requests and instructions digitally, reducing the likelihood of miscommunication. ADS-C is also widely used in oceanic and remote continental airspace and, in combination with CPDLC, has become required equipment to be assigned the most efficient routes across the NAT organized track system (OTS), where ATC allows minimum separation between aircraft.

Note 1: In ADS-C, C = "Contract." The controller sets up one or more electronic contracts with your aircraft to automatically provide time-triggered (periodic) and/or condition-triggered (e.g., deviation event) reports.

Note 2: Equipage with CPDLC does not eliminate the requirement for operable two-way radios. For most oceanic operations this means operable HF radios are required.

4.4.1 Access to Preferred Airspace. Since equipment like CPDLC and ADS-C improves the efficiency with which aircraft in oceanic and remote continental airspace can be controlled, such better-equipped aircraft are being better served through initiatives to reserve preferred blocks of oceanic airspace for those aircraft. Preferred altitudes and routes around the world are more readily issued to aircraft equipped with robust communications, navigation, and surveillance capabilities.

4.4.2 Flight Management Computer Waypoint Reporting (FMC WPR) Service. FMC WPR service is one of the original data link capabilities, whereby your FMC sends a waypoint report to the ATS provider via Aircraft Communications Addressing and Reporting System (ACARS) or CPDLC. It is gradually being replaced by automatic position reporting via ADS-C systems.

4.5 Data Link Systems—Operational Authorization to Use. We will grant operational authorization for operators to use data link by issuing OpSpec/MSpec/LOA A056, Data Link Communications, as appropriate.

Note: OpSpec/MSpec/LOA A056 also applies to datalink communications in overland areas, such as Aeronautical Telecommunications Network Baseline 1 (ATN B1) (formerly Link 2000+), used in European airspace.

4.5.1 Procedures for Obtaining Authorization. You are required to obtain operational authorization prior to using data link systems on designated oceanic and remote continental airspace routes. You can find our guidance on the process and procedures for operational authorization and aircraft data link system approval in the current editions of the following documents:

- AC 20-140, Guidelines for Design Approval of Aircraft Data Link Communication Systems Supporting Air Traffic Services (ATS).
- AC 90-117, Data Link Communications.

4.5.2 Data Link Requirements and Standards. You can consult ICAO Document 10037, GOLD, for additional information on data link requirements and standards.

4.6 ATC in Oceanic and Remote Continental Airspace.

4.6.1 Procedural Airspace. Oceanic and remote continental airspace is nonradar (i.e., where the separation of aircraft does not depend on ground-based radar coverage) and where there is no other form of surveillance such as ADS-B. It is considered "procedural airspace."

ATS providers in oceanic and remote continental airspace primarily provide procedural control and procedural separation to all flights.

4.6.1.1 These facilities issue clearances and instructions providing separation vertically and horizontally, based on the specific aircraft equipment authorizations you indicate on your flight plan. Because of ATC's lower confidence in the aircraft's reported position, adjacent aircraft under procedural control are kept farther apart from each other than under radar control.

4.6.1.2 ATC monitors your compliance with the issued clearance. Your aircraft position reports are processed for conformance with the clearance. If your aircraft is equipped with ADS-C, it provides trigger alerting for lateral and vertical deviations.

4.6.1.3 In order to make this nonradar airspace traffic management system work the way it is designed, you must provide timely and accurate time estimates (estimated time of arrival (ETA)) and operate with strict discipline and adherence to ATC clearances and procedures, both normal and contingency.

4.6.1.4 Controllers manage longitudinal separation in procedural airspace by assigning speeds, either true Mach number or true airspeed. An airspeed assignment is one element of an oceanic clearance. Proper separation of aircraft is dependent upon pilots maintaining the speed assigned with the oceanic clearance (not to be confused with the flight plan speed); therefore, compliance with the speed assignment is mandatory.

4.6.2 ICAO Procedures for Specific Geographical Areas. You will find detailed ICAO procedures for specific geographical areas in ICAO Document 7030, Regional Supplementary Procedures. FAA ATC bases its procedures for oceanic and remote continental airspace on ICAO Standard and Recommended Practices (SARP).

4.6.3 U.S. ATS in Oceanic and Remote Continental Airspace. The United States provides ATS in oceanic and remote continental airspace as follows:

- Atlantic Ocean: New York, Miami, and San Juan Flight Information Regions (FIR).
- Gulf of Mexico: Miami and Houston FIRs.
- Pacific Ocean: Oakland and Anchorage FIRs.
- Arctic Ocean: Anchorage Arctic FIR.
- Alaska Remote Continental Airspace: Anchorage Air Route Traffic Control Center (ARTCC).

4.6.4 Advanced Technologies and Oceanic Procedures (ATOP). U.S. controllers utilize the ATOP (also referred to as Ocean21) System in the airspace of Oakland Oceanic, New York Oceanic, and Anchorage Oceanic FIRs.

4.6.4.1 Within this airspace, ATOP identifies suitably equipped aircraft for the controller (such as CPDLC and ADS-C), provides decision support tools for establishing the separation minima for all pairs of aircraft along a cleared profile, and provides aircraft profile conformance monitoring and protection.

4.6.4.2 ATOP deciphers flight plan information to determine which separation standards may be applied to a particular aircraft based on filed aircraft equipage. The system is capable of determining separation standards which may be applied between aircraft with different equipage and speeds. You must notify ATC immediately if your communications, navigation, and surveillance equipment capability degrades below that which you listed in your flight plan.

4.6.4.3 ATOP protects random routes of an individual aircraft and can issue conflict warnings in excess of 2 hours ahead of the event, depending on local adaptation. ATOP can also adapt to the separation standards applied by adjacent ATC facilities and can warn the controller when a conflict will occur based on the adjacent ATC facility's requirements. This allows controllers to effectively plan for transitions to adjacent FIRs.

4.6.4.4 You can find specific information regarding ATC separation standards in the current edition of FAA Order JO 7110.65, Air Traffic Control. Additionally, trial periods where new separation standards are being applied will be announced via FAA International Notices to Airmen (NOTAM).

4.7 Special Use Airspace (SUA).

4.7.1 Warning Area. A warning area is airspace of defined dimensions extending from 3 NM outward from the coast of the United States that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such a warning area is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

4.7.2 Prohibited Areas. ICAO specifies that these areas exist "above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited."

4.7.3 Restricted Areas. ICAO specifies that these areas exist "above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions."

Note: Carefully review charts for these types of areas when you plan your flight, taking note of the area operating times and restrictions. You should also review applicable oceanic NOTAMs.

4.8 Air Defense Identification Zones (ADIZ). Title 14 CFR part 99, Security Control of Air Traffic, discusses defense areas and ADIZ. You can check part 99, the latest U.S. AIP, the latest AIM (Chapter 5, Section 6), and all FAA NOTAMs Domestic/International to ensure compliance with national security requirements in the ADIZ.

4.9 World Geodetic System 1984 (WGS 84). ICAO and the United States endorse the WGS 84 or equivalent as the geodetic reference datum standard for air navigation latitude and longitude coordinates. WGS 84 was developed in response to the aviation community's need for a common geodetic reference system and to standardize aeronautical surveys and related products. You should determine in advance whether any countries you intend to fly over or into are WGS 84-compliant. Information about WGS 84 compliance is often noted on plates used in terminal operations or on airfield diagrams. A State's AIP generally notes compliance with WGS 84. Most areas of the world are listed as: 1) Unknown (U); 2) Partially Compliant (PC); 3) Compliant (C); or 4) Noncompliant (NC) with WGS 84.

Note: Commercial charting vendors also post information on their websites about specific countries and their compliance with WGS 84.

4.9.1 Operations in Areas That Are Not WGS 84-Compliant. Flight manuals often include a note for long-range navigation systems (LRNS) indicating that, for countries or terminal areas that are not WGS 84-compliant, the crew should deselect the use of Global Navigation Satellite Systems (GNSS). You should be familiar with your flight manual limitations when flying in countries or terminal areas that are not WGS 84-compliant.

CHAPTER 5. FLIGHT PLANNING GUIDANCE FOR INTERNATIONAL AND OCEANIC AND REMOTE CONTINENTAL AIRSPACE OPERATIONS

5.1 Lead Time Requirements.

5.1.1 Preparation. Your preparation for a successful international flight, whether you fly large or small aircraft, starts with adequate planning and training. The lead time required for planning varies depending on such things as experience, training, and currency, as well as specific country requirements, and could exceed 30 days. Dispatch/flight locator departments available to 14 CFR part 121 operators and large 14 CFR part 135 operators could reduce certain planning time requirements.

5.1.1.1 Remember that many countries have long lead times to process visas or other necessary paperwork to approve an international flight. Depending upon the country, it may take up to 6 weeks to obtain visas and/or overflight and landing permits.

5.1.1.2 Ensure you are aware of current and special notices relating to entry and overflight requirements for the countries on your itinerary. In most cases outside North America and Europe, you obtain prior permission to land in or overfly a country directly from that country's Civil Aviation Authority (CAA). You can also find information on immunizations, ports of entry, and other important requirements in the country's Aeronautical Information Publication (AIP) and in various commercial publications.

5.1.2 Verification. You need to allow enough lead time to ensure your planning is thorough, complete, and correct. Always cross-check and verify any flight planning products against the appropriate source documents. By doing so, you could uncover potential errors before they result in a pilot deviation.

5.2 Preparing an Itinerary.

5.2.1 Itinerary Factors. Preparing the itinerary is one of the most important aspects of your international flight. You may want to consider the following questions when developing your itinerary:

1. To which destinations do I intend to fly (or overfly)?
2. Via what routes and altitudes?
3. Are there any terrain clearance concerns along those routes at those altitudes?
4. Have I identified any concerns with suitable Equal Time Point (ETP) alternates along those routes and altitudes?
5. Are there any pitfalls I should be aware of from each State's AIP?
6. What communications, navigation, and surveillance equipment and authorizations must I have in order to fly my intended routes and altitudes?

7. Will I be operating in a Special Area of Operation (SAO)? Do I have the necessary operational authorization(s) to do so?
8. With regard to my Global Navigation Satellite System (GNSS) equipment, are there any World Geodetic System 1984 (WGS 84) compliance issues in countries I intend to transit? (Paragraph 4.9 provides information on WGS 84.)
9. What survival equipment must I have on board in order to fly my intended routes?
10. Are there suitable en route and destination alternates available in the event of an emergency diversion at other than my intended en route altitude? Are there terrain clearance or oxygen considerations at those divert altitudes?
11. Does my preferred destination have instrument approaches and arrival and departure procedures that are compatible with my aircraft equipment and authorizations?
12. What crew rest requirements will I have for each destination?

Note: See paragraph 5.3 below regarding fatigue management issues.

13. Do I intend to use a flight planning or dispatch service for my trip?
14. If my routes take me through oceanic airspace, have I reviewed the following:
    - Oceanic error mitigation procedures?
    - Oceanic flight planning, plotting charts, navigation, and waypoint procedures?
    - My oceanic checklist?
    - Strategic Lateral Offset Procedures (SLOP)?
    - En route procedures for each airspace I will pass through?
    - Oceanic contingency procedures?
15. Are there specific pilot certification, type rating, and/or medical certificate requirements for the countries I'll be visiting? Are single-pilot operations authorized?
16. Will my intended route take me through areas of volcanic activity?
17. If my route takes me through polar areas, have I researched the unique risks inherent to operations on polar routes?

5.2.2 Country-Specific Issues and Requirements. As part of your itinerary preparation, asking the following additional questions can help you determine the country-specific issues/airspace requirements that might affect your international flight:

1. Do I require overflight and landing permits for any of the airspace/airfields I will transit?
2. How much will overflight and landing fees cost, and how do I pay for each airspace and destination I intend to transit (e.g., credit card, cash, local currency, U.S. currency)?
3. How much advance notification do I need to provide prior to arrival?

Note: All countries require some form of advance notification of arrival. You should carry a copy of the advance notification, as well as confirmation that the notification was sent. This is particularly important for countries that do not normally return approvals.

4. What are the availability, types, and duration of visas, tourist cards, and other required entry documents for all countries I intend to visit, as well as those with potential alternate airports (in the event I have to divert)?

Note: Some countries require that you have a visa for the next country of entry before departure, as well as proof of required immunizations for that country. You can obtain this information from the U.S. Department of State (DOS).

5. Are there prohibitions, restrictions, and/or applicable notices for countries I intend to visit?

Note: The FAA's website includes a special section on prohibitions, restrictions, and notices applicable to foreign countries at http://www.faa.gov/air_traffic/publications/us_restrictions/. You should pay particularly close attention to this aspect of your flight planning.

6. What is the normal work week for countries I intend to overfly/enter?

Note: Understanding this will help you coordinate for visas and overflight/landing permits. You can obtain this information from the DOS.

7. Are there any import regulations I need to consider, given the amount of time I intend to remain in the countries on my route?

Note: Aircraft that remain within the territorial limits of a country for an extended period of time may become subject to import regulations and impoundment. Determine in advance the number of days that an aircraft may remain in any country where the aircraft will land.

8. What hours are customs, immigration, and other services operational?
9. Do I intend to conduct any operations that might be considered "cabotage?"

5.2.3 Airport-Specific Issues. Consider the following airport-specific issues when planning for your overseas trip:

1. What time considerations can affect your trip?
   - What is local time at each of my destination airports in terms of Coordinated Universal Time (UTC)?
   - What is local time at my original departure airport?
   - Are there restrictions on operating at night in the countries I intend to transit?
   - Do any of the airspaces/destinations I intend to transit require slot times?
2. Is a Prior Permission Only (PPO) number required for landing?
3. Do my preferred destination and alternate airfields have the appropriate grade of fuel and other types of aircraft handling services available?
4. Are maintenance services available at my destination airfields?
5. Should I bring spare parts for my aircraft?
6. Will I have lodging available at the destination?

5.3 Crew Fatigue.

5.3.1 Fatigue Management. International travel typically involves crossing time zones and interrupting normal sleep patterns (circadian rhythm). Ensure you have a plan for how you will manage fatigue for you and your crew.

5.3.2 Fatigue Management Strategies. The current edition of AC 120-100, Basics of Aviation Fatigue, discusses strategies to mitigate the effects of fatigue and is an excellent resource. The current edition of AC 120-103, Fatigue Risk Management Systems for Aviation Safety, discusses the Fatigue Risk Management Systems (FRMS) prescribed in 14 CFR part 117. While part 117 does not apply to all operators, we recommend you review both ACs as the contents cover issues that are important to all aircrews.

5.3.3 Self-Care and Time Zone Differences. Having a high level of physical fitness, using caffeine strategically, and avoiding alcohol can help you adjust to time zone differences, allow your body to rest better, and help make you a more effective, safer operator.

5.3.4 Preparing to Mitigate Fatigue. Inquire in advance about day sleeping or noise levels in the location where you intend to get your crew rest. This will help your crewmembers know what challenges to good rest might lie ahead. You should also consider adding one or more pilots beyond that for which the aircraft is certified for long-duration flights or those outside of normal sleep times. This will help mitigate fatigue issues and promote safer flying.

5.3.5 Sleep Aids. Make sure you understand the restrictions on using sleep aids and the importance of consulting an Aviation Medical Examiner (AME) prior to use. They will

advise you on the possible side effects of sleep aids. We have built a list of approved prescription sedative-hypnotic-type drugs that can be taken under certain conditions.

- Information regarding pharmaceutical sleep aids can be found on the FAA website.
- This site includes names of many popular sleep aids. It also includes the required wait time after taking the last dose before you can fly ("pill to push" time).

5.4 Required Paperwork/Documentation. Whenever you fly into, from, or over foreign territory, you must comply with that territory's regulations. Ensure that you have all required entry documents available for presentation upon arrival; you may need to provide multiple copies of each.

5.4.1 Documentation. Local authorities may ask to see the below-listed types of paperwork. The Articles of the Chicago Convention specify those items marked with a double asterisk (**).

5.4.1.1 Aircraft/Aircrew Documentation. It is important to note that you may be responsible for additional documentation requirements that this list does not include.

1. Airworthiness certificate**.
2. Aircraft registration** (some States do not allow temporary certificates).
3. Radio station license**.
   - International Civil Aviation Organization (ICAO) Annex 6 Part I requires that one member of the flightcrew hold a valid radio telephone operator's license "authorizing operation of the type of radio transmitting equipment to be used."
   - The European Aviation Safety Agency (EASA) has published inspector guidance for its SAFA Ramp Inspections program that references the ICAO Annex 6 requirement.
   - For U.S. domestic flights operating only on very high frequencies (VHF), the Federal Communications Commission (FCC) does not require the license.
4. Minimum equipment list (MEL) (or Master Minimum Equipment List (MMEL) if operator plans on operating under this option).
5. Airplane Flight Manual (AFM) with Weight and Balance (W&B) information and metric conversion tables, if applicable.
6. Copies of aircraft and engine logbooks.
7. Import papers for aircraft of foreign manufacture.
8. Operations specifications (OpSpecs)/management specifications (MSpecs)/Letters of Authorization (LOA).

Note: Some countries require an OpSpec/MSpec/LOA from the State of Registry or the State of the Operator before operating the aircraft in those countries.

9. Ownership papers.
10. Certificates of insurance, if applicable.
11. Authorization letters from the operating company or the aircraft owner (original signature required), if applicable.

Note: For privately owned aircraft where the owner is not on board, many countries require a letter from the owner before they will allow operations within their country (you can find specific information on this letter and other requirements in the AIP of the countries concerned).

12. Licenses.
13. Crewmember certificates**.

Note: Pay special attention to medical certificates, as expiration rules vary from country to country; consult the AIP for those countries where you intend to land.

5.4.1.2 Trip-Specific Documentation. The following information will change for each flight, but should be available for presentation to authorities:

1. Passenger manifest, containing complete names of passengers and places of embarkation and destinations of each**.
2. Cargo manifest and detailed declaration of the cargo, if carried**.
3. Copies of overflight and landing permissions.
4. General declarations.
5. Journey logbook, signed by the pilot in command (PIC)**. ICAO Annex 6 identifies the components of the journey logbook as listed below. Consult the AIP for the country you are visiting for their particular requirement.
    - Airplane nationality and registration.
    - Date.
    - Names of crewmembers.
    - Duty assignments of crewmembers.
    - Place of departure.
    - Place of arrival.
    - Time of departure.

- Time of arrival.
- Hours of flight.
- Nature of flight (private, aerial work, scheduled, or nonscheduled).
- Incidents and observations, if any.
- Signature of person in charge.

5.4.1.3 Personal Documentation for Crew and Passengers. When planning a trip to or from a foreign country, you must ensure all travelers have proper personal documentation (passports and visas, as required). You may find the requirements for individual countries at https://www.state.gov/travel.

5.5 Entry to Foreign Airspace—Flight Plan Versus Formal Advance Permission.

5.5.1 Permission for Airspace Entry. When the foreign Air Traffic Service (ATS) authority accepts your flight plan and issues you a flight clearance, you have not necessarily received official approval for entering that State's airspace. The governing CAA may independently require permission for airspace entry, and your destination airfield may require permission as well.

5.5.2 Flight Plans. Your flight plan provides advance notice of foreign airspace penetration and facilitates effective air traffic control (ATC) procedures. For some countries, your flight plan is the only advance notice required; other countries use your flight plan as a check against previously granted permission to enter national airspace.

5.5.3 State AIPs. During your pretrip planning, as noted in paragraphs 5.1.1.2, 5.2.1, and 5.2.2 above, consult the AIP for the States you will transit to determine any overflight/landing permits and whether prior permission is required. Ensure you allow plenty of lead time to request and obtain all necessary permissions.

5.6 Managing Risk in Oceanic and Remote Continental Airspace Operations. Operators should have a risk management process before conducting oceanic operations (per ICAO Annex 19, issued in 2013). Many of the oceanic planning topics included in earlier portions of this chapter should be included as elements of your oceanic operations risk assessment. Examples include the list of topics immediately below. Operators are strongly encouraged to research the information available on the FAA website, both from the standpoint of oceanic operations planning, and risk management overall. Non airline operators are also encouraged to review the material specifically earmarked for airline operators. You can get a lot of good ideas from that information.

- Communications, navigation, and surveillance requirements for airspace.
- Crew knowledge and recency-of-experience.
- Crew fatigue.
- Airspace Search and Rescue (SAR) options.

- Weather and atmospheric conditions unique to the airspace.
- Applicable survival equipment.
- Alternate airports.
- Contingency procedures.

Note: The Automated Mutual-assistance Vessel Rescue (AMVER) system, sponsored by the U.S. Coast Guard (USCG), is a computer-based voluntary global ship reporting system used worldwide by SAR authorities to arrange for assistance to persons in distress at sea. Operators conducting oceanic operations are encouraged to be familiar with AMVER in case of a potential ditching. Once the operator notifies ATC of a possible ditching, all merchant vessels registered with AMVER and within 100 nautical miles (NM) of the aircraft's predicted ditching position will be notified.

5.7 Weather Forecasts and Other Meteorological Planning.

5.7.1 The National Weather Service (NWS). The NWS provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas. If you operate outside of the jurisdiction of the NWS, you must utilize a weather source approved by the Administrator.

5.7.2 International Weather Services. You can access many different international weather sources through the NWS. While the NWS may recognize these sources, they are not necessarily approved by the NWS and may not meet regulatory requirements. As a certificate holder, you must have your international weather sources approved in your OpSpec/MSpecs.

5.7.3 Recognized Weather Services. As representatives of the Administrator, Principal Operations Inspectors (POI) may approve the following sources:

- The NWS for the United States and its territories located outside of the 48 contiguous states.
- U.S. and North Atlantic Treaty Organization (NATO) military observing sources.
- Meteorological offices operated by ICAO Member States.
- ICAO Member-State-authorized meteorological stations or automated observations.
- Members of the World Meteorological Organization (WMO).

5.7.4 Enhanced Weather Information Systems (EWINS). Many commercial operators utilize an EWINS. EWINS are systems for gathering, evaluating, and disseminating aviation weather information, and for issuing weather reports and forecasts prepared by properly trained and qualified aviation meteorologists or aircraft dispatchers. Air carriers use EWINS which are proprietary to each carrier. Air carriers require FAA approval to use EWINS.

5.7.4.1 Each carrier's EWINS must have sufficient procedures, personnel, and communications and data processing equipment to effectively obtain, analyze, and disseminate aeronautical weather data. An EWINS source may produce weather analyses and forecasts based on meteorological observations provided by the Federal government.

5.7.4.2 For an explanation of EWINS, refer to the current edition of AC 00-45, Aviation Weather Services. Approval to use EWINS weather products is issued on a case-by-case basis and is currently only applicable to 14 CFR part 91 subpart K (part 91K) program managers and part 121 or 135 certificate holders, who may either act as their own EWINS or contract for services from an outside source. These approved operators may conduct flight operations using the weather analyses and forecasts produced by their approved EWINS.

5.8 Notices to Airmen (NOTAM). We publish these NOTAMs on a 28-day cycle. They include significant international information and special notices that could affect your decision to enter or use certain areas of foreign or international airspace. If you are seeking to enter areas of the world that require special considerations, these NOTAMs can be very important. To access the two most recent editions of the domestic/international FAA NOTAMs, refer to www.faa.gov/air_traffic/publications/notices/.

5.9 Extended Operations (ETOPS). ETOPS (the ICAO term is Extended Diversion Time Operations (EDTO)) requirements pertain to aircraft operated under parts 121 and 135. ETOPS is a system of maintenance, planning, alternate airport selection, dispatch, and flight operations standards that are designed to preclude a diversion and, if one were to occur, to protect that diversion. Thus, ETOPS standards establish a higher level of performance requirements and equipment monitoring.

Note: Rules covering ETOPS do not address operations conducted under part 91. However, because risk increases with distance from an adequate airport, if you are a General Aviation (GA) operator, we strongly recommend that your pilot training, maintenance practices, flight planning, and any applicable dispatch procedures follow the processes and procedures established in ETOPS regulations and guidance.

5.9.1 ETOPS Guidance. Guidance pertaining to ETOPS is provided in the current editions of AC 120-42, Extended Operations (ETOPS and Polar Operations), and AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area. The regulatory basis for ETOPS requirements is provided by part 121, §§ 121.161 and 121.374 and appendix P, and part 135, § 135.364 and appendix G.

5.10 Polar Operations. ACs 120-42 and 135-42 cover polar operations by aircraft operated under parts 121 and 135 respectively. As noted in the ETOPS discussion above, we strongly recommend part 91 operators refer to these ACs if you intend to attempt a flight via a polar route. Other worthwhile sources of information include the Canada and Iceland AIPs and the Canadian Designated Airspace Handbook. The North Polar Area of

Operations includes the area that lies north of latitude 78° N. The North Polar routes across Russia are shown in the Russian AIP or in commercial charting publications for Eastern Europe and Eurasia. The South Polar Area of Operations includes the area south of latitude 60° S. Operators should contact an SAO specialist for advice on things to consider when planning polar operations.

1. OpSpec/MSpec B055, North Polar Operations, authorizes North Polar operations. OpSpec/MSpec B040, Operations in Areas of Magnetic Unreliability, authorizes operations in areas of magnetic unreliability (AMU).
2. Operations in AMUs are not authorized when using a Global Positioning System (GPS)-only navigation-sensor flight management system (FMS). This is due to the lack of accurate and reliable heading information from flux valve-derived headings.

5.11 Areas with Limited ATS. While part 91 GA operators are not bound by the requirements below, we recommend that they have a solid understanding of this information before attempting to operate in this type of airspace. If you intend to operate in advisory-only airspace, your training programs and operating procedures must allow for safe operations and ensure compliance with the expected operating practices. Commercial operators must also show that they comply with OpSpec/MSpec A014, Special En Route IFR Operations in Class G Airspace. If you intend to operate in uncontrolled information regions, you will not have access to ATC, air traffic advisory (TA), flight information, and alerting services. When operating within these areas, you must have acceptable, alternative means to ensure the following:

1. You can notify the appropriate organization in a timely manner should you require SAR assistance.
2. You have a method to access changes in Significant Weather (SIGWX) information in a timely manner.
3. Those navigation facilities necessary for you to safely conduct the operation are available and serviceable. You can receive updates regarding the serviceability of the required Navigational Aids (NAVAID).
4. You have reliable in-flight information concerning other instrument flight rules (IFR) aircraft operating near your route of flight (e.g., Traffic Alert and Collision Avoidance System (TCAS) and/or Automatic Dependent Surveillance-Broadcast (ADS-B) In). This could also include "broadcast in the blind" procedures and other "expected" practices (see Appendix E, IATA In-Flight Broadcast Procedure, as well as ICAO Annex 11's description of traffic information broadcasts by aircraft (TIBA)).

5.12 Rotorcraft Operations.

5.12.1 FAA and ICAO Requirements. The basic part 91 guidance outlined earlier in this chapter also applies to helicopter operations in oceanic and remote continental airspace. If you are operating in international airspace or another State's airspace, you are still obligated

under part 91, § 91.703 to follow ICAO Annex 2. The § 91.703 requirement to follow the rules of the countries you overfly and those in which you intend to land also applies. If the part of 14 CFR under which you operate conflicts with the rules of the country you are operating over or in, you must follow the rules of that country.

5.12.2 Offshore Helicopter Operations in the U.S. National Airspace. The current edition of AC 90-80 contains detailed information on offshore helicopter operations in the U.S. National Airspace System (NAS), both instrument and radar. It also provides instruction on how you can gain authorization to conduct such operations.

5.12.3 Offshore Operators. If you are an offshore operator, you are required to obtain OpSpec/LOA H104, Helicopter Offshore Instrument Operations: Offshore Standard Approach Procedure (OSAP), Airborne Radar Approach (ARA), and Helicopter En Route Descent Area (HEDA) Operations, if conducting en route descent procedures under IFR operations. You will receive the OpSpec or LOA, as applicable, once you meet all certification requirements.

5.12.4 Navigation Requirements. You must meet the following navigation requirements in order to operate rotorcraft in oceanic and remote continental airspace.

5.12.4.1 You may develop proposed routes using NAVAIDs where you have adequate signal coverage available. In areas where signal coverage is not available, you must provide a suitable means of navigation. We may require a validation test in visual flight rules (VFR) conditions to ensure that you are able to demonstrate adequate navigational performance for the route(s) before granting approval for your use of the route(s).

5.12.4.2 For part 135 operators, all the navigation equipment that you use in extended overwater or IFR operations must meet § 135.165(b) requirements. If you obtain positive course guidance for any portion of the route through the use of long-range navigation equipment, such as GPS meeting FAA Technical Standard Order (TSO)-C145, TSO-C146, or TSO-C196, you will not receive approval for these operations until your aircraft has two independent receivers for navigation installed and operative (only one is required in the West Atlantic, Caribbean, and Gulf of Mexico).

CHAPTER 6. FLIGHT EXECUTION GUIDANCE FOR OPERATIONS IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE

6.1 General Information.

6.1.1 Checklists. In Appendix D, Sample Oceanic Checklist, we have included a sample oceanic checklist tailored from the International Civil Aviation Organization (ICAO) version, in both condensed and expanded forms. The checklist is designed to encourage an orderly task flow and reduce oceanic vertical, lateral, longitudinal, and timing navigation errors.

Note: You may tailor the expanded checklist to your specific needs and approvals. During actual operations, refer to that tailored expanded checklist to ensure you follow the procedures in their entirety.

6.1.2 Pilot Deviations—Common Causes.

6.1.2.1 Technological advances in communications, navigation, and surveillance equipment have enabled aircraft to operate with ever-improving precision and accuracy. However, despite this increased navigational capability, pilots continue to deviate from their current route clearances.

6.1.2.2 A large height deviation (LHD) occurs when an aircraft is 300 feet or more off its assigned altitude. LHDs increase the risk of mid-air collision.

6.1.2.2.1 The most common causes of LHDs are:

1. Air traffic control (ATC) loop errors:
   - Misunderstood clearances.
   - Lack of proper ATC coordination procedures.
2. Pilot deviations from assigned altitude:
   - Following the flight plan rather than a clearance or reclearance.
   - Erroneous altitude programming in the flight management system (FMS), such as a mistake in the step-climb entry.
   - Misinterpretation/misapplication of conditional clearances.
   - Improper execution of pilot contingency procedures.
   - Turbulence encounters.

6.1.2.2.2 Collected data indicates that a majority of crew-related errors involve misinterpretation or misapplication of “conditional clearances.” Conditional clearances improve the efficient utilization of airspace, allowing ATC to assign altitudes that enable lower fuel burn. Event reports from ATC and flightcrews indicate that pilots misapply terms in the clearance such as “BY”

or "AT"—terms, which have completely different meanings. See Table 6-1 below for examples of incorrectly applied conditional clearances.

Table 6-1. Examples of Incorrectly Applied Conditional Clearances

CLEARANCE	CREW ACTION	CORRECT ACTION
Via CPDLC at 1714, crew conditionally cleared, "maintain F340, at 1725 climb to and maintain F360, climb to reach F360 by 1735, report level, due to traffic."	Crew initiated climb early, reported (ADS-C) passing F354 at 1721.	Crew should have delayed commencing climb until 1725, and planned to reach F360 by 1735.
Via CPDLC, crew cleared 66/30 66/40 65/50 F380 M081, cleared F390 to cross 66/40 level.	Crew commenced climb to F390 at 40W (Mode C).	Crew should have initiated climb prior to 40W in order to cross 40W at F390.
Via CPDLC at 1945, crew cleared maintain F330, at 1952 climb to and maintain F350, climb to reach F350 by 1957, report level F350.	Reported (ADS-C) level at F350 at 1948.	Crew should have delayed commencing climb until 1952, and planned to reach F350 by 1957.
Crew cleared 68/40 64/50 IRBIM F360 M083 via HF voice, crew recleared to descend after passing 65N to be level F340 before 64N.	Crew commenced descent at 6529N/4650W.	Crew should have initiated descent after passing 65N and levelled at F340 prior to 64N.
Crew cleared 66/30 65/40 63/50 IRBIM LOMTA F400 M081. Via CPDLC, crew cleared climb F410 to cross 65/40 level.	Crew failed to climb as cleared and crossed 65/40 at F400 (ADS-C).	Crew should have initiated climb prior to 65N in order to cross 65N at F410.

6.1.2.2.3 Your training program should provide you and your crew with procedures that ensure all ATC clearances are complied with correctly, particularly clearances with en route restrictions such as changing flight levels (FL) based on a coordinated time or a specific geographic position.

Note: Per ICAO NAT Document 007, when flying in North Atlantic (NAT) airspace, you must immediately report to ATC when leaving and reaching a new FL. Doing so can enable the controller to identify and intervene when you have misunderstood or misapplied your conditional clearance.

6.1.2.3 ICAO identifies gross navigation errors (GNE) as lateral deviations from course of 25 nautical miles (NM) or greater. In the NAT, the threshold is 10 NM.

6.1.2.3.1 The majority of today's GNEs arise from pilots flying a very precise track to the wrong position because they failed to properly update their FMS to reflect their *currently effective route clearance*. This can also result from a clearance or reclearance that was incorrectly entered, misread, or misunderstood. Procedures to follow in the event of a reclearance are included in paragraph 6.4.1.6. Examples of scenarios that have led to GNEs are:

1. Poor management of the master document, resulting in crews not knowing the currently effective route clearance.
2. Incorrect waypoint entry procedures, particularly if the waypoints are not named and flightcrews must enter the full latitude and longitude.

Note: Waypoints entered via full latitude and longitude can produce misleading display names, where minutes are truncated or rounded and/or generic names are generated.

6.1.2.3.2 GNEs also result when the aircraft navigation mode is actually different from that assumed by the crew. This scenario typically occurs when the crew fails to return to lateral navigation (LNAV) after utilizing "heading select" to maneuver the aircraft.

6.1.2.3.3 Although there are a number of causes of GNEs, pilot inattention has been the root cause of many navigational errors. ICAO NAT Document 007, Chapter 14, Guarding Against Common Errors, provides excellent lessons learned from evaluation of GNE incidents.

6.1.2.4 Longitudinal errors, in the form of failure to provide updated estimated times of arrival (ETA), are another common navigation error and one that is easily preventable.

6.1.2.4.1 Deviations around weather can affect ETAs. It is important to remember that even when ATC clears you to deviate, the onus is on the pilot to update the ETA as appropriate.

6.1.2.4.2 You must adhere to your assigned (true) Mach number. If you use Long Range Cruise or Economy (ECON) modes to travel in speed-controlled airspace, you are operating in a constantly changing speed mode. Flying in these modes may not be compatible with the strict tolerances required for ATC's longitudinal separation of aircraft.

6.1.2.4.3 When position reports are made by voice, ICAO requires you to report to Air Traffic Service (ATS) authorities any change to your ETA in excess of

2 minutes, both for your initial oceanic entry point as well as all required reporting points along your route of flight through oceanic and remote continental airspace.

6.1.2.4.4 Discrepant wind data can result in inaccurate ETA computations. This can be particularly problematic if you are not flying at the flight-planned altitude or have outdated winds loaded in your FMS. You must diligently monitor your ETA and maintain your assigned Mach number in order to minimize these errors.

6.1.2.4.5 FMS-computed ETAs, particularly for more distant waypoints, may be erroneous due to down track wind conditions, which the FMS is not presently using to compute the ETA. You should compare FMS estimates with the ETA calculated on the operational flight plan prior to reporting the ETA to ATC facilities.

6.1.2.4.6 Automatic position reports delivered via Automatic Dependent Surveillance-Contract (ADS-C) have greatly reduced the occurrence of longitudinal errors caused by inaccurate ETAs. ATC establishes an ADS-C periodic report interval appropriate for the longitudinal and lateral separation criteria being used. More frequent reports compensate for wind discrepancies and provide ATC with accurate ETAs.

6.2 Flight Plan.

6.2.1 ATC Flight Plan.

6.2.1.1 ICAO requires a flight plan for all flights that cross international borders. Instrument flight rules (IFR) operations in oceanic airspace generally start at 6,000 feet. Visual flight rules (VFR) operations at or below 5,500 feet must comply with all applicable regulations and foreign airspace requirements.

6.2.1.1.1 Even though you may legally conduct flights in oceanic and remote continental airspace under VFR, there is generally a good likelihood of encountering instrument meteorological conditions (IMC) at some point in your flight.

6.2.1.1.2 We highly recommend that you file an IFR flight plan on any oceanic flight, if you are instrument rated and your aircraft meets the equipment requirements for IFR flight.

6.2.1.2 Proper completion of an ATC flight plan requires that you have detailed knowledge of the airspace you intend to transit, the airspace equipment requirements, and the required FAA authorizations (operations specifications (OpSpecs)/management specifications (MSpecs)/Letters of Authorization (LOA)). You also need to be thoroughly familiar with the equipment your aircraft has on board as listed in your filed flight plan. When you file, your flight plan is transmitted to ATS facilities along the route of flight. If you do

not file correctly, you could possibly experience delays before takeoff for an issue with an ATS authority along your route of flight.

6.2.1.2.1 The Aeronautical Information Manual (AIM) has a step-by-step description in Chapter 5 detailing how to complete FAA Form 7233-4, Pre-Flight Checklist and International Flight Plan.

6.2.1.3 As Performance-based Navigation (PBN) becomes more prevalent worldwide, ATS authorities will increasingly set aside certain airspace for PBN-compliant aircraft. You list your aircraft and crew capabilities using descriptors in items 10A, 10B, and 18 of the flight plan.

Note: Without the proper codes or remarks identifying the operational approvals of your crew and aircraft, controllers may deny you en route climbs to your most fuel-efficient FLs or access to the optimum routings or, in some cases, reject your flight plan entirely.

6.2.1.4 Title 14 CFR part 121 dispatch services are required to have staff knowledgeable in all filing requirements for both domestic and international operations. These services can support flight plan reroutes that may arise due to weather or congestion along your route of flight. If you are operating without the benefit of a dispatch service, you must have the knowledge and necessary tools available to react to unplanned reroutes, equipment failures, or emergencies that may impact your flight while en route.

6.2.2 Equipment Capability Codes—Flight Plan.

6.2.2.1 PBN is changing the way ATS providers apply separation criteria between aircraft. Without notifying the crew of either aircraft involved, ATS providers in "mixed mandate" airspace can reduce separation between aircraft based on your stated capability. In order to take advantage of opportunities for more efficient routings, your flight plan should reflect the lowest Required Navigation Performance (RNP) value for which you are capable and authorized.

6.2.2.2 Upon entering oceanic and remote continental airspace, the RNP setting in your flight management computer (FMC) must be equal to or less than that required for the route of flight, and it should reflect the RNP capability indicated on your flight plan. If you indicate RNP 4 capability on the flight plan, for example, ATC could establish separation criteria for your flight based on RNP 4 capability, even though only RNP 10 is required for the route of flight. Likewise, if RNP 10 is required for the route, the FMC setting must be no higher than 10.0. A higher setting will prevent your navigation system's RNP performance monitoring and alerting capability, as well as the lateral deviation scaling, from functioning according to the RNP requirements for your route of flight. In such a scenario, a loss of required aircraft separation could ensue. The Area Navigation (RNAV)/RNP capability indicated on your

flight plan must not be less than that for which you have been approved via an OpSpec, MSpec, or LOA.

6.2.2.3 If you are no longer able to meet your RNP navigation specification while en route (i.e., your Actual Navigation Performance (ANP) exceeds your RNP or required equipment has failed), you are required to immediately notify your ATS provider so they can adjust separation standards between you and other nearby aircraft as required.

6.3 Aircraft Preflight Guidance.

6.3.1 Preflight—Necessary Documents. Effective oceanic and remote continental airspace flight planning and execution requires a number of important pieces of information. You should ensure you have easy access to each of the following documents in the cockpit, as well as others that may be pertinent to your flight:

6.3.1.1 Master flight plan ("master document").

Note: Use strict procedures to manage the master document. Maintain only one copy of the master document in the cockpit.

6.3.1.2 Notices to Airmen (NOTAM) for departure, destination, alternate(s), Extended Operations (ETOPS) alternates (as applicable), and oceanic flight information regions (FIR).

6.3.1.3 Global Positioning System (GPS) NOTAMs (as applicable).

6.3.1.4 Weather for departure, destination, alternate airports along the route of flight, and ETOPS alternates (as applicable).

6.3.1.5 Significant Weather (SIGWX) chart.

6.3.1.6 Wind charts for planned altitudes and altitudes after driftdown/emergency descent.

Note: Compute Equal Time Points (ETP) for contingencies, such as medical divert, engine loss, rapid decompression (RD), and a simultaneous RD and engine loss. Note the location of the ETPs on your chart.

6.3.1.7 Volcanic ash and solar flare information (as applicable).

6.3.1.8 Pilot Weather Reports (PIREP).

6.3.1.9 Receiver autonomous integrity monitoring (RAIM) and fault detection and exclusion (FDE) prediction tools (as applicable), available at http://sapt.faa.gov/default.php.

6.3.1.10 Current track message (for any operations in airspace with a flexible organized track system (OTS)).

Note: If you have a track message or other separate route document associated with the flight, verify that the effective time of the message corresponds to your flight and that the designated route agrees with both your filed routing and the waypoint routing on your master document.

6.3.1.11 Plotting/orientation chart.

6.3.1.11.1 You should use a chart, of appropriate scale, to provide yourself with a visual presentation of your intended route, regardless of your type(s) of long-range navigation system (LRNS). Plotting your route on your chart will increase your situational awareness as you execute your trip through oceanic and remote continental airspace.

6.3.1.11.2 Your chart should include, at a minimum:

1. The route of your filed flight plan or *currently effective route clearance*.
2. Clearly depicted waypoints using standardized symbology.
3. Graphic depictions of all ETPs.
4. Alternate airports.
5. Proximity of other adjacent tracks.

Note: For certificated operators, if OpSpec/MSpec A061 has been issued authorizing use of an Electronic Flight Bag (EFB) and the principal inspector (PI) has authorized "interactive plotting for oceanic and remote continental navigation," the EFB application may be used in place of a paper plotting/orientation chart. The current edition of AC 120-76, Authorization for Use of Electronic Flight Bags, provides guidance for operators to develop associated EFB procedures. For part 91 operators, an EFB may be used, provided the criteria and considerations of the current edition of AC 91-78, Use of Class 1 or Class 2 Electronic Flight Bag (EFB), are observed.

6.3.2 Cockpit Preparations.

6.3.2.1 Check your maintenance log to ensure all your required communications, navigation, and surveillance and altimetry equipment is operational in order to enter oceanic and remote continental airspace.

1. If you are faced with faulty aircraft equipment, such as your long-range navigation equipment or a central air-data computer fault, notify ATC as soon as possible. ATC will more than likely increase spacing around an aircraft with degraded capabilities.
2. Consult your minimum equipment list (MEL) to resolve malfunctioning equipment before you depart. A departure delay for maintenance may be warranted or a reroute to avoid oceanic airspace may be necessary.

6.3.2.2 Identify a single master clock in the cockpit.

1. You must verify that your onboard primary time source, or master clock, is set to Coordinated Universal Time (UTC). In most cases, this time source is the FMS.
2. Use master clock times for all ETAs and actual times of arrival (ATA).

6.3.2.3 Align your inertial navigation system (INS)/inertial reference system (IRS).

1. Proper INS/IRS loading and operating procedures are another important aspect to help you avoid navigation errors. Ensure you select navigation (NAV) mode at the appropriate time and properly manage your navigation computer during intermediate stops.
2. Follow your flight manual procedures carefully to ensure proper navigation reliability.

6.3.2.4 Have a second pilot independently verify the aircraft present position coordinates you have loaded in your navigation system.

1. Regardless of your type of LRNS or the method of insertion, you must verify your current ramp position in the LRNS against current aeronautical publications and not solely based on the present position remaining in the system from your last shutdown.
2. If you conduct another present position check on taxi out and it shows a gross difference with your gate coordinates, it could indicate a problem with the LRNS.

6.3.2.5 Two pilots should independently coordinate the loading and verification of all flight plan entries. One pilot should load the entire route into the LRNS, to include all waypoints, using the master document as source. He or she should then verify the routing has been loaded correctly. Recommended steps for performing this loading and verification are provided immediately below. The second pilot's subsequent confirmation procedures are explained beginning in paragraph 6.3.2.6.

6.3.2.5.1 Prior to loading the flight plan, carefully cross-check the waypoint routing on your master document against your filed flight plan to verify both documents show the same routing.

6.3.2.5.2 Ensure your navigation database is current.

6.3.2.5.3 For systems with pilot-defined waypoint designators or numbers, we recommend you use a consistent procedure from the outset of the flight. Enter this designator on the master document and also use it to store waypoints in the navigational computer.

6.3.2.5.4 You must verify all navigational information contained in the master document against the navigation data information in the FMS.

6.3.2.5.5 Your procedures should provide for a means of verification of the data you loaded. You should check the expanded coordinates and course/distance between waypoints against the same information on your master document. You may also check the route presentation on your navigation display. Most intercontinental-capable aircraft have a modern FMS that is capable of automatically downloading flight plans that have been sent from ATC or from a dispatch service. These flight plan transmission mechanisms are very reliable, but there are occasional glitches that can lead to downloading partial routes, requiring you to make changes to complete the route load. Regardless of whether you have an automatic or manual download of your flight plan into your FMS, you should have procedures to verify your flight plan route against your FMS entries.

6.3.2.6 After the first pilot has loaded and verified the FMS entries against the flight plan, a second pilot should recall and confirm the waypoint data against source information.

6.3.2.6.1 It is not sufficient for one crewmember to simply observe another crewmember entering the data. Exercise an independent cross-check method with each other so no FMS entry goes unverified. An attitude of “healthy suspicion” can facilitate good cross-checks.

6.3.2.6.2 Cross-checks should include comparing the expanded coordinates of the waypoints loaded in the FMS to the filed flight plan, track message (if applicable), and the master document.

6.3.2.6.3 You can use various additional techniques in order to verify that the correct points are loaded for your planned route. Verify the total route distance in your FMS against your master document to help find embedded mistakes. You should also cross-check course/headings and distances between each waypoint to ensure the FMS routing matches your master document. Referencing your plotting or orientation chart here can also be beneficial.

Note: A 1° course deviation causes the aircraft to be off planned routing by approximately 1 mile every 60 miles of travel. A course deviation on an oceanic crossing closer to the equator, where leg lengths are typically longer, can result in cumulatively larger displacements from course. However, although leg lengths are typically shorter at higher latitudes, and similar deviations result in cumulatively smaller displacements from course, the density of traffic and closer spacing of parallel tracks at high northern latitudes actually constitute an environment less tolerant of course deviations.

6.3.2.6.4 The second pilot should work from the FMS back to the master document. Reading from the master document to the FMS can result in "seeing what we expect to see" (expectation bias). A simple way to consider this is that pilot one works from "paper to glass" while pilot two works from "glass to paper."

6.3.2.7 Adopt an appropriate symbology to indicate the status of each waypoint listed on the master document. For example:

1. The first pilot could circle the waypoint, waypoint number, or symbol on the master document to signify that they have independently cross-checked the entry of the coordinates in the navigation computer.
2. The second pilot could then tick or diagonally slash the circled waypoint, waypoint number, or symbol to signify having performed the cross-check described in paragraph 6.3.2.6 above, to include confirming the course and distance information within a specified tolerance (e.g., plus or minus 2° and 2 NM).

6.3.2.7.1 We will discuss additional master document symbology in the en route section later in this chapter, in paragraph 6.4.

6.3.2.8 Set the appropriate Mode S flight identification (FLT ID).

6.3.2.8.1 ATC systems worldwide are becoming more reliant upon information transmitted by Mode S transponders to manage air traffic. ATC systems use transmitted FLT IDs to uniquely identify each aircraft within a given airspace and correlate them to a filed flight plan for the provision of surveillance and separation services.

6.3.2.8.2 A FLT ID is comprised of a maximum of seven alphanumeric characters (e.g., N235RA, AAL3342, BONGO33) and corresponds to the Aircraft Identification (ACID) entered in block 7 of the international flight plan.

6.3.2.8.3 You typically enter your FLT ID through either an FMS interface or your transponder control panel. For ATC systems to function correctly, you must ensure the FLT ID you enter in the FMS exactly matches the ACID in block 7 of your international flight plan.

6.3.2.9 Check your ground speed in the blocks and on taxi out.

1. If you are still in the blocks and your ground speed reads other than zero (0), you may have a developing error in your LRNS.
2. Similarly, if your groundspeed on taxi out appears unreasonable, this may also indicate a problem with your LRNS.

6.3.2.10 Accomplish required Reduced Vertical Separation Minimum (RVSM) altimetry ground checks.

6.3.2.10.1 Before taxi, set your altimeters to the airport local altimeter setting. Both primary altimeters must read within ± 75 feet of field elevation.

6.3.2.10.2 The two primary altimeters must also agree with each other within the limits noted in the aircraft operating manual.

6.4 En Route Guidance.

6.4.1 Oceanic Clearance: How to Request, Receive, and Process.

6.4.1.1 Oceanic clearances are unique clearances that frequently require coordination between two or more air traffic agencies. The clearance you receive from an ATC facility on the ground before departure may not constitute a clearance into or through your filed oceanic and remote continental airspace. Depending on the first oceanic FIR you enter, you may need to obtain this clearance separately and specifically as you approach the oceanic and remote continental airspace boundary. Check the Aeronautical Information Publication (AIP) or source document to determine if such separate oceanic clearance is required.

6.4.1.2 In cases when your departure airport is close to the oceanic and remote continental airspace boundary you may, and at some airports must, obtain your oceanic clearance prior to departure. Check the AIP or source documents to determine clearance requirements unique to your departure airport.

Note: Some airspace authorities have begun issuing the route portion of the oceanic clearance before the aircraft departs, even when the departure airport is not close to the oceanic boundary. In this case, the altitude and airspeed portion will be assigned prior to entering oceanic airspace. New York Oceanic and Oakland Oceanic both operate in this manner.

6.4.1.3 In most cases, obtain your oceanic clearance via voice at least 40 minutes prior to entry, or 30 to 90 minutes prior if using the Aircraft Communications Addressing and Reporting System (ACARS) data link Oceanic Clearance Delivery (OCD) to receive the clearance. As discussed above, if your

departure point is close to the oceanic and remote continental airspace boundary, you may be able to obtain your clearance prior to departure.

6.4.1.4 At least two pilots should be involved in the clearance receipt and read back process, one actively obtaining the clearance and the other monitoring. We recommend both pilots be on a headset during this process.

6.4.1.5 Both pilots should independently copy the clearance. Each pilot cross-checks and verifies both the routing, altitudes, and Mach number assigned (if applicable) for the crossing.

6.4.1.5.1 Read all waypoint coordinates back to the ATS provider in detail. Sometimes, approved local procedures make full read back optional. Always cross-check each detail of the clearance with your master document.

6.4.1.5.2 Ensure the ATS provider acknowledges your correct read back.

6.4.1.5.3 The use of terms "expect" or "when can you accept" by ATC are not a clearance. Typical ATC clearance phraseology is "ATC clears…."

6.4.1.5.4 After each pilot conducts an independent review and verification of the clearance, the crew should discuss the clearance to verify a common understanding and make any plans resulting from the clearance.

6.4.1.6 Ensure the following upon receipt of a reclearance:

Note: A reclearance (that is, a clearance that differs from the oceanic route requested with the filed flight plan) is the number one scenario leading to pilot deviation from the assigned routing. You should be particularly cautious when receiving a reclearance.

6.4.1.6.1 At least two pilots should separately copy the clearance from the ATS provider. Each pilot should be on a headset.

6.4.1.6.2 You read it back correctly and receive an acknowledgement of your read back from the ATS provider.

6.4.1.6.3 All pilots compare the clearance they just copied; contact the ATS provider for clarification of any inconsistencies.

6.4.1.6.4 One pilot reprograms the FMS (or other LRNS), updates the master document, and updates the plotting/orientation chart.

6.4.1.6.5 A second pilot cross-checks the *newly effective route clearance* with the reprogrammed route loaded into the FMS, the updated master document, and the updated plotting/orientation chart.

1. The cross-check of the FMS coordinates includes comparing the expanded coordinates (i.e., degrees *and* minutes).
2. Course and distance connecting the new waypoints should also be checked. Course and distance tables are available commercially for every 10° of longitude, or dispatch can send a new operational flight plan/master document with the updated track and distances. It is also possible to use an onboard flight planning system to independently calculate course and distance, and check that against the FMS.

6.4.1.6.6 If the clearance is received via Controller-Pilot Data Link Communication (CPDLC), each pilot should read it silently to develop an independent understanding of the new clearance; they should then discuss the clearance and query the controller for clarification if they have any disagreement as to what the clearance is asking them to do.

Note 1: If you "accept" a clearance via CPDLC, the FAA recommends you also "execute" the new clearance in your FMS. Some crews have accepted, but not executed, a CPDLC clearance to avoid losing wind data or to preserve meaningful waypoint labels. Failure to "execute" the new clearance in the FMS could result in a navigation error and/or pilot deviation.

Note 2: Reclearance via CPDLC has also been a factor in navigation errors associated with a route change. Operators should be cognizant of this when designing operating procedures for the use of CPDLC.

6.4.1.6.7 Thoroughly brief all relief pilots on the *newly effective route clearance* prior to them assuming cockpit duties.

Note: We highly recommend that the relief pilot(s) also cross-check the FMS against the master document to ensure complete understanding of the new clearance.

6.4.1.7 You must ensure you have given an accurate ETA to ATC for your oceanic entry point. If a time estimate is found to be in error in excess of 2 minutes from that provided to ATC, a revised estimate must be provided to ATC.

6.4.1.8 You must also ensure you enter the ocean at your cleared/assigned FL for the crossing. The domestic ATC sector does not always automatically clear you to the oceanic clearance altitude; in this case, query ATC.

6.4.2 Communications/Navigation/Surveillance System Checks.

6.4.2.1 You should have checked your high frequency (HF) radios prior to departure. If you were unable to get a good check on the ground, check them prior to entering oceanic and remote continental airspace.

6.4.2.2 Accomplish a selective calling system (SELCAL) check prior to oceanic and remote continental airspace entry and then again at each control area (CTA) boundary. Check your SELCAL even when your CPDLC is working properly.

6.4.2.3 For commercial operators, your OpSpecs or MSpecs will prescribe the requirements for confirming your navigation accuracy, and assessing the performance of your LRNS, prior to entering oceanic airspace. We recommend General Aviation (GA) operators perform similar navigation accuracy checks, as further described in paragraph D.2.5.1 of the sample oceanic checklist provided in Appendix D.

6.4.2.4 As discussed in paragraph 6.2.2.2 above, verify the RNP value set in your FMC matches the capability indicated in your flight plan.

6.4.2.5 If you plan on using satellite communications (SATCOM) data link systems, check them prior to oceanic airspace entry. ICAO Document 10037 (GOLD) recommends you log on to CPDLC and/or ADS-C 10 to 25 minutes prior to the oceanic/FIR boundary.

6.4.2.6 Conduct altimetry checks prior to entering oceanic airspace and every hour thereafter. Your two primary altimeters should read within 200 feet of each other.

Note: We recommend you record these readings, along with their times, on your master document. This will aid you in determining the most accurate altimeter in the event of a subsequent altimetry problem.

6.4.3 Entering Oceanic and Remote Continental Airspace—First Steps.

6.4.3.1 Change your transponder code to 2000 in accordance with regional requirements. This requirement varies with the oceanic airspace. You should confirm these procedures, through applicable AIP or other regional documents during flight planning. In the NAT, for example, the transponder code should be changed 30 minutes after entering oceanic airspace.

6.4.3.2 Adjust your airspeed to maintain your assigned Mach number, as applicable.

6.4.3.3 Once you have departed very high frequency (VHF) radio range, set your radios to air-to-air (generally 123.45) and guard (121.5) frequencies.

6.4.3.3.1 ATC and air defense authorities will generally attempt contact with aircraft on guard (121.5 or 243.0 megahertz (MHz)) before ordering an intercept. For this reason, all aircraft are “highly encouraged” to maintain a listening watch on guard.

6.4.3.3.2 The AIM, Chapter 5, Section 6, addresses interception procedures to include a reprint of the intercepting signals table published in ICAO Annex 2.

6.4.3.3.3 The International Air Transport Association (IATA) has developed widely adopted procedures for use in FIRs where poor communications and/or reduced quality of ATS pose a perceived flight hazard. See Appendix E, IATA In-Flight Broadcast Procedure, for IATA procedures for transponder use and radio broadcast in affected areas. The procedures involve maintaining a listening watch and broadcasting "in the blind."

6.4.3.4 Institute an appropriate offset, based on the Strategic Lateral Offset Procedure (SLOP), unless not authorized. SLOP helps mitigate the heightened risk of collision due to highly accurate navigation systems, and it helps avoid wake turbulence.

6.4.3.4.1 SLOP procedures are published in the U.S. AIP, Part 2, En Route (ENR), and ICAO Document 4444, section 16.5.

6.4.3.4.2 We recommend SLOP be part of your oceanic training program and standard procedures for oceanic flying. Many oceanic ATS providers have made SLOP a standard procedure in their airspace. You should check applicable State AIPs to determine where SLOP may not be authorized. The U.S. AIP, for example, authorizes only 1 NM offset increments.

6.4.3.5 Specify which FMS pages, or other monitorable elements of your navigation system, that individual flightcrew members are charged with monitoring during the oceanic portion of the flight (e.g., cross-track error or time/distance).

6.4.4 The Master Document: A Suggested Method for Managing It.

6.4.4.1 ICAO NAT Document 007 discusses the importance of a master document. It requires that you use some form of master working document on the flight deck. You may base this document on the ATC flight plan, operational flight plan (navigation log), or other suitable document which lists sequentially the waypoints defining the route, the course and distance between each waypoint, and other information relevant to navigation along the cleared route.

6.4.4.2 Two minutes before reaching each oceanic waypoint, verify the next and subsequent ("next + 1") waypoints. Using your *currently effective route clearance*, we recommend this verification include (1) a check of the expanded FMC coordinates for the next and subsequent waypoints and (2) a check that the expected outbound magnetic course and distance to the next waypoint presented in the FMC agrees with that clearance.

6.4.4.3 As you pass each waypoint, you can cross out the circled waypoint, waypoint number, or symbol to signify that the aircraft has passed the waypoint.

Note: Approaching a waypoint, some operators use a diagonal line to denote confirming a subsequent waypoint's coordinates and the track and distance to it.

6.4.4.4 Verify the aircraft is progressing on the correct route by cross-checking the leg distance and magnetic course on the master document against the distance and magnetic course to the next point as displayed on the avionics.

6.4.4.5 As you make your position report over the waypoint, note your fuel remaining on the master document next to that waypoint. This is especially important if the cleared route and FL differ from your flight plan.

6.4.5 Position Reporting—General Requirements.

6.4.5.1 Communications over HF radio rely heavily on proper radio terminology and scripted reports. Use the published guidance found in en route publications or the AIM to make sure you deliver messages in the proper format.

1. You are expected to speak at a moderate speed using the internationally accepted phraseology.
2. Be certain you are communicating or logged on CPDLC with the ATC or communications facility appropriate to the oceanic and remote continental airspace in which you are operating or about to enter. More than one station may be using the same HF frequency at the same time. Only accept clearances from the ATS provider for the oceanic and remote continental airspace in which you are operating.

6.4.5.1.1 If you are operating within international airspace, make position reports either directly or by relay. If the ATS provider you are talking to is identified as a "Center," (e.g., "Gander Center") or a "Control" (e.g., "Tokyo Control"), you are talking directly to an air traffic controller. If the provider you are talking to is identified as a "Radio" (e.g., "Gander Radio"), you are talking to an aeronautical radio station, which is a relay facility that communicates between the ATC controlling facility and aircraft. An aeronautical radio station does not control air traffic—it relays the instructions of the ATC facility.

6.4.5.1.2 You must report departing your current FL. In certain regions, the NAT for example, you are also required to report reaching your assigned altitude. You should consult the appropriate regional or State documents (e.g., NAT Document 007, AIP, Airport/Facility Directory Supplement, etc.) to confirm reporting requirements.

6.4.5.1.3 Make your position reports to the ATS provider for the airspace in which you are currently operating.

6.4.5.1.4 In addition to reporting your position to your current ATS provider, in the case of boundary points, often you are expected to repeat your last position report to the FIR or CTA you are entering. Do so when so prescribed in the appropriate section of ICAO Document 7030, Regional Supplementary Procedures, in the applicable AIP, or when requested by ATC.

6.4.5.1.5 If another aircraft relays your report, use the appropriate air-to-air frequency and not the emergency (guard) frequency.

6.4.5.1.6 If you operate in airspace approved for the use of data link, you may provide automatic position reporting via ADS-C logon. In this case, you should discontinue voice position reports.

6.4.5.2 When following a designated oceanic route, you must make position reports when passing each designated compulsory reporting point.

Note: The appropriate ATS authority may request reports over other points as well.

6.4.5.3 If you are not on a designated oceanic route, report your position at significant points listed in the flight plan. ATC expects reports as soon as possible after the first half hour of flight in oceanic and remote continental airspace and at hourly intervals thereafter. The appropriate ATS provider, however, may request additional reports at shorter intervals of time.

1. If your flight tracks predominantly east and west, ATS providers will generally request reports every 5° or 10° of longitude.
2. If your flight tracks predominantly north and south, ATS providers will generally request reports every 5° or 10° of latitude.

6.4.6 Position Reporting—Format.

6.4.6.1 See the AIM, Chapter 5, for general guidance on position report format. You must provide information regarding your current fix and the next two fixes on your route of flight, in the following order:

1. Your complete aircraft call sign.
2. Your position and crossing time, reported in 4 digits UTC.

Note: You do not have to say "UTC" or "Zulu" when you report the time.

3. Your FL.
4. Your next fix and estimate over that fix in 4 digits UTC.

Note: If any reported ETA changes in excess of 2 minutes, you must provide an updated estimate to the ATS provider.

5. Name of your subsequent fix.

6.4.6.2 When position is expressed in coordinates, the following pertains:

6. If your flight tracks predominantly east and west, ATS providers will generally expect latitude to be expressed in degrees and minutes, and longitude in whole degrees only.
7. If your flight tracks predominantly north and south, ATS providers will generally expect latitude to be expressed in whole degrees only, and longitude in degrees and minutes.

6.4.6.3 A 2010 change to ICAO Annex 3 cancelled the requirement to report wind and temperature data via voice. You should continue to report any turbulence or other significant meteorological conditions you encounter to ATC.

Note 1: Ensure the reporting of such meteorological observations references your geographical coordinates at the time of occurrence.

Note 2: ICAO NAT Document 007 has a form for reporting significant wake turbulence encounters. We encourage you to submit this form whenever you encounter significant wake turbulence while operating in NAT airspace, in order to support the monitoring efforts of the NAT airspace authorities.

6.4.7 Navigation Cross-Checking Procedures: Why They Are Important.

6.4.7.1 ICAO Document 7030 includes language requiring the State of Registry or the State of the Operator to approve operator programs established to mitigate the occurrence of navigational errors due to equipment malfunction or operational error. These operator programs must include in-flight operating drills, consisting of mandatory navigation cross-checking procedures, to identify navigation errors in sufficient time to prevent aircraft from inadvertent deviation from an ATC-cleared route.

6.4.7.2 Navigation cross-check procedures mitigate risk and promote situational awareness—an essential requirement for crews operating highly automated airplanes in increasingly crowded airspace. Such procedures help ensure aircraft operating under procedural ATC control are in fact maintaining the separation from other aircraft that ATC has planned and is expecting. Cross-check procedures enable pilots to be certain they are where they think they are; this awareness becomes particularly critical during emergency situations.

6.4.7.3 While advances in navigation accuracy and communications capability generally enhance safety and reduce flightcrew and controller workloads, these advancements have not eliminated human errors. Pilot deviations continue to occur and can be attributed to complacency, poor operational procedures, poor understanding of systems and processes, or simply human frailties such as cognitive or auditory failures.

Note: Numerous deviations in oceanic airspace have been caused by flightcrews failing to follow revised clearances. Transposed numbers, misunderstood clearances, or route amendments not properly verified or not passed on to relief crewmembers also contribute to navigation errors.

6.4.8 Navigation Cross-Checking—Acceptable Procedures.

6.4.8.1 In line with the rationale and requirements for navigation cross-checking procedures described in paragraph 6.4.7, the FAA believes cross-checking is synonymous with "making sure." We consider the "sample oceanic checklists," provided in Appendix D of this AC, to provide operators with not only a "to-do" list but also a means to make sure certain items, known to result in navigation errors if overlooked or done incorrectly, are performed in an organized, systematic manner.

6.4.8.2 The sample checklists (simple and expanded versions) provided in Appendix D are derived from ICAO NAT OPS Bulletin 2014-001, Sample Oceanic Checklists. We have added to the ICAO version in a few important ways. Most significantly, we have provided two acceptable methods for cross-checking aircraft position at a point approximately 10 minutes after oceanic waypoint passage. Up to now the only recommended method of cross-checking aircraft position in the oceanic airspace environment was manual plotting on a chart. However, a panel of aviation industry and FAA personnel completed an Operational Safety Assessment (OSA) of methods for cross-checking oceanic flight navigation. The panel determined that an alternative to manual plotting, by which aircraft position could be checked through use of aircraft FMS-driven navigation displays and indications, would provide for an equivalent level of safety. See Appendix D, paragraph D.2.9.2.

6.4.8.3 The check of aircraft position at a point approximately 10 minutes following waypoint passage is designed to enable you to observe and correct a navigation error before safety of flight is jeopardized. If you made a subtle mistake either while en route to or crossing a waypoint, 10 minutes of travel should allow you to observe that mistake before significant problems result. These cross-checks are a backup to an otherwise well-planned flight that is being executed through systematic and disciplined attention to effective procedures, such as those provided in this chapter and Appendix D. The cross-checks are not designed to overcome poor planning, sloppy procedures or inadequate attention to detail. To reiterate: in-flight operating drills, to include cross-checking of navigation during oceanic and remote continental airspace operations, are mandatory under ICAO standards.

6.4.8.4 The FAA recognizes that, for any number of reasons, operators may require or choose to use navigation cross-checking procedures different from those in the oceanic checklist provided in Appendix D. For those operators who require operational approval, whether to operate in oceanic and remote continental

airspace in general, to operate in airspace where RNP is prescribed, or to operate within oceanic and remote Special Areas of Operation (SAO), such as North Atlantic High Level Airspace (NAT HLA), their choice of procedures will help establish the basis of that approval. Operational approval will be predicated upon use of either the cross-checking procedures described in the sample oceanic checklist (Appendix D) or via an alternative method that will achieve an equivalent level of safety. In order to determine equivalent levels of flight safety, an operator's proposed alternative cross-checking procedures will be assessed, by the PI and an SAO specialist, against the following criteria:

1. Are they written, standardized, and required for use by the operator's flightcrews?
2. Do they require use of a plotting or orientation chart, of adequate scale, for reference/situational awareness purposes?
3. Do they address all the major functions/action points (e.g., independent route verification; at waypoint passage; after waypoint passage) outlined in the sample oceanic checklist?
4. Do they provide for confirming that the aircraft is flying toward, via the expected course/track line, the intended/expected waypoint contained in the flight's currently effective route clearance?
5. Do they prescribe periodic cross-checking, for reasonableness, of the position data reported by all onboard long range navigation systems?
6. Do they require checking of aircraft position approximately 10 minutes after each oceanic waypoint prescribed in the currently effective route clearance?
7. Do they direct prompt and proper correction for any detected deviations from the currently effective route clearance?
8. Do they establish acceptable tolerances for track deviation, as well as course/heading/distance between waypoints, when compared between the flight plan and the navigation system?
9. Do they include ready reference to, and direct compliance with, accepted in-flight contingency procedures (refer to ICAO Document 4444)?

Note: Alternative methods proposed by certificated operators will also require review/approval by the Air Transportation Division.

6.4.8.5 If an operator adopts new oceanic procedures, it is crucial this be done as part of a carefully orchestrated effort in close coordination with both your PI and an SAO specialist. Checklists need to be tailored to reflect operator-unique aspects, manuals need to be updated, and crews need to be trained. Failure to

properly implement the change can lead to confusion, misunderstandings, and errors.

6.4.8.6 Diligent cross-checking of the FMS and master document against the *currently effective route clearance* remains the key to preventing inadvertent deviations from the cleared route.

1. The *active leg* is the most immediate indication of adherence to the currently effective route clearance. The active leg is formed by a "FROM" position and a "TO" waypoint, and features an associated course to fly between the points; this information should be cross-checked against the operational flight plan.
2. In addition to verifying the "TO" waypoint, the FAA also recommends the flightcrew verify autopilot steering mode (e.g., LNAV/NAV, not Heading (HDG)).
3. When checking waypoints, ensure you look at the "expanded" (i.e., degrees and minutes) coordinates. Some waypoint labels can be misleading.

6.4.8.7 While the procedures discussed above, and the items provided in the oceanic checklists in Appendix D, emphasize prevention of lateral errors, we want to emphasize that altitude deviations and longitudinal errors are no less significant. Steps to avoid those two types of errors in oceanic operations are discussed further in paragraph 6.1.2.

6.4.9 Relief Pilots—Preparing to Assume Duties. Increasingly, with long-range operations, relief pilots are part of the crew. In such cases, it is vital to brief the relief pilot on all current operational issues affecting the flight.

1. Many navigation errors have been traced back to inadequate handoff between pilots who first loaded the route into the navigation system and relief pilots who took over hours into the flight. You must fully brief the relief pilot on your currently effective route clearance.
2. We recommend the relief pilot verify the current cleared route prior to occupying the seat, if practical. Work from the FMS to the master document to lessen the risk of expectation bias (seeing what is expected) and maintain an attitude of "healthy suspicion."

6.4.10 Exiting Oceanic and Remote Continental Airspace. Refer to the Coast In step in the Sample Oceanic Checklist (Appendix D).

CHAPTER 7. IN-FLIGHT CONTINGENCY GUIDANCE FOR OPERATIONS IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE

7.1 Contingency Procedures: When They May Be Needed. ICAO Document 4444, section 15.2, has published contingency procedures to allow you to safely deviate from your assigned clearance, in the event a revised clearance cannot first be obtained. The procedures are designed to rapidly separate you from the regular flow of traffic while you address an emergency. Although we can't cover all possible emergencies you may face, the more common cases that might drive you to fly oceanic contingency procedures include:

1. Unexpected meteorological conditions.
2. Degradations in aircraft performance.
   - Aircraft powerplant or pressurization failure.
   - Loss of communications capability.
   - Loss of, or significant reduction in, navigation capability.
3. Medical situations.

7.1.1 Adhering to Contingency Procedures. Keep in mind that you must follow these contingency procedures precisely as written. If you fail to do so, you incur additional risk by invalidating procedures designed to prevent collisions.

7.2 Choosing the Correct Contingency Procedure.

7.2.1 Primary Guidance. ICAO Document 4444, Section 15-2, contains primary guidance for oceanic contingency procedures. ICAO Document 7030 includes additional, region-specific guidance, generally in Chapter 9 of each regional section. The procedures are also described in the En Route (ENR) 7.3 section of the U.S. AIP.

Note: Whenever possible, obtain a revised clearance instead of flying a contingency procedure. If the nature of the emergency precludes this, consider querying ATC about safest routes, even if ATC is unable to clear you that way.

7.2.2 General and Weather Deviation Contingency Procedures. A "General" contingency procedure is available, as is a weather deviation procedure. Flightcrews should be thoroughly familiar with these procedures and ensure ready access to them on the flight deck so they may be performed precisely and without undue delay.

7.2.2.1 The general procedure results in a 15 NM lateral offset, at an altitude of 500 or 1,000 feet "different from those normally used." It is reprinted in Appendix F, Special Procedures for In-Flight Contingencies in Oceanic and Remote Continental Airspace.

7.2.2.2 The weather deviation procedure results in an altitude change of 300 feet, when the lateral deviation exceeds 10 NM from centerline. It is also reprinted in Appendix F.

7.3 Altimetry and/or Navigation Degradation. You must notify the ATS provider as soon as possible if your altimetry and/or navigation systems have degraded below that required to operate in RVSM, RNP, or RNAV airspace. In general, that notification, either via voice or CPDLC, will include the phrase "UNABLE RNP (OR RNAV OR RVSM) DUE TO EQUIPMENT." Whenever possible, you should request a revised clearance. Upon receipt of your message, ATS providers will assess the traffic situation and either allow you to remain as filed or issue a reroute, depending on your current (and projected future) separation from other traffic.

Note: ICAO NAT Document 007 provides specific contingency procedures to be used in the NAT in the event of navigation system degradation.

7.4 Lost Communications Procedures. The general rules for lost communications are captured in ICAO Annex 2, Chapter 3, and are included in their entirety in ICAO Document 4444, Section 15.3.

7.4.1 Region-Specific Rules. In some regions, ATS authorities have amended the rules to meet their specific ATM requirements. These amended rules are included in ICAO Document 7030, Regional Supplementary Procedures, generally in Chapter 9 of the specific Regional Supplementary Procedures (SUPPS). ICAO NAT Document 007 also provides a detailed discussion of lost communications procedures specific to NAT airspace.

7.4.2 Preflight Preparation. Prior to departure, ensure you are familiar with the lost communications rules for the regions you are transiting. The guidance in the following paragraphs is not all-inclusive and should not be the sole basis for your understanding of the lost communications rules that impact your trip.

7.4.2.1 ATS authorities expect you to maintain your last assigned speed and altitude for some period of time (usually 20 minutes or 60 minutes, depending on the region), then adjust your speed and altitude to conform to your flight plan.

7.4.2.2 If you have received an oceanic clearance, you are expected to proceed to your oceanic entry point and enter at your cleared oceanic FL and airspeed, then fly your ATC-cleared routing, FL, and airspeed through oceanic airspace, picking up your filed flight plan route upon oceanic exit, even if your oceanic clearance differed from your flight planned oceanic routing.

7.4.2.3 If you have not yet received an oceanic clearance, you are expected to proceed to your filed oceanic entry point and fly your filed oceanic routing, FL, and airspeed, then continue along your filed route upon exiting oceanic airspace.

7.4.2.4 You can find specific direction in ICAO Document 4444 and ICAO Document 7030. This direction is not the same for every region, so make sure you understand the procedure for the region(s) through which you intend to operate, as well as those for the national airspace structure you will enter upon exiting oceanic airspace.

APPENDIX A. ABBREVIATIONS AND DEFINITIONS

A.1 Abbreviations.

Acronym	Description
14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACARS	Aircraft Communications Addressing and Reporting System
ACAS	Airborne Collision Avoidance System (same as TCAS)
ACID	Aircraft Identification
ADIZ	Air Defense Identification Zone
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
AFI	African-Indian Ocean Region (ICAO)
AIM	Aeronautical Information Manual
AIP	Aeronautical Information Publication
AMVER	Automated Mutual-assistance Vessel Rescue
ANP	Actual Navigation Performance
ARTCC	Air Route Traffic Control Center
ATA	Actual Time of Arrival
ATC	Air Traffic Control
ATM	Air Traffic Management
ATOP	Advanced Technologies and Oceanic Procedures (also referred to as OCEAN21)
ATS	Air Traffic Service
CEP	Central East Pacific
CFP	Computer Flight Plan
CPDLC	Controller-Pilot Data Link Communications
CTA	Control Area
EDTO	Extended Diversion Time Operations
ETA	Estimated Time of Arrival
ETOPS	Extended Operations

Acronym	Description
ETP	Equal Time Point
FAA	Federal Aviation Administration
FANS 1/A	Future Air Navigation System 1/A (1=Boeing; A=Airbus)
FDE	Fault Detection and Exclusion
FIR	Flight Information Region
FL	Flight Level
FLT ID	Flight Identification
FMC	Flight Management Computer
FMC WPR	Flight Management Computer Waypoint Reporting
FMS	Flight Management System
GNE	Gross Navigation Error
GNSS	Global Navigation Satellite System
GOLD	Global Operational Data Link
GPS	Global Positioning System
HF	High Frequency
HLA	High Level Airspace
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFBP	In-Flight Broadcast Procedure
IFR	Instrument Flight Rules
INS	Inertial Navigation System
IRS	Inertial Reference System
LHD	Large Height Deviation
LNAV	Lateral Navigation
LOA	Letter of Authorization
LRCS	Long-Range Communication System
LRNS	Long-Range Navigation System
MEL	Minimum Equipment List
MHz	Megahertz
MMEL	Master Minimum Equipment List
MNPS	Minimum Navigation Performance Specification

Acronym	Description
Mode S	Mode Select Secondary Radar With Data Link
MSpecs	Management Specifications
NAS	National Airspace System
NAT	North Atlantic
NAT SUPPS	North Atlantic Supplementary Procedures
NATO	North Atlantic Treaty Organization
NAV	Navigation
NAVAID	Navigational Aid
NM	Nautical Miles
NOPAC	North Pacific
NOTAM	Notice to Airmen
NWS	National Weather Service
OpSpecs	Operations Specifications
OTS	Organized Track System
PBN	Performance-Based Navigation
PIC	Pilot in Command
PIREP	Pilot Weather Report
POI	Principal Operations Inspector
PPO	Prior Permission Only
RA	Resolution Advisory
RAIM	Receiver Autonomous Integrity Monitoring
RCP	Required Communications Performance
RNAV	Area Navigation
RNP	Required Navigation Performance
RSP	Required Surveillance Performance
RVSM	Reduced Vertical Separation Minimum
SAO	Special Area of Operation
SAR	Search and Rescue
SARP	Standard and Recommended Practice (ICAO)
SATCOM	Satellite Communications
SATVOICE	Satellite Voice

Acronym	Description
SELCAL	Selective Calling System
SIGWX	Significant Weather
SLOP	Strategic Lateral Offset Procedure
SLRCS	Single Long-Range Communication System
SOP	Standard Operating Procedure
SPR	Safety and Performance Requirements
SSR	Secondary Surveillance Radar
SUPPS	Regional Supplementary Procedures
TCAS	Traffic Alert and Collision Avoidance System
TSO	Technical Standard Order
UTC	Coordinated Universal Time
VAAC	Volcanic Ash Advisory Center
VFR	Visual Flight Rules
VHF	Very High Frequency
WAAS	Wide Area Augmentation System
WebOPSS	Web-based Operations Safety System

A.2 Definitions.

A.2.1 Advisory Airspace. Airspace of defined dimensions, or a designated route, within which air traffic advisory service is available.

A.2.2 Aeronautical Information Manual (AIM). A primary FAA publication whose purpose is to instruct airmen on flight operations in the U.S. NAS. The AIM provides basic flight information, ATC procedures, and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

A.2.3 Aeronautical Information Publication (AIP) (ICAO). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

A.2.4 Aeronautical Telecommunication Station. An aeronautical station which forms part of a radio telephone network by providing air/ground communications and flight information service as an integral part of ATS. Aeronautical telecommunication stations are also known as international Flight Service Stations (FSS), Aeronautical Radio, or Aeradio Stations, depending on the State providing the service.

A.2.5 Airborne Collision Avoidance System (ACAS) (ICAO). An aircraft system based on SSR transponder signals, which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.

A.2.6 Air Defense Identification Zone (ADIZ). Airspace over land or water, extending upward from the surface, within which the ready identification, location, and control of aircraft are required in the interest of national security.

A.2.7 Air Traffic Advisory Services (ICAO). A service provided within advisory airspace to ensure separation, in so far as practical, between aircraft that are operating on IFR flight plans.

A.2.8 Air Traffic Management (ATM) (ICAO). The dynamic, integrated management of air traffic and airspace including ATS, airspace management, and air traffic flow management—safely, economically, and efficiently—through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

A.2.9 Air Traffic Management (ATM) System (ICAO). A system that provides ATM through the collaborative integration of humans, information, technology, facilities, and services, supported by air and ground- and/or space-based communications, navigation, and surveillance.

A.2.10 Air Traffic Service (ATS) (ICAO). A generic term meaning variously flight information service, alerting service, air traffic advisory service, ATC service, area control service, or approach control service.

A.2.11 Air Traffic Service (ATS) Surveillance System (ICAO). A generic term meaning variously, ADS-B, Primary Surveillance Radar (PSR), SSR, or any comparable ground-based system that enables the identification of aircraft. A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

A.2.12 Alerting Service (ICAO). A service provided to notify appropriate organizations regarding aircraft in need of SAR aid and to assist such organizations as required.

A.2.13 Area Control Center (ACC) (ICAO). A unit established to provide ATC service to controlled flights in CTAs under its jurisdiction. ACCs are the international equivalent of U.S. ARTCC.

A.2.14 Area of Magnetic Unreliability (AMU). As aircraft move towards the Earth's north or south magnetic pole, the horizontal field strength reduces and the ability of the compass to accurately sense magnetic north is reduced. It is generally recognized that when the horizontal magnetic field strength falls below 6000 nanotesla, the magnetic compass can no longer be considered to be reliable.

A.2.15 Area Navigation (RNAV) (ICAO). A method of navigation that permits aircraft operation on any desired flight path within the coverage of ground- or space-based NAVAIDS or within the limits of the capability of self-contained systems or a combination of these. RNAV includes PBN, as well as other operations that do not meet the definition of PBN.

A.2.16 Automatic Dependent Surveillance (ADS). A surveillance technique in which aircraft automatically provide, via a data link, data derived from onboard navigation and position fixing systems, including aircraft identification, four-dimensional position, and additional data as appropriate.

A.2.16.1 Automatic Dependent Surveillance—Broadcast (ADS-B) (ICAO). A surveillance system by which aircraft, aerodrome vehicles, and other objects can automatically transmit and/or receive data such as identification, position, and additional data, as appropriate, in a broadcast mode via a data link. ADS-B Out operations involve information transmitted from an aircraft for surveillance purposes. ADS-B In operations involve transmissions received by an aircraft and can provide additional situational awareness for the cockpit crew via a Cockpit Display of Traffic Information (CDTI).

A.2.16.2 Automatic Dependent Surveillance—Contract (ADS-C) (ICAO). A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated and what data would be contained in the reports. The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract, or an emergency mode.

A.2.17 Conditional Clearances. A conditional clearance is an ATC clearance given to an aircraft with certain conditions or restrictions, such as changing an FL based on a UTC time or a specific geographic position. In oceanic and remote continental airspace, this usually involves a restriction to comply with the clearance "BY" or "AT" a certain geographic position or time.

A.2.18 Control Area (CTA) (ICAO). A controlled airspace extending upwards from a specified limit above the Earth.

A.2.19 Controller-Pilot Data Link Communications (CPDLC). A two-way digital communications system that conveys textual ATC messages between controllers and pilots using ground- or satellite-based radio relay stations.

A.2.20 Cross-Checking. Cross-checking is the act of verification. Cross-checking involves matching a set of test data against a set of master data to detect deviations in sequence or content.

A.2.21 Data Link Mandate (DLM) (ICAO). Paragraphs 3.3.1 and 5.3.1 of the approved NAT SUPPS amendment in ICAO Document 7030 call for aircraft intending to conduct operations within specified NAT airspace to be fitted with operating FANS 1/A or

equivalent CPDLC and ADS-C. The extent of the airspace requiring these capabilities is expanding on a phased timeline.

A.2.22 Dead Reckoning (DR). The navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, groundspeed, and elapsed time.

A.2.23 Electronic Flight Bag (EFB). An EFB is an electronic display system, intended primarily for cockpit or cabin use. EFB devices can display a variety of aviation data (e.g., checklists, navigation charts, pilot's operating handbook (POH)) or perform basic calculations (e.g., performance data, fuel calculations). The scope of the EFB system functionality may also include various other hosted databases and applications. Physical EFB displays may be portable (Class 1), attached to a mounting device (Class 2), or built into the aircraft (Class 3).

A.2.24 Erosion of Longitudinal Separation. A loss of required horizontal separation between aircraft operating at the same altitude, on the same oceanic routing, usually due to improper speed control or failure to communicate to ATC in a timely manner any changes in ETAs in excess of 2 minutes.

A.2.25 Extended Diversion Time Operations (EDTO) (ICAO). Any operation by an airplane with two or more turbine engines where the diversion time to an en route alternate aerodrome is greater than the threshold time established by the State of the Operator.

A.2.26 Extended Operations (ETOPS). An airplane flight operation, other than an all-cargo operation in an airplane with more than two engines, during which a portion of the flight is conducted beyond a time threshold identified in 14 CFR part 121 or 135, that is determined using an approved one-engine-inoperative cruise speed under standard atmospheric conditions in still air.

A.2.27 Fatigue Risk Management System (FRMS) (ICAO). FRMS is a data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.

A.2.28 Flight Information Region (FIR) (ICAO). An airspace of defined dimensions within which Flight Information Service (FIS) and alerting services are provided.

A.2.29 Flight Information Service (FIS) (ICAO). A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

A.2.30 Flight Level (FL) (ICAO). A surface of constant atmospheric pressure which is related to a specific pressure datum (i.e., Standard Pressure—29.92 in. Hg or 1013.2 HP) and is separated from other such surfaces by specific pressure intervals. Each is stated in three digits that represent hundreds of feet (i.e., FL 060 = 6000 feet).

A.2.31 Flight Operations Officer/Flight Dispatcher (ICAO). A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not,

suitably qualified in accordance with ICAO Annex 1, who supports, briefs, and/or assists the PIC in the safe conduct of the flight.

A.2.32 General Aviation (GA). That portion of civil aviation that does not include scheduled or unscheduled air carriers or commercial space operations.

A.2.33 Global Navigation Satellite System (GNSS) (ICAO). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers, and system integrity monitoring, augmented as necessary to support the RNP for the intended operation.

A.2.34 Global Positioning System (GPS). GPS refers to the worldwide positioning, navigation, and timing determination capability available from the U.S. satellite constellation. The service provided by GPS for civil use is defined in the GPS Standard Positioning Service Performance Standard. GPS is composed of space, control, and user elements.

A.2.35 Gross Navigation Error (GNE). A GNE is a lateral deviation from a cleared track, normally in excess of 25 NM. More stringent standards (for example, 10 NM in some parts of the NAT region) may be soon used in certain regions to support reductions in lateral separation.

A.2.36 High Frequency (HF) Communications. Radio frequencies between 3 and 30 MHz used for air/ground voice communications in overseas operations. HF communications capability is required for all IFR operations in controlled airspace when out of the range of VHF communications. If you are in doubt as to the VHF coverage along your intended route of flight, your aircraft should be equipped with HF communications.

A.2.37 Instrument Meteorological Conditions (IMC) (ICAO). Meteorological conditions expressed in terms of visibility, distance from clouds, and ceiling, which preclude flight in compliance with VFR.

A.2.38 International Civil Aviation Organization (ICAO). ICAO is a specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

A.2.39 Journey Logbook (ICAO). A record of the flight operation, which should be retained in order to maintain a continuous record of the last 6 months' operations.

A.2.40 Large Height Deviations (LHD). A deviation from your cleared altitude by 300 feet or more.

A.2.41 Lateral Navigation (LNAV). A function of RNAV equipment that calculates, displays, and provides lateral guidance to a profile or path.

A.2.42 Long-Range Navigation System (LRNS). An electronic navigation unit that is approved for use under IFR as a primary means of navigation. An LRNS must have at least one source of navigational input, such as an INS or a GPS receiver.

A.2.43 Mach Number Technique. Describes a control technique used by ATC whereby turbojet aircraft operating successively along suitable routes are cleared to maintain appropriate Mach numbers for a relevant portion of the en route phase of flight. The principal objective is to achieve improved utilization of the airspace and to ensure that separation between successive aircraft does not decrease below the established minima.

A.2.44 Master Document. A copy of the operational flight plan, labeled as "Master," on which the currently effective route clearance is recorded, and which serves as the primary flightcrew reference for updating the progress of the flight. It should list sequentially the waypoints defining the route, the track and distance between each waypoint, and other information relevant to navigation along the cleared track.

A.2.45 Master Minimum Equipment List (MMEL) (ICAO). A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations, or procedures.

A.2.46 Minimum Equipment List (MEL) (ICAO). A list that provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

A.2.47 Navigation Specification (ICAO). A set of aircraft and flightcrew requirements needed to support PBN operations within a defined airspace. There are two kinds of navigation specifications:

A.2.47.1 Area Navigation (RNAV) Specification. A navigation specification based on RNAV that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV (e.g., RNAV 5, RNAV 1).

A.2.47.2 Required Navigation Performance (RNP) Specification. A navigation specification based on RNAV that includes the requirement for performance monitoring and alerting, designated by the prefix RNP (e.g., RNP 4, RNP 10).

A.2.48 North Atlantic High Level Airspace (NAT HLA). NAT HLA is that volume of airspace (as defined in ICAO Document 7030) between FL 285 and FL 420 within the oceanic control areas (OCA) of Bodo Oceanic, Gander Oceanic, New York Oceanic East, Reykjavik, Santa Maria, and Shanwick, excluding the Shannon and Brest Ocean Transition Areas. Aircraft operators must be approved by their State of Registry for any operations within NAT HLA.

A.2.49 Notice to Airmen (NOTAM) Domestic/International. A notice containing information concerning the establishment, condition, or change in any aeronautical facility, service, procedure, or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. NOTAMs are distributed via two methods: telecommunications (Class I Distribution) and other than telecommunications (Class II Distribution).

A.2.50 Oceanic Airspace. Airspace over the seas where line-of-sight communications or ATC surveillance (via radar or ADS-B) are not available. ATC is provided using procedural control and procedural separation in accordance with ICAO.

A.2.51 Oceanic Area Control Center (OACC). Any ACC with jurisdiction over oceanic airspace for the purpose of providing ATS. Responsibility for the provisions of ATS is delegated to various States based primarily upon geographic proximity and the availability of the required resources.

A.2.52 Performance-Based Communication (PBC) (ICAO). ATS communication services and capability based on performance requirements for ATS provision and aircraft and flight operations along an ATS route, on an instrument approach procedure (IAP), or in a designated airspace. Communication performance requirements are allocated to system components in an RCP specification in terms of communication transaction time, continuity, availability, integrity, safety, and functionality needed for the proposed operation in the context of a particular airspace concept.

A.2.53 Performance-Based Navigation (PBN) (ICAO). RNAV based on performance requirements for aircraft operating along an ATS route, on an IAP, or in a designated airspace. Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability, and functionality needed for the proposed operation in the context of a particular airspace concept.

A.2.54 Performance-Based Surveillance (PBS) (ICAO). ATS surveillance services and capability based on performance requirements for ATS provision and aircraft and flight operations along an ATS route, on an IAP, or in a designated airspace. Surveillance performance requirements are allocated to system components in an RSP specification in terms of surveillance data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety, and functionality needed for the proposed operation in the context of a particular airspace concept.

A.2.55 Pilot in Command (PIC) (ICAO). The pilot designated by the operator, or in the case of GA, the owner, as being in command and charged with the safe conduct of a flight.

A.2.56 Procedural Control (ICAO). Term used to indicate that information derived from a radar-based ATS surveillance system is not required for the provision of ATC service. Procedural control is a method of providing ATC services relying on inputs from the crew and their onboard communications, navigation, and surveillance equipment. It is used in regions of the world, specifically remote areas and oceans, where ground-based radar coverage is prohibitively expensive or simply not feasible.

A.2.57 Procedural Separation (ICAO). The separation used when providing procedural control.

A.2.58 Reduced Vertical Separation Minima (RVSM). RVSM separation minima are 1000 feet vertical separation between FL 290 and FL 410 inclusive. Aircraft must be RVSM-approved to operate in RVSM airspace.

A.2.59 Remote Continental Airspace. Airspace over terrain where line-of-sight communications, ATC surveillance (via radar or ADS-B), and reliable ground-based NAVAIDs are not available. ATC is provided using procedural control and procedural separation.

A.2.60 Required Communications Performance (RCP) Specification (ICAO). A set of requirements for ATS provision, aircraft capability, and operations needed to support PBC within a defined airspace.

A.2.60.1 RCP Type (ICAO). A label (e.g., RCP 240 or RCP 400) that represents the values assigned to RCP parameters for communication transaction time (in seconds), continuity, availability, and integrity.

A.2.61 Required Navigation Performance (RNP) Specification (ICAO). A navigation specification based on RNAV that includes the requirement for performance monitoring and alerting, designated by the prefix RNP (e.g., RNP 2, RNP 4, RNP 10). A defining characteristic of RNP operations is the ability of the aircraft navigation system to monitor the navigation performance it achieves and inform the crew if the requirement is not met during an operation. This onboard monitoring and alerting capability enhances the pilot's situational awareness and can enable reduced obstacle clearance or closer route spacing without intervention by ATC. The numerical value represents the LNAV accuracy (i.e., maximum total system error) in NM, which is expected to be achieved at least 95 percent of the flight time by the population of aircraft operating within the airspace, route, or procedure.

A.2.62 Required Surveillance Performance (RSP) Specification (ICAO). A set of ATS provisions, including communication services and aircraft and operator requirements, needed for surveillance, supporting a performance-based operation within a defined airspace.

A.2.62.1 RSP Type. A label (e.g., RSP 180 or RSP 400) that represents the values assigned to RSP parameters for surveillance transaction time (in seconds), continuity, availability, and integrity.

A.2.63 Special Use Airspace (SUA). Consists of airspace of defined dimensions identified by an area on the surface of the Earth wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both.

A.2.63.1 Prohibited Areas. A prohibited area is an SUA designated under 14 CFR part 73, within which no person may operate an aircraft without the permission of the using agency.

A.2.63.2 Restricted Areas. A restricted area is an SUA designated under part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

A.2.63.3 Warning Areas. A warning area is airspace of defined dimensions, extending from 3 NM outward from the coast of the United States, which contains activity that may be hazardous to nonparticipating aircraft. The purpose of such a warning area is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both.

A.2.64 Target Level of Safety (TLS) (ICAO). A generic term representing the level of risk that is considered acceptable in particular circumstances.

A.2.65 Very High Frequency (VHF). The frequency band between 30 and 300 MHz. Portions of this band, 108–118 MHz, are used for certain NAVAIDs, while 118–136 MHz are used for civil air/ground voice communications.

A.2.66 Visual Meteorological Conditions (VMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

A.2.67 Waypoint. A predetermined geographical position used for route definition, progress reports, or points for transitioning and/or circumnavigating controlled and/or SUA, that is defined relative to a ground-based NAVAID or in terms of latitude/longitude coordinates. Waypoints are identified as either:

A.2.67.1 Fly-By Waypoint. A waypoint that requires turn anticipation to allow tangential interception of the next segment of a route or procedure.

A.2.67.2 Flyover Waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

APPENDIX B. SPECIAL AREAS OF OPERATION AND OPSPECS/MSPECS/LOAS

B.1 Special Areas of Operation (SAO). SAOs are geographic areas having unique characteristics that require the use of special equipment, procedures, and/or techniques to safely conduct flight operations. In SAOs, the ATC system supports a reduction in separation standards. This reduction in separation standards requires improved levels of performance, utilizing more precise navigation systems and data link communications systems. The tables below identify those OpSpecs, MSpecs, and LOAs typically required for operations in the geographic areas considered SAOs, as well as for oceanic and remote continental airspace operations in general. Absence of the MSpec and/or LOA notation on the authorization line (e.g., OpSpec B041) indicates that an MSpec and/or LOA is not required for those operators who would ordinarily be issued MSpecs or LOAs. Operators should consult with an SAO specialist when first considering flights in these areas.

B.2 SAO-Specific OpSpecs/MSpecs/LOAs.

Auth	OpSpec/MSpec/LOA	Title
B037	OpSpec/MSpec	Operations in Central East Pacific (CEP) Airspace
B038	OpSpec/MSpec	Operations in North Pacific (NOPAC) Airspace
B039	OpSpec/MSpec/LOA	Operations in North Atlantic High Level Airspace (NAT HLA)
B040	OpSpec/MSpec	Operations in Areas of Magnetic Unreliability
B041	OpSpec	North Atlantic Operations with Two-Engine Airplanes Under Part 121
B050	OpSpec/MSpec	Authorized Areas of En Route Operations, Limitations, and Provisions
B055	OpSpec/MSpec	North Polar Operations
B059	OpSpec	Canadian MNPS Airspace (B059 is only issued to part 135 operators)
B450	OpSpec/MSpec/LOA	Sensitive International Areas

B.3 Oceanic and Remote General OpSpecs/MSpecs/LOAs.

Auth	OpSpec/MSpec/LOA	Title
A010	OpSpec/MSpec	Aviation Weather Information
A014	OpSpec	Special En Route IFR Operations in Class G Airspace
A018	OpSpec	Scheduled Passenger Helicopter Operations
A056	OpSpec/MSpec/LOA	Data Link Communications
A317	OpSpec	Acceptance of a Fatigue Risk Management Plan

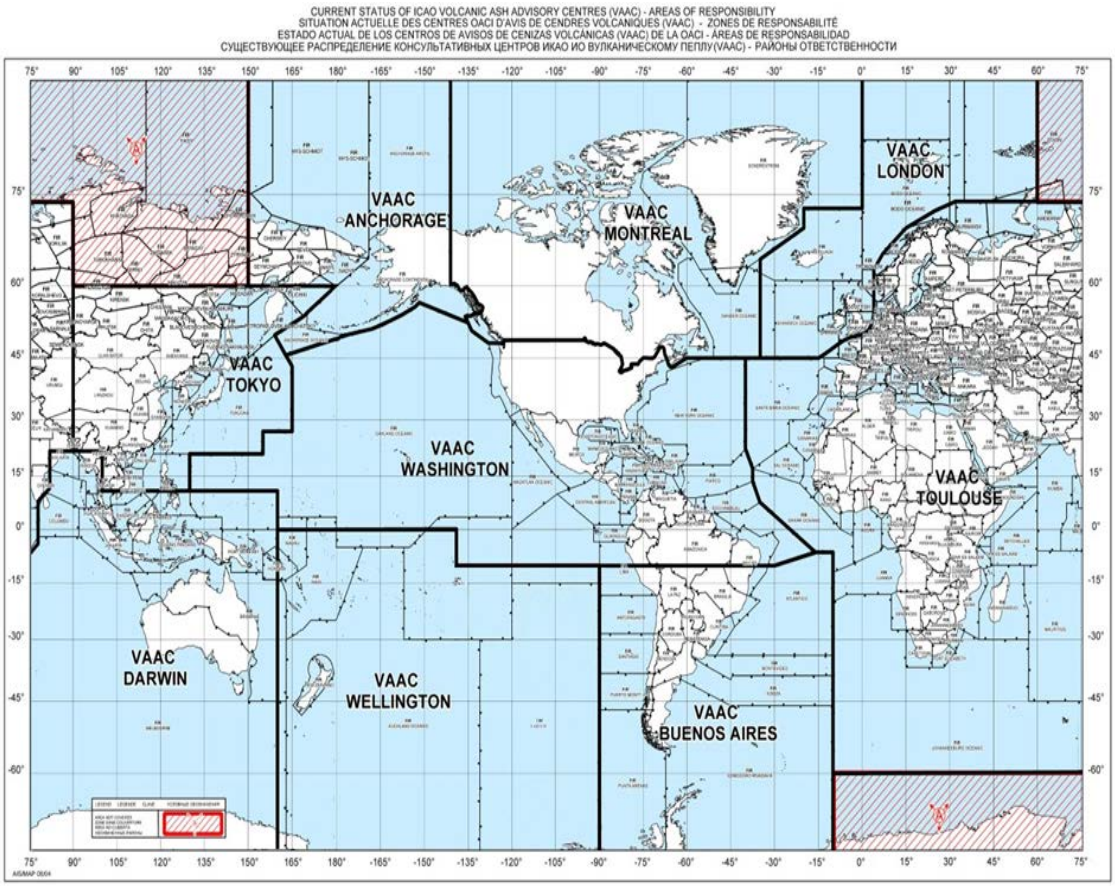
Auth	OpSpec/MSpec/LOA	Title
A354	OpSpec/MSpec/LOA	In-Trail Procedures (ITP) Using ADS-B In
A355	OpSpec/MSpec/LOA	Automatic Dependent Surveillance-Broadcast (ADS-B) In Operations
B030	OpSpec	IFR Navigation Using GPS/WAAS RNAV Systems
B031	OpSpec/MSpec	Areas of En Route Operation
B032	OpSpec/MSpec	En Route Limitations and Provisions
B034	OpSpec/MSpec/LOA	IFR Class I Terminal and En Route Navigation Using Area Navigation Systems
B035	OpSpec/MSpec/LOA	Class I Navigation in the U.S. Class A Airspace Using Area or Long-Range Navigation Systems
B036	OpSpec/MSpec/LOA	Oceanic and Remote Continental Navigation Using Multiple Long-Range Navigation Systems (M-LRNS)
B043	OpSpec/LOA	Special Fuel Reserves in International Operations
B044	OpSpec	Planned Redispatch or Rerelease En Route
B045	OpSpec/MSpec/LOA	Extended Overwater Operations Using a Single Long-Range Communication System
B046	OpSpec/MSpec/LOA	Operations in Reduced Vertical Separation Minimum (RVSM) Airspace
B054	OpSpec/MSpec/LOA	Oceanic and Remote Airspace Navigation Using a Single Long-Range Navigation System
B342	OpSpec	Extended Operations (ETOPS) with Two-Engine Airplanes Under Part 121/135
B343	OpSpec	Performance-Based Contingency Fuel Requirements for Flag Operations
B344	OpSpec	Extended Operations (ETOPS) in Passenger-Carrying Airplanes with More Than Two Engines Under Part 121/135
C055	OpSpec/MSpec	Alternate Airport IFR Weather Minimums
H104	OpSpec/LOA	Helicopter Offshore Instrument Operations: Offshore Standard Approach Procedure (OSAP), Airborne Radar Approach (ARA), and Helicopter En Route Descent Area (HEDA) Operations

APPENDIX C. UNUSUAL WEATHER ACTIVITY

C.1 Volcanic Ash.

C.1.1 In 2010, a small volcano in Iceland erupted, spewing volcanic ash into the atmosphere. Eyjafjallajökull's eruption stranded 8 million travelers and resulted in the largest airspace shutdown since World War II. As a result, in 2012, ICAO produced the first edition of ICAO Document 9974, Flight Safety and Volcanic Ash, which provides guidance for aircraft operators when volcanic ash contamination may be a hazard for flight operations. Whenever your flight planned route approaches the vicinity of a volcanic ash cloud, you should understand the potentially catastrophic effects ingesting volcanic ash could have on your aircraft engines. Currently, nine VAACs offer worldwide coverage of volcanic activity and provide valuable information to assist your trip planning efforts.

Figure C-1. ICAO Volcanic Ash Advisory Centers



C.1.2 Volcanic eruptions emit various gases along with magma, including sulfur dioxide (SO_2) and hydrogen sulfide (H_2S). When SO_2 gas combines with water in the atmosphere, a sulfate aerosol primarily composed of dilute sulfuric acid is formed. Flying through sulfuric acid aerosols has caused crazing of acrylic windows, fading of exterior paint, and accumulation of sulfate deposits in engines. SO_2 gas is colorless, but under certain conditions of reflection and refraction of sunlight, a sulfuric acid aerosol may be a visible

atmospheric feature, such as a layer of haze of variable color (brownish, yellowish, bluish, or whitish). Ash particles likely will be present in aerosol haze but possibly in minor or trace amounts.

C.1.3 Volcanoes are the only sources of large quantities of sulfur gases at cruise altitudes, and both types of sulfur gas have a noticeable smell. SO_2 is identifiable as the sharp, acrid odor of a freshly struck match. H_2S, also known as sewer gas, has the odor of rotten eggs. "Electrical smoke and fire" and SO_2 are two odors described as somewhat similar. Sulfur gases may be detectable only for a short period of time because of "olfactory fatigue" (temporary loss of the ability to smell a particular odor). Inhalation of SO_2, even at low concentrations (<5 ppm), can cause respiratory tract irritation, especially in people with asthma and chronic obstructive pulmonary disease.

C.1.4 If you smell sulfur gases in the cockpit, this may indicate volcanic activity that has not yet been detected or reported and/or your possible entry into an ash-bearing cloud. After determining there are no secondary indications that would result from and indicate an electrical fire, you should establish whether the sulfur odor is transient or not.

C.1.5 You can best achieve this by donning your oxygen mask(s) and breathing 100 percent oxygen for the period of time that results in a complete change of air within the cockpit and also allows you to regain your sense of smell. After the appropriate time period, remove your oxygen mask(s) and determine if the odor is still present. If you confirm the continued presence of sulfur gas, you should inform the controlling ATS unit and dispatch center as soon as practicable to request information about any relevant volcanic activity and the whereabouts of possible volcanic clouds. You do not have the means to determine directly whether or not the cloud is hazardous; therefore, you should seek to exit the cloud.

C.1.6 You might see other indications of volcanic ash such as fine dust in the aircraft, St. Elmo's fire visible around your windshield, and/or a visible glow in the intake of your engines. Your airspeed indications may also become unreliable as the ash contaminates your pitot/static system. Chapter 7 of the AIM discusses PIREPs related to volcanic ash activity and recommends you complete the Volcanic Activity Reporting Form (VAR), found in Appendix 2 of the AIM.You should avoid flying in the vicinity of known volcanic ash. Attempting to overfly an ash plume is also potentially perilous, as an emergency descent could place the aircraft into the plume."

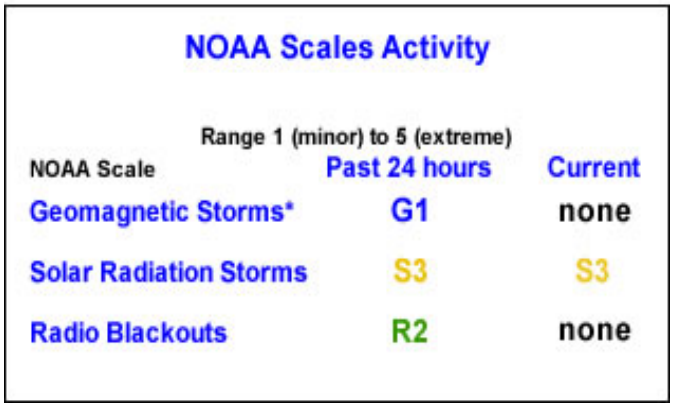
C.2 Space Weather.

C.2.1 The effects of space weather on aviation have generated an increasing amount of interest in recent years. Space weather most commonly impacts radio communications between your aircraft and ground stations. Space weather may also impact navigation signals from space-based and ground-based transmitters as well as onboard avionics components. Exposure to increased radiation levels during solar events has not been a noticeable issue, but it is a factor that you can plan for in order to protect your frequently flying crewmembers and passengers.

C.2.2 The magnetic field around the Earth converges at the North and South Poles, allowing charged particles to access lower levels of the Earth's atmosphere. These lower levels are the same levels used to fly international flights around the world. The aviation community has shown increasing interest in this phenomenon at the poles as the expansion of polar routes has seen more and more flights susceptible to space weather.

C.2.3 The solar cycle is an approximately 11-year period that is characterized by solar activity that departs from the sun and has impacts on whatever celestial bodies are in the path of this space weather. The current cycle, Cycle 24, peaked in early 2014 and should bottom out around 2019–2020. The three effects of this weather are known as radio blackouts, geomagnetic storms, and solar radiation storms. These storms can have varying degrees of short- and long-term impact on ground-based navigation signals, aircraft and aircrew in flight, space-based transmitters, spacecraft, and space crew. The Space Weather Prediction Center (SWPC) tracks these storms and issues space weather watches, warnings, and alerts to inform the public of potential impacts.

Figure C-2. Example of a National Oceanic and Atmospheric Administration Scales Activity Report



C.2.4 Space weather alerts can be subscribed to through the SWPC Product Subscription Service and the following link: http://www.swpc.noaa.gov/communities/space-weather-enthusiasts.

APPENDIX D. SAMPLE OCEANIC CHECKLIST

D.1 Sample Oceanic Checklist. This sample checklist is provided for your reference. If you do not have an oceanic checklist, we encourage you to use this sample and tailor it to your specific needs and approvals. This checklist focuses on an orderly flow and ways to reduce oceanic errors. You should also review the expanded checklist at paragraph D.2. An oceanic checklist should be part of your Safety Management System (SMS). Other sample oceanic checklists are available through the International Civil Aviation Organization (ICAO) North Atlantic (NAT) Ops Bulletins, found at http://www.icao.int/.

D.1.1 Flight Planning.

D.1.1.1 Communications, navigation, and surveillance flight plan codes and planning documents.

D.1.1.2 Oceanic documents.

D.1.1.3 Plotting/orientation chart—plot route coast out to coast in.

D.1.1.4 Equal Time Points (ETP)—plot.

D.1.1.5 Track message (current copy available for all crossings).

Note: Note nearest tracks on plotting/orientation chart.

D.1.1.6 Weather analysis—note en route temperature and turbulence forecasts as well as ETP airport weather.

D.1.1.7 Review suitable navigational aids (NAVAID) for accuracy check prior to coast out.

D.1.2 Preflight.

D.1.2.1 Master clock for all estimated times of arrival (ETA)/actual times of arrival (ATA).

D.1.2.2 Maintenance log—check for any communications, navigation, and surveillance or Reduced Vertical Separation Minimum (RVSM) issues.

D.1.2.3 RVSM.

D.1.2.4 Altimeter checks (tolerance).

D.1.2.5 Wind shear or turbulence forecast.

D.1.2.6 Flight plan (check routing, fuel load, times, groundspeeds).

D.1.2.7 Dual long-range navigation system (LRNS) for oceanic and remote continental airspace operations.

D.1.2.8 High frequency (HF) check (including selective calling system (SELCAL)).

D.1.2.9 Confirm present position coordinates (best source).

D.1.2.10 Master document symbols (④, ✓, \, X).

D.1.2.11 LRNS programming:

1. Check navigation database currency and software version.
2. Independently verify flight management system (FMS) programming.
3. Check expanded coordinates of oceanic waypoints.
4. Check course and distance (± 2° and ±2 nautical miles (NM)).
5. Upload winds, if applicable.

D.1.2.12 Groundspeed check.

D.1.3 Taxi and Prior to Takeoff.

D.1.3.1 Groundspeed check.

D.1.3.2 Present position check.

D.1.4 Climb Out.

D.1.4.1 Transition altitude—set altimeters to 29.92 inches (1013.2 hectopascals).

D.1.4.2 Manually compute ETAs as duties permit.

D.1.5 Prior to Oceanic Entry.

D.1.5.1 Navigation accuracy check—record results on master document.

D.1.5.2 HF check, if not done during preflight.

D.1.5.3 Confirm satellite communication (SATCOM) data link is operational, if equipped.

D.1.5.4 Log on to Controller-Pilot Data Link Communication (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C) 10 to 25 minutes prior, if equipped.

D.1.5.5 Verify your Required Navigation Performance (RNP) value.

D.1.5.6 Obtain oceanic clearance from appropriate clearance delivery and verify/cross-check air traffic control (ATC) route clearance is properly programmed into the LRNS.

1. Confirm assigned oceanic flight level (FL) and request climb or descent to be at your assigned FL prior to oceanic airspace boundary.
2. Confirm FL, Mach, and route for crossing.
3. Advise ATC when able higher.

D.1.5.7 Reclearance—update LRNS, master document, and plotting/orientation chart.

Note: Check course and distance for new route.

D.1.5.8 Check altimeters—record readings on master document.

D.1.5.9 Compass heading check (inertial navigation system (INS))—record.

D.1.6 After Oceanic Entry.

D.1.6.1 Squawk 2000—30 minutes after entry, if applicable.

D.1.6.2 Maintain assigned Mach.

D.1.6.3 Maintain assigned FL.

D.1.6.4 Very high frequency (VHF) radios—set to air-to-air and guard frequency.

D.1.6.5 Strategic Lateral Offset Procedure (SLOP)—Depending on standard operating procedures (SOP), fly cleared route or up to 2 NM to the right of ATC-cleared track. Confirm procedures in the State Aeronautical Information Publication (AIP).

D.1.6.6 Altimeter checks—hourly.

D.1.7 Approaching Waypoints.

D.1.7.1 Confirm coordinates of subsequent waypoints.

Note: Verify that the active FMS waypoint, as well as the next and subsequent ("next plus 1") waypoints, match your *currently effective route clearance*. Confirm that the *expanded* (i.e., full latitude and longitude coordinates) of the next and subsequent waypoints, as well as the course/heading and distance to the waypoints, agree with your currently effective route clearance.

D.1.7.2 Confirm lateral navigation (LNAV)/navigation (NAV) is engaged.

D.1.8 Overhead Waypoints.

D.1.8.1 Confirm aircraft transitions to next waypoint.

Note: Check magnetic heading and distance against master document.

D.1.8.2 Confirm time to next waypoint.

Note: ETA changes in excess of 2 minutes require ATC notification.

D.1.8.3 Make position report.

Note: Record fuel remaining and current time on your master document.

D.1.9 Ten Minutes after Waypoint Passage. Cross-check navigational performance and course compliance via one of the following methods:

D.1.9.1 Plotting method (see paragraph D.2.9).

D.1.9.2 Navigation display method (see paragraph D.2.9).

D.1.9.3 Alternative method accepted by the FAA (see paragraph 6.4.8).

D.1.10 Midway Between Waypoints.

D.1.10.1 Cross-check winds between master document, LRNS, and winds aloft charts.

D.1.10.2 Confirm time to next waypoint.

D.1.11 Coast In.

D.1.11.1 Remove strategic lateral offset prior to oceanic exit point.

D.1.11.2 Confirm routing beyond oceanic airspace.

D.1.11.3 Compare LRNS to ground-based NAVAID.

D.1.12 Descent. Transition level—set altimeters to barometric pressure for local altimeter setting (QNH).

D.1.13 Destination/Block-In.

D.1.13.1 Navigation accuracy check.

D.1.13.2 RVSM write-ups.

D.2 Sample Expanded Oceanic Checklist. This sample expanded checklist is provided for your reference. If you do not have an expanded oceanic checklist, we encourage you to use this sample and tailor it to your specific needs and approvals. This checklist focuses on an orderly flow and ways to reduce oceanic errors. An oceanic checklist should be part of your SMS.

D.2.1 Flight Planning.

D.2.1.1 Communications, Navigation, and Surveillance Flight Plan Codes and Planning Documents.

1. Review your ATC flight plan with emphasis on items 10A, 10B, and 18. Ensure that you properly filed the appropriate communications, navigation, and surveillance and Performance-based Navigation (PBN) descriptors in items 10 and 18 of your flight plan.
2. You should review each aircraft's minimum equipment list (MEL) for system deferrals that may affect the communications, navigation, and surveillance capabilities of your aircraft. The "remarks and exceptions" column should provide the specific guidance for flight plan filing.
3. You should ensure your operator's flight manual includes procedures to require flight plan amendments (or cancellations as appropriate) when your communications, navigation, and surveillance capabilities are changed during the preflight planning phase prior to departure.

Note: Items 10 and 18 of the flight plan require more detail to indicate your communications, navigation, and surveillance capabilities and authorizations. These additional codes are necessary to meet performance-based requirements and are noted in ICAO Document 4444, Procedures for Air Navigation Services—Air Traffic Management and in the U.S. Aeronautical Information Manual (AIM).

D.2.1.2 Oceanic Documents. Operators are encouraged to develop a flight planning checklist to ensure they have the necessary documents before departure. The checklist should include, as a minimum, the following:

1. Master document.
2. Notices to Airmen (NOTAM) for departure, destination, alternate(s); Extended Operations (ETOPS) alternates (as applicable); and oceanic flight information regions (FIR).
3. Weather for departure, destination, alternate airports along the route of flight, and ETOPS alternates (as applicable).
4. Track message(s).

5. Significant Weather (SIGWX) chart.
6. ETP(s), wind tables, or winds aloft charts for FLs or altitudes.
7. Global Positioning System (GPS) NOTAMs (as applicable); any applicable space weather watches, warnings, and alerts (see Appendix C).
8. Volcanic ash information.
9. Pilot Weather Reports (PIREP).
10. Plotting charts.

D.2.1.3 Plotting/Orientation Chart.

D.2.1.3.1 You should use an oceanic plotting/orientation chart of appropriate scale that depicts published oceanic tracks.

D.2.1.3.2 ICAO groups that review oceanic errors have determined that the routine use of a chart is an excellent way to reduce lateral errors. A chart can also help in the event of partial or total navigation system failure.

D.2.1.3.3 You should read from the plotting/orientation chart back to the master document when verifying data. Reading from the master document to the chart can introduce "expectation bias," where errors are missed because we see what we expect to see.

D.2.1.3.4 Plot your *currently effective route clearance* from coast out to coast in. Make sure you update this (as applicable) whenever your route clearance changes.

D.2.1.3.5 Note nearest oceanic tracks on your chart.

D.2.1.4 ETPs.

D.2.1.4.1 You should compute ETPs for contingencies such as medical divert, engine loss, or rapid depressurization. You should also consider a simultaneous engine loss and rapid depressurization.

D.2.1.4.2 Verify that planned ETP airports are adequate during time of flight operations.

D.2.1.4.3 You should annotate the ETPs and associated alternates on your plotting/orientation chart. When crossing ETPs, you should review with other crewmembers the appropriate diversion airport(s).

D.2.1.4.4 Your pilot procedures should also include a manual method for computing ETPs. You should not enter ETPs in the active route of the LRNS because additional waypoints, even if along the route, can produce nuisance out-of-conformance alerts on ground-based monitoring systems. Also, crew

misunderstanding about these additional waypoints has occasionally led to pilot deviations from the cleared route.

D.2.1.5 Track Message.

D.2.1.5.1 You must have a current track message even if you have filed for a random route or you filed above North Atlantic High Level Airspace (NAT HLA). Reviewing the date, effective time, and track message identifier ensures having a current track message on board. The track message identifier is linked to the Julian date.

D.2.1.5.2 You should also ensure that your flight planning and operational control process requires notification of crewmembers of any amendments to the daily track message in a timely manner.

D.2.1.5.3 When flying a random route, plotting adjacent tracks and/or crossing tracks can help your situational awareness in case you need to execute a contingency procedure.

D.2.1.6 Weather Analysis. You should note en route temperature and turbulence forecasts, as well as ETP airport weather, diversion/emergency airport weather, volcanic activity, magnetic storms, and solar flares affecting your route of flight.

D.2.1.7 NAVAIDs. Review suitable NAVAIDs for accuracy check prior to coast out.

D.2.1.7.1 You should determine in advance a primary and secondary ground-based NAVAID that you will use to verify the accuracy of your LRNS.

D.2.1.7.2 This planning may help you identify intended NAVAIDs that are limited or NOTAM'd unusable and will help you when you depart airports close to oceanic airspace.

D.2.1.7.3 A latitude/longitude radar fix from ATC also meets the requirements for an accuracy check.

D.2.2 Preflight.

D.2.2.1 Master Clock. You must have an identified master clock on board synchronized to Coordinated Universal Time (UTC) (generally via GPS). You must use this single time source, typically the FMS, for all ETAs and ATAs.

D.2.2.2 Maintenance Log. You should focus, in particular, on any write-ups that affect communications, navigation, surveillance equipment, or RVSM requirements.

D.2.2.3 RVSM.

D.2.2.3.1 Required equipment to operate in RVSM airspace includes two primary independent altimetry sources, one altitude alert system, and one automatic altitude control system.

D.2.2.3.2 In most cases, you are also required to have a functioning transponder that can be linked to the primary altimetry source.

D.2.2.3.3 You should note any maintenance issues that could affect accurate altimetry.

D.2.2.4 Altimeter Checks.

D.2.2.4.1 Before taxi, you should set your altimeters to the airport QNH. Both primary altimeters must read within ± 75 feet of field elevation.

D.2.2.4.2 The two primary altimeters must also agree with each other within the limits noted in the aircraft operating manual.

D.2.2.5 Wind Shear or Turbulence Forecast.

D.2.2.5.1 You should review the master document with the projected wind shear or the turbulence forecast documents for flights in RVSM airspace.

D.2.2.5.2 Forecast severe turbulence could lead ATC to stop using certain FLs.

D.2.2.5.3 Forecast severe turbulence may be incompatible with flight manual or company limitations.

D.2.2.6 Flight Plan.

1. Ensure the flight plan designated as the master document includes the date, type aircraft, fuel load, and performance requirements.
2. Cross-check the routing and forecast groundspeeds.
3. Carefully check the master document against your filed flight plan to ensure both documents show the same routing.
4. Check the en route time on the master document against the distance to your destination to ensure it is based on a reasonable groundspeed.
5. Compare the en route time against the total distance to ensure you have planned a reasonable fuel load.

D.2.2.7 LRNS.

1. You are typically required to have two independent operational LRNSs for oceanic and remote continental airspace operations. Operations Specification (OpSpec)/Management Specification (MSpec)/Letter of Authorization (LOA) B054/MB054, Oceanic and Remote Airspace Navigation Using a Single Long-Range Navigation System, identifies the oceanic and remote continental areas authorized for operations with a single LRNS.
2. A single FMS receiving inputs from two navigation sensors does not qualify as two LRNSs.

D.2.2.8 HF Check.

1. You should conduct an HF check on the primary and secondary HF radios in areas where dual HF radios are required. (Two long-range communications systems are typically required for oceanic and remote continental airspace operations.)
2. If possible, you should accomplish the HF checks on the ground or before entering oceanic airspace.
3. Even if you are data link equipped, you should accomplish a SELCAL check at each oceanic control area (OCA) boundary.

D.2.2.9 Confirm Present Position Coordinates.

1. Both pilots should independently verify the present position coordinates using either published ramp coordinates or by determining your position from the airfield diagram.
2. You should not rely on the present position resident in your FMS from the previous flight.

D.2.2.10 Master Document Symbols. You should use consistent symbology on your master document.

1. A circled number (④) may indicate the second crewmember has independently verified the coordinates entered or cross-checked by the first crewmember.
2. A checkmark (✓) may indicate that the track and distances have been confirmed.
3. A diagonal line (\) may indicate that the crew has confirmed the coordinates of the approaching and next waypoint.
4. A second diagonal line creating an X symbol (X) may indicate waypoint passage.

D.2.2.11 LRNS Programming.

D.2.2.11.1 Check navigation database currency and software version.

1. You should not fly with an expired database.
2. Your MEL may allow relief to fly with an expired database but require you to manually cross-check all data.
3. You should also confirm the software version of the database, to ensure the correct version is loaded.

D.2.2.11.2 Independently verify FMS programming.

1. Two pilots should independently coordinate the loading and verification of flight plan entries.
2. Prior to loading the route, carefully cross-check the waypoint routing on your master document against your filed ICAO flight to verify they are consistent.
3. One pilot should load the route with all waypoints using the master document. That same pilot should verify the route has been loaded correctly. Use a means independent of the data you loaded, such as checking the course/distance between waypoints against the master document.
4. A second pilot should independently check the entries by recalling and confirming the waypoint data against source information. This cross-check should include comparing the waypoints loaded in the FMS against both your filed flight plan and the master document. Cross-checking course and distance against the master document will further confirm the waypoints were loaded correctly.
5. The pilot accomplishing the cross-check should read from the FMS screen back to the master document when verifying data.

Note: Reading from the master document to the FMS can introduce "expectation bias" where errors are missed because we see what we expect to see.

D.2.2.11.3 Check waypoint expanded coordinates (degrees and minutes).

1. Most FMSs allow entering abbreviated oceanic coordinates. There have been cases when there was an error in the minutes, but crews only checked the 7-character display label, or the 5 alphanumeric-character waypoint name, neither of which displays minutes.

2. If you only verify the abbreviated coordinates, this could lead to a lateral error. You should check the expanded (i.e., degrees and minutes) coordinates of all oceanic waypoints.

D.2.2.11.4 Check course and distance.

1. To minimize oceanic errors, you should check magnetic course and distance between waypoints from oceanic entry to oceanic exit. You should establish a tolerance such as ± 2° and ± 2 NM.
2. The course and distance checks comparing the master document against the LRNS are critical in detecting errors that you may not have noticed by simply checking coordinates.
3. A discrepancy of more than 2° between the course in the master document and that in the LRNS may be caused by incompatible magnetic variation applied in the master document. An LRNS applies the magnetic variation at the present position to display magnetic course, whereas magnetic courses listed in the master document can be based on initial, mid-leg, or average leg magnetic variation. Given that course and distance checks are done on initial rollout, master documents should list courses based on the initial magnetic variation to ensure validity of this check. You should recheck and verify any difference outside the ± 2° or ± 2 NM tolerance.
4. You should also refer to a master source such as an en route chart to confirm the accuracy of coordinates at the oceanic boundaries.
5. Confirm that total distance computed by the LRNS is consistent with your master document.
6. If your navigation system waypoint sequencing is limited, number the master document waypoints. Use the same numbering sequence for all navigation systems in use.

D.2.2.11.5 Upload winds. Some LRNS units allow the crew to upload projected winds. This procedure allows more accurate reporting of ETA.

D.2.2.12 Groundspeed Check. You should note the groundspeed before taxiing the aircraft. You should expect the groundspeed to read zero knots.

Note: This procedure is a good practice to detect an error that may be developing in the LRNS.

D.2.3 Taxi and Prior to Takeoff.

D.2.3.1 Groundspeed Check. During taxi to the active runway, pilots should again check the groundspeed to see if it is reasonable.

D.2.3.2 Present Position Check. You should also conduct a present position check after leaving the gate.

D.2.3.2.1 Check for a gross difference between this present position and your gate coordinates.

D.2.3.2.2 This check may alert you to a possible error in the LRNS database that you can investigate/correct prior to takeoff.

D.2.4 Climbout.

D.2.4.1 Transition Altitude.

1. You should brief the transition altitude published on the departure or approach charts, or provided via Automatic Terminal Information Service (ATIS).
2. After climbing through the transition altitude, you should reset the altimeters to 29.92 inches or 1013.2 hectopascals.

D.2.4.2 Manually Compute ETAs. If the departure airport is near the oceanic entry point, you should manually compute your ETAs from departure to destination, time and duties permitting, during climb out, or otherwise prior to oceanic entry. You should note these ETAs on the master document.

Note: This is an excellent cross-check of ETAs computed by your LRNS.

D.2.5 Prior to Oceanic Entry.

D.2.5.1 Navigation Accuracy Check.

D.2.5.1.1 Before oceanic entry, you should check the accuracy of your LRNS against a suitable ground-based NAVAID, as applicable. A latitude/longitude radar fix from ATC can also support a navigation accuracy check in lieu of a NAVAID.

D.2.5.1.2 You should record the results of the accuracy check on the master document, with the time and position.

1. A large difference between the ground-based NAVAID and your LRNS, such that the ability to navigate with the accuracy required by ATC is questionable, requires immediate action, to include notification of ATC prior to entry into oceanic airspace.

Note: Crews should not attempt to correct an error by performing an air alignment or by manually updating the position of the LRNS, because this has often resulted in worsening the problem.

2. You should establish a navigation accuracy check tolerance based on your type of LRNS. Rank each navigation system by accuracy if applicable.
3. Record aircraft compass/inertial/radio magnetic indicator (RMI) headings and note differences and deviations. A compass deviation check is particularly important if your aircraft is not equipped with an FMS.

D.2.5.1.3 Select the most accurate navigation system for autocoupling as appropriate.

D.2.5.2 HF Checks.

1. If you were unable to accomplish the HF checks on the ground, you should accomplish these checks before oceanic entry.
2. Accomplish a SELCAL check prior to oceanic and remote continental airspace entry and then again at each control area (CTA) boundary. Check your SELCAL even when your CPDLC is working normally.

D.2.5.3 SATCOM Data Link Check. If you plan on using SATCOM data link, you should check that your SATCOM data link is operational before oceanic entry.

D.2.5.4 Log on to CPDLC and/or ADS-C. If you are approved to use CPDLC and/or ADS-C, you should log on to the appropriate data authority 10 to 25 minutes prior to the boundary.

D.2.5.5 Verify Your RNP Value. Verify that the RNP value set in your flight management computer (FMC) is no higher than that required for the route of flight and reflects the RNP capability you indicated in your flight plan. For example, if you filed indicating RNP 4 capability, you should set an RNP value of 4.0 even though the route may only require RNP 10.

D.2.5.6 Obtain Oceanic Clearance.

D.2.5.6.1 At least two pilots should be involved in the clearance receipt and read-back process, one actively and one monitoring. When obtaining the clearance via radio, we recommend both pilots wear headsets because errors have resulted from loudspeaker distortion.

Note: Consult the AIP for the oceanic airspace FIR you are transiting to determine how and when to obtain your oceanic clearance. Timing differs depending on whether you receive your clearance via voice or data link.

D.2.5.6.2 You should include your requested FL in your initial clearance request.

Note: Some oceanic centers, such as New York, request that pilots advise them at the time of their oceanic clearance "when able higher."

D.2.5.6.3 Both pilots should independently copy the clearance. Each pilot then cross-checks and verifies with the other pilot the routing, FL, and Mach number assigned for the crossing. If there are any differences, contact the ATS provider for clarification.

D.2.5.6.4 Read all waypoint coordinates back to the ATS provider in detail. Ensure the ATS provider acknowledges your correct read back. Always cross-check each detail of the clearance with your master document.

D.2.5.6.5 It is important that both pilots confirm and ensure the aircraft enters the oceanic airspace at the altitude assigned in the oceanic clearance (this may be different than the domestic cleared FL). Request climb or descent, as required, in order to be at your cleared oceanic FL prior to entering oceanic airspace.

D.2.5.6.6 Verify/cross-check route clearance is properly programmed into LRNS.

D.2.5.7 Reclearance.

D.2.5.7.1 The number one scenario that leads to a pilot deviation from the assigned routing is a reclearance (that is different from the oceanic route requested with the filed flight plan).

D.2.5.7.2 You should be particularly cautious when receiving a reclearance.

D.2.5.7.3 Both pilots should separately copy and confirm the new routing, comparing with each other and confirming any inconsistencies with the ATS provider.

D.2.5.7.4 One pilot reprograms (and executes) your LRNS and updates the master document and plotting/orientation chart, crossing out the old waypoints and plotted route and replacing them with the updated information.

D.2.5.7.5 A second pilot cross-checks the *newly effective route clearance* with the reprogrammed route in the FMS (checking the expanded coordinates: degrees and minutes), the updated master document, and the updated chart.

D.2.5.7.6 You should check the magnetic course and distance between the new waypoints as noted in paragraph D.2.2.11 above. To update the master document course and distance, use commercially available tables, or obtain from dispatch an updated master document. It is also possible to use an onboard flight planning system to independently calculate course and distance, and check that against the FMS.

D.2.5.7.7 Thoroughly brief all relief pilots on the new clearance prior to them assuming cockpit duties. We highly recommend the relief pilots also independently cross-check the *currently effective route clearance* against the FMS, master document, and chart.

D.2.5.8 Altimeter Checks.

D.2.5.8.1 Prior to oceanic entry, you must check the two primary altimeters are reading within 200 feet of each other (or lesser value if specified in your aircraft operating manual). Conduct this check while at level flight.

D.2.5.8.2 You should also note the stand-by altimeter reading.

D.2.5.8.3 Record the altimeter readings along with the time on the master document.

D.2.5.9 Compass Heading Check (INS).

D.2.5.9.1 If inertial systems are your only means of long-range navigation (LRN), we recommend you conduct a compass heading check and record the results.

D.2.5.9.2 If a problem develops over water, this check can also aid you in determining the most accurate compass.

D.2.6 After Oceanic Entry.

D.2.6.1 Squawk 2000.

1. Thirty minutes after oceanic entry, you should change your squawk to 2000, if applicable.
2. There may be regional differences. For example, aircraft flying within the West Atlantic Route System (WATRS) or transiting the Reykjavik OCA are expected to maintain the last assigned squawk.

D.2.6.2 Maintain Assigned Mach. Some oceanic clearances include a specific Mach. ATC requires you to maintain these speeds precisely.

1. The increased emphasis on longitudinal separation requires increased crew vigilance, as ATS providers base that separation on your aircraft maintaining that assigned Mach.
2. Controllers will assign a true Mach. In most cases, the true Mach is the indicated Mach. Some aircraft may require a correction factor.

Note: Crews must ensure they fly the assigned Mach vice Economy (ECON) or Long Range Cruise.

D.2.6.3 Maintain Assigned FL. You must report to ATC when departing your current FL.

D.2.6.4 VHF Radios. After going beyond the range of the assigned VHF frequency, you should set your radios to air-to-air (123.45) and guard frequency (121.5).

D.2.6.5 SLOP. Your SOPs should include SLOP for all oceanic crossings. NOTAMs, State AIPs, and other flight planning guidance will indicate where exceptions apply and where procedures differ.

D.2.6.5.1 This procedure was developed to reduce the risk associated with an altitude deviation and two highly accurate navigation systems navigating to the same point.

D.2.6.5.2 SLOP also replaced the contingency procedure developed for aircraft encountering wake turbulence. Depending upon winds aloft, coordination between aircraft to avoid wake turbulence may be necessary.

D.2.6.5.3 This procedure, which distributes traffic between the route centerline and up to 2 NM right of centerline, greatly reduces risk by the nature of its randomness.

1. Operators that have an automatic offset capability should fly up to 2 NM right of the centerline.
2. Aircraft that do not have an automatic offset capability (that can be programmed in the LRNS) should fly the centerline only.

D.2.6.6 Hourly Altimeter Checks. The two primary altimeters should continue to read within 200 feet of each other (or lesser value if specified in your aircraft operating manual).

Note: We recommend that you record these hourly checks on the master document with the readings and times. This information can help you determine the most accurate altimeter if you develop an altimetry problem.

D.2.6.7 Routine Monitoring.

1. Specify which FMS pages, or other monitorable elements of your navigation system, that specific flightcrew members are charged with monitoring (e.g., cross-track error or time/distance).
2. The nonsteering navigation system should be used to display cross-track error and track angle error, if available.
3. If your FMS provides a predicted ETA capability, you should take full advantage of that function in order to track the accuracy of ETAs and provide reminders for performing the “approaching

waypoint" and "10 minutes following waypoint passage" cross-checking procedures.

D.2.7 Approaching Waypoints. Confirm coordinates of subsequent waypoints.

D.2.7.1 Within a few minutes prior to crossing an oceanic waypoint, you should confirm the expanded coordinates of the next and subsequent ("next + 1") oceanic waypoints.

D.2.7.2 You should accomplish this check by comparing the coordinates in your FMS against your master document (as updated based on your *currently effective route clearance*), as well as verifying that the course/heading and distance in the FMS matches your master document. Draw a diagonal through the waypoint on your master document.

D.2.7.3 Confirm your autopilot steering is appropriately engaged (LNAV/NAV).

D.2.8 Overhead Waypoints.

D.2.8.1 Confirm aircraft transitions to the next waypoint.

1. When overhead an oceanic waypoint, you should ensure that your aircraft properly transitions to the next leg.
2. You can confirm this by noting the magnetic heading and distance to the next waypoint as compared against the master document (as updated based on your *currently effective route clearance*).

D.2.8.2 Position report:

1. Use the standard format for voice position reports to ATC.
2. You should also note and record your fuel status on the master document at each oceanic waypoint.

Note 1: This is especially important if the cleared route and FL differ significantly from the filed flight plan.

Note 2: In 2010, ICAO eliminated the requirement to report weather data via voice reports.

D.2.9 Ten Minutes After Waypoint Passage. Cross-check navigational performance and course compliance by one of the following methods:

D.2.9.1 The "plotting" method is appropriate for all aircraft navigation configurations.

1. Verify your plotting/orientation chart reflects the *currently effective route clearance*.

2. Plot your present latitude/longitude and record the time on your chart.
3. You should plot your position using coordinates from the nonsteering LRNS.
4. Investigate/take corrective action if your plotted position does not agree with your *currently effective route clearance*.
5. Using the steering LRNS, verify the next waypoint is consistent with the *currently effective route clearance*.
6. Verify your autopilot steering mode is in LNAV/VNAV or other appropriate mode to ensure steering to the next intended waypoint.

D.2.9.2 The "navigation display" method is appropriate for and available for use in aircraft equipped with an operable FMS:

1. Confirm the aircraft symbol is on the programmed route on the navigation display (at smallest scale).
2. Check system-generated cross-track deviation or similar indication of any deviation from the programmed route of flight.
3. Using the steering LRNS verify the "TO" waypoint is consistent with your *currently effective route clearance*.
4. Investigate/take correction action to address any anomalies or unexpected deviations.
5. Verify your autopilot steering mode is LNAV/VNAV or other appropriate mode to ensure steering to the next intended waypoint.

D.2.9.3 An alternate method may be used with FAA acceptance.

D.2.10 Midway Between Waypoints.

D.2.10.1 Cross-Check Winds.

D.2.10.1.1 We recommend you cross-check the winds midway between oceanic waypoints by comparing the master document, LRNS, and winds aloft chart.

D.2.10.1.2 This cross-check will also assist with situational awareness and in the event your navigation capability is degraded to the point where you need to dead reckon (DR).

D.2.10.2 Confirm ETA. We recommend you confirm your ETA to the next waypoint.

Note: Revise your ETA with ATC in a timely manner if it has changed greater than 2 minutes.

D.2.11 Coast In.

D.2.11.1 Remove strategic lateral offset. You must remove the strategic lateral offset prior to exiting oceanic airspace at coast in. We recommend you include this as a checklist item.

D.2.11.2 Confirm routing beyond oceanic airspace. Before entering the domestic route structure, you must confirm your routing and speed assignment.

Note: Crews experiencing loss of communication leaving oceanic airspace should follow guidance published in the applicable State AIP.

D.2.11.3 Compare LRNS to ground-based NAVAID (as applicable depending on your equipage).

1. When departing oceanic airspace and acquiring ground-based NAVAIDs, you should note the accuracy of your LRNS compared to the position information provided by those NAVAIDs.
2. You should note discrepancies in your maintenance log.

D.2.12 Descent.

D.2.12.1 **Transition Level.** During the approach briefing, you should note the transition level on the approach plate or verify with ATC. You must reset your altimeters to QNH when descending through the transition level. You should confirm whether the altimeter setting is based on inches of mercury or hectopascals.

D.2.13 Destination/Block-In.

D.2.13.1 **Navigation Accuracy Check.** When arriving at your destination gate, you should note any drift or circular error in your LRNS.

1. A GPS primary means system normally should not exceed 0.27 NM for the flight.
2. Some inertial systems may drift as much as 2 NM per hour.

Note: If tolerances are exceeded, make an appropriate entry in the maintenance log.

D.2.14 RVSM Write-Ups. You must note problems in the altimetry system, altitude alert, or altitude hold in the maintenance log.

Note: ATS authorities closely monitor RVSM airspace for any large height deviations (LHD). If your aircraft no longer meets RVSM standards, you must not flight plan into RVSM airspace.

APPENDIX E. IATA IN-FLIGHT BROADCAST PROCEDURE

E.1 In-Flight Broadcast Procedure (IFBP) Version 7: Publication Date 12 December 2013, Effective Date: 9 January 2014. You should use this for information only. It is based on data available at the time of issuance. Confirm you have the latest edition.

E.2 Listening Watch. You should maintain a listening watch on the designated frequency (126.9 MHz in the African-Indian Ocean Region (AFI)) from a point 10 minutes before entering the designated airspace until leaving the airspace. If you depart from an aerodrome located within the lateral limits of the designated airspace, you should establish a listening watch as soon as appropriate and maintain this watch until leaving the airspace.

E.3 Times You Should Broadcast. You should clearly pronounce your broadcast in English:

1. Ten minutes before entering or crossing a flight information region (FIR) within an IFBP region.
2. If you take off from an aerodrome located within the IFBP region, make your broadcast as soon as appropriate.
3. Ten minutes prior to crossing or joining an Air Traffic Service (ATS) route, report crossing airway or waypoint; in the interest of reducing congestion on the IFBP frequency, you may exercise discretion to omit closely spaced repetitive IFBP reports.
4. At not less than 20-minute intervals.
5. Before you change your flight level (FL).
6. At any other time you consider necessary.

E.4 Broadcast Procedure. You should structure your broadcast message as follows:

1. ‘ALL STATIONS’
2. ‘THIS IS (Flight ID) in the XXX (name FIR) FIR’
3. ‘FL....’
4. ‘North-eastbound on XX (airway)’
5. ‘Estimate XXXXX (or crossing airway if no waypoint) at .... UTC (Coordinated Universal Time)’
6. ‘(Flight ID)’
7. ‘FL....’
8. ‘in the xxx FIR’

E.5 Operating Procedures.

E.5.1 Changes of Cruising Level. Changes of cruising level are considered necessary by pilots to avoid traffic conflicts, for weather avoidance, or for other valid operational reasons.

Note: When you change your cruising level, you should display all available aircraft lighting which would improve the visual detection of the aircraft while you change levels.

E.5.2 Collision Avoidance. If you receive a traffic information broadcast from another aircraft, which leads you to decide that you must take immediate action to avoid an imminent collision risk to your aircraft, and you cannot achieve this in accordance with the right-of-way provisions of International Civil Aviation Organization (ICAO) Annex 2, you should:

1. Unless an alternative maneuver appears more appropriate, climb or descend 500 ft.
2. Display all available aircraft lighting.
3. As soon as possible, reply to the broadcast by advising the other aircraft of the action you are taking.
4. Also repeat your notification of the action you have taken on the appropriate ATS frequency.
5. As soon as your situation has been rectified, resume normal FL and notify the appropriate ATS frequency.

E.5.3 Normal Position Reporting Procedures. You should continue normal position reporting procedures at all times, regardless of any action you take to initiate or acknowledge a traffic information broadcast.

E.5.4 Operation of Transponders. You must ensure that you comply with transponder procedures as contained in ICAO Document 8168, Procedures for Air Navigation Services—Aircraft Operations, and, in the absence of other directions from air traffic control (ATC), operate your transponder on Mode A and C code 2000.

Note: You must ensure the operation of your transponders, even when you are outside radar coverage, in order to enable Traffic Alert and Collision Avoidance System (TCAS)-equipped aircraft to identify conflicting traffic.

E.5.5 Use of TCAS. In accordance with ICAO Document 7030, Regional Supplementary Procedures, if you are operating a civil fixed-wing turbine-engine aircraft having a maximum takeoff mass exceeding 5,700 kg or maximum approved passenger seating configuration of more than 19, you must carry and operate Airborne Collision Avoidance System (ACAS) II in the AFI region. The International Air Transport Association (IATA) therefore promotes the use of a working TCAS for aircraft when operating within the AFI region. You must select traffic advisory (TA)/Resolution Advisory (RA) mode at maximum range.

E.5.6 Use of Strategic Lateral Offset Procedure (SLOP). SLOP is promoted in the AFI region.

E.6 The IFBP in AFI. In many FIRs in the AFI region, communications both fixed and mobile have either not been implemented or operate well below the required reliability. This has an impact on the proper provision of ATS, especially flight information services (FIS). Consequently, the AFI Regional Technical Conference has decided that the IFBP should be used within designated FIRs in the region as an interim measure until such time as communications facilities affecting the FIRs in question have been improved.

E.7 Designated Frequency in AFI. In the AFI region the designated frequency for the IFBP is 126.9 MHz.

E.8 Area of Application. In the AFI region the IFBP should be applied in the following FIRs and airspaces:

1. Asmara.
2. Brazzaville*.
3. Kano.
4. Khartoum.
5. Kinshasa.
6. Luanda.
7. Mogadishu.
8. Niamey*.
9. N'Djamena*.
10. Tripoli**.

* The Brazzaville, Niamey, and N'Djamena FIRs provide Controller-Pilot Data Link Communication (CPDLC) service, however these FIRs are maintained in the IFBP area of applicability to accommodate users' requirement for linear boundaries to the extent feasible.

** The Tripoli FIR mandated IFBP within its entire FIR, hence its IFBP region extends from north of latitude 30° N to cover the entire Tripoli FIR.

Note: Even though some FIRs are removed from area of applicability, they may continue applying IFBP in case of contingency (e.g., Dakar Terrestrial and Dakar Oceanic).

E.9 Enforcement. All airlines operating in the AFI region are requested to:

1. Ensure that their crews are fully briefed on the procedure and area of application described.

2. Ensure that their charts and flight documentation are fully amended to reflect the foregoing.

E.9.1 Any operator reported to IATA as not applying the procedure must be contacted immediately, informed of the procedure, and requested to apply it.

E.9.2 Attention is drawn to the fact that during the Haj pilgrimage period the number of east-west flights in the north-central part of the AFI region increases dramatically, and with it the risk of ATS incidents and therefore the importance of the IFBP.

E.10 Review. The procedure and its area of applicability are reviewed by the IATA AFI Regional Coordination Group from time to time. The list of FIRs in which you should apply the procedure may be modified as necessary.

Figure E-1. Map of IFBP Area of Applicability



APPENDIX F. SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AND REMOTE CONTINENTAL AIRSPACE

F.1 Introduction. Although all possible contingencies cannot be covered, these procedures provide for the more frequent cases such as:

- Inability to comply with assigned clearance due to meteorological conditions, aircraft performance, or pressurization failure.
- En route diversion across the prevailing traffic flow.
- Loss of, or significant reduction in, the required navigation capability when operating in airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.

F.1.1 The procedures are applicable primarily when descent and/or turn back or diversion is required. The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgment shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control (ATC) shall render all possible assistance.

F.2 General Procedures.

Note: There may be regional differences in these general procedures (see paragraph 7.2.1). You should be familiar with the planning and guidance documents pertinent to the airspace in which you will be operating.

F.2.1 If an aircraft is unable to continue the flight in accordance with its ATC clearance and/or is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

F.2.2 The radiotelephony distress signal ("MAYDAY") or urgency signal ("PAN PAN"), preferably spoken three times, shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

F.2.3 If deviation is required and prior clearance cannot be obtained, the following contingency procedures should be employed until such time a revised clearance is received. Advise ATC as soon as practicable, reminding them of the type of aircraft involved and the nature of the problem. In general terms, the aircraft should be flown at a flight level (FL) and on an offset track where other aircraft are least likely to be encountered. Specifically, the pilot shall:

F.2.3.1 Leave the assigned route or track by initially turning at least 45° to the right or left, in order to acquire a same or opposite direction track offset 15 nautical miles (NM) (28 km) from the assigned track centerline. When possible, the direction of the turn should be determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are:

1. The direction to an alternate airport.
2. Terrain clearance.
3. Any strategic lateral offset being flown.
4. The FLs allocated on adjacent routes or tracks.

F.2.3.2 Having initiated the turn:

F.2.3.2.1 If unable to maintain the assigned FL, initially minimize the rate of descent to the extent that is operationally feasible. Pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM Strategic Lateral Offset Procedure (SLOP) and select a final altitude which differs from those normally used by 500 ft. (150 m) if at or below FL 410, or by 1,000 ft. (300 m) if above FL 410; or

F.2.3.2.2 If able to maintain the assigned FL, once the aircraft has deviated 10 NM (19 km) from the assigned track centerline, climb or descend to select an FL which differs from those normally used by 500 ft. (150 m), if at or below FL 410, or by 1,000 ft (300m) if above FL 410.

F.2.3.3 Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals, on 121.5 megahertz (MHz) (or, as a backup, on the interpilot air-to-air frequency 123.45 MHz) and where appropriate on the frequency in use: Aircraft Identification (ACID), FL, position (including the Air Traffic Service (ATS) route designator or the track code, as appropriate) and intentions.

F.2.3.4 Maintain a watch for conflicting traffic both visually and by reference to the Airborne Collision Avoidance System (ACAS).

F.2.3.5 Turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

F.2.3.6 Keep the Secondary Surveillance Radar (SSR) transponder on at all times.

F.2.4 When leaving the assigned track:

F.2.4.1 If the intention is to acquire a same direction offset track, the pilot should consider limiting the turn to a 45° heading change, in order not to overshoot the offset contingency track.

F.2.4.2 If the intention is to acquire and maintain an opposite direction offset track, then:

F.2.4.2.1 Operational limitations on bank angles at cruising altitudes will normally result in overshooting the track to be acquired. In such cases a continuous turn

should be extended beyond 180° heading change, in order to re-intercept the offset contingency track as soon as operationally feasible.

F.2.4.2.2 Furthermore, if executing such a turn back in a 30 NM (56 km) lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in paragraph F.2.3.2.2, should be completed preferably before approaching within 10 NM (19 km) of any adjacent ATS route.

F.3 General Weather Deviation Procedures. The following procedures are intended for deviations around adverse meteorological conditions.

F.3.1 When the pilot initiates communications with ATC, a rapid response may be obtained by stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response. When necessary, the pilot should initiate the communications using the urgency call "PAN PAN" (preferably spoken three times).

F.3.2 The pilot should notify ATC and request clearance to deviate from track, advising when possible, the extent of the deviation expected.

F.3.3 ATC should take one of the following actions:

F.3.3.1 When appropriate separation can be applied, issue clearance to deviate from track.

F.3.3.2 If there is conflicting traffic and ATC is unable to establish appropriate separation, ATC shall:

1. Advise the pilot of inability to issue clearance for the requested deviation.
2. Advise the pilot of conflicting traffic.
3. Request the pilot's intentions.

F.3.4 The pilot should take one of the following actions:

1. Comply with the ATC clearance issued; or
2. Advise ATC of intentions and execute the procedures detailed in paragraph F.3.5 below.

F.3.5 Actions to be taken if a revised ATC clearance cannot be obtained:

Note: These provisions apply to situations where a pilot needs to exercise the authority of a pilot in command (PIC) under the provisions of ICAO Annex 2, paragraph 2.3.1.

F.3.5.1 If the aircraft is required to deviate from track to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the pilot shall take the following actions:

F.3.5.1.1 If possible, deviate away from an organized track or route system.

F.3.5.1.2 Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: ACID, FL, position (including ATS route designator or the track code) and intentions, on the frequency in use and on 121.5 MHz (or, as a backup, on the interpilot air-to-air frequency 123.45 MHz).

F.3.5.1.3 Watch for conflicting traffic, both visually and by reference to ACAS.

Note: If, as a result of actions taken under the provisions of items F.3.5.1.2 and F.3.5.1.3 above, the pilot determines that there is another aircraft at or near the same FL with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

F.3.5.1.4 Turn on all aircraft exterior lights (commensurate with appropriate operating limitations).

F.3.5.1.5 For deviations of less than 10 NM (19 km), remain at a level assigned by ATC.

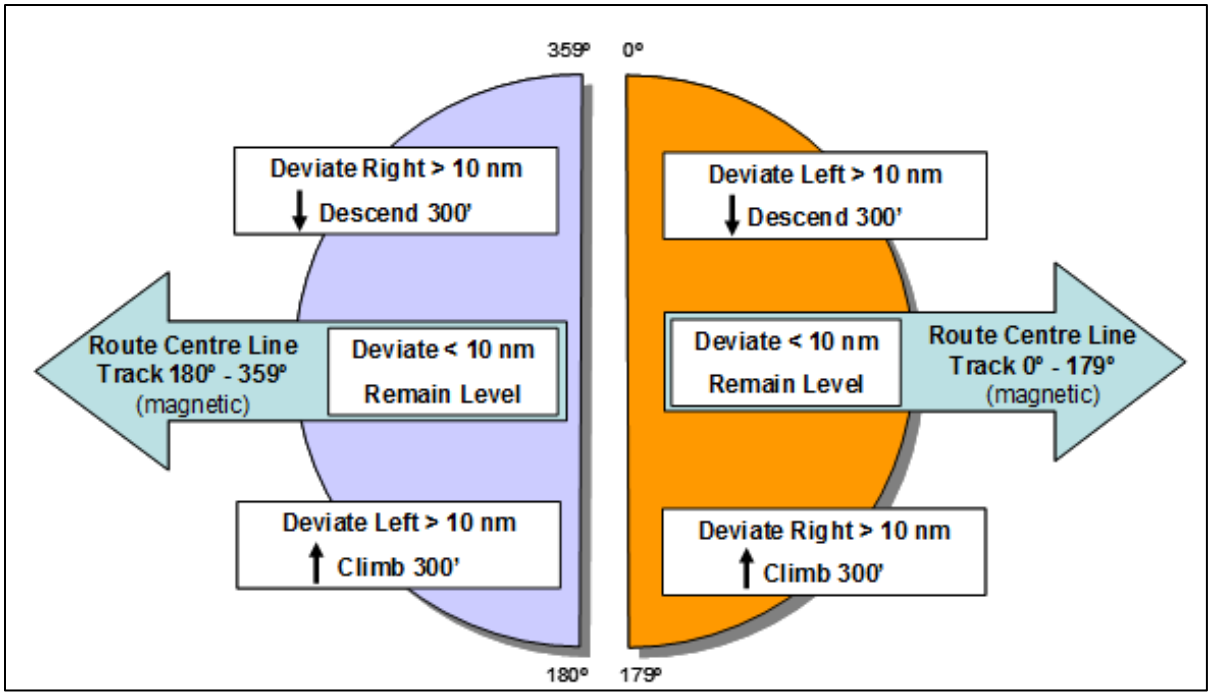
F.3.5.1.6 For deviations greater than 10 NM (19 km), when the aircraft is approximately 10 NM (19 km) from track, initiate a level change in accordance with Figure F-1, General Weather Deviation Procedures Model.

F.3.5.1.7 When returning to track, be at the assigned FL when within approximately 10 NM (19 km) of the centerline.

F.3.5.1.8 If contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

F.3.6 The pilot shall inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

Figure F-1. General Weather Deviation Procedures Model



APPENDIX G. SUGGESTED SUBJECTS FOR INCLUSION IN OCEANIC AND INTERNATIONAL PROCEDURES AND/OR AN OPERATIONS MANUAL

Note 1: This list is for reference only. It is not intended to be all inclusive. You are encouraged to use this sample when creating procedures and/or operations manuals and keeping them current. Your complexity of operations and operational approvals will dictate which items on this list are applicable or need to be expanded. Please see the North Atlantic (NAT) Resource Guide for United States Operators, Pacific Resource Guide for U.S. Operators, or West Atlantic Route System, Gulf of Mexico, Caribbean Resource Guide for U.S. Operators for the most current version of this list.

Note 2: You should establish and maintain a robust process to remain current in Oceanic and International Operations. This continuous analysis or process is one component of an operator's Safety Management System (SMS).

G.1 Regulations, International Civil Aviation Organization (ICAO) Guidance, and References.

G.1.1 Title 14 of the Federal Code of Regulations (14 CFR).

G.1.2 Applicable ICAO Documents (current editions). Find the following documents at the ICAO store at https://store.icao.int.

1. ICAO Document 4444, Procedures for Air Navigation Services—Air Traffic Management.
2. ICAO Document 7030, Regional Supplementary Procedures.
3. ICAO Document 9574, Manual on a 300 m (1000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive.
4. ICAO Document 9613, Performance-based Navigation (PBN) Manual.
5. ICAO Document 10037, Global Operational Data Link (GOLD) Manual (CPDLC, ADS-C).
6. ICAO Annex 2, Rules of the Air.
7. ICAO Annex 6, Operation of Aircraft (Parts I, II, and III, as applicable).
8. ICAO NAT Document 007, North Atlantic Operations and Airspace Manual.

G.1.3 Aeronautical Information Publication (AIP), United States of America—Relevant Material.

G.1.4 Applicable FAA Advisory Circulars (AC) (current editions):

1. AC 90-96, Approval of U.S. Operators and Aircraft to Operate Under Instrument Flight Rules (IFR) In European Airspace Designated for Basic Area Navigation (B-RNAV)/RNAV 5 and Precision Area Navigation (P-RNAV).

2. AC 90-105, Approval Guidance for RNP Operations and Barometric Vertical Navigation in the U.S. National Airspace System and in Oceanic and Remote Continental Airspace.
3. AC 91-70, Oceanic and Remote Continental Airspace Operations.
4. AC 91-85, Authorization of Aircraft and Operators for Flight in Reduced Vertical Separation Minimum (RVSM) Airspace.
5. AC 120-42, Extended Operations (ETOPS and Polar Operations).
6. AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.

G.1.5 Miscellaneous.

1. FAA North Atlantic (NAT) Resource Guide for United States Operators, Pacific Resource Guide for U.S. Operators, or West Atlantic Route System, Gulf of Mexico, Caribbean Resource Guide for U.S. Operators, Required Navigation Performance (RNP) PDF, ICAO Paris, and Eurocontrol (SKYbrary).
2. State Department Travel Alerts and Transportation Safety Administration (TSA) Alerts.

G.1.6 Notices to Airmen (NOTAM) and Special Federal Aviation Regulations (SFAR).

G.2 Navigation. Class I versus Oceanic and Remote and dead reckoning (DR).

G.3 Flight Planning.

G.3.1 North American Routes (NAR).

G.3.2 Track Messages.

G.3.3 ICAO Flight Plans. Explanation and correct codes.

G.3.4 Computer Flight Plan (CFP).

1. Comparison to ICAO flight plan.
2. Basic cross checks (fuel, groundspeed, winds).
3. ETP and points of safe return.
4. Fuel requirements (in particular, ICAO Annex 6) and reduced fuel (OpSpecs B043, B044, and B343).

G.3.5 Special Area of Operation (SAO) Requirements.

G.3.6 Use of Plotting/Orientation Chart and Journey Log.

G.3.7 Weather Radar (WX) Charts.

1. Terminal Aerodrome Forecast (TAF), Aviation Routine Weather Report (METAR), and significant weather (SIGWX).
2. 700 millibars (mb), 500 mb, 400 mb, 300 mb, 250 mb.
3. Approved source(s)—NWS and EWINS.

G.3.8 Driftdown—Terrain, Alternates, ETOPS.

G.3.9 World Geodetic System 84 (WGS 84) or Equivalent Compliance.

G.4 State Operating Restrictions (e.g., Cabotage).

G.5 Reduced Vertical Separation Minimum (RVSM).

1. General description.
2. Metric assignments (e.g., China versus Russia).
3. Minimum required equipment.
4. Contingencies.
5. Forecasts, tropopause, temperature deviations.

G.6 Accident/Incident.

G.6.1 Title 49 of the Code of Federal Regulations (49 CFR) Part 830 (National Transportation Safety Board (NTSB)) and Part 175 (Hazardous Materials Regulations (HMR)).

G.6.2 Contingencies.

1. Weather deviations.
2. Fifteen nautical miles (NM) offset.
3. Lost Communications/Navigations, In-Flight Broadcast Procedures (IFBP), Automated Mutual-assistance Vessel Rescue (AMVER) system, Oxygen.
4. Intercept, hijack.

G.6.3 Use of Long-Range Navigation Systems (LRNS)/Flight Management Systems (FMS).

1. Review of Airplane Flight Manual Supplements (AFMS) for capabilities/limitations.
2. Description of Global Positioning System (GPS)/Inertial.
3. Currency/software version of database.
4. Loading and cross-checks.

5. Independent verification.
6. Contingencies/fault codes.

G.6.4 Oceanic Crossing.

1. Oceanic checklist (Appendix D).
2. Master time source.
3. Clearance-Flight Information Region (FIR) differences.
4. Navigation accuracy check.
5. RVSM checks.
6. Approaching, overhead, and post-position waypoint checks.
7. Position report—estimated time of arrival (ETA) tolerance.
8. Ten-minute post-position check.

G.6.5 Altimetry.

1. Barometric pressure for local altimeter setting (QNH), barometric pressure for standard altimeter setting (QNE), and atmospheric pressure at aerodrome elevation (QFE).
2. Transition Altitude (TA)/Transition Level (TL).
3. MB, Hectopascals.

G.6.6 Transponder Operations. Regional requirements.

G.6.7 Communications, navigation, and surveillance.

1. Airspace requirements (RNP 10/5/4/1).
2. Data link (ADS-C, CPDLC).
3. Reduced separation—trials and implementations.

G.6.8 Strategic Lateral Offset Procedure (SLOP).

G.6.9 Volcanic Ash. Source of information and crew notification.

G.6.10 Space Weather. Warnings, alerts, and advisories (see Appendix C).

G.6.11 Operational Control.

1. OpSpec A008—Operational Control.
2. OpSpec A009—Airport Aeronautical Data.
3. OpSpec/MSpec A010—Aviation Weather Information.

G.6.12 Mach Number Technique.

1. Tolerance.
2. Areas applicable.

G.6.13 Oceanic Errors.

1. Reclearance/conditional clearances.

Advisory Circular Feedback Form

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by contacting the Flight Technologies and Procedures Division (AFS-400) at 9-AWA-AFS400-COORD@faa.gov or the Flight Standards Directives Management Officer at 9-AWA-AFS-140-Directives@faa.gov.

Subject: AC 91-70B CHG 1, Oceanic and Remote Continental Airspace Operations

Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____

_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____

_____

☐ Other comments:

_____

_____

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____