**U.S. Department of Transportation**
Federal Aviation Administration

# Advisory Circular

**Subject:** Oceanic and Remote Continental Airspace Operations

**Date:** DRAFT **AC No:** 91-70D
**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 certificated and General Aviation (GA) operators ("you") planning flights in oceanic and remote continental airspace. The principal regulatory reference for this guidance is Title 14 of the Code of Federal Regulations (14 CFR) § 91.703, which incorporates International Civil Aviation Organization (ICAO) Annex 2, Rules of the Air, by reference. ICAO Annex 2, in turn, refers to ICAO Doc 7030, which requires State of the Operator or State of Registry approval for oceanic Required Navigation Performance (RNP) operations. This guidance includes the authorizations you may need for operations in such airspace.

**2. PRINCIPAL CHANGES.** This change reflects adjustments to the FAA designation of the Northern Area of Magnetic Unreliability (AMU) to include the area north of 75° N latitude in the Nuuk (Greenland) flight information region (FIR) and updates references throughout.

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Hugh Thomas
Acting Executive Director, Flight Standards Service

**U.S. Department of Transportation**
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# Advisory Circular

**Subject:** Oceanic and Remote Continental Airspace Operations

**Date:** 4/3/25 **AC No:** 91-70D
**Initiated by:** AFS-400 **Change:**

This advisory circular (AC) contains both general information and detailed guidance for operators planning flights in oceanic and remote continental airspace. 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 oceanic and remote continental airspace. This AC is laid out in a building block 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 continues to be available in the Regional Oceanic Resource Guides for U.S. Operators at https://www.faa.gov/about/officeorg/headquartersoffices/avs/oceanic-resource-guides. These online resource guides, along with Notices to Airmen (NOTAM) and FAA International Notices, 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. While we carefully checked at the time of publication that information included in this AC is current, oceanic and remote continental airspace operations are constantly evolving, and it is incumbent on you, the operators, to ensure you are flying with current information.

This AC neither is mandatory, nor does it constitute 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 remote continental 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 certificated and General Aviation (GA) operators ("you") planning flights in oceanic and remote continental airspace. The principal regulatory reference for this guidance is Title 14 of the Code of Federal Regulations (14 CFR) § 91.703, which incorporates International Civil Aviation Organization (ICAO) Annex 2, Rules of the Air, by reference. ICAO Annex 2, in turn, refers to ICAO Doc 7030, which requires State of the Operator or State of Registry approval for oceanic Required Navigation Performance (RNP) operations. This guidance includes the authorizations you may need for operations in such airspace.

**Note: This is a guidance document. Its content is not legally binding in its own right and will not be relied upon by the Department as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with the guidance document is voluntary only. Nonconformity will not affect rights and obligations under existing statutes and regulations.**

**1.2 Audience.** We wrote this AC primarily for operators who do not have experience with flying in oceanic and remote continental airspace, to assist in developing their own procedures. We also wrote this AC for GA pilots who do not fly regularly in oceanic and remote continental airspace and need a refresher in planning and executing such a flight. Most certificated 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 https://www.faa.gov/regulations_policies/advisory_circulars and the Dynamic Regulatory System (DRS) at https://drs.faa.gov.

**1.4 What This AC Cancels.** AC 91-70C, Oceanic and Remote Continental Airspace Operations, dated October 4, 2023, is canceled.

**1.5 Fundamental Changes From Previous Edition.** This revision of AC 91-70 adds clarifications on navigation equipment regulations and "proceeding safely," and includes new guidance on dead reckoning. Also, we have adjusted Appendix D, Sample Oceanic Checklist, in light of the removal of separate oceanic clearances in the North Atlantic (NAT).

**1.6 Related 14 CFR Parts.**

- Sections 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, 91.903, 91.1039, and 91.1073; and appendix G.
- Sections 119.5, 119.49, 119.59, and 119.63.

- Sections 121.11, 121.101, 121.121, 121.163, 121.339, 121.349, 121.351, 121.353, 121.355, 121.401, 121.415, 121.427, and 121.445; and appendix G.
- Sections 125.23, 125.45, 125.51, 125.203, 125.209, 125.296, and 125.363.
- Sections 135.3, 135.43, 135.145, 135.165, 135.167, 135.183, 135.213, 135.323, 135.329, 135.351, 135.364, and 135.381; 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/standards.

1. RTCA DO-258/ED-100, Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications.
2. RTCA DO-260/ED-102, Minimum Operational Performance Standards (MOPS) for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B).
3. RTCA DO-306/ED-122, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard).
4. RTCA DO-350/ED-228, Safety and Performance Requirements Standard for ATS Data Communications (SPR Standard).

**1.7.2** FAA Technical Standard Orders (TSO). Available at https://drs.faa.gov.

1. TSO-C115, Required Navigation Performance (RNP) Equipment 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)/RNAV 5 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 91-92, Pilot's Guide to a Preflight Briefing.
11. AC 120-42, Extended Operations (ETOPS and Polar Operations).
12. AC 120-100, Basics of Aviation Fatigue.
13. AC 120-103, Fatigue Risk Management Systems for Aviation Safety.
14. AC 121-31, Flightcrew Sleeping Quarters and Rest Facilities.
15. AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area.

**1.7.4** FAA Instrument Flight Rules (IFR) Enroute Aeronautical Planning Charts. These charts are available at https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/ifr.

1. North Atlantic Route Chart.
2. North Pacific Route Chart.
3. Western Atlantic Route System Chart.

**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 AC Feedback Form.

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

**2.1 ICAO and its Relationship to U.S. Aviation.** The United States is a Contracting State to the Convention on International Civil Aviation (Chicago Convention) and an ICAO Member State and has fully supported the organization's goals from its inception. 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 Standards and Recommended Practices (SARPs) for the safe and orderly development of international aviation. The 19 Annexes to the Chicago Convention (ICAO Annexes) contain more than 10,000 adopted SARPs.

**Note:** ICAO Member States are obligated to "collaborate in securing the highest practicable degree of uniformity in regulations" and generally achieve this by complying with the SARPs contained in the 19 Annexes and supporting ICAO documents, such as ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM), and ICAO Doc 7030, Regional Supplementary Procedures (SUPPS). States notify ICAO of their "differences" with SARPs and publish them in their Aeronautical Information Publication (AIP).

**2.2 ICAO Annexes.** Find all ICAO Annexes at the ICAO store at https://store.icao.int or at the ICAO eLibrary at https://elibrary.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 Service 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 Operations. 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, Communication Systems. Standardizes communications systems.
4. Volume IV, Surveillance and Collision Avoidance Systems. Standardizes surveillance radar and collision avoidance.
5. Volume V, Aeronautical Radio Frequency Spectrum Utilization. Standardizes aeronautical radio spectrum utilization.
6. Volume VI, Communication Systems and Procedures Relating to Remotely Piloted Aircraft Systems C2 Link (applicable November 26, 2026).

**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.
4. Volume IV, Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

**2.2.17** Annex 17, Aviation 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** FAA regulations relating to certification, airworthiness, licensing, and certain operational aspects (e.g., operational control, communication and navigation equipment, and Extended Operations (ETOPS)) are applicable to U.S. operators wherever they fly. Some of these regulations are fundamental to oceanic operations:

**2.3.1.1** Title 14 CFR § 91.511 (applicable to 14 CFR part 91 subpart F) deals with "overwater" operations which are more than 30 minutes or 100 nautical miles (NM) from the nearest shore.

**Note:** Title 14 CFR § 91.511(b) notes that a unit is "independent if the function of any part of it does not depend on the functioning of any part of another receiver or electronic navigation unit."

**2.3.1.1.1** For such operations, two independent long-range navigation systems (LRNS) are required, except in an area defined by coordinates in 14 CFR § 91.511(f), where only one LRNS is sufficient.

**2.3.1.1.2** Title 14 CFR part 91 subpart F overwater operations outside very high frequency (VHF) voice communication coverage require two long-range communication systems (LRCS), except when an aircraft has two VHF radios, in which case only one high frequency (HF) radio is sufficient.

**2.3.1.2** Title 14 CFR §§ 121.351, 125.203, and 135.165 use a different term, extended overwater operations, defined in 14 CFR § 1.1 as more than 50 NM from the nearest shoreline.

**2.3.1.2.1** Title 14 CFR § 121.351 specifically requires two "independent long-range navigation systems" for extended overwater operations.

**2.3.1.2.2** Title 14 CFR §§ 125.203 and 135.165 use different language, and only require "two approved independent navigation systems suitable for navigating the airplane along the route" within the "degree of accuracy required for ATC." This allows extended overwater operations along Air Traffic Services (ATS) routes that have ground-based Navigational Aid (NAVAID) coverage, without any LRNS.

**2.3.1.2.3** For 14 CFR parts 121, 125, and 135, extended overwater operations "in certain geographic areas" with only a single LRNS can be authorized via the B036 authorization.[1]

**2.3.1.2.4** Extended overwater operations outside VHF voice communication coverage require two LRCSs, except for certificated operators who hold the B045 authorization which defines an area by coordinates where only one LRCS is sufficient.

**2.3.2** Similarly, some regulations applicable to U.S. operators wherever they fly are fundamental to operations outside ground-based NAVAID coverage, where an LRNS is used. The following are regulatory considerations inherent to those operations:

**2.3.2.1** Title 14 CFR §§ 121.349, 125.203, and 135.165 use the term "proceed safely" in the event of loss of navigation capability of the system being used to navigate to the degree of accuracy for ATC, in the context of fuel planning and operations with a "single independent navigation system."

**2.3.2.2** These sections require there to be "at least one other independent navigation system suitable…for proceeding safely to a suitable airport and completing an instrument approach…" A compass and a stopwatch comprise a very rudimentary independent navigation system that is not suitable for navigating within the degree of accuracy required for ATC.

**2.3.2.3** However, if flightcrews are properly trained, a compass and a stopwatch can be used together with an operational flight plan to dead reckon. In an unexpected failure situation, dead reckoning can be a valid method to proceed safely. The sections cited above require that the other navigation system be suitable to "complete an instrument approach," which normally would be an

[1] FAA operational authorizations (specific approvals) are given in the form of operations specifications (OpSpecs), management specifications (MSpecs), or Letters of Authorization (LOA). For simplicity in this AC, we use the term "authorization."

instrument landing system (ILS) approach. Additional considerations about dead reckoning are discussed in Chapter 4.

**Note:** The guidance above pertains to being able to proceed safely when operating with a single independent navigation system that experiences a failure. Equipping an aircraft with multiple independent navigation systems gives operators additional options in unexpected failure situations.

**2.3.3** Table 2-1 below provides a listing of select regulations that apply at various distances from the coast of the United States or from the "nearest shoreline." The table lists some of these regulations and the distance from the coast where they apply. Note that 14 CFR § 91.101 applies to all aircraft, but regulations referencing 50 NM and 100 NM apply to U.S.-registered civil aircraft. The listing is *not* exhaustive.

**Table 2-1. Regulatory References With Distances From the Nearest Shoreline**

| Distance From the Coast/Nearest Shoreline[2] | Title 14 CFR Reference | Remarks |
|---|---|---|
| ≤ 12 NM from coast of the United States | § 91.101 | • Title 14 CFR part 91 subpart B applies for operation of aircraft "within 12 nautical miles from the coast of the United States."<br>• Waters up to and including 12 NM are generally "territorial waters," which underly "sovereign airspace." |
| > 12 NM from coast | § 91.703[3] | • Title 14 CFR § 91.703 applies "outside of the United States" and requires compliance with ICAO Annex 2 "when over the high seas."<br>• The United Nations Convention on the Law of the Sea (UNCLOS) allows coastal states to exercise sovereignty over their "territorial seas" up to a limit not to exceed 12 NM.<br>• Beyond 12 NM is where "high seas" (international) airspace generally begins and where ICAO Annex 2 (regulating "flight and maneuver") applies. |
| > 50 NM from nearest shoreline | § 1.1, Definition of Extended Overwater Operation | Communications and navigation equipment:<br>• Title 14 CFR § 121.351.<br>• Title 14 CFR § 125.203.<br>• Title 14 CFR § 135.165. |
| | | Emergency equipment:<br>• Title 14 CFR § 121.339.<br>• Title 14 CFR § 125.209. |

[2] The term "coast" applies to oceans, whereas the term "shore" or "shoreline" applies to oceans and lakes.
[3] Title 14 CFR §§ 125.23 and 135.3 both also refer to 14 CFR § 91.703, which incorporates ICAO Annex 2 by reference.

| Distance From the Coast/Nearest Shoreline[2] | Title 14 CFR Reference | Remarks |
|---|---|---|
| | | • Title 14 CFR § 135.167. |
| > 50 NM from nearest shore | § 91.509(a) | Survival equipment required for 14 CFR part 91 subpart F (life preservers). |
| > 100 NM or 30 minutes from nearest shore, whichever is less | § 91.509(b) | Survival equipment required for 14 CFR part 91 subpart F (life rafts). |
| > 100 NM or 30 minutes from nearest shore | § 91.511 | Communication and navigation equipment required for 14 CFR part 91 subpart F. |

**2.3.4** The 12 NM distance listed in Table 2-1 above pertains to "Flight Rules." This, in fact, is the title of 14 CFR part 91 subpart B, which is applicable to all operators in U.S. sovereign airspace only.[4] Such so-called "flight and maneuver" regulations are generally harmonized with ICAO rules, in accordance with Article 12 to the Chicago Convention. Exceptions are listed as "Differences" in the relevant AIP. In the U.S. AIP, these are found in Section GEN 1.7, Differences From ICAO Standards, Recommended Practices and Procedures.

**2.3.5** U.S. operators flying outside U.S. sovereign airspace must abide by the "flight and maneuver" regulations in effect for that airspace. If the airspace is "high seas" (per the entry in Table 2-1 above, "high seas" airspace generally begins outside 12 NM from the nearest shore), the applicable rules are found in ICAO Annex 2 and ICAO Doc 7030.[5] In other countries' sovereign airspace, information on regulations is found in the relevant AIP, with Differences from ICAO SARPs also notified there.

**2.3.5.1** Title 14 CFR § 91.703 says that you must comply with ICAO Annex 2 if you operate your U.S.-registered aircraft "over the high seas." Title 14 CFR § 91.703 further requires that you, when within a foreign country, follow the rules "relating to the flight and maneuver of aircraft there in force."

**2.3.5.2** According to 14 CFR §§ 121.11, 125.23(b), and 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.

[4] Exception: Title 14 CFR § 91.703 imposes the following flight rules over the high seas: 14 CFR §§ 91.117(c), 91.127, 91.129, and 91.131.

[5] In addition, 14 CFR contains four flight and maneuver regulations (listed in footnote 4) which apply to operations of civil aircraft of U.S. registry over the high seas.

**Note:** In some countries, ICAO Annex 6 fuel SARPs are in force, which may be more restrictive than applicable 14 CFR rules.

**2.3.6** Overwater Airspaces and Interrelationships. Table 2-2 below provides a summary of the various overwater airspaces and their interrelationships.

**Table 2-2. Overwater Airspaces and Interrelationships**

| Type of Airspace | High-Level Definition | Remarks/Relationship to Other Airspaces |
|---|---|---|
| U.S. sovereign airspace | Airspace over land or 12 NM or less from the coast of the United States. | Title 14 CFR part 91 subpart B applies. |
| High seas airspace | Airspace beyond 12 NM from the coast. | ICAO Annex 2 applies. |
| Offshore airspace | International (high seas) airspace over water where VHF voice and ATS surveillance (radar and/or Automatic Dependent Surveillance-Broadcast (ADS-B)) coverage exist. | • Begins beyond 12 NM from the coast (high seas).<br>• Usually extends to ~175 NM from the coast.<br>• Normally has a boundary with an OCA.<br>• Does *not* include OCAs where LRCS are used. |
| Oceanic Control Area (OCA) | Flight information regions (FIR) where LRCS are required. | |
| Extended overwater operations (14 CFR § 1.1) | Operations greater than 50 NM from the nearest shoreline. | For certificated operators, 14 CFR requirements on emergency equipment and communication and navigation equipment apply. |

**2.3.6.1** Other distances generally relevant to oceanic flying are:

**2.3.6.1.1** A VOR/DME with "High Altitude" (H) standard service volume (SSV) classification has a range of 130 NM. Coastal areas generally have a good network of VOR/DMEs of the (H) SSV classification.

**2.3.6.1.2** The typical maximum range for the Air Traffic Service (ATS) surveillance systems (e.g., radar and ADS-B) and VHF voice transceivers is 150–200 NM. For this reason, OCAs typically begin approximately 175 NM from the coast.

**2.4 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.

**2.5 Operational Authorizations.**

**2.5.1** Title 14 CFR part 91 operators need LOA B036, Oceanic Required Navigation Performance (RNP) Operations, to indicate oceanic RNP on ATC flight plans. Further discussion on other 14 CFR part 91 LOAs and the application process are in Appendix B, Operational Authorizations: 14 CFR Part 91 LOAs.

**2.5.2** Certificated operators (14 CFR parts 121, 125, 121/135, and 135) require OpSpecs, MSpecs, and/or 14 CFR part 125 LOAs. Further information on oceanic and remote continental authorizations for certificated operators is available from the responsible Flight Standards office.

**2.6 ICAO Guidance Documents and Reference Material.** Find the following ICAO documents at the ICAO store at https://store.icao.int or at the ICAO eLibrary at https://elibrary.icao.int.

**2.6.1** 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.

**2.6.2** Chicago Convention. We single out the following articles of the Convention on International Civil Aviation (listed in ICAO Doc 7300, 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.

**2.6.3** ICAO Publications. The principal purpose of ICAO publications is the "systematic and prompt dissemination in concise form of the policies and activities of the Organization." These publications consist of Annexes, documents with "Procedures for Air Navigation Services" and "Regional Supplementary Procedures" in the name, manuals, and other similar publications. The following is a brief description of each category of publications, beginning with the most authoritative, and moving down the hierarchy.

**2.6.3.1 Annexes.** There are 19 Annexes (named in paragraph 2.2 above) to the Convention on International Civil Aviation (listed in ICAO Doc 7300). They state the SARPs.

**2.6.3.2 Procedures for Air Navigation Services (PANS) and Regional Supplementary Procedures (SUPPS).** ICAO publications with "Procedures for Air Navigation Services" in the title have special status, as does the publication "Regional Supplementary Procedures."

**2.6.3.2.1** ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM). These procedures complement the SARPs contained in ICAO Annexes 2 and 11, and specify, in greater detail than in the SARPs, the actual procedures ATS units apply when providing various services to air traffic. ICAO Doc 4444 is the primary reference for oceanic contingency procedures, described in Appendix F, Special Procedures for In-Flight Contingencies in Oceanic Airspace.

**2.6.3.2.2** ICAO Doc 8168, Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS). This document has three volumes:

1. Volume I, Flight Procedures, describes operational requirements for flying the procedures designed in accordance with the criteria provided in Volume II.
2. Volume II, Construction of Visual and Instrumental Flight Procedures, is intended for the guidance of procedures specialists and describes the essential areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operations. It provides the basic guidelines to States, and those operators and organizations producing instrument flight charts, that will result in uniform practices at all aerodromes where instrument flight procedures are carried out.
3. Volume III, Aircraft Operating Procedures, describes operational procedures recommended for the guidance of flight operations personnel and flightcrew.

**2.6.3.2.3** ICAO Doc 7030, Regional Supplementary Procedures. For each ICAO region, ICAO Doc 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 PANS documents. The SUPPS complement the statement of requirements for facilities and services contained in the Air Navigation Plan publications.

**Note:** To illustrate the hierarchy among ICAO publications, we can look at the topic of communication failure. ICAO Annex 2 details global procedures on communication failure. ICAO Doc 4444 elaborates on those procedures, which, "unless otherwise prescribed on the basis of regional air navigation agreement," are in effect. ICAO Doc 7030 describes such regional agreements (e.g., area-specific communication failure procedures). FAA principal inspectors (PI) and specialists within the FAA's Flight Technologies and Procedures Division, Flight Operations Group can help you understand the relationship between various ICAO publications.

**2.6.3.3** **Manuals.** Similar to our ACs, ICAO manuals provide guidance and information concerning selected aspects of aeronautical activity or facilitating the uniform application of ICAO SARPs. Therefore, you should familiarize

yourself with topics covered in the following documents (current editions) prior to undertaking operations in oceanic and remote continental airspace. The following are the more prominent ICAO manuals:

**2.6.3.3.1** ICAO Doc 9574, Manual on a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive. ICAO Doc 9574 provides States' regional planning groups with a basis for the revision of documents, procedures, and programs to enable the maintenance of a 300 m (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.

**2.6.3.3.2** ICAO Doc 9613, Performance-based Navigation (PBN) Manual. This manual provides practical guidance 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.

**2.6.3.3.3** ICAO Doc 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.

**2.6.3.3.4** ICAO Doc 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 Annexes 2, 10, and 11; the provisions in ICAO Doc 4444; and, when necessary, ICAO Doc 7030.

**2.6.3.3.5** ICAO NAT Doc 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). It also offers guidance to the State regulators responsible for the approval/certification/licensing of such aircraft operators, pilots, or dispatchers.

**Note:** Operators flying below NAT HLA should pay particular attention to ICAO NAT Doc 007 guidance on flight operations below the NAT HLA.

**2.6.4** Other References:

1. ICAO Satellite Voice Guidance Material (SVGM), available at https://www2023.icao.int/APAC/Documents/edocs/cns/SATVOICE_SVGM_v1.pdf. 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 Doc 4444, and, when necessary, ICAO Doc 7030.
2. The FAA website at https://www.faa.gov.
3. Regional Oceanic Resource Guides for U.S. Operators, available at https://www.faa.gov/about/officeorg/headquartersoffices/avs/oceanic-resource-guides.

   **Note:** Contact information for specialists from the Flight Operations Group can be obtained from the responsible Flight Standards office and is available in these resource guides.

4. Applicable FAA Domestic/International Notices and Notices to Airmen (NOTAM).
5. U.S. AIP and applicable foreign AIPs. 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 ("differences" are listed in AIPs). Eurocontrol maintains a global listing of links to AIPs at https://eurocontrol.int/articles/ais-online. Refer to the current AIP for any States whose airspace you intend to operate in/through.
6. Regulations of the foreign countries over which you intend to fly.
7. The customs procedures, cultural considerations, entry and overflight procedures, and health and safety precautions for each country in which you intend to land.
8. The "Oceanic and Remote" section of the FAA's Flight Operations Group web page at https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs410/oceanic_remote. Refer in particular to the "Oceanic and Remote Continental Application Guides" posted there.
9. The "Data Communications" section of the FAA's Flight Operations Group web page at https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs410/datacomm/. Refer in particular to the "Data Link Communication Application Guide" posted there.
10. NAT bulletins, found in the "EUR and NAT Documents" area of the ICAO website: https://www.icao.int/EURNAT/EUR-NAT-DOCS?fid=3493.
11. The NAT Central Monitoring Agency (CMA). The NAT CMA hosts a secure site with event reports and summaries at https://natcma.com. Industry stakeholders can request access to deidentified reports.

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

## 3.1 Training Requirements for Oceanic and Remote Continental Airspace Operations.

**3.1.1** Certificated Operator Training. Certificated operators are required to have training approved by the Administrator.[6] This normally takes place during the certification process and prior to issuance of operational authorizations.

**3.1.2** General Aviation (GA) Training. If you are a GA pilot desiring to indicate oceanic Required Navigation Performance (RNP) capability, you need operational authorization via an LOA B036 (see Appendix B, Operational Authorizations: 14 CFR Part 91 LOAs, paragraph B.1).[7] An optional LOA B030 is available for Remote Continental operations. The following are options for training:

1. Completing an operator's oceanic operations current training program.
2. Completing a commercial oceanic operations current 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 recent experience.

**3.1.3** 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 (as required based on the types of operations being conducted):

1. Title 14 CFR (applicable parts).
2. ICAO Standards and Recommended Practices (SARPs) and measurement standards.
3. Operator's international operating procedures, to include the international operations manual,[8] its organization and structure, and access via Electronic Flight Bag (EFB), as applicable.
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 space weather.

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[6] References are 14 CFR §§ 91.1073, 121.401, 125.296, and 135.323.
[7] Regulatory reference is 14 CFR § 91.703, which incorporates ICAO Annex 2 by reference. Annex 2, in turn, refers to ICAO Doc 7030, which requires State of the Operator or State of Registry approval for oceanic RNP operations.
[8] See also Appendix G, Suggested Subjects for Inclusion in Oceanic and International Procedures and/or an Operations Manual.

8. Preparation of international flight plans, plotting charts, and operational flight plans/flight logs, to include Equal Time Point (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 and operational authorizations, 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 Airspace), including contingency procedures for weather diversions, required emergency equipment, Search and Rescue (SAR) techniques, communication failure procedures, and navigation equipment failure techniques (to include dead reckoning).
17. Specialized training (e.g., if conducting operations in areas of magnetic unreliability (AMU), or, for 14 CFR parts 121 and 135, Extended Operations (ETOPS) "preclude and protect" philosophy, as applicable).
18. Use of polar/remote area checklists.
19. Polar/remote continental terrain awareness, risk mitigations, and contingency options.

**Note:** For additional training topics, see Appendix G and the list of dead reckoning topics under paragraph 4.6.3.

# 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 Service (ATS).

**4.1.1** Technological Advances. Technological advances in 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 by reducing separation minima, allowing controllers to space aircraft closer together. Trials of new separation minima or implementations of new operating procedures are common in oceanic airspace. Operators should therefore make sure they have the most up-to-date information concerning the airspace in which they will be flying. U.S. and foreign State Aeronautical Information Publications (AIP), Notices to Airmen (NOTAM), and related publications are normally the best sources of current information. International operations manuals that consolidate this information should be current.

**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.

**4.1.3** Space-Based ADS-B. In 2019, a constellation of low-Earth orbit satellites with ADS-B receivers began supplying surveillance data to ATS Providers (ATSP). Shortly thereafter, ICAO published a new separation standard for areas under ADS-B surveillance where very high frequency (VHF) voice communications are not available. This new separation standard allows aircraft to be more closely spaced in oceanic areas, which in turn allows more efficient routing. While space-based ADS-B update rates are comparable to those of some domestic radar systems, communication systems traditionally used in oceanic and remote continental airspace do not perform as quickly as the VHF voice communications used in domestic environments. Consequently, aircraft cannot yet be spaced as closely as in domestic areas. As communication systems evolve, allowable separation between aircraft will likely be reduced further.

## 4.2 Performance-Based Operations.

**4.2.1** Performance Specifications. The three performance specifications, Required Communication Performance (RCP), Required Navigation Performance (RNP), and Required Surveillance Performance (RSP), determine required separation between flights.

**4.2.2** RCP. RCP establishes aircraft/controller communications timeline, safety, equipment, and flightcrew training standards. Generally, RCP is specified in terms of the timeline required to complete the communication transaction and the continuity, availability, and integrity of the transaction. In addition, RCP includes criteria for monitoring and alerting. In oceanic and remote continental airspace, RCP 240 and RCP 400 are the relevant communications-related performance specifications.

**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 99.9[9] percent probability the communication can be initiated (availability) and no more than $10^{-5}$ communications transaction malfunctions per flight-hour (integrity).

**4.2.2.2** 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[10] 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** U.S. operators desiring Performance-based Communication and Surveillance (PBCS) approval for qualifying systems (e.g., with RCP 240 and RSP 180) can obtain the A056 authorization. See paragraph 4.5 below.

**4.2.2.4** For additional details, please refer to AC 90-117, Data Link Communications; and ICAO Doc 10037, Global Operational Data Link (GOLD) Manual, and ICAO Doc 9869, Performance-based Communication and Surveillance (PBCS) Manual, Appendix B, RCP Specifications, at https://store.icao.int.

**4.2.3** RNP. RNP establishes aircraft navigation accuracy, equipment, and flightcrew training standards. In addition, RNP includes criteria for monitoring and alerting. ICAO Doc 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 ATSPs 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, ATSPs will apply appropriate separation minima between adjacent aircraft based on the capabilities each aircraft operator files in the flight

[9] RTCA DO-350B, published in September 2023, relaxed the availability requirement to 99.8 percent. As of early 2026, ICAO Doc 9869 Second Edition was still current and listed the RCP 240 requirement for availability as 99.9 percent.

[10] RTCA DO-350B, published in September 2023, relaxed the availability requirement to 99.8 percent. As of early 2026, ICAO Doc 9869 Second Edition was still current and listed the RCP 400 requirement for availability as 99.9 percent.

plan. You must only indicate the oceanic RNP capability authorized in your B036 authorization.[11]

1. RNP 10 requires accuracy to be within 10 nautical miles (NM) 95 percent of the time.
2. RNP 4 requires accuracy to be within 4 NM 95 percent of the time and within 8 NM 99.999 percent of the time.
3. RNP 2 requires accuracy to be within 2 NM 95 percent of the time and within 4 NM 99.999 percent of the time.

**Note:** Regardless of RNP value, pilots are expected to fly the centerline (or where use of Strategic Lateral Offset Procedures (SLOP) is authorized, up to 2 NM right of course).

**4.2.4** RSP. RSP establishes aircraft/controller surveillance timeline, safety, and equipment standards. Generally, RSP is specified in terms of the timeline required to complete the transaction and the continuity, availability, and integrity of the transaction. In addition, RSP includes criteria for monitoring and alerting. In oceanic and remote continental airspace, RSP 180 and RSP 400 are the relevant performance specifications.

**4.2.4.1** RSP 180 requires a 99.9 percent probability (continuity) the surveillance transaction will complete in less than 180 seconds (timeline). It also requires a 99.9[12] 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 99.9 percent probability (continuity) the surveillance transaction will complete in less than 400 seconds (timeline). It also requires a 99.9[13] 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 refer to ICAO Doc 9869.

**4.2.5** Access to Performance-Based Separation. Communications, navigation, and surveillance capabilities of aircraft and crew determine eligibility for operational authorizations, which in turn allow operators to take advantage of performance-based separation in oceanic and remote continental airspace. The significant improvements in communications, navigation, and surveillance systems have allowed air traffic controllers

[11] Regulatory reference is 14 CFR § 91.169, which refers to 14 CFR § 91.153. This requires the flight plan to include "any other information the pilot in command or ATC believes is necessary for ATC purposes."

[12] RTCA DO-350B, published in September 2023, relaxed the availability requirement to 99.8 percent. As of early 2026, ICAO Doc 9869 Second Edition was still current and listed the RSP 180 requirement for availability as 99.9 percent.

[13] RTCA DO-350B, published in September 2023, relaxed the availability requirement to 99.8 percent. As of early 2026, ICAO Doc 9869 Second Edition was still current and listed the RSP 400 requirement for availability as 99.9 percent.

to reduce separation between aircraft, expanding access to more favorable routing and/or altitudes that offer savings in time and fuel.

**4.3 Voice Communications in Oceanic Airspace.** When operating over the high seas, ICAO Annex 2, Rules of the Air, requires you to maintain a continuous air-to-ground voice communication watch with the appropriate ATS authority on the appropriate communication channel.

**Note:** It is not acceptable to depend solely on other aircraft providing a radio relay 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 paragraph 4.3.2 below), and new antenna concepts. Consider the following when using HF communications:

**4.3.1.1** HF radio calls are typically made to a radio operator, who in turn electronically relays the information, via keyboard and preformatted messages, to air traffic controllers in oceanic centers. There is some delay between your requests and air traffic control (ATC) clearances, where the radio operator coordinates with the appropriate controller. Radio operators do not have the authority to issue ATC clearances on their own.

**4.3.1.2** Communications over HF radio rely heavily on proper radio terminology and scripted reports. Use the published guidance found in enroute 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 Doc 9432, Manual of Radiotelephony. This document and other ICAO reference materials are available on ICAO's website at https://store.icao.int.

**4.3.1.3** If ATC uses the terms "expect" or "when can you accept," 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** ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM), requires the flightcrew to read back level instructions, heading and speed instructions, and ATC route clearances. Ensure that the radio operator 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

common to use several frequencies on one flight while communicating with the same ATSP.

**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. ATSPs can transmit SELCAL signals over VHF or HF. The signals produce an audio tone and possibly a cockpit indication 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 16-tone 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. Therefore, you should be certain that the ATS radio operator uses your exact call sign when responding to a SELCAL.

**4.3.2.3** New SELCALs use 32 tones, instead of only 16 tones currently used, and thereby increase the number of unique identifiers exponentially. The ICAO Communication Panel approved the global implementation of SELCAL 32 for revisions to take effect in November 2022. SELCAL 32 compliant equipment became available beginning in 2020. Operators with 16-tone HF SELCALs may continue to encounter a duplicate code situation.

**4.3.2.4** Check HF SELCAL even when your Controller-Pilot Data Link Communications (CPDLC) are working properly. You should do a SELCAL check prior to oceanic entry and then again at each control area (CTA) boundary. See the sample transcript of an HF SELCAL check below.

| **Sample Transcript of HF SELCAL Check** | |
|---|---|
| HF call from the air: | *"New York Radio, Airline 123, request SELCAL Check."* |
| Answer from the ground: | *"Airline 123, New York Radio, roger."*<br>*[SELCAL tones transmitted]* |
| HF call from the air: | *[If successful]*<br>*"SELCAL okay."* |

**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 (Route) Service providers. The FAA currently restricts direct SATVOICE contact between the pilot and FAA ATC to "distress and urgency situations," or other exceptional circumstances only. For oceanic communications with ATC via New York Radio and San Francisco Radio, relevant SATVOICE policy and short codes are published in the U.S. AIP.

**4.3.3.1** The FAA requires SATVOICE equipment supporting ATS communications to be installed in accordance with AC 20-150, Airworthiness Approval of Satellite Voice (SATVOICE) Equipment Supporting Air Traffic Service (ATS) Communication.[14] Additional requirements are listed in the U.S. AIP. Portable satellite phones are *not* approved for normal and routine ATC communications.

**4.3.3.2** Additionally, the FAA requires a SATVOICE Callback Check when pilots use SATVOICE to communicate with ATC via New York Radio or San Francisco Radio. A sample transcript is here:

| **Sample Transcript of SATVOICE Callback Check** | |
|---|---|
| SATVOICE call from the air: | *"New York Radio, Airline 123, request SATVOICE Callback Check."*<br>For aircraft equipped with both Inmarsat and Iridium: *"…on Inmarsat/Iridium* (as applicable)*"* |
| Answer from the ground: | *"Airline 123, roger, terminating call, will call you right back."* |
| New SATVOICE call from ground: | *"Airline 123, New York Radio with your SATVOICE Callback, how do you read?"* |
| SATVOICE answer from the air: | *"Loud and clear, SATVOICE Callback Check good, good day!"* |

**4.3.3.3** If SATVOICE is used (as authorized in the relevant AIP) as the sole voice LRCS, for purposes of maintaining a continuous air-to-ground voice communication watch with the relevant ATS authority on the appropriate communication channel, several important considerations apply:

1. Flightcrews should be thoroughly familiar with SATVOICE use, to include the aural and visual alerts for incoming calls, call answering, display and selection of call priority, use of press-to-talk switches, call setup with or without the avionics phone book, call preemption, and call termination.

[14] Regulatory references are 14 CFR § 91.703 and ICAO Annex 2, paragraph 3.6.5.1. The U.S. AIP, in describing the "appropriate communication channel," invokes AC 20-150.

2. Avionics (e.g., flight management computer (FMC)) phone books should be organized in a logical, easy-to-understand manner, and flightcrews should have the appropriate number preloaded to facilitate rapid call setup with the relevant ATS authority. Calls should be managed to ensure a line is always available for an incoming "Operational High" priority (Priority 2/Q12) call from the relevant ATS authority.
3. For purposes of compliance with 14 CFR requirements on numbers of LRCS, the FAA recognizes SATVOICE as an approved LRCS only in areas where the ground infrastructure supports SATVOICE as the "sole voice LRCS." Such services are described in the relevant AIP. In areas lacking this designation, at least one operable HF (voice) radio is required.[15]
4. As SATVOICE technology evolves, ensure that you comply with the latest guidance. In the United States, refer to the entry in the U.S. AIP, with new changes published in the FAA's International Notices. For additional guidance, refer to the FAA's AIM, ICAO's Satellite Voice Guidance Material (SVGM), and/or the relevant AIP.

**4.3.4** Changes to Communications Procedures. Information needed on initial contact with an agency, radio frequencies, and other aspects of oceanic communications are changed frequently. Thus, it is important that you consult the appropriate AIP, international notices, current oceanic charts, and commercial enroute publications for the most current information.

- ICAO NAT Doc 007, North Atlantic Operations and Airspace Manual, describes North Atlantic (NAT) operations, to include communication and navigation procedures in NAT airspace. The NAT section of ICAO Doc 7030, Regional Supplementary Procedures (SUPPS), currently requires HF SELCAL checks, meaning that an HF radio is required 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).** Data link communications systems are widely used throughout the world and are normally used in concert with ADS-C systems that further improve ATS capability. CPDLC technology improves communications between aircraft and ATSPs. CPDLC replaces most of 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,

[15] Regulatory references are 14 CFR § 91.703 and ICAO Annex 2, paragraph 3.6.5.1. The applicable AIP describes the "appropriate communication channel."

reducing the likelihood of miscommunication. CPDLC compliant with RCP 240 and ADS-C compliant with RSP 180 are *required* to fly the most efficient routes in the NAT.

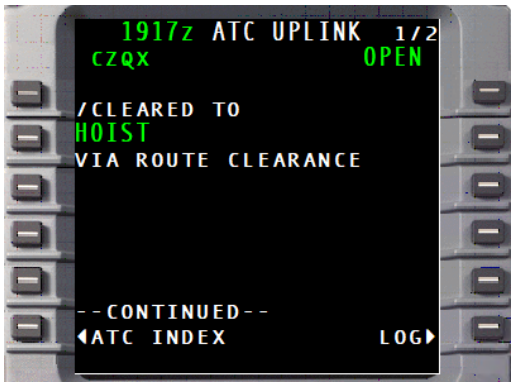
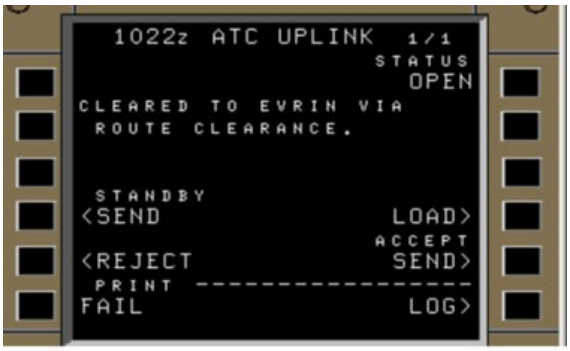
**Note:** In ADS-C, C = "Contract." The controller sets up one or more electronic contracts with your aircraft to automatically provide time-triggered (periodic) and/or condition-triggered (e.g., waypoint change event or deviation event) reports. In addition, a controller, at any time, can issue a "demand" contract for a single periodic ADS-C report.

**4.4.1** Title 14 CFR Requirements for LRCS. For purposes of compliance with 14 CFR requirements on numbers of LRCS (see paragraph 2.3.1 above), the FAA recognizes CPDLC that is compliant with RCP 240 as an approved LRCS. Equipage with CPDLC does not eliminate the requirement for at least one operable voice LRCS. This means that (as is mentioned in paragraph 4.3.3.3, item 3) unless the relevant AIP authorizes SATVOICE as a sole voice LRCS, at least one operable HF (voice) radio is required.

**4.4.2** 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.

**4.4.3** FAA Domestic CPDLC Use of Free Text in Route Uplinks. The FAA's domestic flight data processing systems automatically add so-called "Free Text" messages containing the entire cleared route, to all route clearance change messages. This allows pilots to more readily see and understand the given change. However, oceanic systems do not do this. The result is that pilots accustomed to the FAA domestic display of route clearances could be confused when seeing an oceanic route uplink. Figure 4-1, Sample CPDLC Route Uplinks, shows how a CPDLC route uplink might look if sent from a U.S. domestic system versus an oceanic system.

**Figure 4-1. Sample CPDLC Route Uplinks**

| **Sample Route Uplink <u>With</u> Free Text (Used by domestic FAA systems)** | |
|---|---|
|  |  |
| *"Route clearance" is readily visible.* | |
| **Sample Route Uplinks <u>Without</u> Free Text (Used by oceanic systems)** | |
|  |  |
| *With this FMS, to view the "route clearance," the pilot must advance to the next page, then select the "ATC CLNC" prompt.*<br><br>*This is <u>not</u> a clearance to proceed direct to HOIST.* | *With this FMS, to view the "route clearance," the pilot must select the "LOAD" prompt.*<br><br>*This is <u>not</u> a clearance to proceed direct to EVRIN.* |

**4.5 Data Link Systems—Operational Authorization to Use.** We grant operational authorization for operators to use Future Air Navigation System (FANS) data link in oceanic areas by issuing the A056 authorization, as appropriate.[16]

**Note:** The A056 authorization also applies to VHF data link communications in overland areas outside the United States, such as Aeronautical Telecommunication Network (ATN) Baseline 1 (B1) (formerly Link 2000+), used in European airspace.

**4.5.1** Oceanic Data Link Requires Authorization. U.S. operators (including 14 CFR part 91) must have a data link authorization to file ATC flight plan capability codes J5 and/or J7 in oceanic airspace.[17] These codes denote Inmarsat and Iridium satellite communications (SATCOM) capability, respectively. You can find our guidance on the process and procedures for operational authorization and aircraft data link system approval in the following documents:

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

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

**4.6 Independent Navigation Systems and Proceeding Safely.** Regulations on navigation equipment for overwater operations require dual independent navigation systems. As is mentioned in paragraph 2.3.2, several sections in 14 CFR (notably, in 14 CFR parts 121, 125, and 135) use the term "proceeding safely" in the context of fuel planning and operations with a single independent navigation system.

**4.6.1** To satisfy requirements for an independent navigation system, a pilot would normally be able to revert to a ground-based Navigational Aid (NAVAID). In areas outside the coverage of ground-based NAVAIDs, immediately reverting to another navigation capability is constrained. Here, 14 CFR requirements to be able to "proceed safely" when using "a single independent navigation system" are particularly relevant.

**4.6.2** For remote continental operations at lower altitudes closer to terrain, dead reckoning procedures must be robust to be able to proceed safely in the event of loss of navigation capability. In addition, for *any* operations that rely solely on Global Positioning System (GPS) for navigation, dead reckoning procedures are particularly important so flightcrews can safely deal with degradation (e.g., through jamming or spoofing[18]) of GPS signal.

[16] AC 90-117 provides information on the A056 authorization.
[17] AC 90-117 cites the regulatory basis for this requirement, which is 14 CFR § 91.123.
[18] The phrase "jamming or spoofing" is used in this AC. There are other phrases to describe these phenomena, such as "disruption or manipulation" or the broader term "radio-frequency interference (RFI)."

**4.6.3** Flightcrews that rely on dead reckoning procedures should be familiar with the following topics:

1. Dead reckoning procedures, to include use of operational flight plans.
2. Aircraft systems, to include behavior in jamming or spoofing of GPS signal situations, as well as recovering from any residual effects (as applicable):
   - Navigation system(s).
   - SATCOM system(s); SATVOICE, as well as data communication systems that use SATCOM.
   - Aircraft Terrain Awareness and Warning Systems (TAWS), ground proximity warning system (GPWS), and/or enhanced ground proximity warning system (EGPWS).
   - Synthetic visual system.
3. ATS surveillance systems and ATC's ability to assign headings using radar:
   - ADS-B and ADS-C reliance on GPS; behavior with jamming or spoofing of GPS signal.
   - Airport surveillance radar (ASR) and precision approach radar (PAR) capability.
   - FAA ATC Minimum Vectoring Altitude Chart (MVAC) and Minimum Instrument Flight Rules (IFR) Altitude (MIA) chart.
4. Use of charts with depictions of terrain and obstacle clearance altitudes:
   - Minimum en route altitude (MEA).
   - Off-route obstruction clearance altitude (OROCA).
   - Minimum obstruction clearance altitude (MOCA).
5. Designated mountainous areas.

**Note:** Dead reckoning is *not* an approved means of navigation under IFR. It is also *not* a suitable method for navigating "within the degree of accuracy required for ATC." It is only suitable for "proceeding safely," as a contingency in case of degradation or failure of the primary navigation system.

**4.6.4** For operations at low altitudes permitted by the B030 remote continental authorization, in most cases, proceeding safely after a loss of navigation capability would include climbing to the quadrant OROCA or higher. Weather conditions must be consistent with procedures to proceed safely. For example, for an aircraft not capable of flight into icing conditions, if such conditions just above the IFR MEA preclude climbing to the OROCA, weather conditions on the given route could be inconsistent with the requirement to be able to proceed safely in the event of loss of navigation capability. In this case, the operator would have to alter the route or delay the flight, as appropriate.

**4.6.5** The FAA approves operators' ability to revert to dead reckoning procedures before issuing associated authorizations. This approval allows a stopwatch and a compass to be considered suitable "for proceeding safely," where regulations call for "one other independent navigation system" in the event of an unexpected failure of the system being used to navigate to the degree of accuracy for ATC, as discussed in paragraph 2.3.2. In such a failure situation, that "other" system would also have to be suitable to "complete an instrument approach," normally an instrument landing system (ILS) approach.

## 4.7 ATC in Oceanic and Remote Continental Airspace.

**4.7.1** Procedural Airspace. In oceanic and remote continental airspace, ATC typically requires position reports via voice or ADS-C, and controllers apply "procedural separation," spacing aircraft farther apart than in domestic "ATS surveillance airspace" (where radar or ADS-B surveillance is accompanied by VHF voice communication with ATC). Space-based ADS-B provides significant improvements in surveillance, but without ATC being able to issue a vector via VHF voice communications, required separation between aircraft is greater. In areas with space-based ADS-B surveillance that lack direct VHF voice communications with the controller, ATC still therefore provides at least some elements of procedural control.

**4.7.1.1** In procedural airspace, ATC issues clearances and instructions providing separation vertically and horizontally, based on the specific aircraft equipment authorizations you indicate on your flight plan.

**4.7.1.2** 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.

**4.7.1.3** In order to make this procedural separation 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.[19]

**4.7.1.4** Controllers manage longitudinal separation in procedural airspace by assigning speeds, as necessary, either true Mach number or true airspeed. Proper separation of aircraft is dependent upon pilots maintaining the speed assigned with the clearance (not to be confused with the speed filed on the flight plan).

- If traffic conditions permit, the controller may permit variations. However, if a controller assigns a speed, compliance with that speed is mandatory.

[19] ICAO Annex 2, paragraph 3.6.2.2d), says: "if the time estimate…changes in excess of 2 minutes from that previously notified to air traffic services…the flight crew shall notify the appropriate air traffic services unit as soon as possible." For aircraft providing automatic position reports via ADS-C, position reports can be omitted "in airspace where ADS-C services are provided."

- Even when a controller permits variations, ICAO Annex 2 specifies that pilots must inform ATC of speed variations of Mach 0.02 or greater from the current flight plan (current clearance).

**4.7.2** ICAO Procedures for Specific Geographical Areas. You will find detailed procedures for the applicable ICAO Region in ICAO Doc 7030. When flying over the high seas (international airspace, generally greater than 12 NM from the nearest coast), 14 CFR § 91.703 requires compliance with ICAO Annex 2. Annex 2, in turn, refers to ICAO Doc 7030. You should consider ICAO Doc 7030 regulatory.

**4.7.3** U.S. ATS. Information on provision of ATS by the United States is available in FAA Order JO 7400.11, Airspace Designations and Reporting Points. Also refer to 14 CFR part 71.

**4.7.3.1** **Domestic Airspace.** (ICAO refers to this as "Continental" Airspace.) In sovereign airspace (over land and territorial waters of the United States), the United States provides ATS using domestic ATC procedures with radar or ADS-B surveillance and VHF communications.

**4.7.3.2** **Offshore Airspace.** In "high seas" airspace (outside of the 12 NM sovereign limit) extending to as far as the useful range of radar and VHF communications systems permits, approximately 150–200 NM from the coast, the United States provides ATS using domestic policies and procedures.

**Note:** As discussed in Table 2-1, 14 CFR part 91 subpart B applies in U.S. sovereign airspace, and ICAO Annex 2 applies in "high seas" airspace.

**4.7.3.3** **Oceanic Airspace.** The United States provides ATS using procedural control in oceanic airspace as follows:

- Atlantic Ocean: New York, Miami, and San Juan flight information regions (FIR).
- Pacific Ocean: Oakland and Anchorage CTA/FIR.
- Arctic Ocean: Anchorage Arctic CTA/FIR.

**Note:** The Houston Air Route Traffic Control Center (ARTCC) has an "Oceanic" control area, but the FAA provides ATS surveillance services in that airspace using ADS-B and VHF transmitters on oil platforms.

**4.7.3.4** **Remote Continental Airspace.** The United States provides ATS in remote continental airspace as follows: Alaska remote continental airspace; Anchorage ARTCC.

**4.7.4** Advanced Technologies and Oceanic Procedures (ATOP). U.S. controllers use the ATOP flight data processing system in the airspace of Oakland Oceanic, New York Oceanic, and Anchorage Oceanic and Arctic FIRs.

**4.7.4.1** Within this airspace, ATOP allows for establishing the separation minima for all pairs of aircraft along a cleared profile and provides aircraft profile conformance monitoring and protection.

**4.7.4.2** ATOP deciphers ATC flight plan information to determine what separation standards may be applied to a particular aircraft based on filed aircraft equipage. Accordingly, you must notify ATC immediately if your communications, navigation, and surveillance equipment capability degrades below that which you listed in your flight plan.[20]

**4.7.4.3** ATOP analyzes cleared routes of aircraft and alerts controllers of potential future conflicts (scalable to more than 2 hours ahead) with other aircraft. ATOP also considers different 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.

**4.7.4.4** You can find specific information regarding ATC separation standards in FAA Order JO 7110.65, Air Traffic Control. Additionally, trial periods where new separation standards are being applied will be announced on the FAA's International Notices web page.

## 4.8 Special Use Airspace (SUA).

**4.8.1** Warning Area. A warning area, as defined in 14 CFR § 1.1, 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.

**4.8.2** Prohibited Areas. ICAO Annex 2 specifies that these areas exist "above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited."

**4.8.3** Restricted Areas. ICAO Annex 2 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."

[20] Regulatory reference is 14 CFR § 91.169, which refers to 14 CFR § 91.153. This requires the flight plan to include "any other information the pilot in command or ATC believes is necessary for ATC purposes." The U.S. AIP states that pilots must "advise ATC" if equipment failures render the filed capability indicators inaccurate.

**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.

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

**4.10 World Geodetic System 1984 (WGS 84).** ICAO and the United States endorse the WGS 84 or approved equivalent as the geodetic reference datum standard for air navigation latitude and longitude coordinates. WGS 84 provides for a common geodetic reference system and a means 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 charts 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.

**4.10.1** Operations in Areas That Are Not WGS 84-Compliant. As of early 2026, while most countries are at least "partially compliant" with WGS 84, some aerodromes remain noncompliant. Flight manuals may include a note for RNAV systems indicating that, for terminal areas that are not WGS 84-compliant, the crew should deselect the use of Global Navigation Satellite Systems (GNSS) and use ground-based NAVAIDs for navigation. You should be familiar with your flight manual limitations as well as any country-specific procedures published in State AIPs 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 oceanic and remote continental and/or international flight, whether you fly large or small aircraft, starts with adequate training and planning. 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 of 14 CFR part 121 operators and large 14 CFR part 135 operators with good familiarity and experience with such flights can sometimes work with shorter lead times. Commercial flight planning companies used by 14 CFR part 91 and smaller 14 CFR part 135 operators can offer similar services.

**5.1.2** Awareness. 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.

**5.1.3** Verification. You should allow enough lead time to ensure your planning is thorough, complete, and correct. You should also 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. You should consider the following questions when developing your itinerary:

1. What airspace, routes, speeds, and altitudes do I fly to get to my destination(s)?
2. Are there any terrain clearance concerns along those routes at those altitudes?
3. Is the flying time to suitable and available en route alternates from along those routes and altitudes appropriate for the aircraft and operating part? (Plotting Equal Time Points (ETP) will help answer this question.)
4. Are there any pitfalls I should be aware of from each State's AIP?
5. What communications, navigation, and surveillance equipment and authorizations must I have in order to fly my intended routes and altitudes?
6. Will I be operating in a Special Area of Operation (SAO)? Do I have the necessary operational authorization(s) to do so? (See Appendix B, Operational Authorizations: 14 CFR Part 91 LOAs.)

7. 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 4.10 provides information on WGS 84.)
8. What survival equipment must I have on board in order to fly my intended routes?
9. 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?
10. Does my preferred destination have instrument approaches and arrival and departure procedures that are compatible with my aircraft equipment and authorizations?
11. What crew rest requirements will I have for each destination?

    **Note:** See paragraph 5.3 below regarding fatigue management issues.

12. Should I use a flight planning or dispatch service for my trip?
13. 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 all airspace I will pass through?
    - Oceanic contingency procedures?
14. Are there specific pilot certification, type rating, and/or medical certificate requirements for the countries I will be visiting? Are single-pilot operations authorized?
15. Will my intended route take me through areas of volcanic activity?
16. If my route takes me through polar areas, have I researched the risks inherent to operations on polar routes? (Paragraph 5.10 provides information on polar operations.)
17. Extended Operations (ETOPS) consideration: Will I be operating more than:
    a. Title 14 CFR part 121: 60 minutes (two-engine airplanes) or 180 minutes (more than two-engine passenger airplanes) from an adequate airport?
    b. Title 14 CFR part 135: 180 minutes from an adequate airport?

**5.2.2** Administrative, 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, notices, and/or applicable travel advisories for countries I intend to visit?

   **Note:** The FAA's website includes a special section on prohibitions, restrictions, notices, and DOS travel advisories applicable to foreign countries at https://www.faa.gov/air_traffic/publications/us_restrictions. This is a particularly important 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 may become subject to import regulations and impoundment.

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. AC 120-100, Basics of Aviation Fatigue, discusses strategies to mitigate the effects of fatigue and is an excellent resource. AC 120-103, Fatigue Risk Management Systems for Aviation Safety, discusses the Fatigue Risk Management Systems (FRMS) prescribed in 14 CFR part 117. While 14 CFR 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. Although a Fatigue Risk Management Plan (FRMP) is only required for 14 CFR part 121 operators, the FAA recommends any operator who frequently conducts long-range flights to objectively assess the risks of flightcrew fatigue and implement some form of a plan to reduce those risks.

**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 pilots 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 approved for use under certain conditions.

- Information regarding pharmaceutical sleep aids is available on the FAA's website.
- This website 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 plus sign (++).

**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.++
   - ICAO Annex 6, Operation of Aircraft, Part I, International Commercial Air Transport—Aeroplanes, 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 Union Aviation Safety Agency (EASA) has published inspector guidance for its Ramp Inspections program that references the requirement in Article 30 of the Chicago Convention at https://www.easa.europa.eu/sites/default/files/dfu/SAFA%20Ramp%20Inspections%20Guidance%20Material%20-%20Version%202.0.pdf. Some operators have found it useful to create a ramp inspection binder for easy access to required documents.
   - For U.S. domestic flights operating only on very high frequency (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 to operate 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. Operational authorizations.

   **Note:** Some countries require an operational authorization and/or an airworthiness statement for certain operations.

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 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, ensure that all travelers have proper personal documentation (passports and visas, as required). You may find the requirements for individual countries at https://travel.state.gov.

## 5.5 Entry to Foreign Airspace—Flight Plan vs. 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 5.1.2, 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, Safety Management, originally issued in 2013). Many of the topics included in earlier portions of this chapter should be included as elements of your risk assessment. 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 good ideas from that information.

**Note:** The Automated Mutual-assistance Vessel Rescue (AMVER) system, sponsored by the United States Coast Guard (USCG), is a computer-based voluntary global ship reporting system used worldwide by Search and Rescue (SAR) authorities to arrange for assistance to persons in distress at sea. The AMVER website is located at https://www.amver.com. 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** 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. Title 14 CFR parts 91 subpart K (part 91K), 121, and 135 operators must use an approved weather source (i.e., NWS or FAA-approved).[21]

**5.7.2** Weather Sources. As representatives of the Administrator, Principal Operations Inspectors (POI) may approve, via the A010 authorization (required for 14 CFR parts 91K, 121, and 135), the following weather sources:

- The NWS for the United States and its territories.
- U.S. and North Atlantic Treaty Organization (NATO) military observing sources.
- Meteorological offices or automated observations operated by ICAO Member States (as long as the States subscribe to ICAO meteorological standards and practices (i.e., list no differences to ICAO Annex 3, Meteorological Service for International Air Navigation)).
- Members of the World Meteorological Organization (WMO).

**5.7.3** Enhanced Weather Information Systems (EWINS). Many certificated 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 typically use a proprietary EWINS. Title 14 CFR part 91K, 121, and 135 operators require FAA approval via the A010 authorization to use EWINS.[22]

**5.7.3.1** 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.

**5.7.3.2** For an explanation of EWINS, refer to FAA Order 8900.1, Volume 3, Chapter 26, Section 4, Enhanced Weather Information Systems. Approval to use EWINS weather products is issued on a case-by-case basis and is currently only applicable to 14 CFR part 91K program managers and 14 CFR part 121 or 135 certificate holders (CH), 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 FAA International Notices Web Page.** International Notices include Flight Prohibitions Notices and International Oceanic Airspace Notices that could affect your decision to

[21] Regulatory references are 14 CFR §§ 91.1039, 121.101, and 135.213.
[22] Regulatory references are 14 CFR §§ 91.1039, 121.101, and 135.213.

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 notices can be very important. To access FAA International Notices, refer to https://www.faa.gov/air_traffic/publications/internationalnotices.

**5.9 ETOPS.** ETOPS (the ICAO term is "Extended Diversion Time Operations (EDTO)") requirements pertain to aircraft operated under 14 CFR 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 14 CFR part 91. However, because risk increases with distance from an adequate airport (defined in 14 CFR § 121.7), 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 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 14 CFR part 121 (§§ 121.161 and 121.374 and appendix P) and 14 CFR part 135 (§ 135.364 and appendix G).

**5.10 Polar Operations.** ACs 120-42 and 135-42 cover polar operations by aircraft operated under 14 CFR parts 121 and 135, respectively. As noted in the ETOPS discussion above, we strongly recommend 14 CFR part 91 operators refer to these ACs if you fly 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 charts for Eastern Europe and Eurasia. The South Polar Area of Operations includes the area south of latitude 60° S. Operators should contact a specialist from the FAA's Flight Technologies and Procedures Division, Flight Operations Group for advice on operational factors to consider when planning polar operations. The relevant operational authorization is B055, North Polar Operations.

**5.10.1** Magnetic Variation. In polar areas, there are navigation challenges. Within these areas, air navigation tasks are complicated by very rapid changes in magnetic variation over small distances. For example, when flying between the Magnetic North Pole and the True North Pole, a heading of True North results in a magnetic heading of south (a magnetic variation of 180 degrees).

**5.10.2** Convergence of the Meridians. The convergence of the meridians (i.e., lines of longitude) presents additional directional complications. When flying "great circle" courses at latitudes greater than 67 degrees, convergence of the meridians can create rapid changes in true headings and true courses with small changes in aircraft position. As a result,

relatively small errors in determining the aircraft's actual position can produce very large errors in determining the proper heading to fly and maintain the assigned flightpath.

**5.10.3** Areas of Magnetic Unreliability (AMU). Conventional magnetic compasses sense magnetic direction by detecting the horizontal component of the Earth's magnetic field. Since the horizontal component of the Earth's magnetic field vanishes near the magnetic poles, magnetic compasses are highly unreliable and unusable in an area approximately 1,000 NM from each magnetic pole. Within these areas, air navigation is further complicated by very rapid changes in magnetic variation over short distances. Relevant authorities in AMUs typically designate all headings, courses, and tracks with respect to True North, not Magnetic North. Pilots should consult applicable AIPs to know where authorities make such designations.

**5.10.3.1** The locations of the magnetic poles wander over time; an authoritative source for their current locations is the National Oceanic and Atmospheric Administration (NOAA) website, located at https://www.ncei.noaa.gov/products/wandering-geomagnetic-poles.

**5.10.3.2** The FAA authorizes certificated operators to operate in AMUs via the B040 operational authorization. For purposes of B040, the FAA designates the AMUs as follows:

**5.10.3.2.1** The Northern AMU is the area within 1,000 NM of the Magnetic North Pole, but excludes Alaska and its territorial waters, 12 NM from the coast. In addition, Canadian Northern Domestic Airspace (NDA) is part of the Northern AMU, as well as the area north of 75° N latitude in the Nuuk (Greenland) flight information region (FIR).

**5.10.3.2.2** The Southern AMU is the area within 1,000 NM of the Magnetic South Pole.

**5.10.3.3** It is crucial for pilots operating in AMUs to be familiar with procedures for switching heading and course references to/from True North (e.g., latitude-based or manual switching), how to fly true headings/courses, and how the active heading/course reference is displayed on compasses and in navigation systems.

**Note:** Operations in AMUs when using a Global Positioning System (GPS)-only navigation sensor for the navigation system require careful analysis to confirm that the system is providing accurate and reliable heading information.

**5.11 Areas With Limited or No ATS (Also Called "NO FIR" Areas).** Two examples of such areas are the boundary between Bodo Oceanic and Sankt Petersburg, and the area southeast of Mazatlán's Oceanic FIR off the west coast of Central America.

**5.11.1** Title 14 CFR Part 91 Operators. While 14 CFR 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, you are required, as you are for all flights, to become familiar with all available information concerning that flight.[23] Good familiarity with applicable operating procedures allows for safe operations.

**5.11.2** Certificated Operators. To operate in uncontrolled information regions, certificated operators must be issued the A014 authorization, in accordance with 14 CFR § 91.1015, § 121.93, § 121.113, § 125.31, or § 135.215, as applicable. In uncontrolled airspace, you will not have access to ATC, air traffic advisory, flight information, and alerting services. In approving routes outside controlled airspace via the A014 authorization, the Administrator makes a determination that traffic density is such that an adequate level of safety can be assured. FAA inspectors will also evaluate whether you 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 the description of traffic information broadcasts by aircraft (TIBA) in ICAO Annex 11, Air Traffic Services).

## 5.12 Rotorcraft Operations.

**5.12.1** FAA and ICAO Requirements. The guidance on U.S. and International Regulations in Chapter 2, Background Information for Operations in Oceanic and Remote Continental Airspace, also applies to helicopter operations in oceanic and remote continental airspace.

**5.12.2** Offshore Helicopter Operations. AC 90-80, Approval of Offshore Standard Approach Procedures, Airborne Radar Approaches, and Helicopter En Route Descent Areas, contains detailed information on offshore helicopter operations, both instrument and ATS surveillance (ADS-B or radar). It also provides instruction on how you can gain authorization to conduct such operations.

**5.12.3** Helicopter Offshore Instrument Operations. The H104 authorization is available to authorize en route descent procedures under IFR.

[23] Regulatory references are 14 CFR § 91.103, Preflight Action, and ICAO Annex 2, Rules of the Air, Chapter 2, Applicability of the Rules of the Air, Paragraph 2.3.2, Pre-Flight Action.

**5.12.4** Helicopter 14 CFR Part 135 Proving and Validation Tests. Title 14 CFR § 135.145 is relevant for rotorcraft operations in oceanic and remote continental airspace. 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).

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

**6.1 General Information.** The main focus of this guidance is operations in oceanic airspace. The guidance is also applicable to some operations in remote continental airspace, where long-range communication systems (LRCS) are used.

**6.1.1** Checklists. In Appendix D, Sample Oceanic Checklist, we have included a sample oceanic checklist tailored from the 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. Similar to the ICAO version, the checklist in this AC represents lessons learned from many years of flight in oceanic airspace, along with internationally accepted best practices for such operations.

**Note:** You may tailor the abbreviated and expanded checklists to your specific needs and operational circumstances. Until you are experienced and familiar with all items on your tailored checklist, we recommend you refer to your expanded checklist to ensure you follow the procedures in their entirety.

**6.1.2** Pilot Deviations—Common Causes. Technological advances in communications, navigation, and surveillance equipment have enabled aircraft to operate with ever-improving precision and accuracy. However, despite these improvements in capability, pilots continue to deviate from their current route clearances.

**Note:** The North Atlantic (NAT) ICAO Region publishes the Oceanic Errors Safety Bulletin (OESB) (Serial Number: 2017-002), which is an excellent resource for understanding how to prevent common errors. The current OESB can be found in the "EUR and NAT Documents" area of the ICAO website at https://www.icao.int/EURNAT/EUR-NAT-DOCS?fid=3493. Select the "NAT Documents" folder to find the "2017_002" document within the "NAT OPS Bulletins" subfolder.

**6.1.2.1 Large Height Deviation (LHD).** An LHD occurs when an aircraft is 300 feet or more off its assigned altitude. LHDs increase the risk of midair collision.

**6.1.2.1.1** The most common causes of LHDs are:

1. Air traffic control (ATC) loop errors:
   - Misunderstood or miscommunicated clearances.
   - Inadequate ATC coordination.
2. Pilot deviations from assigned altitude:
   - Following the flight plan rather than a clearance or revised clearance.
   - 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 contingency procedures.
- Turbulence encounters.

**6.1.2.1.2** 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 F360, 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 before 1735. |
| Via CPDLC, crew at F380, cleared to cross 66N040W at F390, report level F390. | 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 before 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. |

**6.1.2.1.3** Your training program should provide your flightcrew 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 Doc 007, North Atlantic Operations and Airspace Manual, when flying in North Atlantic High Level Airspace (NAT HLA), if your aircraft is not using Controller-Pilot Data Link Communications (CPDLC)/Automatic Dependent Surveillance-Contract (ADS-C), you must immediately report to ATC both 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.

**6.1.2.2 Gross Navigation Error (GNE).** The FAA defines GNEs as lateral deviations from course of 10 nautical miles (NM) or greater.

**6.1.2.2.1** 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 navigation system to reflect their *currently effective route clearance*. This can also result from a clearance or revised clearance that was incorrectly entered, misread, or misunderstood. Procedures to follow in the event of a revised clearance 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 1:** We use the term "currently effective route clearance" to describe what ICAO Annex 2, Rules of the Air, refers to as the "current flight plan," or the most recently issued ATC clearance.

**Note 2:** Waypoints entered via full latitude and longitude can produce misleading display names, with truncated or rounded minutes of latitude/longitude or longitude. For example, the two points listed in Table 6-2 below could have identical avionics display names:

**Table 6-2. Selected Waypoint Entry Methods and Avionics Display**

| ATC Flight Plan Entry | Geographic Coordinates | Avionics Display[24] |
|---|---|---|
| 55**30**N02000W<br>(11 characters, degrees & minutes) | N55°**30'**/W020° | N55W020 |
| 55N020W<br>(7 characters, degrees only) | N55°/W020° | N55W020 |

[24] Avionics displays vary by manufacturer. Some produce a generic name (e.g., "LL01"). Using the ARINC 424 rules (see Figure 6-2, ARINC 424—Oceanic Waypoints, below), the half-degree of latitude and whole-degree points in Table 6-2 would be H5520 and 5520N, respectively.

**Note 3:** Pilots should therefore always confirm the expanded coordinates of undesignated significant points (i.e., unnamed waypoints defined by geographic coordinates).

**6.1.2.2.2** 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 the flight guidance system to an Area Navigation (RNAV) mode (e.g., "LNAV") after using heading mode (e.g., "HDG") to maneuver the aircraft.

**6.1.2.2.3** Although there are a number of causes of GNEs, pilot inattention has been the root cause of many navigational errors. ICAO NAT Doc 007 guidance on guarding against common errors provides excellent lessons learned from evaluation of GNE incidents.

**6.1.2.3** **Longitudinal Errors.** 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.

**6.1.2.3.1** Deviations around weather can affect ETAs. ICAO Annex 2 requires you to provide ATC with an updated ETA when weather deviations cause the originally notified ETA to be inaccurate.

**6.1.2.3.2** Per ICAO Annex 2, you must adhere to any assigned Mach number or airspeed. If you use Long Range Cruise (LRC) or Economy (ECON) modes, you are operating in a constantly changing speed mode. Flying in these modes may not be compatible with maintaining a fixed ATC speed assignment.

**6.1.2.3.3** When position reports are made by voice, ICAO Annex 2 requires you to report to the Air Traffic Service (ATS) 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. (In the NAT region, the allowance for revised estimates is "3 minutes or more.")

**6.1.2.3.4** 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 navigation system. You must diligently monitor your ETA and maintain your assigned Mach number in order to minimize these errors.

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

**6.1.2.3.6** Automatic position reports delivered via 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 Annex 2 requires you to file a flight plan for any flight that crosses 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, you will likely encounter instrument meteorological conditions (IMC) at some point in your flight.

**6.2.1.1.2** We therefore recommend that you file and fly under IFR on all oceanic flights.

**6.2.1.2** Proper completion of an ATC flight plan relies on detailed knowledge of the airspace you intend to transit, the airspace equipment requirements, and the required FAA operational authorizations. 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) and the U.S. Aeronautical Information Publication (AIP) have step-by-step descriptions detailing how to complete Form FAA 7233-4, Pre-Flight Pilot Checklist and International Flight Plan.

**6.2.1.3** As Performance-based Navigation (PBN) and Performance-based Communication and Surveillance (PBCS) become more prevalent worldwide, ATS authorities will increasingly set aside certain airspace for 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, may reject your flight plan entirely.

**6.2.1.4** Title 14 CFR part 121 dispatch services 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 the route of flight. Regardless of whether you are operating with a dispatch service, you must comply with 14 CFR § 91.103, which requires pilots to "become familiar with all available information" concerning a flight. Pilots should have the knowledge and necessary tools available to react to unplanned reroutes, equipment failures, or emergencies that may affect a flight while en route. Operators using commercial vendor flight planning services remain responsible for all aspects of the flight.

**6.2.2** Equipment Capability Codes—Flight Plan.

**6.2.2.1** PBN and PBCS are changing the way ATS Providers (ATSP) apply separation criteria between aircraft. Without notifying the crew of either aircraft involved, ATSPs 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 (i.e., the best) Required Navigation Performance (RNP), Required Communication Performance (RCP), and Required Surveillance Performance (RSP) values for which you are capable and authorized. You must only use codes for equipment that is installed and operable. Similarly, you must only use capability codes that reflect your actual authorizations, when authorization is required. You must have a B036 authorization to indicate RNP 2 (oceanic/remote), RNP 4, or RNP 10 capability on your flight plan.[25] Conversely, 14 CFR part 91 operators do not require an authorization to indicate RNAV 1 or 2 capability.

**6.2.2.2** The absence of equipment or capability codes in your flight plan (e.g., for RNP, RSP, RCP, ADS-C, Automatic Dependent Surveillance-Broadcast (ADS-B), CPDLC, Reduced Vertical Separation Minimum (RVSM), etc.) informs ATC that your aircraft is either not equipped with or authorized to use such capabilities. The presence or absence of equipment and capability codes affects route and altitude assignments, as well as separation differences with other aircraft. You should ensure your flight plan reflects all the codes, as per flight plan guidance in the AIM, applicable to your aircraft equipment and authorizations.

**6.2.2.3** The RNAV/RNP, RCP, or RSP capability indicated on your flight plan must not be better than that for which you have been approved via an operational authorization, as applicable. For example, if you have only been approved for RNAV/RNP 10 (code A1), you must not indicate RNP 4 capability (code L1).

[25] Regulatory reference is 14 CFR § 91.169, which refers to 14 CFR § 91.153. This requires the flight plan to include "any other information the pilot in command or ATC believes is necessary for ATC purposes." The U.S. Aeronautical Information Publication (AIP) states that pilots must "advise ATC" if equipment failures render the filed capability indicators inaccurate.

## 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 the following documents/information 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 operational flight plan labeled "master" in the cockpit.

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

**6.3.1.3** Global Positioning System (GPS) NOTAMs. Select "GPS NOTAMs" in "Predefined Queries" under "Location" (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 plotting/orientation chart.

**6.3.1.7** Space weather: solar flare information (refer to the National Oceanic and Atmospheric Administration's (NOAA) website at https://www.swpc.noaa.gov/forecasts).

**6.3.1.8** Volcanic ash information (as applicable).

**6.3.1.9** Pilot Weather Reports (PIREP).

**6.3.1.10** Receiver autonomous integrity monitoring (RAIM) and fault detection and exclusion (FDE) prediction tools (for Global Navigation Satellite System (GNSS) and RNP operations), available at https://sapt.faa.gov/default.php.

**6.3.1.11** 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.

**6.3.1.12** Plotting/orientation chart.

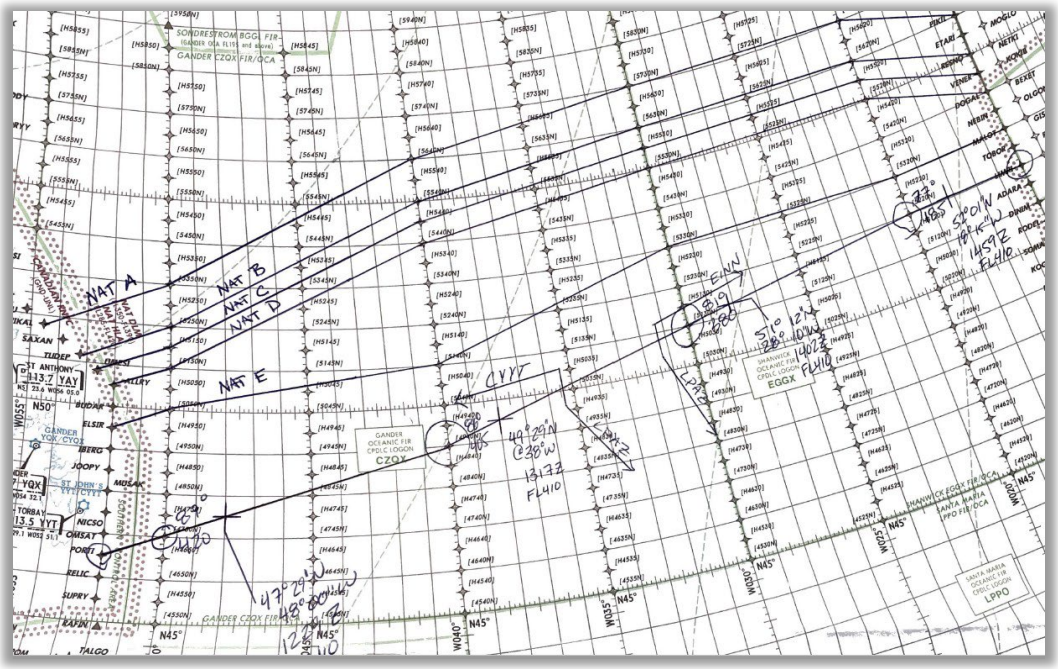
**6.3.1.12.1** You should use an oceanic plotting/orientation chart, of appropriate scale, and with latitude and longitude depicted, to provide a visual presentation of your intended route, regardless of your type(s) of long-range navigation system (LRNS) and method of cross-checking aircraft position. Plotting your route on a chart helps with situational awareness, and (together with the operational flight plan) also helps with navigation contingencies such as dead reckoning, in the event of navigation system degradation/failure.

**6.3.1.12.2** Your chart should include, at a minimum:

1. The route of your filed flight plan. If your cleared route differs from what you filed, your *currently effective route clearance*.
2. Clearly depicted waypoints using standardized symbology.
3. All ETPs, plotted on the chart (with relation to the route).
4. Alternate airports.
5. Other adjacent/nearby tracks.

**6.3.1.12.3** Figure 6-1 shows a sample plotting chart for an eastbound flight on a random route in the NAT at FL 410. Note that the westbound tracks are plotted north of the route of flight, for situational awareness.

**Figure 6-1. Sample Plotting Chart**




**Note:** For certificated operators, if you hold the A061 authorization authorizing use of an EFB, the principal inspector (PI) can authorize "interactive plotting for oceanic and remote continental navigation," ensuring the EFB application fulfills plotting/orientation chart requirements listed in paragraph 6.3.1.12. With this authorization, you can use your EFB application in place of a paper plotting/orientation chart. AC 120-76, Authorization for Use of Electronic Flight Bags, provides guidance for operators to develop associated EFB procedures. Title 14 CFR part 91 operators may use an EFB, provided they observe the criteria and considerations of AC 91-78, Use of Electronic Flight Bags.

**6.3.2** Cockpit Preparations.

**Note:** These procedures assume at least two pilots are on duty. Some aircraft are certified for single-pilot operations. If your intended flight in oceanic or remote airspace can safely accommodate single-pilot operations, you should develop some methodology to check your clearance, waypoint entries, equipment setup, etc. It may be possible to involve non-flying crew in some checks, either prior to flight, or in flight, via appropriate voice and/or data communications. Where such support is not available, single-pilot procedures should be carefully designed to detect and fix errors promptly, thereby minimizing or altogether preventing deviations.

**6.3.2.1** Check your maintenance log to ensure all your required communications, navigation, and surveillance and altimetry equipment is operational.

1. Consult your minimum equipment list (MEL) to be fully familiar with operational procedures associated with any inoperative equipment before you depart.
2. Inoperative equipment could affect the capabilities filed in the ATC flight plan. It is important to update the codes, as needed, to ensure ATC routes you in accordance with your capabilities.
3. A departure delay to accommodate repairs may be warranted. Alternatively, a reroute to avoid oceanic airspace may be necessary.

**6.3.2.2** Identify a single master clock in the cockpit.

1. 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, which for some systems is automatically synced with GPS time.

   **Note:** As clock errors can be symptoms of GPS spoofing, it is recommended to have a backup clock set to UTC that is not dependent on GPS.

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. Carefully follow your inertial system flight manual procedures 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. Both pilots should verify the present position in the LRNS. Aircraft maintenance or towing can cause the present position suggested on initialization to be incorrect.
2. If you conduct another present position check on taxi out and it shows a gross difference from 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. That pilot should then verify the routing has been loaded correctly. Below are recommended steps for performing this loading and verification. The second pilot's

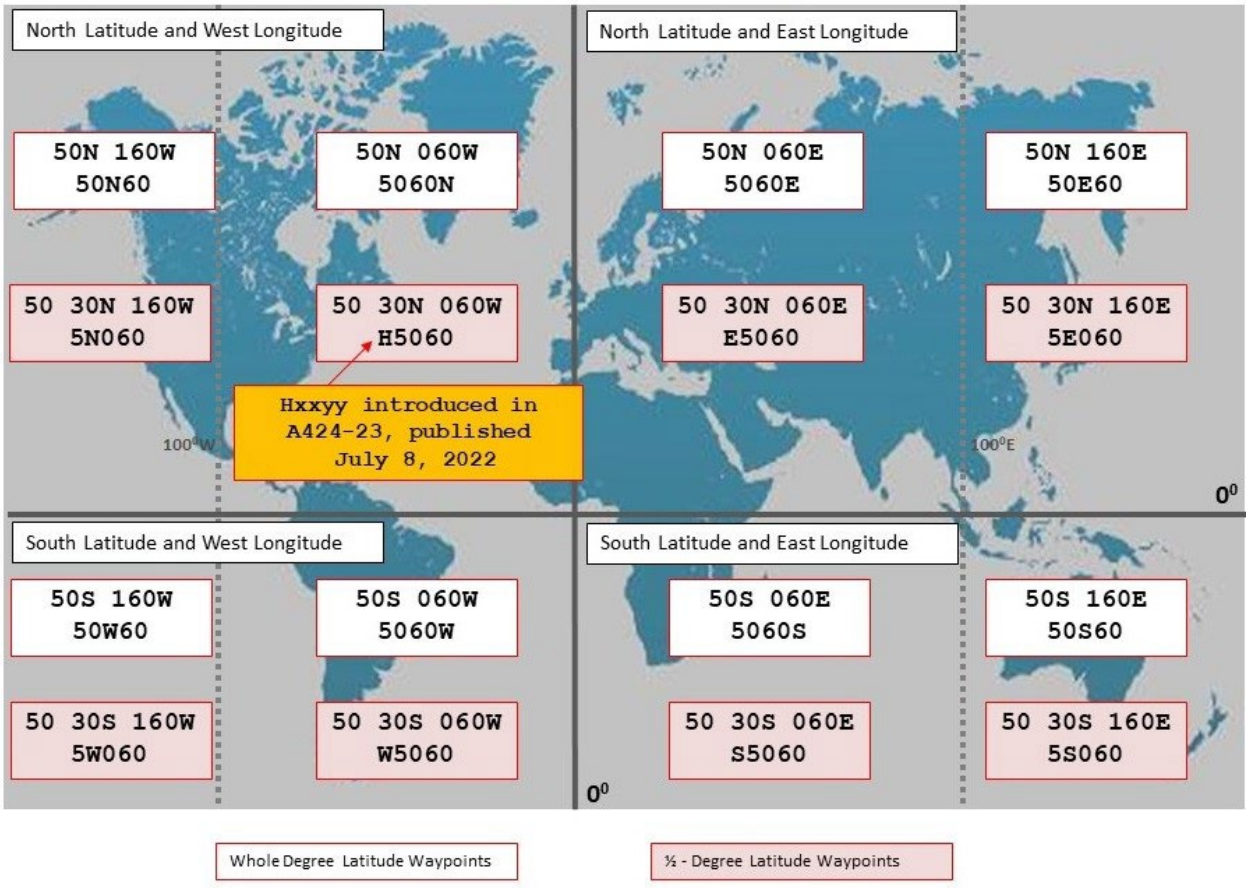
subsequent confirmation procedures are explained beginning in paragraph 6.3.2.6.

**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 and FMS software version are current and correct.

**6.3.2.5.3** For systems with pilot-defined waypoint designators or numbers, we recommend you use a consistent procedure. Enter this designator on the Master Document and use it to store waypoints in the navigation computer. Figure 6-2 depicts sample waypoint designators using rules published in ARINC 424 Specification, Paragraph 7.2.5, Reporting Positions Defined by Coordinates.

**Figure 6-2. ARINC 424—Oceanic Waypoints**




**Note:** ARINC 424 names can be used for "undesignated waypoints" where ATC has not established five-letter name codes (e.g., HOIST). For undesignated points,

the proper latitude/longitude format for ATC flight plans and communications with ATC is shown in Table 6-2 above.

**6.3.2.5.4** Verify all navigational information contained in the Master Document against the navigation data information in the navigation system.

**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 long-range aircraft have a navigation system that is capable of uplinking flight plans sent from ATC and/or from a dispatch service, either prior to departure or while airborne. These uplinks can normally be added to the active route via a "push-to-load" function, but there are occasional glitches in the associated "functional integration" that can require you to make changes to complete the route load. Regardless of how you load your flight plan into your navigation system, you should have procedures to verify your flight plan route against your navigation system entries.

**6.3.2.6** After the first pilot has loaded and verified the navigation system 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 simply to observe another crewmember entering the data. You should use an independent cross-check method between pilots so no navigation system 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 navigation system to the filed flight plan, track message (if applicable), and the Master Document.

**6.3.2.6.3** Verify the total route distance in your navigation system against your Master Document to help find gross errors. More importantly, cross-check course/headings and distances between each waypoint to ensure the navigation system routing matches your Master Document. Referencing your plotting or orientation chart here can also be beneficial.

**6.3.2.6.4** A 1-degree 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.

**6.3.2.6.5** The second pilot should work from the navigation system back to the Master Document (i.e., by reading what is in the navigation system, and comparing that with what is in the Master Document). Reading from the Master Document to the navigation system can result in "seeing what we expect to see" (expectation bias). A simple way to consider this is that the first pilot works from "paper to glass" while the second pilot works from "glass to paper."

**6.3.2.7** Adopt appropriate annotations to indicate the status of each waypoint listed on the Master Document. For example:

1. The first pilot could put a circle next to 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 circle next to the waypoint, waypoint number, or symbol to signify having performed the cross-check described above, to include confirming the course and distance information within a specified tolerance (e.g., plus or minus 2 degrees and 2 NM).

**6.3.2.7.1** We discuss additional Master Document symbology in the en route section, in paragraph 6.4.

**6.3.2.8** Set the appropriate mode select secondary radar with data link (Mode S) flight identification (FLT ID), which should correspond verbatim to the Aircraft Identification (ACID) (call sign) entered in item 7 of the ATC flight plan.

**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** An FLT ID is composed of a maximum of seven alphanumeric characters (e.g., N235RA, AAL3342, BONGO33) and must agree, verbatim, with the ACID entered in item 7 of the ATC 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 item 7 of the ATC flight plan.

**6.3.2.9** Check your groundspeed in the blocks and on taxi out.

1. If you are still in the blocks and your groundspeed reads other than zero, 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 RVSM altimetry ground checks.

**6.3.2.10.1** Before taxi, set your altimeters to the airport local altimeter setting. Both primary altimeters should read within ±75 feet of a known elevation (e.g., touchdown zone elevation (TDZE) or marked 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** **No Separate Clearance.** In 2024, ATSPs in the NAT began phasing out the issuance of separate oceanic clearances, instead relying on the ATC clearance you receive before departure. NAT procedures do, however, call for providing an estimate for the oceanic entry point and the requested oceanic FL and speed via voice or the Aircraft Communications Addressing and Reporting System (ACARS) data link Oceanic Clearance Delivery (OCD) application. ATC then assigns the altitude and airspeed (as required) for oceanic crossing prior to entering oceanic airspace. Check the AIP (or other relevant source document) for timing (i.e., minutes prior to the oceanic entry point) on required steps, and to determine whether a separate oceanic clearance is required. Also, check applicable NOTAMs for updated procedures.

**6.4.1.2** **Separate Clearance.** In situations where a separate oceanic clearance is required, and your departure airport is relatively close to the oceanic airspace boundary, you may, and at some airports must, obtain your oceanic clearance prior to departure. Check the AIP or other relevant source documents to determine clearance requirements unique to your departure airport.

**6.4.1.3** **CPDLC.** CPDLC Departure Clearances (CPDLC-DCL) provided at large U.S. airports may include an oceanic clearance. Oceanic clearances are also issued via CPDLC from en route controllers.

**6.4.1.4** **Voice.** When receiving an ATC clearance via voice, at least two pilots should be involved, one actively obtaining the clearance and the other monitoring. We recommend both pilots be on a headset during this process.

**6.4.1.5** **Crew Coordination.** Both pilots should independently copy the clearance. Each pilot cross-checks and verifies the routing, altitudes, and Mach number/airspeed assigned (if applicable).

1. Read all waypoint coordinates back to the ATSP in detail. Always cross-check each detail of the clearance with your Master Document.

2. Ensure the ATSP acknowledges your correct read back.
3. The terms "expect" or "when can you accept" are not used by ATC when issuing a clearance. Typical ATC clearance phraseology is "ATC clears…"
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 Revised Clearance.** Ensure the following upon receipt of a revised clearance:

**Note:** A revised clearance (that is, an ATC amended clearance that differs from either the oceanic route requested via the flight plan, or from a previously issued clearance) is the number one scenario leading to pilot deviation from the assigned routing. You should be particularly cautious when receiving a revised clearance.

1. At least two pilots should separately copy the clearance from the ATSP. Each pilot should be on a headset.
2. You read it back correctly and receive an acknowledgement of your read back from the ATSP.
3. All pilots compare and analyze the clearance they just copied; contact the ATSP for clarification of any inconsistencies.
4. One pilot reprograms the navigation system, updates the Master Document, and updates the plotting/orientation chart.
5. A second pilot cross-checks the revised clearance with the reprogrammed route loaded into the navigation system, the updated Master Document, and the updated plotting/orientation chart.
    a. The cross-check of the navigation system coordinates includes comparing the expanded coordinates (i.e., degrees *and* minutes).
    b. 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 may be able to send a new operational flight plan/Master Document with the updated track and distances. Preferably, an onboard flight planning application in an EFB is used to independently calculate course and distance, and check that against the navigation system. Legacy methods, using plotter (protractor) and pencil on a plotting chart, are also possible; pilots, however, need focused training to be proficient with these methods.
6. If the clearance is received via CPDLC, each pilot should read it silently to develop an independent understanding of the new clearance, making sure the full content of the uplink has been viewed (all pages, as well as routes to be loaded). They should then discuss the clearance and ask the

controller for clarification if they have any doubts as to what the clearance means.

**Note 1:** If you receive a route uplink (loadable clearance) via CPDLC, the FAA recommends you use the "push-to-load" function, if available, to program your navigation system, instead of manually entering the route. Some crews have not used the "push-to-load" function with CPDLC route uplinks to avoid losing wind data or to preserve meaningful waypoint labels. Failure to properly load the clearance in the navigation system will result in a deviation.

**Note 2:** Revised clearances sent via CPDLC have also been associated with navigation errors. Operators should be cognizant of this when designing operating procedures for the use of CPDLC.

7. Thoroughly brief all relief pilots on the revised clearance prior to them assuming cockpit duties.

**Note:** We highly recommend that the relief pilot(s) also cross-check the navigation system against the Master Document to ensure complete understanding of the new clearance.

**6.4.1.7** **Time Estimate.** Ensure you have given an accurate ETA to ATC for your oceanic entry point. If you previously provided a time estimate, and it subsequently changes in excess of 2 minutes (in the NAT, "3 minutes or greater"), you must revise your estimate with ATC.

**Note:** Pilots do not need to provide a revised estimate when under ATS surveillance (refer to ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM), paragraph 8.6.4.4). Also, for aircraft providing automatic position reports via ADS-C, position reports can be omitted "in airspace where ADS-C services are provided" (refer to ICAO Annex 2, paragraph 3.6.2.2). Nonetheless, domestic controllers often relay the pilot-provided estimate to oceanic controllers, and separation can be predicated on that time estimate.

**6.4.1.8** **Flight Level (FL).** You must also ensure you enter oceanic airspace at your cleared/assigned FL for the crossing. The domestic ATC sector does not always automatically clear you to the altitude you have requested for oceanic crossing; if there are questions about your cleared FL, 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** If you are using Satellite Voice (SATVOICE) to communicate with ATC via New York or San Francisco Radio, the FAA requires a SATVOICE Callback Check, with a sample transcript provided in paragraph 4.3.3.2. You can find operational policy regarding the use of SATVOICE in the U.S. AIP, Section ENR 7, Oceanic Operations. You may find changes to SATVOICE policy, between AIP publication cycles, posted on the FAA's International Notices web page.

**6.4.2.4** Your flight manual may prescribe a requirement for confirming your navigation accuracy, and assessing the performance of your LRNS, prior to entering oceanic airspace. A sample navigation accuracy check is described in paragraph D.2.5.1 of the sample oceanic checklist provided in Appendix D.

**6.4.2.5** Upon entering oceanic and remote continental airspace, verify that the RNP alerting by your flight management computer (FMC) is consistent with the RNP capability indicated on your flight plan. If you indicate RNP 4 capability on the flight plan, for example, FMC alerting must be no higher than 4.0.

**6.4.2.6** If you are no longer able to meet your RNP navigation specification (NavSpec) while en route (i.e., your Actual Navigation Performance (ANP) exceeds your RNP or required equipment has failed, or you receive an "UNABLE RNP" alert), you are required to immediately notify your ATSP so they can adjust separation standards between you and other nearby aircraft as required.

**6.4.2.7** If you plan to use satellite communications (SATCOM) data link systems, check them prior to oceanic airspace entry. AC 90-117, Data Link Communications, recommends you initiate logon/notification for CPDLC and/or ADS-C services 10 to 25 minutes prior to the oceanic/FIR boundary, unless otherwise specified in the relevant AIP.

**6.4.2.8** Conduct altimetry checks prior to entering oceanic airspace and every hour thereafter, or as specified in the Airplane Flight Manual (AFM). 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** Set your transponder in accordance with regional requirements (generally to code 2000). 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, pilots should squawk 2000 10 minutes after entering oceanic airspace (in 2024, this changed from 30 minutes to 10 minutes). In the Pacific, Oakland advises that pilots should change the transponder code "upon entering" the OCA, after radar (/surveillance) services are terminated.

**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, Air Traffic Procedures, Section 6, National Security and Interception Procedures, addresses interception procedures and provides 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 may pose a 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 aircraft position "in the blind."

**6.4.3.4** Institute an appropriate offset, based on the Strategic Lateral Offset Procedures (SLOP), unless not authorized. Use of 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 guidance is published in the U.S. AIP, Part 2, En Route (ENR), and ICAO Doc 4444, section 16.5. As a reminder, SLOP offsets are only right of course, up to a maximum of 2 NM, in increments of 0.1 NM.

**6.4.3.4.2** We recommend SLOP be part of your oceanic training program and standard procedures for oceanic flying, on organized tracks as well as on random routes. You should check applicable State AIPs to determine where use of SLOP is authorized.

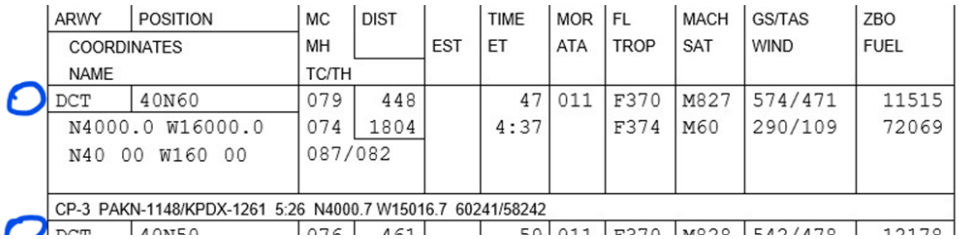
**6.4.3.5** Specify which FMS pages, or other displays of navigation information, that individual flightcrew members are charged with monitoring during the oceanic portion of the flight (e.g., cross-track error or time/distance).

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

**6.4.4.1** A Master Document is a copy of the operational flight plan (also referred to as navigation log, or computer flight plan (CFP)) with "MASTER" written on it. It does not "belong" to the pilot or the copilot, but rather is the flightcrew's central reference document to record clearances, frequencies, ETAs notified to ATC, fuel status, and other operational information. The Master Document is also used to record verification of waypoint information and should be kept current and organized so pilots can easily understand the progress of the flight, to include the *currently effective route clearance*. ICAO NAT Doc 007 provides further details on recommended use of a Master Document, and notes that it should list sequentially the waypoints defining the route, the course and distance between each waypoint, and other information relevant to navigation along the cleared route.

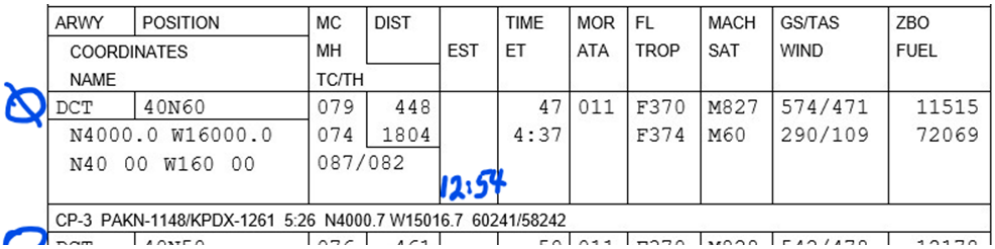
**6.4.4.2** Suggested Master Document annotations are provided here to help operators standardize procedures. Other annotations (e.g., squares, rectangles, or hash marks) could be used as well, as long as they are part of a clearly defined and standardized process of managing the Master Document.

**6.4.4.2.1** A circle next to the waypoint identifier denotes both pilots verified the coordinates, courses, and distances. This would normally be done during initial navigation system loading.



| ARWY | POSITION | MC | DIST | | TIME | MOR | FL | MACH | GS/TAS | ZBO |
|---|---|---|---|---|---|---|---|---|---|---|
| | COORDINATES | MH | | EST | ET | ATA | TROP | SAT | WIND | FUEL |
| | NAME | TC/TH | | | | | | | | |
| DCT | 40N60 | 079 | 448 | | 47 | 011 | F370 | M827 | 574/471 | 11515 |
| | N4000.0 W16000.0 | 074 | 1804 | | 4:37 | | F374 | M60 | 290/109 | 72069 |
| | N40 00 W160 00 | 087/082 | | | | | | | | |
| CP-3 PAKN-1148/KPDX-1261 5:26 N4000.7 W15016.7 60241/58242 | | | | | | | | | | |

**6.4.4.2.2** A diagonal backslash (\) over the circle denotes confirming a subsequent waypoint's coordinates and the track and distance to it. An ETA for that waypoint is also recorded. This would normally be done after rollout on the new course, and/or approaching the active waypoint.



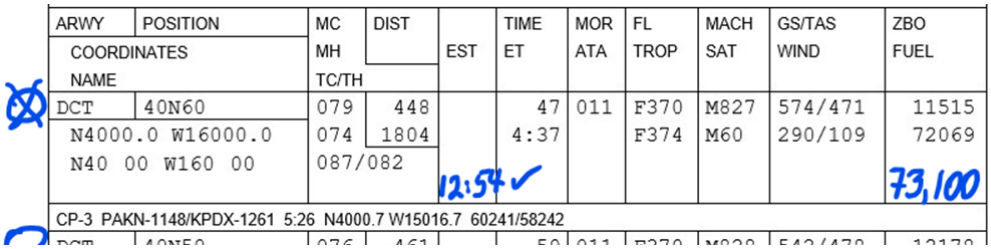
| ARWY | POSITION | MC | DIST | | TIME | MOR | FL | MACH | GS/TAS | ZBO |
|---|---|---|---|---|---|---|---|---|---|---|
| | COORDINATES | MH | | EST | ET | ATA | TROP | SAT | WIND | FUEL |
| | NAME | TC/TH | | | | | | | | |
| DCT | 40N60 | 079 | 448 | | 47 | 011 | F370 | M827 | 574/471 | 11515 |
| | N4000.0 W16000.0 | 074 | 1804 | | 4:37 | | F374 | M60 | 290/109 | 72069 |
| | N40 00 W160 00 | 087/082 | | 12:54 | | | | | | |
| CP-3 PAKN-1148/KPDX-1261 5:26 N4000.7 W15016.7 60241/58242 | | | | | | | | | | |

**6.4.4.2.3** 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.

Approaching each oceanic waypoint, verify the next and subsequent ("next + 1") waypoints. Using your *currently effective route clearance*:

1. Check the expanded FMC coordinates for the next and subsequent waypoints, and
2. Check that the expected outbound magnetic course and distance to the next waypoint presented in the FMC agree with that clearance.

**6.4.4.2.4** A diagonal forward slash (/) turns the previously annotated backslash into an "X." This denotes waypoint passage. Overhead time is confirmed with a "check" (or updated time, as applicable), and fuel remaining is annotated.



| ARWY | POSITION | MC | DIST | | TIME | MOR | FL | MACH | GS/TAS | ZBO |
|---|---|---|---|---|---|---|---|---|---|---|
| | COORDINATES | MH | | EST | ET | ATA | TROP | SAT | WIND | FUEL |
| | NAME | TC/TH | | | | | | | | |
| DCT | 40N60 | 079 | 448 | | 47 | 011 | F370 | M827 | 574/471 | 11515 |
| | N4000.0 W16000.0 | 074 | 1804 | | 4:37 | | F374 | M60 | 290/109 | 72069 |
| | N40 00 W160 00 | 087/082 | | 12:54 ✓ | | | | | | 73,100 |
| CP-3 PAKN-1148/KPDX-1261 5:26 N4000.7 W15016.7 60241/58242 | | | | | | | | | | |

As you pass each waypoint, 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.

**6.4.5** 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 enroute 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 internationally accepted phraseology.
2. Be certain you are communicating with the 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 ATSP for the oceanic and remote continental airspace in which you are operating.

**6.4.5.1.1** Radio call signs of ground stations. Position reports are generally provided to aeronautical radio stations, which relay this information to ATC. If the ATSP 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., "New York 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., ICAO NAT Doc 007, AIP, Chart Supplement, etc.) to confirm reporting requirements.

**6.4.5.1.3** In addition to reporting your position to your current ATSP, in the case of boundary points, often you must repeat your last position report to the FIR or CTA you are entering. Do so when so prescribed in the appropriate section of ICAO Doc 7030, Regional Supplementary Procedures (SUPPS), in the applicable AIP, or when requested by ATC.

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

**6.4.5.1.5** If you operate in airspace approved for the use of data link, you may provide Automatic Position Reporting (APR) via ADS-C. 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 noncompulsory reporting points as well. In oceanic airspace where the FAA is the ATSP, position reports are required over all points used in the flight plan to define the route of flight, even if they are noncompulsory.

**6.4.5.3** If you are not on a designated oceanic route, provide position reports at all points listed in item 15 (route of flight) of 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 (approximately) thereafter. The appropriate ATSP, however, may request additional reports at shorter intervals.

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

**6.4.6** Position Reporting—Format.

**6.4.6.1** Refer to 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:** In reporting coordinates and times, say each number individually (e.g., 1032 is "one zero three two," not "ten thirty-two"). 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 (3 minutes or more in the NAT), you must provide an updated estimate to the ATSP. For aircraft providing automatic position reports via ADS-C, position reports can be omitted in airspace where ADS-C services are provided.

5. Name of your subsequent fix.

**6.4.6.2** An example position report is:
"N1234 over CEBEN at 1422, FL350, estimating CIVIT 1503, CORTT next."

**6.4.6.3** When position is expressed in coordinates, the following pertains:

1. If your flight tracks predominantly east and west, ATSPs will generally expect latitude to be expressed in degrees and minutes (if not zero), and longitude in whole degrees only.
2. If your flight tracks predominantly north and south, ATSPs will generally expect latitude to be expressed in whole degrees only, and longitude in degrees and minutes (if not zero).

**6.4.6.4** A 2010 change to ICAO Annex 3, Meteorological Service for International Air Navigation, canceled 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 Doc 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 Doc 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 are the result of 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. In addition, paragraph 4.4.3 describes issues with displays of CPDLC messages; Figure 4-1, Sample CPDLC Route Uplinks, shows sample FMS pages flightcrews would interact with to load an uplinked, revised route.

**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, 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 the ICAO NAT Sample Oceanic Checklists,

now found in NAT Doc 007. In these checklists, we have provided two acceptable methods for cross-checking aircraft position at a point approximately 5–10 minutes after oceanic waypoint passage. Previously, 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 (ELOS). See Appendix D, paragraph D.2.9.2.

**6.4.8.3** The check of aircraft position at a point approximately 5–10 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, 5–10 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.

**Note:** Previously, the FAA included a check called "10 minutes after waypoint passage" in the sample oceanic checklist. Most operators use position cross-checking methods that allow observation of an error earlier. In addition, pilot workload on data communications-equipped aircraft has decreased, where voice position reports are no longer required. Accordingly, the FAA now has renamed this check the "5 minutes after waypoint passage" check, which can be completed approximately 5–10 minutes after waypoint passage, which is about 1–2 degrees of latitude or longitude (depending on direction of flight) after passing the waypoint.

**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 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 ELOS. In order to determine equivalent levels of flight safety, an operator's proposed

alternative cross-checking procedures will be assessed, by the PI and a specialist from the FAA's Flight Technologies and Procedures Division, Flight Operations Group, 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 navigation systems?
6. Do they require checking of aircraft position approximately 5–10 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 Doc 4444)?

**Note:** Alternative methods proposed by certificated operators will also require review/approval by the Flight Standards Service (FS).

**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 a specialist from the Flight Operations Group. 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 navigation system 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., lateral navigation (LNAV)/navigation (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. It is therefore vital that you 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 navigation system 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 AIRSPACE

**7.1 Contingency Procedures: When They May Be Needed.** ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM), includes 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 cannot 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 (e.g., severe weather and/or turbulence).
2. Degradations in aircraft performance.
   - Aircraft engine or pressurization failure.
   - Inability to maintain cleared flight level (FL) (e.g., due to unexpected temperatures).
   - Loss of, or significant reduction in, navigation capability.
3. Loss of communications capability. This can have many causes:
   - Degradation or failure of aircraft communication equipment.
   - Degradation or failure of ground communication equipment.
   - Unexpected closure of an oceanic air traffic control (ATC) facility.
4. 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. To be clear, for operations in airspace where direct controller-pilot very high frequency (VHF) voice communications are not available, the only assurances of safe separation come when all aircraft are flying the exact track and altitude assigned by ATC. ATC can no longer assure safe separation when an aircraft deviates from the assigned track or altitude, without prior clearance. The contingency procedures, if followed exactly, minimize the risk inherent in these deviations.

**7.2 Choosing the Correct Contingency Procedure.**

**7.2.1** Primary Guidance. ICAO Doc 4444, Section 15.2, Special Procedures for In-Flight Contingencies in Oceanic Airspace, contains primary guidance for oceanic contingency procedures. ICAO Doc 7030, Regional Supplementary Procedures (SUPPS), includes additional region-specific guidance, generally in chapter 9 of each regional section. The procedures are also described in the U.S. Aeronautical Information Publication (AIP), Section ENR 7.3. Refer also to the FAA's International Notices web page, which will include any changes or regional applications to contingency procedures.

**Note 1:** In 2020, ICAO changed the lateral offset values in oceanic contingency procedures to 5 nautical miles (NM). For the general procedures, acquire the 5 NM offset before changing altitude. For the weather contingency procedures, adjust altitude by 300 ft (climb or descend, per the procedures) only when deviating 5 NM or more.

**Note 2:** 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 5 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 Airspace.

**7.2.2.2** The weather deviation procedure results in an altitude change of 300 feet, to be applied when the lateral deviation reaches 5 NM from the centerline. It is also reprinted in Appendix F.

**7.3 Altimetry and/or Navigation Degradation.** You must notify the Air Traffic Service (ATS) Provider (ATSP) as soon as possible if your altimetry and/or navigation systems have degraded below that required to operate in Reduced Vertical Separation Minimum (RVSM), Required Navigation Performance (RNP), or Area Navigation (RNAV) airspace. In general, that notification, either via voice or Controller-Pilot Data Link Communications (CPDLC), will include the phrase "UNABLE RNP (OR RNAV OR RVSM) DUE EQUIPMENT."

**7.3.1** Whenever possible, you should request a revised clearance that accounts for the degradation you have experienced. Upon receipt of your message, ATSPs 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.

**7.3.2** For navigation degradation scenarios, dead reckoning procedures may be required. Flightcrews should be familiar with determining heading and leg time required, through the use of the Master Document, the chart, and/or Electronic Flight Bag (EFB) applications.

**Note:** ICAO NAT Doc 007, North Atlantic Operations and Airspace Manual, provides specific procedures to be used in the North Atlantic (NAT) in the event of navigation system degradation or failure.

**7.4 Lost Communications Procedures.** The general rules for lost communications are captured in ICAO Annex 2, Rules of the Air, Chapter 3, General Rules, and are included in their entirety in ICAO Doc 4444, Section 15.3, Air-Ground Communications Failure.

Prior to departure, ensure you are familiar with the lost communications rules for the regions you are transiting.

**7.4.1** Region-Specific Rules. In some regions, ATS authorities have amended the rules to meet their specific air traffic management (ATM) requirements. These amended rules are included in ICAO Doc 7030, generally in chapter 9 of the applicable region's section. ICAO NAT Doc 007 also provides a detailed discussion of lost communications procedures specific to NAT airspace. Refer also to the FAA's International Notices web page, which will include any changes or regional applications to lost communications procedures.

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

**7.4.1.2** In the NAT region, you are expected to fly your ATC-cleared routing, FL, and airspeed through oceanic airspace, picking up your filed flight plan route after passing the oceanic exit point.

**7.4.2** Unexpected Closure of an Oceanic ATC Facility. See Appendix F, paragraph F.4 for considerations in the event of an oceanic ATC facility shutdown.

**7.5 Normal Aircraft Tracking.** ICAO, in Annex 6, Operation of Aircraft, Part I, International Commercial Air Transport—Aeroplanes, Section 3.5, Aircraft Tracking, established a requirement for an automated four dimensional (4D) (latitude, longitude, altitude, and time) tracking capability for oceanic operations involving aircraft above a certain weight and seating capacity. The FAA recommends all operators establish some automated capability to track the position of their aircraft during oceanic operations using a means that does not require direct flightcrew action. ICAO Circular 347, Aircraft Tracking Implementation Guidelines, provides additional information.

# APPENDIX A. ABBREVIATIONS AND DEFINITIONS

## A.1 Abbreviations.

| Acronym | Description |
|---|---|
| 14 CFR | Title 14 of the Code of Federal Regulations |
| 4D | Four Dimensional |
| AC | Advisory Circular |
| ACARS | Aircraft Communications Addressing and Reporting System |
| ACAS | Airborne Collision Avoidance System (same as TCAS) |
| ACC | Area Control Center |
| ACID | Aircraft Identification |
| ADIZ | Air Defense Identification Zone |
| ADS | Automatic Dependent Surveillance (in older documents published before ADS-B existed, "ADS" generally refers to ADS-C) |
| ADS-B | Automatic Dependent Surveillance-Broadcast |
| ADS-C | Automatic Dependent Surveillance-Contract |
| AFI | African-Indian Ocean Region (per ICAO) |
| AIM | Aeronautical Information Manual |
| AIP | Aeronautical Information Publication |
| AMU | Area of Magnetic Unreliability |
| AMVER | Automated Mutual-assistance Vessel Rescue |
| ANP | Actual Navigation Performance |
| APR | Automatic Positioning Reporting |
| 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 |
| ATS | Air Traffic Service |
| ATSP | Air Traffic Service Provider |
| CAA | Civil Aviation Authority |
| CEP | Central East Pacific |

| Acronym | Description |
|---|---|
| CFP | Computer Flight Plan |
| CPDLC | Controller-Pilot Data Link Communications |
| CTA | Control Area |
| DME | Distance Measuring Equipment |
| DOS | Department of State |
| EDTO | Extended Diversion Time Operations |
| EFB | Electronic Flight Bag |
| ELOS | Equivalent Level of Safety |
| ETA | Estimated Time of Arrival |
| ETE | Estimated Time En Route |
| ETOPS | Extended Operations |
| ETP | Equal Time Point |
| EWINS | Enhanced Weather Information System |
| 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 |
| FIS | Flight Information Services |
| FL | Flight Level |
| FLT ID | Flight Identification |
| FMC | Flight Management Computer |
| FMS | Flight Management System |
| FRMS | Fatigue Risk Management System |
| GA | General Aviation |
| GNE | Gross Navigation Error |
| GNSS | Global Navigation Satellite System |
| GOLD | Global Operational Data Link Document |
| GPS | Global Positioning System |
| $H_2S$ | Hydrogen Sulfide |
| HF | High Frequency |
| HLA | High Level Airspace |

| Acronym | Description |
|---|---|
| hPa | Hectopascal |
| IAP | Instrument Approach Procedure |
| IATA | International Air Transport Association |
| ICAO | International Civil Aviation Organization |
| IFBP | In-Flight Broadcast Procedure |
| IFR | Instrument Flight Rules |
| ILS | Instrument Landing System |
| IMC | Instrument Meteorological Conditions |
| inHg | Inch of Mercury |
| INS | Inertial Navigation System |
| IRS | Inertial Reference System |
| LHD | Large Height Deviation |
| LNAV | Lateral Navigation |
| LOA | Letter of Authorization |
| LRC | Long Range Cruise |
| LRCS | Long-Range Communication System |
| LRNS | Long-Range Navigation System |
| MEA | Minimum En Route Altitude |
| MEL | Minimum Equipment List |
| MHz | Megahertz |
| MMEL | Master Minimum Equipment List |
| Mode S | Mode Select Secondary Radar With Data Link |
| MSpecs | Management Specifications |
| NAS | National Airspace System |
| NAT | North Atlantic |
| NAT HLA | North Atlantic High Level Airspace |
| NATO | North Atlantic Treaty Organization |
| NAV | Navigation |
| NAVAID | Navigational Aid |
| NavSpec | Navigation Specification |

| Acronym | Description |
|---|---|
| NDA | Northern Domestic Airspace |
| NDB | Nondirectional Beacon |
| NM | Nautical Miles |
| NOAA | National Oceanic and Atmospheric Administration |
| NOPAC | North Pacific |
| NOTAM | Notice to Airmen |
| NWS | National Weather Service |
| OAPS | Operations Approval Portal System, hosted in the Safety Assurance System (SAS) |
| OCA | Oceanic Control Area |
| OESB | Oceanic Errors Safety Bulletin |
| OpSpecs | Operations Specifications |
| OPSS | Operations Safety System, hosted in SAS |
| OROCA | Off-Route Obstruction Clearance Altitude |
| OTS | Organized Track System |
| PANS | Procedures for Air Navigation Services |
| PANS-ATM | Procedures for Air Navigation Services—Air Traffic Management (ICAO Doc 4444) |
| PANS-MET | Procedures for Air Navigation Services—Meteorology (ICAO Doc 10157) |
| PANS-OPS | Procedures for Air Navigation Services—Aircraft Operations (ICAO Doc 8168) |
| PBC | Performance-based Communication |
| PBCS | Performance-based Communication and Surveillance |
| PBN | Performance-based Navigation |
| PI | Principal Inspector |
| PIC | Pilot in Command |
| PIREP | Pilot Weather Report |
| POI | Principal Operations Inspector |
| PPO | Prior Permission Only |
| QFE | Atmospheric pressure at aerodrome elevation (or at runway threshold). (With the runway threshold QFE set in the subscale, your altimeter will read zero on the runway threshold.) |

| Acronym | Description |
|---|---|
| QNE | Pressure Altitude (Flight Level), obtained with Standard Pressure (29.92 inches of mercury (inHg) or 1013.2 hPa) set in the altimeter subscale. |
| QNH | The pressure set on the subscale of the altimeter so that the instrument indicates its height above sea level. |
| RA | Resolution Advisory |
| RAIM | Receiver Autonomous Integrity Monitoring |
| RCP | Required Communication Performance |
| RD | Rapid Decompression |
| RNAV | Area Navigation |
| RNP | Required Navigation Performance |
| RSP | Required Surveillance Performance |
| RVSM | Reduced Vertical Separation Minimum |
| SAO | Special Area(s) of Operation |
| SAR | Search and Rescue |
| SARPs | Standards and Recommended Practices (ICAO) |
| SAS | Safety Assurance System |
| SATCOM | Satellite Communications |
| SATVOICE | Satellite Voice |
| SELCAL | Selective Calling System |
| SIGWX | Significant Weather |
| SLOP | Strategic Lateral Offset Procedure |
| SMS | Safety Management System |
| $SO_2$ | Sulfur Dioxide |
| SOP | Standard Operating Procedure |
| SSR | Secondary Surveillance Radar |
| SSV | Standard Service Volume |
| SUA | Special Use Airspace |
| SUPPS | Regional Supplementary Procedures (ICAO Doc 7030) |
| SVGM | Satellite Voice Guidance Material |
| SWPC | Space Weather Prediction Center |
| TAF | Terminal Aerodrome Forecast |

| Acronym | Description |
|---|---|
| TAS | True Airspeed |
| TCAS | Traffic Alert and Collision Avoidance System |
| TIBA | Traffic Information Broadcasts by Aircraft |
| TMI | Track Message Identifier |
| TSO | Technical Standard Order |
| USGS | United States Geological Survey |
| UTC | Coordinated Universal Time |
| VAAC | Volcanic Ash Advisory Center |
| VFR | Visual Flight Rules |
| VHF | Very High Frequency |
| VMC | Visual Meteorological Conditions |
| VONA | Volcano Observatory Notice for Aviation |
| VOR | Very High Frequency Omnidirectional Range |
| WAT | West Atlantic |
| WebOPSS | Web-based Operations Safety System, renamed to OPSS in 2025, now hosted in SAS |
| WGS 84 | World Geodetic System 1984 |

## 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 provide the aviation community with basic flight information and ATC procedures for use in the NAS of the United States. The AIM contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the ATC system, and information on safety and accident and hazard reporting.

**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 Services (FIS) 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 Service (ICAO). A service provided within advisory airspace to ensure separation, insofar 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 FIS, 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). For purposes of authorizations for certificated operators, the FAA designates the boundaries of the AMUs as follows:

**A.2.14.1** The Northern AMU is the area within 1,000 NM of the Magnetic North Pole but excludes Alaska and its territorial waters. In addition, Canadian Northern Domestic Airspace (NDA) is part of the Northern AMU, as well as the area north of 75° N latitude in the Nuuk (Greenland) flight information region (FIR).

**A.2.14.2** The Southern AMU is the area within 1,000 NM of the Magnetic South Pole.

**A.2.14.3** As aircraft move towards the Earth's Magnetic North or South Pole, the horizontal field strength diminishes, 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 6,000 nanotesla, the magnetic compass can no longer be considered reliable.

**A.2.15** Area Navigation (RNAV) (ICAO). A method of navigation that permits aircraft operation on any desired flightpath 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.

**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 ACID, four-dimensional (4D) 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.

**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 UTC 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** Current Flight Plan (ICAO). The flight plan, including changes, if any, brought about by subsequent clearances.

**Note:** In this AC, we use the term "currently effective route clearance" to refer to the route of flight information in what ICAO Annex 2, Rules of the Air, calls the "current flight plan."

**A.2.22** Dead Reckoning. 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 any device, or combination of devices, actively displaying EFB applications. EFB applications are categorized as Type A or B and can be hosted on either portable or installed components. A list of EFB applications can be found in the appendices of AC 120-76, Authorization for Use of Electronic Flight Bags.

**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 provide updated voice position reports to ATC in a timely manner on 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 FIS and alerting services are provided.

**A.2.29** Flight Information Services (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 inHg or 1013.2 hPa) and is separated from other such surfaces by specific pressure intervals.

**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, Personnel Licensing, 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 (SPS) Performance Standard. GPS is composed of space, control, and user elements.

**A.2.35** Gross Navigation Error (GNE). A GNE is a lateral deviation of 10 NM or more from the aircraft's cleared route.

**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 (or, if supported, SATVOICE) 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 (or SATVOICE, if supported).

**A.2.37** High Seas. The seas beyond the 12 NM from the baseline of a shore. Airspace over the high seas is considered international airspace.

**A.2.38** Instrument Meteorological Conditions (IMC) (ICAO). Meteorological conditions expressed in terms of visibility, distance from clouds, and ceiling, less than the minima specified for visual meteorological conditions (VMC).

**A.2.39** 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.2.40** 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.2.41** Large Height Deviations (LHD). A deviation from your cleared altitude by 300 feet or more.

**A.2.42** Lateral Navigation (LNAV). A function of RNAV equipment that calculates, displays, and provides lateral guidance to a profile or path.

**A.2.43** 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 suitable for oceanic and remote continental navigation, such as an INS or a GPS receiver.

**A.2.44** 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.2.45** 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.2.46** 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.2.47** 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.2.48** Navigation Specification (NavSpec) (ICAO). A set of aircraft and flightcrew requirements needed to support PBN operations within a defined airspace. There are two kinds of NavSpecs:

**A.2.48.1 Area Navigation (RNAV) Specification.** A NavSpec based on RNAV that does not include the requirement for onboard performance monitoring and alerting, designated by the prefix RNAV (e.g., RNAV 5 or RNAV 1).

**A.2.48.2 Required Navigation Performance (RNP) Specification.** A NavSpec based on RNAV that includes the requirement for onboard performance monitoring and alerting, designated by the prefix RNP (e.g., RNP 4 or RNP Approach (APCH)).

**A.2.49** North Atlantic High Level Airspace (NAT HLA). NAT HLA is that volume of airspace (as defined in ICAO Doc 7030) between FL 285 and FL 420 within the OCAs 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 obtain approval from their State of Registry to operate within NAT HLA.

**A.2.50** 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.2.51** Oceanic Airspace. Airspace over the high seas. Generally, "oceanic" is included in the airspace designation (e.g., OCA), and direct controller-pilot VHF voice communications are not available. ATC is provided using at least some elements of procedural control in accordance with ICAO.

**A.2.52** Oceanic Area Control Center (OACC). An ACC with responsibilities for providing ATS in oceanic airspace. Responsibility for the provisions of ATS is delegated by ICAO to various States based primarily upon geographic proximity and the availability of the required resources.

**A.2.53** Offshore/Control Airspace Areas. Airspace designated in international airspace, extending outward from 12 NM from the coast of the United States to the CTA/FIR boundary, in accordance with the criteria in 14 CFR part 71, within which the United States applies domestic ATC procedures.

**A.2.54** Performance-based Communication (PBC) (ICAO). Communication based on performance specifications applied to the provision of ATS. An RCP specification includes communication performance requirements that are allocated to system components in terms of communication to be provided and associated continuity, availability, integrity, safety, and functionality needed for the proposed operation in the context of a particular airspace concept.

**A.2.55** 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 NavSpecs (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.2.56** Performance-based Surveillance (PBS) (ICAO). Surveillance based on performance specifications applied to the provision of ATS. An RSP specification includes surveillance performance requirements that are allocated to system components in terms of the surveillance to be provided and associated 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.2.57** 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.2.58** Procedural Control (ICAO). Term used to indicate that information derived from an ATS surveillance system is not required for the provision of ATC service.

**A.2.59** Procedural Separation (ICAO). The separation used when providing procedural control.

**A.2.60** Reduced Vertical Separation Minima (RVSM). RVSMs are 1,000 feet vertical separation between FL 290 and FL 410 inclusive. Operators and aircraft must be authorized by the Administrator to operate in RVSM airspace. An operator may be authorized without application to the FAA when meeting the standards of 14 CFR part 91 appendix G, section 9. Alternatively, the B046 authorization is available as a specific approval, when needed for international operations. For additional guidance, refer to AC 91-85, Authorization of Aircraft and Operators for Flight in Reduced Vertical Separation Minimum (RVSM) Airspace.

**A.2.61** Remote Continental Airspace. Airspace over land where VHF voice 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, with LRCS.

**A.2.62** Required Communication Performance (RCP) Specification (ICAO). A set of requirements for ATS provision, aircraft capability, and operations needed to support PBC within a defined airspace.

**A.2.63** Required Navigation Performance (RNP) Specification (ICAO). A NavSpec based on RNAV that includes the requirement for performance monitoring and alerting, designated by the prefix RNP (e.g., RNP 2, RNP 4, or RNP APCH).

**A.2.64** 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.2.65** Special Use Airspace (SUA). Consists of airspace of defined dimensions where activities must be confined because of their nature, or where limitations are imposed upon aircraft operations that are not a part of those activities, or both.

**A.2.65.1 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.2.65.2 Restricted Areas.** A restricted area is an SUA designated under 14 CFR part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction.

**A.2.65.3 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.2.66** Target Level of Safety (TLS) (ICAO). A generic term representing the level of risk that is considered acceptable in particular circumstances.

**A.2.67** 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.2.68** Visual Meteorological Conditions (VMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

**A.2.69** Waypoint. A predetermined geographical position that is defined in terms of latitude/longitude coordinates. Waypoints may be a simple named point in space or associated with existing NAVAIDs, intersections, or fixes. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. For purposes of RNAV procedures, waypoints are identified as either:

**A.2.69.1 Flyby Waypoint.** Flyby waypoints are used when an aircraft should begin a turn to the next course prior to reaching the waypoint separating the two route segments. This is known as turn anticipation.

**A.2.69.2 Flyover Waypoint.** Flyover waypoints are used when the aircraft must fly over the point prior to starting a turn.

# APPENDIX B. OPERATIONAL AUTHORIZATIONS: 14 CFR PART 91 LOAs

**B.1 Authorization for Oceanic and Remote Continental Operations for 14 CFR Part 91.** The FAA requires all operators to obtain the B036 operational authorization to indicate oceanic Required Navigation Performance (RNP) on air traffic control (ATC) flight plans.

**Note:** Details on oceanic and remote continental authorizations for certificated operators are available from the responsible Flight Standards office.

**B.1.1** Oceanic Authorizations. The 14 CFR part 91 Letter of Authorization (LOA) B036 is called "Oceanic Required Navigation Performance (RNP) Operations." To indicate an oceanic RNP capability (i.e., RNP 2 (oceanic/remote), RNP 4, or RNP 10) on an ATC flight plan, a B036 is required.

**B.1.1.1** The FAA recommends 14 CFR part 91 operators obtain LOA B036 for all oceanic operations. While LOA B036 is not required for 14 CFR part 91 to fly in oceanic airspace, it is required to indicate oceanic RNP capability (i.e., RNP 2 (oceanic/remote), RNP 4, or RNP 10) on ATC flight plans. Without RNP capability, you may not be cleared on optimal routes and/or altitudes.

**B.1.1.2** For some oceanic areas, 14 CFR part 91 operators require LOA B036. Some oceanic areas require a minimum of RNP 10 capability, including, for example, NAT HLA and Central East Pacific (CEP) routes at FL 290 through FL 410. Certain North Pacific (NOPAC) routes require a minimum of RNP 4 capability (as well as RCP 240 and RSP 180) at certain altitudes. You should consult the AIP of the airspace you are planning to fly in to determine if a specific RNP capability is required. For details on required data communications authorizations associated with RCP 240 and RSP 180, refer to AC 90-117, Data Link Communications.

**B.1.2** Remote Continental Authorizations. An optional 14 CFR part 91 LOA B030 is available as a means of documenting FAA endorsement of remote continental training and procedures. That LOA is called "IFR Remote Continental Operations and/or IFR Alaska Special Minimum En Route Altitude (MEA) Operations."

**B.1.3** Long-Range Navigation System (LRNS). Generally, at least two LRNSs are required in oceanic airspace. Operators are encouraged to obtain a B036 for any operations in oceanic flight information regions (FIR). For 14 CFR part 91 subpart F, overwater operations using a single LRNS are permitted, in accordance with 14 CFR § 91.511.

**B.1.4** Authorization Process. The FAA uses a five-phase process to approve operator applications. The responsible Flight Standards office can provide you with the details pertinent to each phase and your specific requirements.

**B.1.4.1** **Phase 1.** You determine a need for authorization and contact the FAA.

**B.1.4.2 Phase 2.** You formally submit a proposal for FAA evaluation.

**B.1.4.3 Phase 3.** We evaluate the request and determine what level of demonstration is required. We may conduct the demonstration within the responsible Flight Standards office, at your site of operations, or at another suitable location.

**B.1.4.4 Phase 4.** We observe and evaluate a demonstration of your ability to perform in accordance with your proposal. This is an operational evaluation. If the demonstration is unsuccessful, we will provide feedback on deficient areas and their resolution.

**Note:** Flight or line observations are not required for General Aviation (GA) LOA applications. For GA operators, we evaluate your application and, if warranted, conduct a knowledge validation (tabletop exercise and/or static airplane demonstration).

**B.1.4.5 Phase 5.** If your demonstration is successful, we issue the requested operational authorizations.

**B.1.5** Operations Safety System (OPSS).[26]

**B.1.5.1 OPSS Access.** OPSS is the FAA's document management system for issuing operational authorizations to air operators as indicated in 14 CFR. Authorized aviation industry personnel can apply for access to OPSS through the Safety Assurance System (SAS) External Portal at https://sas.faa.gov/sas.external.portal/ext/accounts. OPSS access allows industry personnel to view and propose changes to their authorizations, which can expedite applications.

**B.1.5.2 OPSS Training.** You will require training prior to receiving OPSS access. You can accomplish the training either through an FAA inspector or by taking the OPSS formal training course through the FAA's Mike Monroney Aeronautical Center (MMAC).

**Note:** The Operations Approval Portal System (OAPS), also accessed via SAS, streamlines processing of authorizations requiring review by the FAA's Flight Technologies and Procedures Division. OAPS allows bundling and is integrated with OPSS.

**B.1.6** Title 14 CFR Part 91 Authorizations. Title 14 CFR part 91 operators can obtain oceanic and/or remote operational authorizations per Table B-1, Title 14 CFR Part 91 LOAs for Oceanic and/or Remote Areas, below:

[26] SAS has assumed functions that, before 2025, were performed by OAPS and the Web-based Operations Safety System (WebOPSS).

**Table B-1. Title 14 CFR Part 91 LOAs for Oceanic and/or Remote Areas**

| LOA | Title | Remarks |
|---|---|---|
| A056 | Data Link Communications | Required to conduct data link communications in oceanic areas. |
| B030 | IFR Remote Continental Operations and/or IFR Alaska Special Minimum En Route Altitude (MEA) Operations | Not required to conduct such operations but is available to document FAA recognition of an operator's remote continental training and procedures. |
| B036 | Oceanic Required Navigation Performance (RNP) Operations | Required to indicate oceanic and remote continental RNP capability. See the discussions in paragraph 2.5.1 and in B.1.1. |
| B039 | Operations in North Atlantic High Level Airspace (NAT HLA) | Required to operate in NAT HLA. |
| B046 | Operations in Reduced Vertical Separation Minimum (RVSM) Airspace | Required to operate outside FAA-controlled RVSM airspace. |
| D098 | Short-Term Operations in Airspace Requiring Specific Approval | Available to authorize operations in oceanic/remote airspace, RVSM airspace, and in NAT HLA. |

**B.2 Map, Authorization for Optional Single LRNS.** Figure B-1 shows the area defined in 14 CFR § 91.511(f), where use of a single LRNS is authorized for 14 CFR part 91 subpart F operators.

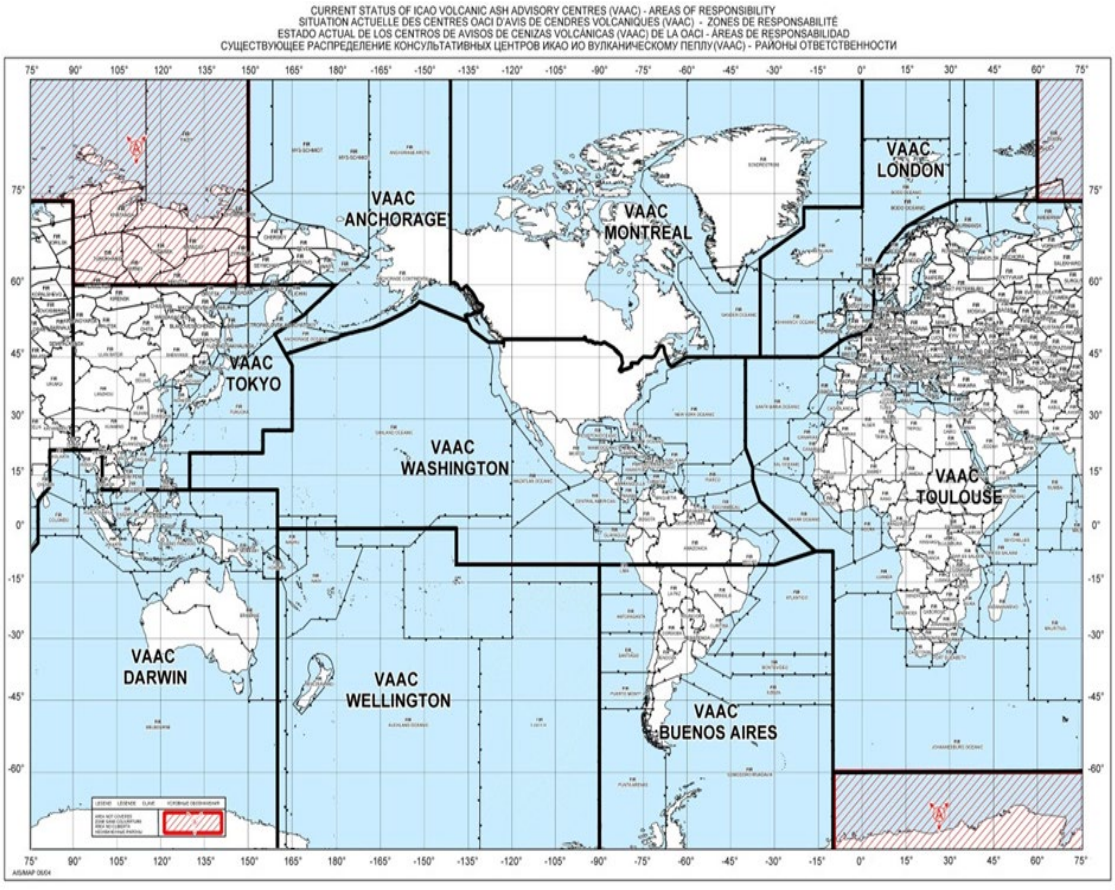
**Figure B-1. Single Long-Range Navigation System (LRNS) Area**

# 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. Eyjafjallajokull'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 Doc 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 Volcanic Ash Advisory Centers (VAAC) offer worldwide coverage of volcanic activity and provide valuable information to assist your trip planning efforts. For more information on the VAACs, go to https://www.ospo.noaa.gov/Products/atmosphere/vaac/other-vaacs.html.

**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 parts per million (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 Air Traffic Service (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. The Aeronautical Information Manual (AIM), Chapter 7, Safety of Flight, recommends, in the event of encountering an ash cloud, that pilots reverse course and reduce thrust (altitude permitting) to escape from the cloud, and to disengage autothrottles (as applicable), turn on continuous ignition, and turn on all bleed-powered systems so as to provide additional engine stall margin. In addition, the AIM discusses Pilot Weather Reports (PIREP) 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.1.7** In 2025, ICAO published ICAO Doc 10157, Procedures for Air Navigation Services—Meteorology, which established a standard format for the Volcano Observatory Notice for Aviation (VONA). The United States Geological Survey (USGS) discusses delivery

of VONAs at https://www.usgs.gov/programs/VHP/volcano-notifications-deliver-situational-information.

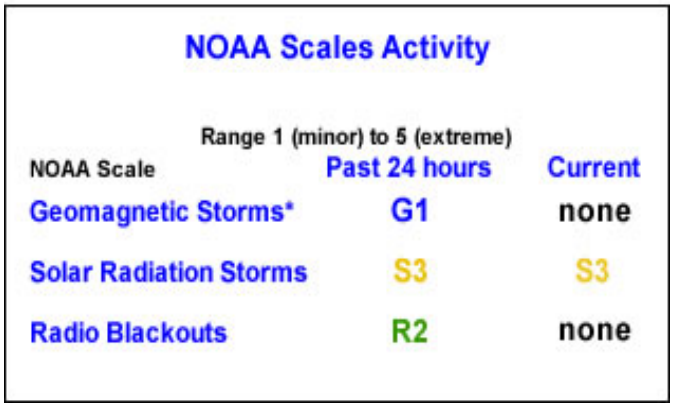
## C.2 Space Weather.

**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 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: https://pss.swpc.noaa.gov/ProductSubscriptionService/LoginWebForm.aspx.

**C.3 Space Weather Advisory Information.** Amendment 78 to ICAO Annex 3, Meteorological Service for International Air Navigation (November 2018), introduced a requirement to issue space weather advisory information when necessitated by space weather events. The space weather advisory message is similar in structure to advisory messages for tropical cyclones and volcanic ash clouds issued by the Tropical Cyclone Advisory Centers (TCAC) and VAACs concerned.

**C.3.1** Space Weather Advisory Centers issue space weather advisory information when there are impacts to high frequency (HF) communications, communications via satellite, Global Navigation Satellite System (GNSS)-based navigation and surveillance systems, or when heightened radiation occurs.

**C.3.2** The advisory message informs the user of:

- The type of impact;
- The expected onset, or that the event is already in progress;
- The duration of the event;
- A generalized description of the spatial extent affected for the next 24 hours; and
- A description of the severity of the impact in moderate (MOD) or severe (SEV) categories.

**C.3.3** ICAO Annex 3; ICAO Doc 10100, Manual on Space Weather Information in Support of International Air Navigation; and ICAO NAT Doc 006 – Part III, Space Weather Contingency Procedures, published in 2023, are additional references.

# APPENDIX D. SAMPLE OCEANIC CHECKLIST

**D.1 Sample Abbreviated Oceanic Checklist.** This sample abbreviated 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 published in your international operations manual and evaluated and kept up to date as part of your Safety Management System (SMS), as applicable. The ICAO North Atlantic (NAT) oceanic checklists, which served as the foundation for our checklists, are available in Attachment 4 of NAT Doc 007, posted on the ICAO European and North Atlantic (EUR/NAT) region website, found at https://www.icao.int/EURNAT/EUR-NAT-DOCS?fid=3403. NAT Doc 007 also discusses oceanic procedures.

**D.1.1** Flight Planning.

1. Communications, navigation, and surveillance flight plan codes and planning documents.
2. Oceanic documents.
3. Plotting/orientation chart—plot route coast out to coast in.
4. Equal Time Points (ETP)—plot.
5. Track message (current copy available for all crossings).
6. Note nearest tracks on plotting/orientation chart.
7. Weather analysis—note en route wind, temperature, and turbulence forecasts as well as ETP airport weather.
8. Review suitable Navigational Aids (NAVAID) for accuracy check (as applicable) prior to coast out.

**D.1.2** Preflight.

1. Master clock for all estimated times of arrival (ETA)/actual times of arrival (ATA).
2. Maintenance log—check for any communications, navigation, and surveillance or Reduced Vertical Separation Minimum (RVSM) issues.
3. RVSM.
4. Altimeter checks (tolerance).
5. Wind shear or turbulence forecast.
6. Flight plan (check routing, fuel load, times, groundspeeds).
7. Dual long-range navigation system (LRNS) for extended overwater operations outside the range of ground-based NAVAIDs.
8. Voice long-range communication system (LRCS) check (as applicable):

a. High frequency (HF) radio check.

b. Satellite Voice (SATVOICE) operability check.

9. Confirm present position coordinates (best source).

10. Master Document symbols (④, ✓, \, X).

11. LRNS programming:

a. Check navigation database currency and software version.

b. Independently verify navigation system/flight management system (FMS) programming.

c. Check expanded coordinates of oceanic waypoints.

d. Check leg course and distance (±2 degrees and ±2 nautical miles (NM)).

e. Upload winds, if applicable.

12. Groundspeed check (as applicable).

**D.1.3** Taxi and Prior to Takeoff.

1. Groundspeed check (as applicable).

2. Present position check.

**D.1.4** Climb Out.

1. Transition altitude—set altimeters to 29.92 inches of mercury (inHg) (1013.2 hectopascals (hPa)).

2. Calculate/update ETAs on Master Document as duties permit.

**D.1.5** Prior to Oceanic Entry.

1. Navigation accuracy check (if required by flight manual)—record results on Master Document.

2. Voice LRCS (HF selective calling system (SELCAL) or SATVOICE Callback) check with aeronautical radio station.

3. Confirm satellite communications (SATCOM) data link is operational, if equipped.

4. Log on to Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C) 10 to 25 minutes prior, if equipped, unless otherwise specified in the relevant Aeronautical Information Publication (AIP).

5. Verify your Required Navigation Performance (RNP) value is set (as applicable).

6. Confirm flight level (FL), Mach, and route for crossing and verify/cross-check loading of route clearance into the navigation system.

7. Revised clearance—update navigation system, Master Document, and plotting/orientation chart.

**Note:** Check expanded coordinates, course, and distance for new route.

8. Check altimeters—record readings on Master Document.
9. Compass heading check (inertial navigation system (INS))—record.

**D.1.6** After Oceanic Entry.

1. Squawk 2000—10 or 30 minutes after entry, as applicable.
2. Maintain assigned Mach.
3. Maintain assigned FL.
4. Very high frequency (VHF) radios—set to air-to-air and guard frequency.
5. Strategic Lateral Offset Procedures (SLOP)—Depending on standard operating procedures (SOP), fly cleared route or up to 2 NM to the right of air traffic control (ATC)-cleared track. Confirm procedures in the applicable AIP.
6. Altimeter checks—hourly (as applicable).

**D.1.7** Approaching Waypoints.

1. Confirm coordinates of subsequent waypoints.

**Note:** Verify that the active navigation system 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*.

2. Confirm lateral navigation (LNAV)/navigation (NAV) is engaged.

**D.1.8** Overhead Waypoints.

1. Confirm aircraft transitions to next waypoint.

**Note:** Check magnetic heading and distance against Master Document.

2. Confirm time to next waypoint.

**Note:** ETA changes in excess of 2 minutes ("3 minutes or more" in the NAT) require ATC notification. (For aircraft providing automatic position reports via ADS-C, position reports can be omitted in airspace where ADS-C services are provided.)

3. Make position report.

**Note:** Record fuel remaining and current time on your Master Document.

**D.1.9** Five Minutes After Waypoint Passage. Cross-check navigational performance and course compliance 5–10 minutes after waypoint passage via one of the following methods:

1. Plotting method (see paragraph D.2.9).
2. Navigation display method (see paragraph D.2.9).
3. Alternative method accepted by the FAA (see paragraph 6.4.8).

**D.1.10** Midway Between Waypoints.

1. Cross-check winds between Master Document, LRNS, and winds aloft charts.
2. Confirm time to next waypoint.

**D.1.11** Coast In.

1. Remove strategic lateral offset prior to oceanic exit point.
2. Confirm routing beyond oceanic airspace.
3. Compare LRNS to ground-based NAVAID (as applicable).

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

**D.1.13** Destination/Block-In.

1. Navigation accuracy check (as applicable).
2. Altimetry system writeups.
3. Data communications (CPDLC) problem reports.

**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 published in your international operations manual and be evaluated and kept up to date as part of your SMS, as applicable.

**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 descriptors in items 10 and 18 of your flight plan.
2. You should review your maintenance log and the 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. Your flight manual should include procedures to make flight plan amendments (or cancellations, as appropriate) when your communications, navigation, and surveillance capabilities change 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. See paragraph 6.2.2.

**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. Select "GPS NOTAMs" in "Predefined Queries" under "Location" (as applicable).
8. Any applicable space weather watches, warnings, and alerts (see Appendix C, Unusual Weather Activity).
9. Volcanic ash information.
10. Pilot Weather Reports (PIREP).
11. Plotting/orientation 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 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 method for recomputing ETPs, either manually, using the aircraft flight management computer (FMC), or using an Electronic Flight Bag (EFB) application. 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 in ATC's monitoring systems. Confusion about these additional waypoints can also lead to deviations from the cleared route.

**Note:** ETPs may need to be recalculated when the cleared route changes, when there are significant changes in FLs, and/or when estimated time en route (ETE) to destination differs by more than 15 minutes from planned.

**D.2.1.5 Track Message.**

1. You must have a current track message even if you have filed for a "random route" (where at least part of the oceanic route is not on a published track) or if you filed above North Atlantic High Level Airspace (NAT HLA). Reviewing the date, effective time, and Track Message Identifier (TMI) ensures having a current track message on board. The TMI is linked to the Julian date.
2. You should also ensure that your flight planning and operational control process includes timely notification of crewmembers of any amendments to the daily track message.
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. Monitoring traffic on the Traffic Alert and Collision Avoidance System (TCAS) or Automatic Dependent Surveillance-Broadcast (ADS-B) In will further help your situational awareness, as the same random routes are sometimes heavily used.

**D.2.1.6 Weather Analysis.** You should note en route wind, 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 (as applicable, depending on equipage) 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 a designated 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.** Pay particular attention to any writeups 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 a known elevation (e.g., 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 operational flight plan to determine where along the route wind shear and/or turbulence are forecasted.

**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 operator 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. Ensure the Master Document and filed flight plan 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 airspace operations.
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 (if equipped with two).
2. If possible, you should accomplish the HF checks on the ground or before entering oceanic airspace.

**D.2.2.9 SATVOICE Check.** You should perform the appropriate functional check if you intend to use SATVOICE on your flight.

**D.2.2.10 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 navigation system from the previous flight.

**D.2.2.11 Master Document Annotations.** You should use consistent annotations on your Master Document. See paragraph 6.4.4.2 for samples of this suggested annotation scheme.

1. A circle next to the waypoint designator indicates both pilots verified the coordinates, courses, and distances. This would normally be done during initial navigation system loading.
2. A backslash ("\") over the circle denotes confirming a subsequent waypoint's coordinates and the track and distance to it. This would normally be done approaching the active waypoint.
3. A forward slash ("/") over the previously annotated backslash creates an "X." This indicates waypoint passage.

**D.2.2.12 LRNS Programming.**

**D.2.2.12.1** Check navigation database currency and software version.

1. You should not fly with an expired database.
2. You should also confirm the software version of the database, to ensure the correct version is loaded.

**D.2.2.12.2** Independently verify navigation system 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 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 navigation system 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 navigation system screen back to the Master Document when verifying data.

**Note:** Reading from the Master Document to the navigation system can introduce "expectation bias" where errors are missed because we see what we expect to see.

**D.2.2.12.3** Check waypoint expanded coordinates (degrees and minutes).

1. Most navigation systems 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.2.2.12.4** 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 degrees and ±2 NM.
2. The course and distance checks comparing the Master Document against the LRNS can help detect errors that you may not have noticed by simply checking coordinates.
3. A discrepancy of more than 2 degrees between the course in the Master Document and that in the LRNS may be due to the Master Document listing the mid-leg course, instead of the *initial* course. You should recheck and verify any difference outside the ±2 degrees or ±2 NM tolerance.

   **Note 1:** Flight plan vendors typically allow an operator to list the initial, mid-leg, and/or end-point magnetic course in the Master Document. An LRNS normally displays the present position magnetic course. Both the Master Document and the LRNS use great circle routing between points. However, unless you are flying along a line of longitude or along the Equator, your LRNS true course will gradually increase or decrease as you progress along the great circle course. On a typical oceanic leg (traversing 10° of longitude), the true course changes as much as 8° between the initial and end-points. On legs in polar areas, convergence of the meridians exaggerates this phenomenon, creating even bigger changes in true course.

   **Note 2:** Small discrepancies between the course in the LRNS and in the Master Document can in some cases also be attributed to differences in magnetic variation.

4. You should also refer to a master source, such as an enroute chart, to confirm the accuracy of coordinates at the oceanic boundaries.
5. Confirm the 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.2.2.12.5** Upload winds. Some LRNS units allow the crew to upload projected winds. This procedure allows more accurate reporting of ETA.

**D.2.2.13 Groundspeed Check (as applicable).** 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 (as applicable).** During taxi, pilots should again check the groundspeed to see if it is reasonable.

**D.2.3.2 Present Position Check (as applicable).** You should also conduct a present position check after leaving the gate.

1. Check for a gross difference between this present position and your gate coordinates.
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** Climb Out.

**D.2.4.1 Transition Altitude.**

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

**D.2.4.2 Calculate/Update ETAs on Master Document.** If the departure airport is near the oceanic entry point, you should calculate/update your ETAs from departure to destination, time and duties permitting, during climb out or otherwise prior to oceanic entry by adding the ETEs to the most recent ATA. You should note these updated 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 (as applicable).** For modern aircraft with monitoring and alerting of navigation performance, this check is not required. A quick reasonability check may, however, still be appropriate.

**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 discrepancy between the ground-based NAVAID, or ATC radar fix, and your LRNS should cause you to consider whether your navigation system will navigate within the degree of accuracy you indicated in your flight plan (e.g., RNP 4 or 10), or that is otherwise expected by ATC. If you have any doubts about your navigation accuracy, it is better to notify ATC early, so the controller can adjust separation accordingly.

   **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. In any case, follow flight manual procedures. As applicable, rank each navigation system by accuracy.
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 coupling to the autopilot.

**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 SATVOICE Callback Check.**

1. When using SATVOICE to communicate with ATC via New York Radio or San Francisco Radio, the FAA requires a SATVOICE Callback Check.
2. Contact the appropriate aeronautical radio station and request a SATVOICE Callback Check, indicating which satellite provider you are using if you filed both Inmarsat and Iridium (codes M1 and M3). See sample transcript in paragraph 4.3.3.2.

**D.2.5.4 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.2.5.5 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 10–25 minutes prior to the boundary, unless otherwise specified in the relevant AIP.

**D.2.5.6 Verify Your RNP Value.** Verify that the RNP value set in your 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. With some modern aircraft, a default RNP value is automatically set after ground-based NAVAID signals are lost for a defined period.

**D.2.5.7 Confirm FL, Mach, and Route for Crossing.** Consult the AIP for the oceanic FIR you are transiting to determine how and when to confirm your flight level (FL), Mach, and route for crossing. In some FIRs, a preformatted data link message is used to provide the estimate for the oceanic entry point and to confirm requested routing and altitude; this may also be done via a combination of ADS-C, voice, and/or CPDLC. Query ATC if there are questions.

1. You should provide your requested FL, as well as the maximum FL you are able to accept, to the oceanic Air Traffic Service (ATS) Provider (ATSP).
2. Verify/cross-check the cleared route is properly programmed into LRNS.

**D.2.5.8 Revised Clearance.** (See also paragraph 6.4.1.6.)

1. The number one scenario that leads to a pilot deviation from the assigned routing is when the ATC clearance is different from the oceanic route requested with the filed flight plan.

2. When issuing revised clearances, ATC often, but not always, notes that "route (/altitude) has been changed." You should be particularly cautious when receiving such a revised clearance.
3. Both pilots should separately copy and confirm the new routing, comparing with each other and confirming any inconsistencies with the ATSP.
4. One pilot reprograms (and executes) your navigation system and updates the Master Document and plotting/orientation chart, crossing out the old waypoints and plotted route and replacing them with the updated information.
5. A second pilot cross-checks the revised clearance with the reprogrammed route in the navigation system (checking the expanded coordinates: degrees and minutes), the updated Master Document, and the updated chart.
6. You should check the expanded coordinates, magnetic course, and distance between the new waypoints as noted in paragraph D.2.2.12 above. Unless you receive a new Master Document from your dispatcher, you should update the Master Document with the new courses and distances. Some operators use commercially available tables specifically made for this purpose, or use an onboard flight planning system (e.g., an application in an EFB) to independently calculate course and distance, for comparison against the navigation system.
7. Thoroughly brief 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 navigation system, Master Document, and chart.

### D.2.5.9 Altimeter Checks.

1. Prior to oceanic entry, check that the two primary altimeters are reading within 200 feet of each other (or as specified in your flight manual). Conduct this check while at level flight.
2. You should also note the standby altimeter reading.
3. Record the altimeter readings and time on the Master Document.

**Note:** Cross-checking altimeters and airspeed indicators can reveal pitot-static discrepancies and is especially advisable in areas of known or forecast icing.

### D.2.5.10 Compass Heading Check (INS).

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.

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. Ten or thirty minutes after oceanic entry, you should change your squawk to 2000, as applicable.
2. There are regional differences in transponder requirements. For example, aircraft transiting through in the New York West oceanic control area (OCA) or the Reykjavik OCA are expected to maintain the last assigned squawk.

**D.2.6.2 Maintain Assigned Mach.** Some ATC clearances in oceanic airspace include a specific Mach. In such cases, ATC expects you to maintain the exact Mach assigned (i.e., there is not an implied speed range you can fly).

1. Longitudinal separation standards applied by ATC frequently require crews to maintain the assigned Mach until otherwise advised. Economy (ECON) or Long Range Cruise (LRC) modes of the FMS may cause the aircraft to deviate from the assigned Mach.
2. If controllers assign a Mach, it is a true Mach. In most cases, the true Mach is the indicated Mach. Some aircraft may require a correction factor.

**Note:** In the NAT, the CPDLC message, "RESUME NORMAL SPEED," is used to allow flexibility where ATC has not assigned a fixed speed. Paragraph 4.7.1.4 discusses ICAO Annex 2, Rules of the Air, requirements that still apply in this case.

**D.2.6.3 Maintain Assigned FL.** You must report to ATC when departing your current FL.[27]

**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.

1. Executing SLOP reduces the risk associated with two aircraft using their highly accurate navigation systems to navigate head-on between the same two points, where one of those aircraft is at the wrong altitude.

[27] Regulatory references are 14 CFR § 91.183 and ICAO Annex 2, Paragraph 3.6.3, Position Reports. The U.S. Aeronautical Information Manual (AIM), Paragraph 5-3-2, Position Reporting, describes when ATC specifies these reports.

2. Executing SLOP also helps aircraft avoid wake turbulence. Depending upon winds aloft, coordination between aircraft may be necessary.
3. These procedures, which distribute traffic between the route centerline and up to 2 NM right of the centerline in increments of 0.1 NM, greatly reduce collision risk by the nature of their randomness.
    a. Operators that have an automatic offset capability should fly up to 2 NM right of the centerline.
    b. Aircraft that do not have an automatic offset capability (that can be programmed in the navigation system) should fly the centerline only.

**D.2.6.6 Hourly Altimeter Checks (as applicable).** The two primary altimeters should continue to read within 200 feet of each other (or lesser value if specified in your flight 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. Some operators incorporate these altimeter checks into their "overhead waypoint" checks.

**D.2.6.7 Routine Monitoring.**

1. Specify which FMS pages, or other displays of navigation information, that individual flightcrew members are charged with monitoring (e.g., a cross-track error or time/distance).
2. You should use the nonsteering navigation system to display cross-track error and track angle error, if available.
3. If your navigation system 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 "5 (/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 navigation system 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 navigation system matches your Master Document. Draw a diagonal through the circle next to 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:** This is especially important if the cleared route and FL differ significantly from the filed flight plan.

**D.2.9** Five Minutes After Waypoint Passage. Cross-check navigational performance and course compliance 5–10 minutes after waypoint passage 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/NAV 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 corrective action to address any anomalies or unexpected deviations.
5. Verify your autopilot steering mode is LNAV/NAV or other appropriate mode to ensure steering to the next intended waypoint.

**D.2.9.3** You may use an alternate method with FAA acceptance.

**D.2.10** Midway Between Waypoints.

**D.2.10.1 Cross-Check Winds.**

1. We recommend you cross-check the winds midway between oceanic waypoints by comparing the Master Document, LRNS, and winds aloft chart.
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.

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

**Note:** Promptly advise ATC if your ETA has changed greater than 2 minutes ("3 minutes or more" in the NAT) (for aircraft providing Automatic Position Reporting (APR) via an ADS-C logon, pilots should discontinue voice position reports).

**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, 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. Reset your altimeters to QNH (or QFE, if used) when descending through the transition level. You should confirm whether the altimeter setting is based on inches of mercury (inHg), hectopascals (hPa), or (less common) millimeters (mm) of mercury.

**D.2.13** Destination/Block-In.

**D.2.13.1 Navigation Accuracy Check (as applicable).** 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** Altimetry System Writeups. Record any 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.

**D.2.15** CPDLC Writeups. As applicable, note problems with the data communication system, providing sufficient detail so a problem report can be submitted to the Data Link Monitoring Agency (DLMA), if warranted. FMS and SATCOM logs are helpful in investigating anomalies, and sometimes are available only for the most recent activity.

# APPENDIX E. IATA IN-FLIGHT BROADCAST PROCEDURE

**E.1 Introduction.** The International Air Transport Association (IATA) developed the following procedures to promote flight safety over portions of the African continent and some adjacent waters. IATA last updated the procedures in 2024. You should check the IATA website at https://www.iata.org for any further updates prior to flight in the affected airspace.

**E.2 Background.** A number of flight information regions (FIR) in the continent of Africa experience deficiencies with both fixed and mobile aviation communication systems, especially with regard to flight information services (FIS). The In-Flight Broadcast Procedure (IFBP) developed by the IATA Regional Coordination Group (RCG) for Africa is recommended to be applied where deficiencies in communication exist.

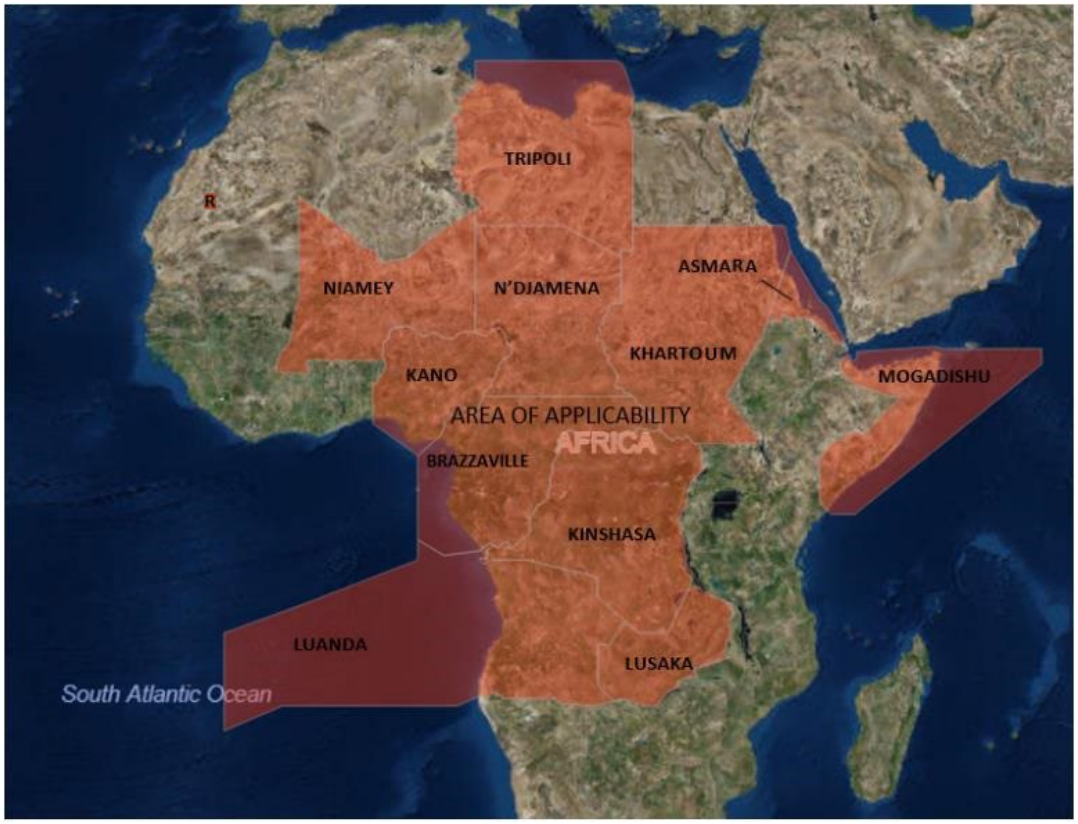
**E.3 Designated Frequency in AFI.** The designated frequency for IFBP is 126.9 megahertz (MHz).

**E.4 Area of Application.** It is recommended that the IFBP be applied in the following FIRs and airspace:

| | |
|---|---|
| Asmara | Lusaka |
| Brazzaville | Tripoli |
| Kano | Mogadishu |
| Khartoum | Niamey |
| Kinshasa | N'Djamena |
| Luanda | Dakar |

1. Brazzaville, Niamey, and N'Djamena FIRs provide Controller-Pilot Data Link Communications (CPDLC) service; however, these FIRs are maintained in the IFBP at the present time in order to maintain seamless application of IFBP in adjacent FIRs to the extent feasible.
2. The use of IFBP is mandated by the Tripoli Civil Aviation Authority (CAA), as published in the Libyan Aeronautical Information Circular (AIC).

**Figure E-1. Map of IFBP Area of Applicability**




**E.5 Listening Watch.**

**E.5.1** It is recommended that a listening watch should be maintained on the designated frequency (126.9 MHz) 10 minutes before entering the designated airspace until leaving the airspace.

**E.5.2** For an aircraft taking off from an aerodrome located within the lateral limits of the designated airspace, listening watch should start as soon as appropriate and be maintained until leaving the airspace.

**E.6 Broadcast Intervals.** It is recommended that a broadcast should be clearly pronounced in English as follows:

- Ten minutes before entering an FIR within the IFBP region;
- Upon entering an FIR within the IFBP region;
- As soon as practicable when departing from an aerodrome located within the IFBP region;
- Ten minutes prior to crossing or joining an Air Traffic Service (ATS) route or crossing an airway or waypoint;
- Every 20 minutes;

- Before a change in flight level (FL);
- Upon reaching the intended FL; and
- At any other time considered necessary by the pilot.

**Note 1:** In the interest of reducing congestion on the IFBP frequency, pilots may exercise discretion to omit closely spaced repetitive IFBP reports. However, broadcast intervals should not exceed 20 minutes.

**Note 2:** It is recommended that the IFBP frequency is closely monitored at all times when in the region (e.g., not to turn off or reduce volume levels on the transmitting/receiving frequency).

**E.7 Broadcast Procedure.** It is recommended a broadcast message should be structured as follows:

"ALL STATIONS"
"THIS IS ABC123 [flight number] in the XXX [FIR name] FIR"

| | | |
|---|---|---|
| Position *AAAAA*<br>*(current position)* | at … : … UTC | FL … *(altitude maintaining)* |
| "*DIRECTION* Bound"<br>*(direction)* | on *XX987 (airway)* | |
| Estimating *BBBBB*<br>*(next position; waypoint or crossing airway if no waypoint)* | at … : … UTC | |
| *CCCCC* NEXT<br>*(subsequent position; waypoint or crossing airway if no waypoint)* | | |

*ABC123*…(flight number) AT FL…(altitude maintaining) *DIRECTION* BOUND (direction) IN THE *XXXX* (FIR name) FIR

**E.8 Additional Operating Procedures.**

**E.8.1** 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. When cruising level changes are unavoidable, all available aircraft lighting which would improve the visual detection of the aircraft should be displayed while changing levels.

**E.8.2** Collision Avoidance. If on receipt of a traffic information broadcast from another aircraft, a pilot decides that immediate action is necessary to avoid an imminent collision risk to their aircraft, and this cannot be achieved in accordance with the right-of-way provisions of ICAO Annex 2, Rules of the Air, they should:

- Unless an alternative maneuver appears more appropriate, climb or descend 500 ft.
- Display all available aircraft lighting which would improve the visual detection of the aircraft.
- As soon as possible, reply to the broadcast advising action being taken, and specify altitude maintaining.
- Notify the action taken on the appropriate ATS frequency.
- As soon as your situation has been rectified, resume allocated FL, notifying the action on the appropriate ATS frequency.

**E.8.3** Normal Position Reporting Procedures. Normal position reporting procedures should be continued at all times, regardless of any action taken to initiate or acknowledge a traffic information broadcast.

**E.8.4** Operation of Transponders. Pilots shall ensure that transponder procedures as contained in ICAO Doc 8168, Procedures for Air Navigation Services—Aircraft Operations (PANS-OPS), are complied with and, in the absence of other directions from air traffic control (ATC), operate the transponder on Mode A and C code 2000.

**E.8.5** Use of Traffic Alert and Collision Avoidance System (TCAS).

**E.8.5.1** In accordance with ICAO Annex 6, Operation of Aircraft, all turbine-engine airplanes of a maximum certificated takeoff mass in excess of 5,700 kg or authorized to carry more than 19 passengers shall be equipped with Airborne Collision Avoidance System (ACAS) II.

**E.8.5.2** IATA recommends the use of an operable TCAS when operating within the continent of Africa and recommends selection of Traffic Advisory (TA)/Resolution Advisory (RA) mode at maximum range.

**E.8.6** Use of Strategic Lateral Offset Procedures (SLOP). Use of SLOP is promoted in the AFI.

**E.8.7** Haj Operations. During the Haj Pilgrimage period, the number of east-west flights in the North-Central part of the AFI Region increases significantly and, with it, the risk of ATS incidents and the importance of adopting the IFBP.

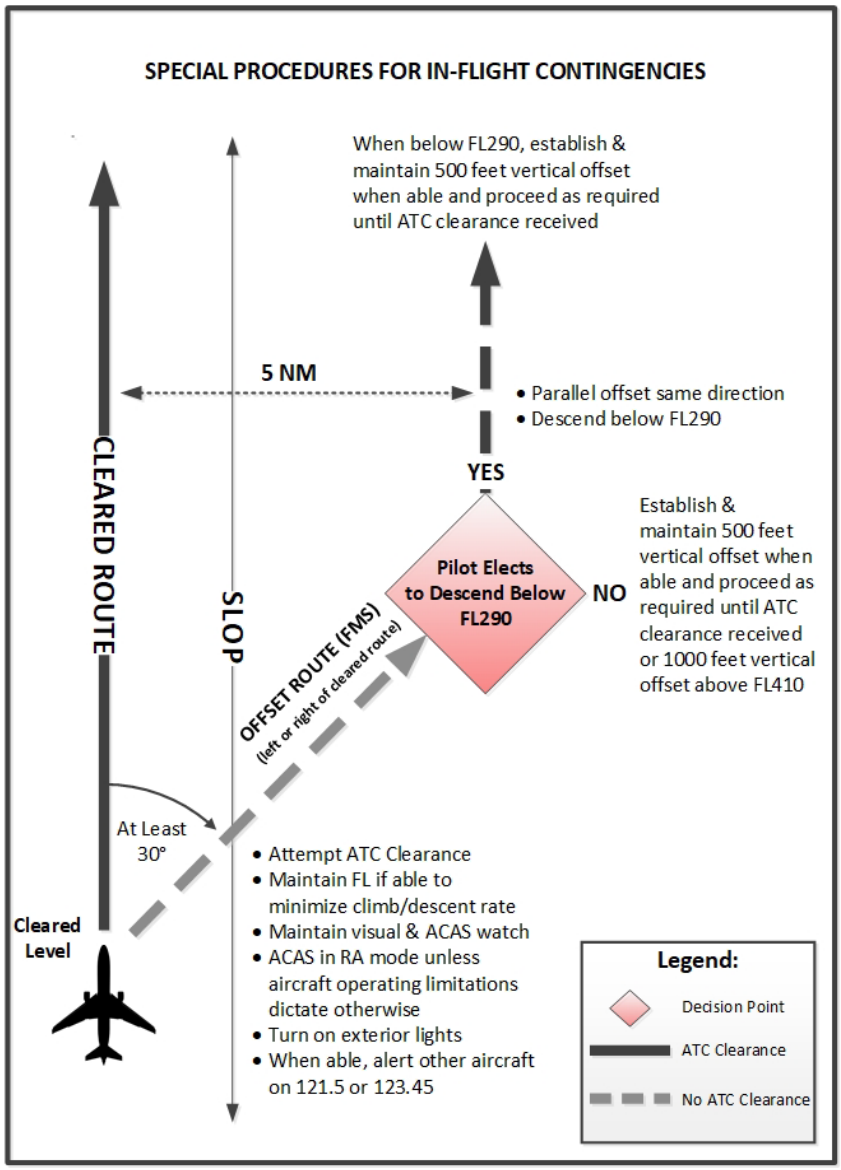
**E.9 Review.** The procedure and its area of applicability shall be reviewed by the IATA AFI RCG under governance of the Operations Advisory Council, and the associated risk monitored by the IATA Safety Review Board.

# APPENDIX F. SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE

**Note 1:** The source document for these procedures is ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM). The U.S. Aeronautical Information Publication (AIP) publishes these procedures as well. There are slight format or wording differences, but the procedures are identical in substance.

**Note 2:** The FAA recommends that operators carry a quick reference card containing the applicable contingency procedures. Figure F-1 provides a useful graphic and can be used for this purpose.

**Figure F-1. Special Procedures for In-Flight Contingencies in Oceanic Airspace (Non-Weather)**



**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.1.2** While the procedures described here are applicable in "high seas" (international) oceanic areas, pilots operating in remote continental airspace may also at times need to deviate from an ATC clearance. In U.S. sovereign airspace, "captain's authority" is granted via 14 CFR § 91.123 to deviate in an emergency. ICAO Annex 2, Rules of the Air, generally forms the basis of flight rules in sovereign airspace throughout the world, and grants the same deviation authority in Paragraph 3.6.2, Adherence to Current Flight Plan. Given that in remote continental airspace, long-range communication systems (LRCS) are used, the oceanic contingency procedures described here may be useful in instances where relevant State AIP procedures are not available. Oceanic contingency procedures help when a pilot urgently needs to deviate from an ATC clearance but is unable to coordinate the deviation quickly enough with ATC.

**F.2 General Procedures (5 Nautical Miles (NM)).**

**Note:** In 2020, ICAO changed the lateral offset values in oceanic contingency procedures to 5 NM. For the general procedures, acquire the 5 NM offset before changing altitude. For the weather contingency procedures, adjust altitude by 300 ft (climb or descend, per the procedures) only when deviating 5 NM or more.

**F.2.1** If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance should be obtained, whenever possible, prior to initiating any action.

**F.2.2** If prior clearance cannot be obtained, the following contingency procedures should be employed until a revised clearance is received.

1. Leave the cleared route or track by initially turning at least 30 degrees to the right or to the left in order to intercept and maintain a parallel, same direction track or route offset of 9.3 km (5.0 NM). The direction of the turn should be based on one or more of the following:

- Aircraft position relative to any organized track or route system;
- The direction of flights and flight levels (FL) allocated on adjacent tracks;
- The direction to an alternate airport;
- Any strategic lateral offset being flown; and
- Terrain clearance.

2. The aircraft should be flown at an FL and an offset track where other aircraft are less likely to be encountered.
3. Maintain a watch for conflicting traffic both visually and by reference to the Airborne Collision Avoidance System (ACAS) (if equipped), leaving ACAS in Resolution Advisory (RA) mode at all times, unless aircraft operating limitations dictate otherwise.
4. Turn on all aircraft exterior lights (commensurate with appropriate operating limitations).
5. Keep the Secondary Surveillance Radar (SSR) transponder on at all times and, when able, squawk 7700, as appropriate.
6. As soon as practicable, the pilot shall advise ATC of any deviation from assigned clearance.
7. Use whatever means is appropriate (i.e., voice and/or Controller-Pilot Data Link Communications (CPDLC)) to communicate during a contingency or emergency.
8. If voice communication is used, the radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN), preferably spoken three times, shall be used, as appropriate.
9. When emergency situations are communicated via CPDLC, the controller may respond via CPDLC. However, the controller may also attempt to make voice communication contact with the aircraft.
10. Additional guidance on emergency procedures for controllers and radio operators, and flightcrew, in data link operations can be found in ICAO Doc 10037, Global Operational Data Link (GOLD) Manual.
11. Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 megahertz (MHz) (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz), and where appropriate on the frequency in use: Aircraft Identification (ACID), the nature of the distress condition, intention of the person in command, position (including the Air Traffic Service (ATS) route designator or the track code, as appropriate) and FL.
12. The controller should attempt to determine the nature of the emergency and ascertain any assistance that may be required. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and overall traffic situation.

**F.2.3** Actions to Be Taken Once Offset From Track. The pilot's judgment of the situation and the need to ensure the safety of the aircraft will determine if the actions outlined in

paragraph F.2.3.2, item 1 or 2, will be taken. Factors for the pilot to consider when diverting from the cleared route or track without an ATC clearance include, but are not limited to:

- Operation within a parallel track system;
- The potential for User Preferred Routes (UPR) parallel to the aircraft's track or route;
- The nature of the contingency (e.g., aircraft system malfunction); and
- Weather factors (e.g., convective weather at lower FLs).

**F.2.3.1** If possible, maintain the assigned FL until established on the 9.3 km (5.0 NM) parallel, same direction track or route offset. If unable, initially minimize the rate of descent to the extent that is operationally feasible.

**F.2.3.2** Once established on a parallel, same direction track or route offset by 9.3 km (5.0 NM), either:

1. Descend below FL 290, establish a 150 m (500 ft) vertical offset from those FLs normally used, and proceed as required by the operational situation or, if an ATC clearance has been obtained, proceed in accordance with the clearance; or

   **Note:** Descent below FL 290 is considered particularly applicable to operations where there is a predominant traffic flow (e.g., east-west) or parallel track system where the aircraft's diversion path will likely cross adjacent tracks or routes. A descent below FL 290 can decrease the likelihood of conflict with other aircraft, ACAS RA events, and delays in obtaining a revised ATC clearance.

2. Establish a 150 m (500 ft) vertical offset (or 300 m (1,000 ft) vertical offset if above FL 410 from those FLs normally used) and proceed as required by the operational situation or, if an ATC clearance has been obtained, proceed in accordance with the clearance.

   **Note:** Altimetry system error may lead to less than actual 500 ft vertical separation when the procedure above is applied. In addition, with the 500 ft vertical offset applied, ACAS RAs may occur.

**F.3 General Weather Deviation Procedures (5 NM).** The following procedures are intended for deviations around adverse meteorological conditions.

**Note:** In 2020, ICAO changed the lateral offset values in oceanic contingency procedures to 5 NM. For the general procedures, acquire the 5 NM offset before changing altitude. For the weather contingency procedures, adjust altitude by 300 ft (climb or descend, per the procedures) only when deviating 5 NM or more.

**F.3.1** General.

**F.3.1.1** When weather deviation is required, the pilot should initiate communications with ATC via voice or CPDLC. A rapid response may be obtained by either:

1. Stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response; or
2. Requesting a weather deviation using a CPDLC lateral downlink message.

**F.3.1.2** When necessary, the pilot should initiate the communications using the urgency call "PAN PAN" (preferably spoken three times) or by using a CPDLC urgency downlink message.

**F.3.1.3** 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.

**F.3.2** Actions to Be Taken When Controller-Pilot Communications Are Established.

**F.3.2.1** The pilot should notify ATC and request clearance to deviate from track or route, advising when possible, the extent of the deviation requested. The flightcrew will use whatever means is appropriate (i.e., CPDLC and/or voice) to communicate during a weather deviation.

**Note:** Pilots are advised to contact ATC as soon as possible with requests for clearance in order to provide time for the request to be assessed and acted upon.

**F.3.2.2** ATC should take one of the following actions:

1. When appropriate separation can be applied, issue clearance to deviate from track; or
2. If there is conflicting traffic and ATC is unable to establish appropriate separation, ATC should:
   a. Advise the pilot of the inability to issue clearance for the requested deviation;
   b. Advise the pilot of conflicting traffic; and
   c. Request the pilot's intentions.

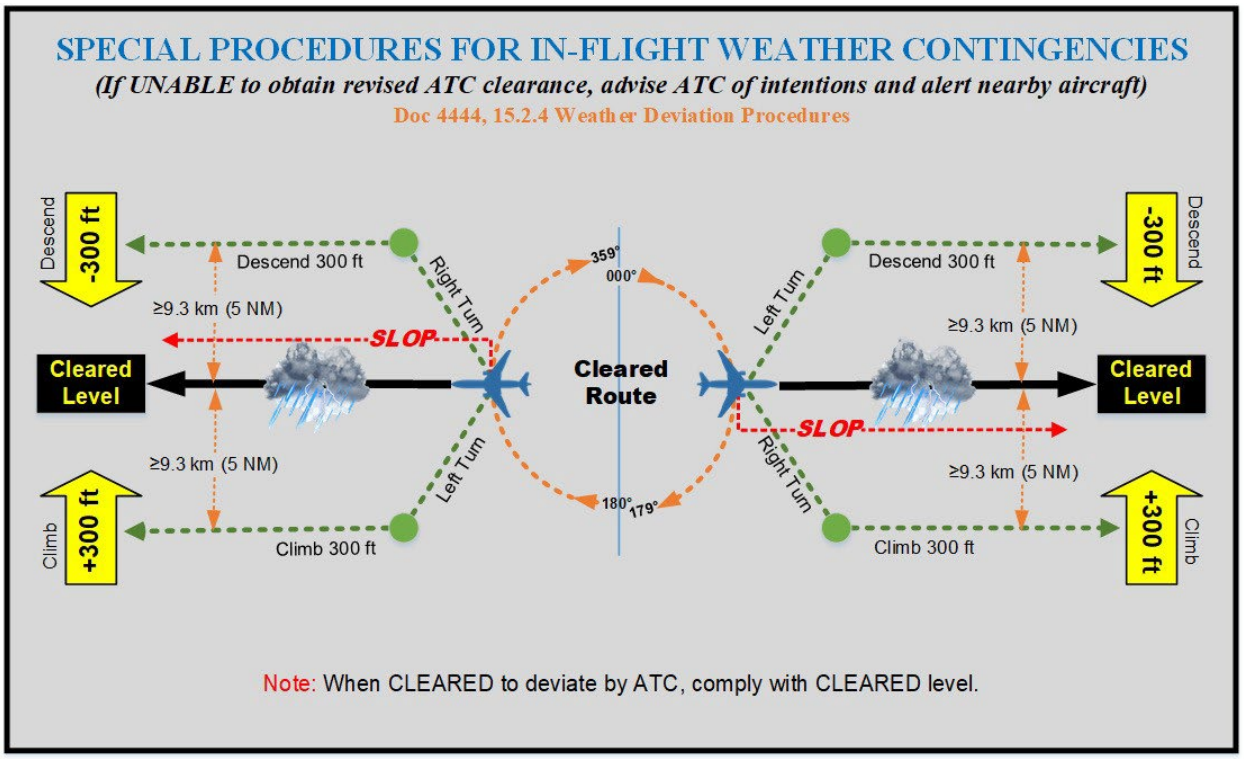
**F.3.2.3** The pilot should take one of the following actions:

1. Comply with the ATC clearance issued; or
2. Advise ATC of intentions and execute the procedures provided in paragraph F.3.3 below.

**F.3.3** Actions to Be Taken if a Revised ATC Clearance Cannot Be Obtained.

**Note:** The provisions of this paragraph 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, Responsibility of Pilot-in-Command.

**Figure F-2. Special Procedures for In-Flight Weather Contingencies**




**F.3.3.1** If the aircraft is required to deviate from track or route 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:

**Note:** Figure F-2 provides a general illustration of the weather deviation scenario. Table F-1 shows the altitude offset portion of the procedures.

1. If possible, deviate away from an organized track or route system;
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 inter-pilot air-to-air frequency 123.45 MHz);
3. Watch for conflicting traffic both visually and by reference to ACAS (if equipped);

4. Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
5. For deviations of less than 9.3 km (5.0 NM) from the originally cleared track or route, remain at a level assigned by ATC;
6. For deviations greater than or equal to 9.3 km (5.0 NM) from the originally cleared track or route, when the aircraft is approximately 9.3 km (5.0 NM) from track, initiate a level change in accordance with Table F-1;
7. If the pilot receives clearance to deviate from cleared track or route for a specified distance and subsequently requests but cannot obtain a clearance to deviate beyond that distance, the pilot should apply an altitude offset in accordance with Table F-1 before deviating beyond the cleared distance;
8. When returning to track or route, be at its assigned FL when the aircraft is within approximately 9.3 km (5.0 NM) of the centerline; and
9. 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.

**Note:** If, as a result of actions taken under the provisions of paragraph F.3.3.1, 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.

**Table F-1. Altitude Offset When Denied Clearance to Deviate 9.3 km (5.0 NM) or More (5 NM Procedures)**

| **Originally Cleared Track or Route Centerline** | **Deviations** ≥ 9.3 km (5.0 NM) | **Level Change** |
|---|---|---|
| EAST (000°–179° magnetic) | LEFT | DESCEND 90 m (300 ft) |
| | RIGHT | CLIMB 90 m (300 ft) |
| WEST (180°–359° magnetic) | LEFT | CLIMB 90 m (300 ft) |
| | RIGHT | DESCEND 90 m (300 ft) |

**F.4 Contingency Considerations for Unexpected Closure of an Oceanic ATC Facility.** The Aeronautical Information Manual (AIM) includes guidance for an "ARTCC Radio Frequency Outage," with many of the same considerations listed here. Initially, it may not be evident to a flightcrew that an en route ATC facility has unexpectedly closed, but ATC being unresponsive to communication attempts would be an early indication. Eventually, neighboring ATC units would inform aircraft, likely via company dispatch

and voice relay. The nature of an unexpected closure could result in some periods of confusion and uncertainty.

**F.4.1** Flights Within Any Oceanic Airspace. Continue as last cleared and contact the next (neighboring) ATC unit. Provide a position report, and request guidance/advice. Flightcrews should use extreme caution and use all available means to detect any conflicting traffic.

**F.4.2** Flights Approaching Any Oceanic Airspace.

**F.4.2.1** Normally, flights should land at an appropriate aerodrome or, if feasible, request clearance to avoid the affected oceanic control area (OCA).

**F.4.2.2** In some situations, the flightcrew may determine that continuing the flight is a safer course of action. ATC services within the affected OCA may be nonexistent or severely limited. Due to the uncertainty surrounding the contingency situation, flightcrews should, if possible, consider seeking a clearance to reroute around the affected OCA.

**F.4.2.3** Flightcrews should broadcast traffic information in the blind to other flights/stations on 121.5 MHz and on 123.45 MHz (or 126.9 MHz as appropriate in designated International Air Transport Association (IATA) broadcast areas), to exchange position information. A continuous air-ground voice communication watch, per ICAO Annex 2, Paragraph 3.6.5, Communications, must be maintained.

**F.4.2.4** Operators and flightcrews should be aware that ATC may invoke the ICAO traffic information broadcasts by aircraft (TIBA) procedure, with flightcrew member broadcasts in the following form:

ALL STATIONS (call sign), FLIGHT LEVEL (number) (or CLIMBING/DESCENDING TO FLIGHT LEVEL (number)) (direction) (ATS route) (or DIRECT FROM (position) TO (position)) POSITION (position) AT (time) ESTIMATING (next reporting point, or the point of crossing or joining a designated ATS route) AT (time) (call sign) FLIGHT LEVEL (number) (direction).

TIBA calls should be provided by a flightcrew member at the following times:

1. Ten minutes before entering the designated airspace or, for a flightcrew member taking off from an aerodrome located within the lateral limits of the designated airspace, as soon as appropriate after takeoff;
2. Ten minutes prior to crossing a reporting point;
3. Ten minutes prior to crossing or joining an ATS route;
4. At 20-minute intervals between distant reporting points;
5. Two to five minutes, where possible, before a change in FL;

6. At the time of a change in FL; and
7. At any other time considered necessary by the flightcrew.

**F.4.3** Additional Considerations:

1. Flights involved in level change should complete the maneuver as soon as possible in accordance with the clearance.
2. Mandatory position reports should be accomplished via high frequency (HF) or Satellite Voice (SATVOICE).
3. Flights equipped with Future Air Navigation System 1/A (FANS 1/A) or equivalent should communicate using HF voice or SATVOICE while attempting to reestablish CPDLC connection in airspace where ATC services are suspended.
4. Flights may request their flight dispatch offices provide traffic information and/or forward position reports to the relevant OCA.

**F.4.4** Additional Recommendations. Consistent with AIP recommendations, should flightcrews encounter situations that are not covered by regulation, they are expected to exercise good judgment in whatever action they elect to take. Additionally, flightcrews should take the following actions:

1. Monitor for traffic visually and by using Traffic Alert and Collision Avoidance System (TCAS) or Automatic Dependent Surveillance-Broadcast (ADS-B) In.
2. Ensure all appropriate exterior lights are operable and turned on.
3. Monitor and use, as appropriate, relevant communication channels (e.g., 121.5/123.45 or 126.9 MHz in oceanic airspace), to include HF frequencies for traffic and situational awareness, and SATVOICE and/or data link.

**F.4.5** References:

- IATA's In-Flight Broadcast Procedures (IFBP) (see Appendix E).
- TIBA (refer to ICAO Annex 11, Air Traffic Services, Attachment B, Traffic Information Broadcasts by Aircraft (TIBA) and Related Operating Procedures).
- Two-way radio communications failure (refer to 14 CFR § 91.185 and the U.S. AIP, GEN 3.4, paragraphs 12 and 13).
- North Atlantic (NAT) communications failure (refer to the U.S. AIP, ENR 7.8, paragraph 4; and ICAO NAT Doc 006 – Part I, Air Traffic Management Operational Contingency Plan, North Atlantic Region).
- Pacific communications failure (refer to ICAO Annex 2, paragraph 3.6.5.2.2; and ICAO Doc 7030, Regional Supplementary Procedures (SUPPS), PAC paragraph 9.3).
- Special Procedures for In-Flight Contingencies in Oceanic Airspace (refer to the U.S. AIP, ENR 7.3).

# 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 list when creating procedures and/or operations manuals and keeping them current. The complexity of your operations and operational approvals will dictate which items on this list are applicable or need to be expanded. Please refer to the Regional Oceanic Resource Guides for U.S. Operators, available at https://www.faa.gov/about/officeorg/headquartersoffices/avs/oceanic-resource-guides 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, ICAO Guidance, and References.

**G.1.1** Title 14 CFR.

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

- ICAO Doc 4444, Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM).
- ICAO Doc 7030, Regional Supplementary Procedures (SUPPS).
- ICAO Doc 9574, Manual on a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive.
- ICAO Doc 9613, Performance-based Navigation (PBN) Manual.
- ICAO Doc 9869, Performance-based Communication and Surveillance (PBCS) Manual.
- ICAO Doc 10037, Global Operational Data Link (GOLD) Manual (Controller-Pilot Data Link Communications (CPDLC), Automatic Dependent Surveillance-Contract (ADS-C)).
- ICAO Annex 2, Rules of the Air.
- ICAO Annex 6, Operation of Aircraft (Parts I, II, and III, as applicable).
- ICAO NAT Doc 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 ACs (current editions):

- 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.[28]
- AC 90-117, Data Link Communications.
- AC 91-70, Oceanic and Remote Continental Airspace Operations.
- AC 91-85, Authorization of Aircraft and Operators for Flight in Reduced Vertical Separation Minimum (RVSM) Airspace.
- AC 120-42, Extended Operations (ETOPS and Polar Operations) (also refer to 14 CFR § 121.161).
- AC 135-42, Extended Operations (ETOPS) and Operations in the North Polar Area (also refer to 14 CFR § 135.364).

**G.1.5** Miscellaneous:

- FAA Regional Oceanic Resource Guides for U.S. Operators, available at https://www.faa.gov/about/officeorg/headquartersoffices/avs/oceanic-resource-guides.
- ICAO North Atlantic (NAT) and Eurocontrol (SKYbrary).
- State Department Travel Alerts and Transportation Security Administration (TSA) Alerts.
- Electronic Flight Bag (EFB) instructions and procedures; applications (as applicable).

**G.1.6** Notices to Airmen (NOTAM), Global Positioning System (GPS) NOTAMs (select "GPS NOTAMs" in "Predefined Queries" under "Location"), FAA International Notices, and Special Federal Aviation Regulations (SFAR).

**G.2 Navigation.** Continental (formerly Class I) versus Oceanic and Remote navigation; and navigation by means of dead reckoning.

**G.3 Flight Planning.**

**G.3.1** North American Routes (NAR).

**G.3.2** Track Messages.

**G.3.3** Air Traffic Control (ATC) Flight Plans. Explanation and correct codes.

[28] Refer to, in particular, AC 90-105, Chapter 8, Operator Responsibilities, Paragraph 8.4.3, Pilot Knowledge.

**G.3.4** Operational Flight Plan (also known as Computer Flight Plan (CFP)):

- Comparison to ATC flight plan.
- Basic cross checks (fuel, groundspeed, winds).
- Equal Time Point (ETP) and points of safe return.
- Fuel requirements (in particular, ICAO Annex 6) and reduced fuel (B043, B044, and B343 authorizations).

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

**G.3.6** Use of Plotting/Orientation Chart and Master Document.

**G.3.7** Weather Radar (WX) Charts:

- Terminal Aerodrome Forecast (TAF), Aviation Routine Weather Report (METAR), and Significant Weather (SIGWX).
- 700 millibars (mb), 500 mb, 400 mb, 300 mb, 250 mb.
- Approved source(s): National Weather Service (NWS) and Enhanced Weather Information System (EWINS).

**G.3.8** Driftdown—Terrain, Alternates, Extended Operations (ETOPS).

**G.3.9** World Geodetic System 1984 (WGS 84) or Approved Equivalent Compliance.

**G.4 State Operating Restrictions.**

**G.5 Reduced Vertical Separation Minimum (RVSM):**

- General description.
- Metric assignments (e.g., China).
- Minimum required equipment.
- Contingencies.
- Forecasts, tropopause, temperature deviations.

**G.6 Accident/Incident.**

**G.6.1** Title 49 of the Code of Federal Regulations (49 CFR):

- Part 175, Carriage by Aircraft (hazardous materials (hazmat) regulations).
- Part 830, Notification and Reporting of Aircraft Accidents or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records (National Transportation Safety Board (NTSB)).

**G.6.2** Contingencies:

- Weather deviations.
- General contingencies.
- Lost communications, traffic information broadcasts by aircraft (TIBA), In-Flight Broadcast Procedure (IFBP).
- Degraded navigation, dead reckoning.
- Activation of Automated Mutual-assistance Vessel Rescue (AMVER) system, emergency locator transmitter (ELT).
- Depressurization/oxygen supply.
- Intercept, hijack.

**G.6.3** Use of Navigation System:

1. Review of Airplane Flight Manual Supplements (AFMS) for capabilities/limitations.
2. Description of GPS, GPS NOTAMs, receiver autonomous integrity monitoring (RAIM) prediction, fault detection and exclusion (FDE).
3. Description of inertial navigation system (INS), time limits.
4. Currency/software version of database.
5. Loading, updating, and cross-checks:
   - Format for manual entry into the flight management system (FMS) of latitude/longitude waypoints.
   - Methods for entering time or "line-of-longitude" constraints (e.g., "at 1210 climb to FL 340" or "cross 16W level at FL 340").
   - How to "expand" waypoints to display full latitude and longitude.
6. Independent verification.
7. Contingencies/fault codes.

**G.6.4** Oceanic Crossing:

- Oceanic checklist (see Appendix D, Sample Oceanic Checklist).
- Master time source.
- Clearance-flight information region (FIR) differences.
- Navigation accuracy check (as applicable).
- RVSM checks.
- Approaching, overhead, and post-position waypoint checks.

- Position report—estimated time of arrival (ETA) tolerance.
- Five-minute post-position check.

**G.6.5** Altimetry:

- QNH, QNE, and QFE.
- Transition altitude (TA)/transition level (TL).
- Millibars (mb), hectopascals (hPa).

**G.6.6** Transponder Operations. Regional (e.g., NAT, Pacific) requirements.

**G.6.7** Communications, Navigation, and Surveillance.

- Airspace requirements (RNP 10/4/2).
- Data link (ADS-C, CPDLC).
- Voice communications and aeronautical radio stations (very high frequency (VHF), high frequency (HF), Satellite Voice (SATVOICE)).
- Reduced separation—trials and implementations.

**G.6.8** Strategic Lateral Offset Procedures (SLOP).

**G.6.9** Volcanic Ash. Source of information and crew notification.

**G.6.10** Space Weather. Warnings, alerts, and advisories (see Appendix C, Unusual Weather Activity).

**G.6.11** Operational Control:

- A008 authorization.
- A009 authorization.
- A010 authorization.

**G.6.12** Oceanic Speed Control:

- Tolerance, areas applicable.
- ATC Mach Number Technique.
- Operations Without Assigned Fixed Speed (OWAFS).

**G.6.13** Oceanic Errors:

- Revised clearance/conditional clearances.
- CPDLC route clearances.