



# OPERATIONS MANUAL PART C

ROUTE AND AERDODROME INSTRUCTIONS AND INFORMATION

Document Code:

**OM-C**

Issue:

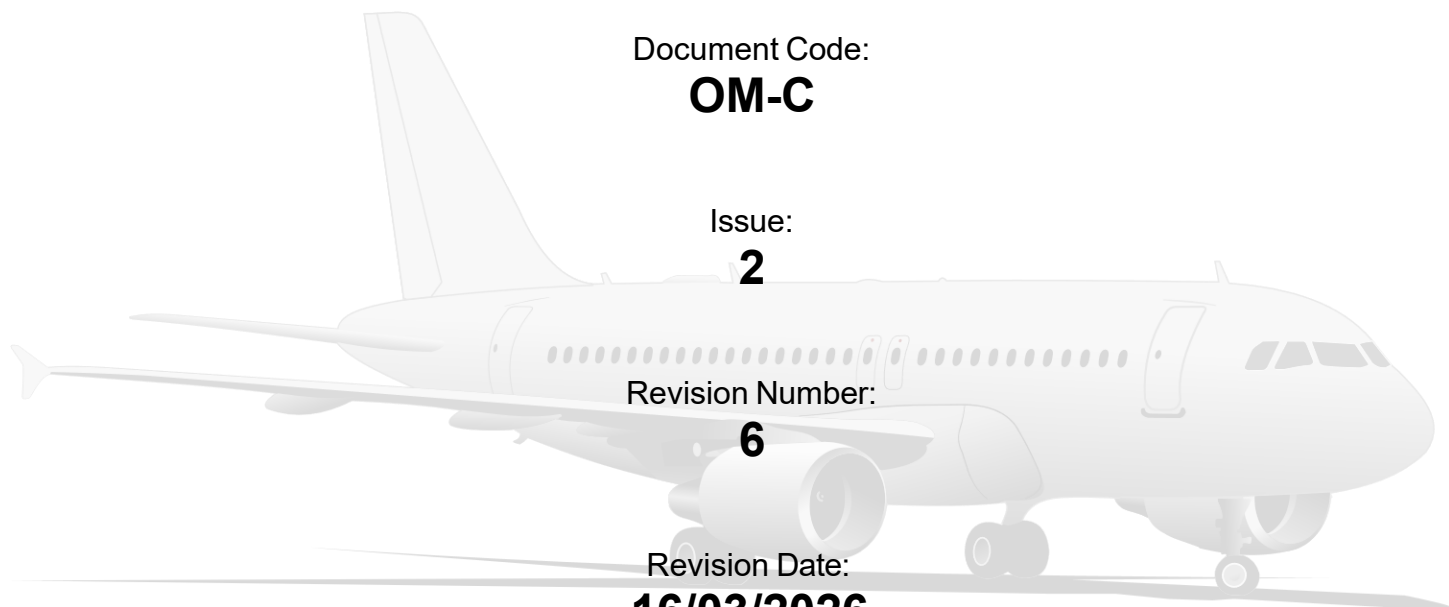
**2**

Revision Number:

**6**

Revision Date:

**16/03/2026**



Intentionally left blank

## PRELIMINARY PAGES

This page constitutes the approval page of the Operations Manual Part C of Fly2Sky OOD. Unless explicitly mentioned, it shall be signed by the Manual Responsible (MR) and stamped and countersigned by the Competent Authority upon approval. The Original signatures are present at the Flight Operations Department.

### OM-C ISSUE 2

| Revision | Date       | MR Name and Signature | DG CAA Stamp and Signature                                                                                                       |
|----------|------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 0        | 20/03/2022 | Petar Lavrinov        | Approved                                                                                                                         |
| 1        | 25/05/2022 | Petar Lavrinov        | Approved                                                                                                                         |
| 2        | 10/11/2022 | Petar Lavrinov        | Approved                                                                                                                         |
| 3        | 08/04/2023 | Petar Lavrinov        | Approved                                                                                                                         |
| 4        | 05/10/2023 | Tsvetan Kirilov       | Approved                                                                                                                         |
| 5        | 18/03/2025 | Tsvetan Kirilov       | Approved                                                                                                                         |
| 6        | 16/03/2026 | Tsvetan Kirilov       | Orlin Gueorguiev<br>Ignatov<br><small>Digitally signed by Orlin Gueorguiev Ignatov<br/>Date: 2026.03.17 12:03:19 +02'00'</small> |
| 7        |            |                       |                                                                                                                                  |
| 8        |            |                       |                                                                                                                                  |
| 9        |            |                       |                                                                                                                                  |
| 10       |            |                       |                                                                                                                                  |
| 11       |            |                       |                                                                                                                                  |
| 12       |            |                       |                                                                                                                                  |
| 13       |            |                       |                                                                                                                                  |
| 14       |            |                       |                                                                                                                                  |
| 15       |            |                       |                                                                                                                                  |



A320/A321

OPERATIONS MANUAL PART C

## PRELIMINARY PAGES

### APPROVAL PAGE

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## PRELIMINARY PAGES

### TABLE OF CONTENTS

#### **0 GENERAL**

#### **1 MINIMUM FLIGHT LEVEL / ALTITUDE**

#### **2 AIRPORT SUITABILITY AND OPERATING MINIMA**

#### **3 COMMUNICATION FACILITIES AND NAVIGATION AIDS**

#### **4 AERODROME AND OPERATING SITE FACILITIES**

#### **5 APPROACH, MISSED APPROACH AND DEPARTURE**

#### **6 COMMUNICATION FAILURE PROCEDURES**

#### **7 SEARCH AND RESCUE FACILITIES**

#### **8 MAPS AND CHARTS**

#### **9 AERONAUTICAL INFORMATION, METEOROLOGICAL SERVICES**

#### **10 EN-ROUTE COM/NAV PROCEDURES**

#### **11 AERODROME CATEGORISATION AND BRIEFINGS**

#### **12 SPECIAL LIMITATIONS**



A320/A321  
OPERATIONS MANUAL PART C

## PRELIMINARY PAGES

### TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## PRELIMINARY PAGES

### LIST OF EFFECTIVE SECTIONS/SUBSECTIONS

| M(1) | Localization | Subsection Title                                      | Rev. Date |
|------|--------------|-------------------------------------------------------|-----------|
|      | 0-1          | EXPLANATIONS AND DEFINITIONS OF TERMS & ABBREVIATIONS | 10 NOV 22 |
|      | 1-1          | GENERAL                                               | 20 MAR 22 |
|      | 2-1          | OPERATING MINIMA                                      | 20 MAR 22 |
|      | 3-1          | GENERAL                                               | 20 MAR 22 |
|      | 3-2          | DATALINK COMMUNICATION                                | 20 MAR 22 |
|      | 3-3          | ATC DATALINK LOGON                                    | 20 MAR 22 |
|      | 3-4          | ATC DATALINK APPLICATIONS                             | 20 MAR 22 |
|      | 3-5          | ATC DATALINK APPLICATIONS – SOP                       | 20 MAR 22 |
|      | 3-6          | ATC VOICE COMMUNICATION                               | 08 APR 23 |
|      | 3-7          | NAVIGATION AIDS                                       | 20 MAR 22 |
|      | 3-8          | JEPPESEN DOCUMENTATION                                | 20 MAR 22 |
|      | 4-1          | GENERAL                                               | 18 MAR 25 |
|      | 4-2          | DE/ANTI-ICING ON GROUND                               | 20 MAR 22 |
|      | 5-1          | GENERAL                                               | 20 MAR 22 |
|      | 6-1          | CALCULATION SYSTEM                                    | 08 APR 23 |
|      | 7-1          | GENERAL                                               | 20 MAR 22 |
|      | 8-1          | GENERAL                                               | 20 MAR 22 |
|      | 9-1          | GENERAL                                               | 20 MAR 22 |
|      | 10-1         | GENERAL                                               | 08 APR 23 |
| R    | 10-2         | NAT HLA OPERATIONS                                    | 16 MAR 26 |
| R    | 11-1         | GENERAL                                               | 16 MAR 26 |
|      | 12-1         | GENERAL                                               | 20 MAR 22 |
|      | SUPP-CAR     | SUPPLEMENT CARREBEAN REGION                           | 20 MAR 22 |
|      | SUPP-NAM     | SUPPLEMENT NORTH AMERICA                              | 20 MAR 22 |
|      | SUPP-SAM     | SUPPLEMENT SOUTH AMERICA                              | 20 MAR 22 |

(1) Evolution code: N=New, R=Revised, E=Effectivity, M=Moved



A320/A321  
OPERATIONS MANUAL PART C

## PRELIMINARY PAGES

### LIST OF EFFECTIVE SECTIONS/SUBSECTIONS

Intentionally left blank

## **0. GENERAL**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

### PRELIMINARY PAGES

### TABLE OF CONTENTS

#### 0.1 EXPLANATIONS AND DEFINITIONS OF TERMS & ABBREVIATIONS

|                          |   |
|--------------------------|---|
| 0-1-1 INTRODUCTION.....  | A |
| 0-1-2 DEFINITIONS.....   | B |
| 0-1-3 ABBREVIATIONS..... | C |
| 0-1-4 REFERENCES .....   | D |



A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

### DEFINITIONS

#### 0-1-1 INTRODUCTION

Applicable to: ALL

When used in the Operations Manual, the following terms shall have the meaning outlined below:

- Is or are "**to**" / "**must**" / "**shall**", or an action verb in the imperative sense, means that the application of a rule or procedure or provision is mandatory;
- "**Should**" means that the application of a procedure or provision is recommended;
- "**May**" means that the application of a procedure or provision is optional.

This manual applies to both male and female crewmembers, operations personnel, passengers and other persons, although references in the text are made to either the masculine or feminine gender only as a matter of simplification.

This document has been compiled for Fly2Sky operations. Whenever used throughout this manual, the simple term "Fly2Sky" implies Fly2Sky OOD.

#### 0-1-2 DEFINITIONS

Applicable to: ALL

The full definitions list can be found in OM-A. *Refer to: OM-A 0-1-6 DEFINITIONS*

#### 0-1-3 ABBREVIATIONS

Applicable to: ALL

The full abbreviations list can be found in OM-A. *Refer to: OM-A 0-1-5 ABBREVIATIONS*

#### 0-1-4 REFERENCES

Applicable to: ALL

Operations Manual Parts A, B and C inserted with reference to chapters.



A320/A321  
OPERATIONS MANUAL PART C

## GENERAL

### DEFINITIONS

The Geographic coverage of this manual is dictated by the Route Manual which in the case of Fly2Sky is Jeppesen FD Pro X. The Route Manual is integral part of the Operations Manual Part C and all regions and countries where Fly2Sky operates are part of its database.

All regional-specific rules are stated in the Publications (Pubs) section of Jeppesen FD Pro X, which includes the relevant ICAO documentations.

In case of a charter flight to a country that is not part of the Jeppesen FD Pro X, all relevant charts will be separately loaded to the onboard database or given to flight crews directly.

The following provisions must be respected:

- For the approved Area of Operation, *Refer to: OM-A 1-1-1 ORGANISATIONAL STRUCTURE, RESPONSIBILITIES AND ACCOUNTABILITIES*;
- Principal area of operation: same as the general area of operation, note airports being chosen for destination including in the airport briefings appendix;
- All ICAO Regions of the world are contained in the Route manual (Jeppesen FD Pro X).

## **1. MINIMUM FLIGHT LEVEL/ALTITUDE**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

PRELIMINARY PAGES

TABLE OF CONTENTS

### 1.1 GENERAL

|                                           |   |
|-------------------------------------------|---|
| 1.1.1 MINIMUM FLIGHT LEVEL/ALTITUDE ..... | A |
| 1.1.2 ROUTE MANUAL DOCUMENTATION .....    | B |



A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

### GENERAL

#### 1-1-1 MINIMUM FLIGHT LEVEL/ALTITUDE

Applicable to: ALL

For minimum flight level and altitude restrictions, refer to the OM-A. *Refer to: OM-A 8-1-1 MINIMUM FLIGHT ALTITUDES*

#### 1-1-2 ROUTE MANUAL DOCUMENTATION

Applicable to: ALL

*Refer to: Jeppesen FD Pro X – Publications (Pubs)*



A320/A321  
OPERATIONS MANUAL PART C

## MINIMUM FLIGHT LEVEL/ALTITUDE

### GENERAL

Intentionally left blank

## **2 AIRPORT SUITABILITY AND OPERATING MINIMA**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AIRPORT SUITABILITY AND OPERATING MINIMA

### PRELIMINARY PAGES

### TABLE OF CONTENTS

## 2.1 OPERATING MINIMA

|                                                                          |   |
|--------------------------------------------------------------------------|---|
| 2-1-1 OPERATING MINIMA.....                                              | A |
| 2-1-2 WEATHER PLANNING MINIMA DESTINATION AND ALTERNATE<br>AIRPORTS..... | B |
| 2-1-3 DEPARTURE AND TAKEOFF MINI.....                                    | C |
| 2-1-4 LANDING MINIMA.....                                                | D |
| 2-1-5 RUNWAY VISUAL RANGE (RVR).....                                     | E |
| 2-1-6 RELEVANT RUNWAY VISUAL RANGE.....                                  | F |
| 2-1-7 CONTROLLING RVR – APPROACH MINIMA.....                             | G |
| 2-1-8 CONVERSION OF REPORTED METEOROLOGICAL VISIBILITY.....              | H |
| 2-1-9 LVO (LOW VISIBILITY OPERATION).....                                | I |
| 2-1-10 TEMPORALLY FAILED OR DOWNGRADED GROUND EQUIPMENT.....             | J |
| 2-1-11 ALTITUDE CORRECTION CHART.....                                    | K |
| 2-1-12 CRITERIA FOR DETERMINING THE USABILITY OF AERODROMES .....        | L |
| 2-1-13 APPROVED AERODROMES .....                                         | M |
| 2-1-14 CONSIDERATIONS FOR PLANNING.....                                  | N |
| 2-1-15 AEROPLANE APPROACH CATEGORIES .....                               | O |
| 2-1-16 OTHER RELEVANT DOCUMENTATION .....                                | P |

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AIRPORT SUITABILITY AND OPERATING MINIMA

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |





A320/A321  
OPERATIONS MANUAL PART C

## AIRPORT SUITABILITY AND OPERATING MINIMA

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## NORMAL PROCEDURES

### APPROACH SUMMARIES

#### 2-1-1 OPERATING MINIMA

Applicable to: ALL

*Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA Refer to: OM-A 8-1-4 EN-ROUTE OPERATING MINIMA FOR VFR FLIGHTS*

#### 2-1-2 WEATHER PLANNING MINIMA DESTINATION AND ALTERNATE AIRPORTS

Applicable to: ALL

*Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES*

#### 2-1-3 DEPARTURE AND TAKEOFF MINIMA

Applicable to: ALL

*Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES  
Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

Airport specific take-off minima are published in the Jeppesen FD Pro X. *Refer to: Jeppesen FD Pro X-REF-Airport Briefing*

#### 2-1-4 LANDING MINIMA

Applicable to: ALL

The method of determining landing minima is described for the following types of approaches:

- Landing minima - Non-Precisions Approaches: *Refer to: OM-A 8-1-3*
- Landing minima - Category I Precisions Approaches: *Refer to: OM-A 8-1-3*
- Landing minima - Category II Precision Approaches: *Refer to: OM-A 8-1-3*
- Landing Minima - Category III Precision Approaches: *Refer to: OM-A 8-1-3*
- Visual Approaches: *Refer to: OMA 8-1-3*
- Circling Approaches: *Refer to: OM-A 8-1-3*

Approach specific landing minima used in Fly2ky operations are published on the Jeppesen FD Pro X instrument approach charts. *Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA* for the policy on approach minima used in Fly2Sky operations.



A320/A321  
OPERATIONS MANUAL PART C

## NORMAL PROCEDURES

### APPROACH SUMMARIES

#### 2-1-5 RUNWAY VISUAL RANGE (RVR)

**Applicable to: ALL**

The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

#### 2-1-6 RELEVANT RUNWAY VISUAL RANGE

**Applicable to: ALL**

*Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

#### 2-1-7 CONTROLLING RVR – APPROACH MINIMA

**Applicable to: ALL**

*Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

#### 2-1-8 CONVERSION OF REPORTED METEOROLOGICAL VISIBILITY

**Applicable to: ALL**

*Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

#### 2-1-9 LVO (LOW VISIBILITY OPERATION)

**Applicable to: ALL**

*Refer to: (GM10 SPA.LVO.110)*

The primary source of information for aerodrome assessment is Jeppesen FD Pro X. If an aerodrome is not present in Jeppesen FD Pro X, the assessment would be impossible and therefore, Fly2Sky will not operate to and from such aerodrome.

For operational information, *Refer to: OM-A 8-4 LOW VISIBILITY OPERATIONS.*



A320/A321  
OPERATIONS MANUAL PART C

## NORMAL PROCEDURES

### APPROACH SUMMARIES

#### 2-1-10 TEMPORALLY FAILED OR DOWNGRADED GROUND EQUIPMENT

Applicable to: ALL

For the effect of temporally failed or downgraded ground equipment on landing minima, *Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

#### 2-1-11 ALTITUDE CORRECTION CHART

Applicable to: ALL

*Refer to: 8-1-1 MINIMUM FLIGHT ALTITUDES*

#### 2-1-12 CRITERIA FOR DETERMINING THE USABILITY OF AERODROMES

Applicable to: ALL

*Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES*

#### 2-1-13 APPROVED AERODROMES

Applicable to: ALL

*Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES*

#### 2-1-14 CONSIDERATIONS FOR PLANNING

Applicable to: ALL

*Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES*

This chapter takes into account the following:

- Performance (Take off and landing);
- Weather planning minima and selection of aerodromes;
- Take-off Alternate;
- Destination;
- Destination/Enroute (alternate and isolated aerodrome);



A320/A321  
OPERATIONS MANUAL PART C

## NORMAL PROCEDURES

### APPROACH SUMMARIES

- Number of destination alternates to be selected;
- Enroute alternate;
- Alternates general considerations;
- Aircraft performance during Takeoff and Landing (Destination or alternate).

#### 2-1-15 AEROPLANE APPROACH CATEGORIES

Applicable to: ALL

*Refer to: OM-A 8-1-3 ESTABLISHING AERODROME OPERATING MINIMA*

#### 2-1-16 OTHER RELEVANT DOCUMENTATION

Applicable to: ALL

The following is a is of the other relevant documentation and applications:

- Jeppesen FD Pro X;
- Low Visibility Operations Manual (LVOM).

## **3 COMMUNICATION FACILITIES AND NAVIGATION AIDS**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### PRELIMINARY PAGES

#### SUMMARY OF HIGHLIGHTS

### 3-1 GENERAL

|                                  |   |
|----------------------------------|---|
| 3-1-1 INTRODUCTION.....          | A |
| 3-1-2 DATALINK COMMUNICATIO..... | B |
| 3-1-3 CPDLC COVERAGE EUROP.....  | C |

### 3-2 DATALINK COMMUNICATION

|                                                      |   |
|------------------------------------------------------|---|
| 3-2-1 AIRLINE (AOC) DATALINK APPLICATIONS .....      | A |
| 3-2-2 ATC DATALINK APPLICATIONS - GENERAL.....       | B |
| 3-2-3 FLIGHT PLAN FILING .....                       | C |
| 3-2-4 VOICE AND PHRASEOLOGY RELATED TO DATALINK..... | D |

### 3-3 ATC DATALINK LOGON

|                                    |   |
|------------------------------------|---|
| 3-3-1 GENERAL .....                | A |
| 3-3-2 INITIAL LOGON REQUEST .....  | B |
| 3-3-3 INITIAL LOGON RESPONSE ..... | C |
| 3-3-4 EXITING DATALINK AREAS ..... | D |

### 3-4 ATC DATALINK APPLICATIONS

|                                    |   |
|------------------------------------|---|
| 3-4-1 GENERAL .....                | A |
| 3-4-2 OPERATING PRINCIPLES .....   | B |
| 3-4-3 OPERATIONAL GUIDELINES ..... | C |
| 3-4-4 CPDLC CONNECTIONS.....       | D |
| 3-4-5 CPDLC MESSAGE TYPES.....     | E |
| 3-4-6 ADS-C.....                   | F |

### 3-5 ATC DATALINK APPLICATIONS – SOP

|                                            |   |
|--------------------------------------------|---|
| 3-5-1 GENERAL .....                        | A |
| 3-5-2 FLIGHT PREPARATION .....             | B |
| 3-5-3 PRELIMINARY COCKPIT PREPARATION..... | C |
| 3-5-4 COCKPIT PREPARATION.....             | D |
| 3-5-5 LOGON .....                          | E |
| 3-5-6 ESTABLISHING CPDLC CONNECTION .....  | F |
| 3-5-7 CPDLC COMMUNICATION .....            | G |
| 3-5-8 CLOSING CPDLC CONNECTION .....       | H |
| 3-5-9 EMERGENCY PROCEDURES .....           | I |
| 3-5-10 NON-ROUTINE PROCEDURES .....        | J |

### 3-6 ATC VOICE COMMUNICATION

|                                                                |   |
|----------------------------------------------------------------|---|
| 3-6-1 RADIO USAGE DISCIPLINE .....                             | A |
| 3-6-2 TRANSMITTING TECHNIQUE .....                             | B |
| 3-6-3 CLEARANCE ISSUE AND READ BACK REQUIREMENTS .....         | C |
| 3-6-4 SIMULTANEOUS TRANSMISSIONS .....                         | D |
| 3-6-5 FORMAT OF INITIAL CALLS.....                             | E |
| 3-6-6 SUBSEQUENT FREQUENCY CHANGES.....                        | F |
| 3-6-7 LOW VISIBILITY PROCEDURES .....                          | G |
| 3-6-8 DELAYS.....                                              | H |
| 3-6-9 AERODROME CONTROL SERVICE PHRASEOLOGY.....               | I |
| 3-6-10 DEPARTURE INFORMATION AND ENGINE START PROCEDURES ..... | J |
| 3-6-11 TAXI INSTRUCTIONS.....                                  | K |
| 3-6-12 PRE-DEPARTURE MANOEUVRING .....                         | L |

VAW

OM-C ISSUE 2 REVISION 0

3-PLP-SOH P 1/2

20 MAR 22





A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### PRELIMINARY PAGES

#### SUMMARY OF HIGHLIGHTS

|                                         |   |
|-----------------------------------------|---|
| 3-6-13 TAKE OFF CLEARANCE .....         | M |
| 3-6-14 FINAL APPROACH AND LANDING ..... | N |
| 3-6-15 RADAR PHRASEOLOGY .....          | O |
| 3-6-16 NAT HLA PHRASEOLOGY .....        | P |
| 3-6-17 COMMUNICATION FACILITIES .....   | Q |
| 3-6-18 CURRENT PHRASEOLOGY.....         | R |

### 3-7 NAVIGATION AIDS

|                     |   |
|---------------------|---|
| 3-7-1 GENERAL ..... | A |
|---------------------|---|

### 3-8 JEPPESEN DOCUMENTATION

|                     |   |
|---------------------|---|
| 3-8-1 GENERAL ..... | A |
|---------------------|---|



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

Intentionally left blank

### 3-1-1 INTRODUCTION

Applicable to: ALL

Communication will be performed using:

- Voice communication; and/or
- Datalink communication.

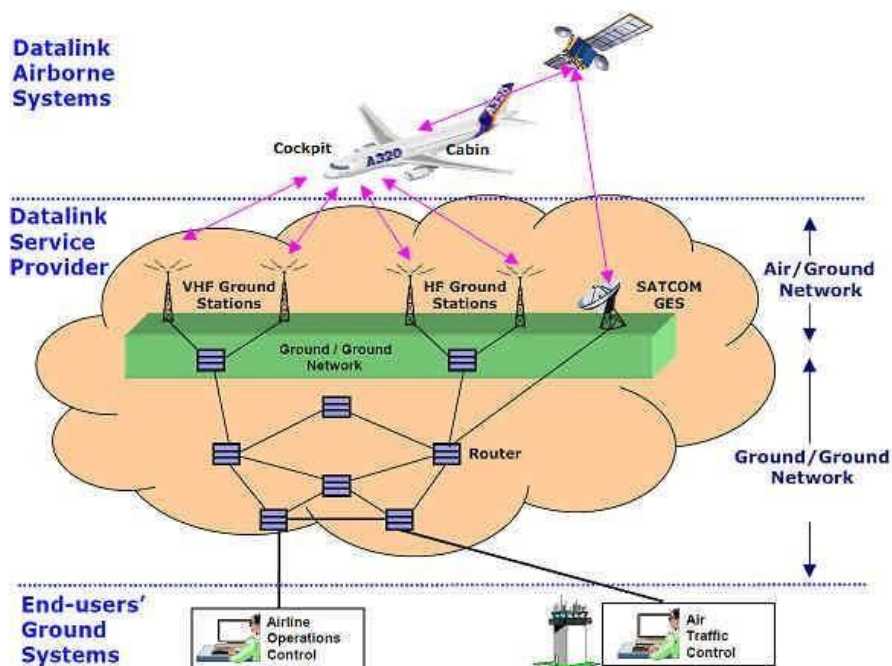
Information on communication facilities and navigation aids is published in the following parts of the Jeppesen FD Pro X:

- Frequencies of communication facilities, navigation aids and datalink logon addresses: *Refer to: Jeppesen FD Pro X – Low/High IFR;*
- Available datalink services and logon addresses. *Refer to: Jeppesen FD Pro X-Pubs-Regions-Air Traffic Control*

### 3-1-2 DATALINK COMMUNICATION

Applicable to: ALL

Datalink is the exchange of digitised information between end-users.



There is independence between applications and datalink media. Aeronautical datalink communications can be classified as follow:

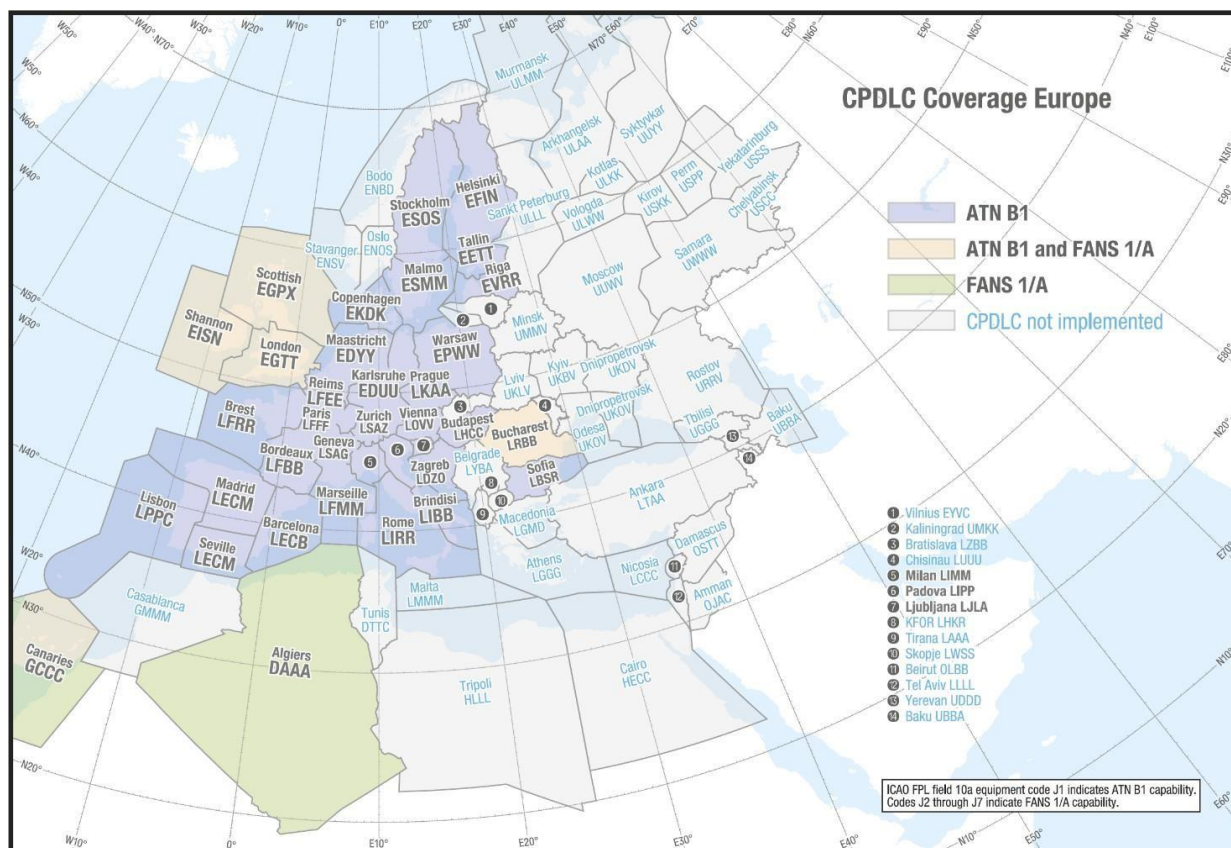
- AOC (Airline Operational Communications);
- ATC (Air Traffic Control Communications).

Information and procedures published in Fly2Sky documentation are based on the latest edition of the ICAO Global Operational Data Link (GOLD) Manual. *Refer to: Jeppesen FD Pro X-General Airway Manual-CPDLC* for background information and an excerpt of the latest edition of the Global Operational Data Link (GOLD) Manual. *Refer to: FCOM AIRCRAFT SYSTEMS-INFORMATION SYSTEMS/DATALINK* for details of the datalink system installed and type-specific operational procedures.

### 3-1-3 CPDLC COVERAGE EUROPE

Applicable to: ALL

The below given map is for reference only.





A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### DATALINK COMMUNICATION

#### 3-2-1 AIRLINE (AOC) DATALINK APPLICATIONS

Applicable to: ALL

Currently not in use at Fly2Sky.

#### 3-2-2 ATC DATALINK APPLICATIONS - GENERAL

Applicable to: ALL

### AIRSPACE VS. AIRCRAFT EQUIPMENT

#### AIRSPACE

The equipment fit required for datalink operations depends on the standards the infrastructure of the given airspace complies with. Information on the standard applied in given airspace can be found in the Jeppesen FD Pro X. *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual-Enroute Data-CPDLC*

#### AIRCRAFT

The following ATC datalink applications are currently available on Fly2Sky aircraft:

- CPDLC

Fly2sky provides updated CPDLC failure procedures, ensuring a smooth transition back to voice communication.

To use datalink:

- In a FANS 1/A standard airspace, an Airbus aircraft needs to be equipped with FANS A / A+ / A+B, or with FANS C;
- In an ATN B1 standard airspace, an Airbus aircraft needs to be equipped with FANS B / B+ / A+B, or with FANS C.

In the Fly2Sky fleet. most aircraft are equipped with FANS B+ (Future Air Navigation System B+), thus able to use ATC datalink services in ATN B1 airspace.



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### DATALINK COMMUNICATION

- *Refer to: FCOM GENERAL INFORMATION-AIRCRAFT CONFIGURATION SUMMARY/IF INSTALLED TABLE* for the FANS equipment standard installed on a particular aircraft;
- All aircraft use VDL M2 (Very high-frequency data link – mode 2) to ensure datalink through VHF;

To be able to communicate with ATC (i.e. to use CPDLC) through datalink, an aircraft also needs to be equipped with a CPDLC system.

In the Fly2Sky Fleet, most aircraft are equipped with a CPDLC system. *Refer to: QRH OPERATIONAL DATA-AIRCRAFT CONFIGURATION SUMMARY* for the CPDLC equipment installed on a particular aircraft.

*Refer to: FCOM AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK - GENERAL SYSTEM DESCRIPTION* for details of the CPDLC pilot interface.

### 3-2-3 FLIGHT PLAN FILING

Applicable to: ALL

The Fly2Sky MCC will advise the Fly2Sky OCC and flight crew about aircraft technical status of the CPDLC systems of the aircraft in the fleet. The Fly2Sky OCC shall file data link capability. The Commander shall ensure, that the ATS FPL includes the proper information and that it accurately indicates the equipment and capabilities that the flight will use anytime CPDLC services are available on any part along the route of the flight.

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Appendix 2 – Flight Plan* for details and for codes to be used for equipment capabilities.

### 3-2-4 VOICE AND PHRASEOLOGY RELATED TO DATALINK

Applicable to: ALL

Pilots must contact ATC by voice as per standard RT procedures on each change of frequency, irrespective of whether the instruction has been received by voice or CPDLC.

There is no need to indicate CPDLC capability, or active CPDLC connection at the end of the initial voice call i.e.: no need to add during check-in “**SOFIAJET , CPDLC**”.

By default, all ATC FPL will be filed indicating full aircraft datalink capability, therefore controllers in airspace where datalink service is provided expect flight crew to logon and use CPDLC communication. Both pilots must be trained and the aircraft equipment must be



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### DATALINK COMMUNICATION

operational in order to be able to use CPDLC. If either condition are not fulfilled (training not completed, or in-flight failure of equipment), this situation must be indicated during the initial voice call to each ATC with datalink, as **"SOFIAJET , UNABLE CPDLC"**

For CPDLC related phraseologies *Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication.*

For CPDLC related phraseologies to be used in 'non-standard' scenarios involving ground/aircraft system failures and communication, problems *Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*





A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### DATALINK COMMUNICATION

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK LOGON

#### 3-3-1 GENERAL

Applicable to: ALL

The Logon function is a part of the data link initiation capability (DLIC). *Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication* for details on the DLIC. The logon is the first step in the data link process. A logon, initiated either by the flight crew or automatically following a contact request from another ATS unit, shall be performed prior to the ATS unit establishing a CPDLC connection.

#### 3-3-2 INITIAL LOGON REQUEST

Applicable to: ALL

When operating outside data link airspace, the flight crew should initiate a logon 10 to 25 min prior to entry into airspace where data link services are provided. An initial logon request is needed when the aircraft does not already have a CPDLC connection, such as when:

- The aircraft is preparing for departure; or
- The aircraft will enter an area where data link services are available from an area where data link services are not available; or
- Instructed by ATC (e.g. following a failed data link transfer).

Prior to initiating the logon, the flight crew should verify the following data in the FMGS vs. ATC FPL:

- Aircraft identification (same as item 7 of the ATC flight plan);
- Aircraft registration and/or aircraft address (same as item 18, preceded by REG and/or CODE, of the ATC flight plan); and
- Departure and destination aerodromes, when required (same as items 13 and 16 of the ATC flight plan).

The flight crew should then manually initiate a logon using the logon address, as indicated on aeronautical charts. *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual- Enroute Data Europe-CPDLC Coverage Europe*. Additionally, the CPDLC Logon credentials for each country or region can be seen on its border on the High IFR Chart.

|                |                                               |
|----------------|-----------------------------------------------|
| <b>CAUTION</b> | FIR codes on the OFP are not logon addresses. |
|----------------|-----------------------------------------------|



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK LOGON

#### 3-3-3 INITIAL LOGON RESPONSE

Applicable to: ALL

The ground system automatically responds to a logon request with a logon response whether:

- The logon request was successful; or
- The logon request was unsuccessful.

The logon response message also provides information concerning the ATS data link applications the ATS unit supports.

If an indication that the logon procedure was unsuccessful is received, the flight crew should reconfirm that the logon information is correct, as defined for the initial logon and reinitiate a logon.

#### 3-3-4 EXITING DATALINK AREAS

Applicable to: ALL

Approximately 15 min after exiting CPDLC and/or ADS-C areas, the flight crew should ensure there are no active CPDLC or ADS-C connections. Ensuring that connections are not active eliminates the possibility of inadvertent or inappropriate use of the connections.

The flight crew should consult the current ATS unit prior to the manual termination of any ADS contract, even if it is suspected to be unnecessary or that its termination has failed.

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*

**3-4-1 GENERAL****Applicable to: ALL**

Controller-Pilot Data Link Communications (CPDLC) enables the flight crew and controllers to exchange routine, non-time-critical instructions, clearances and requests via datalink text messages.

***Note:** CPDLC is not intended to be used in situations, where speed of delivery, and assurance of receipt of an instruction, are of a time-critical nature in order to ensure the immediate safety of an aircraft.*

The CPDLC infrastructure is designed to provide service above FL285 but may be available below this level in some regions. The introduction of CPDLC will be on a state by state basis depending on the upgrade of ATC systems at each of the area control centres. The Availability of CPDLC will be indicated on Enroute charts.

**3-4-2 OPERATING PRINCIPLES****Applicable to: ALL**

The following two underlying principles are applicable to the use of voice versus CPDLC:

- Voice and data links will co-exist as a means of ATS communication. Implementation of CPDLC in continental airspace is intended as a supplementary means of communication to the use of voice communication.
- CPDLC is intended to be used in the context of non-time-critical communications. Time-criticality is mainly determined by the following factors: ATC traffic situation, end-to-end performance (systems and flight crew/controller response time) and recovery time.

***Note:** A time-critical situation is a situation when prompt controlling action is required in the provision of air traffic services.*

**WHEN TO USE VOICE AND WHEN TO USE CPDLC**

The flight crew will determine the communication medium used at any given time. The flight crew shall respond to a CPDLC message via CPDLC and should respond to a voice message via voice. Pilots must contact ATC by voice as per standard RT procedures on

each change of frequency, irrespective whether the instruction has been received by voice or CPDLC. When required, a voice read back shall be used, as specified in the respective Aeronautical Information Publications (AIPs) for profile changing CPDLC messages.

*Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual- Enroute Data Europe-CPDLC Coverage Europe*

In the event of a technical fault affecting CPDLC, logoff and revert to voice communication. If there is any doubt as to the meaning or intent of a specific clearance, respond to the uplink message with **“UNABLE”** and revert to voice.

During an emergency, the flight crew would normally revert to voice communications. However, the flight crew may use CPDLC for emergency communications if it is either more expedient or if voice contact cannot be established.

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*

### 3-4-3 OPERATIONAL GUIDELINES

Applicable to: ALL

#### **POTENTIAL RISKS ASSOCIATED WITH USING CPDLC**

- The crew may not be familiar with the datalink equipment – potential misuse of equipment;
- Use of CPDLC reduces voice communication, the crew is unaware of communication with other traffic – the potential loss of situational awareness;
- Interpretation of the same message can be different by each pilot – potential ambiguity and non-compliance with instructions, level bust, loss of separation;
- Both pilots may be naturally tempted to get occupied with the interpretation of a CPDLC uplink/downlink message at the same time – potential head down status of both pilots, loss of situational awareness;
- A pilot may be tempted to read incoming CPDLC messages aloud resulting in that messages are not 'heard and understood' independently by the flight crew members – potential confirmation bias;
- CPDLC allows controllers and pilots to send long and complex messages – potential misunderstanding of, or partial compliance with clearances;
- CPDLC is only to be used in non-time-critical situations- potential misunderstanding of time-critical;
- With CPDLC it is much easier (compared to using voice) to transmit a message to an

- aircraft (importance of correct call-sign inserted in FMS!) – potential for sending the wrong message to an aircraft, or sending the message to the wrong aircraft;
- With CPDLC it is possible that an aircraft is using voice to communicate with one ATS unit (or sector) while being CPDLC connected to another – potential conflicting instructions causing loss of separation;
  - CPDLC allows users to send messages in 'free text' format – potential misunderstanding and confusion due to non-standard phrases;
  - Dialogues may be 'open' when transferring the control of an aircraft to a new data authority (i.e. new ATS unit). When transferring aircraft between different sectors within the same data authority (ATS unit) it is technically possible to transfer the open dialogue to the receiving sector – potential conflicting instructions causing loss of separation;
  - Temporary absence or change/swap of a flight crew member – the potential loss of situational awareness;
  - Flight Crew may be tempted to use printer based information, as a reference – potential incompleteness/inaccuracy of messages;
  - ATC handover received by CPDLC – the potential omission of frequency change, loss of communication;
  - Misuse of CPDLC during abnormal/emergency situations – potential high workload, human error, misallocation of tasks;
  - Parallel usage of voice and CPDLC communication – potential ambiguity about the proper communication media to use;

### **GUIDELINES ADDRESSING IDENTIFIED RISKS**

Some general operational guidelines including Crew Resource Management and Human Factors:

- Operation of CPDL requires appropriate familiarization with procedures and equipment. Both pilots must have completed training for datalink operations in order to use CPDLC during the flight.
- Operation of CPDLC is a PM function as per R/T communications.
- The operation of CPDLC must not interfere with the safety of the flight. Operation of CPDLC must be avoided at critical flight phases and in high workload situations. Generally, CPDLC is not available in low-level airspace for approach and departure.
- When a CPDLC uplink is received, each flight crew member must read the message from the flight deck displays individually. Once the message has been individually read, the flight crew shall then discuss whether to respond to the message with wilco or roger, as appropriate, or unable.
- When processing a multi-element uplink message:

- The flight crew should ensure that the entire message has been read and understood in the correct sequence prior to responding;
- The flight crew should only respond with **WILCO** if all the clearances in the entire message can be complied with;
- If the flight crew cannot comply with any portion of a multi-element message, the flight crew shall respond to the entire message with **UNABLE**.
- Clearances must not be actioned until a **WILCO** response has been sent and **RECEIVED BY ATC** is indicated.
- To clear the screen for additional messages, ensure that messages are closed after they are:
  - Sent; or
  - Answered and related actions are performed (if any).
- Avoid sending multiple clearance requests in the same message;
- Avoid duplicate messages - see the following recommendations;
  - Answer incoming messages before 100s (otherwise they will time-out);
  - Do not re-send a message, when ATC does not answer immediately.
- Review all pages of each message on the display before sending. For this reason, the \*symbol is not available in front of the **SEND** prompt until all pages have been displayed;
- All the time apply priority policy aviate/navigate/communicate. Disregard CPDLC messages if it is required to focus on higher priorities;
- Any time when a 'handover briefing' is necessary between flight crew members (e.g. leaving/return to cockpit), datalink and CPDLC status must also be included;
- Flight crew should continuously monitor the appropriate emergency frequency and when required, maintain a listening or SELCAL watch on the specified backup or secondary frequency (frequencies);
- Free text messages:
  - Should generally not be used;
  - May be used where supported by ATC datalink services and when an appropriate standard message element does not exist;

- Shall be composed of standard ATS phraseology and format and shall not contain nonessential words and phrases. Abbreviations should only be included when they form part of standard ICAO phraseology.

### 3-4-4 CPDLC CONNECTIONS

Applicable to: ALL

#### **GENERAL**

The purpose of a CPDLC connection is to allow the exchange of CPDLC messages between an aircraft and an ATS unit (active connection with Current Data Authority – CDA), and also to provide an advance connection with the next ATS unit (inactive connection with the Next Data Authority – NDA).

An aircraft can have a maximum of two CPDLC connections established concurrently, each with a different ATS unit. Only one CPDLC connection can be active at any given time; any second connection is inactive.

#### **ESTABLISHING CPDLC CONNECTION**

The ATS unit initiates a CPDLC connection by sending a CPDLC connection request to the aircraft. The ATS unit can only initiate a CPDLC connection request after successfully correlating an aircraft with the associated flight plan. Provided there is no existing CPDLC connection, the aircraft system:

- Accepts the connection request;
- Establishes this CPDLC connection as the active connection; and
- Responds with a CPDLC connection confirmation.

If there is an existing CPDLC connection when a CPDLC connection request is received, the aircraft system verifies that the ATS unit sending the CPDLC connection request has been specified as the next data authority. In this case, the aircraft system:

- Accepts the CPDLC connection request;
- Establishes the connection, which is inactive; and
- Responds with a CPDLC connection confirm;
- Otherwise, the aircraft system rejects the CPDLC connection request by sending a



connection rejection message.

In the event of an unexpected CPDLC disconnect, the flight crew may attempt to reinitiate a logon to resume data link operations. *Refer to FCOM AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK - HOW TO/HOW TO CONNECT*

### **TERMINATING A CPDLC CONNECTION**

The Current Data Authority initiates the termination of the CPDLC connection by sending a termination request message to the aircraft. On receipt of a termination request message (without any additional message elements), the aircraft system will downlink a CPDLC termination confirm message. The aircraft system will consider the aircraft to be disconnected as soon as the termination confirm the message has been sent.

On receipt of a termination request message containing a message element with a response attribute, such as a **CONTACT** or **MONITOR** message element the aircraft system will:

- Display the message contained in the termination request message for flight crew processing; and
- If the flight crew responds with **WILCO**, send a CPDLC termination to confirm the message and then consider the aircraft to be disconnected; or
- If the flight crew responds with **UNABLE** or **STANDBY**, maintain the CPDLC connection with the current data authority (and the next data authority, if any).

### **3-4-5 CPDLC MESSAGE TYPES**

Applicable to: ALL

CPDLC messages can be:

- Uplink, or Downlink messages;
- Instructions (clearances), notifications, requests, indications, advisories, acknowledgements or free text messages.

### **UPLINK MESSAGES**

CPDLC - Uplink Messages are messages sent from ATS unit to aircraft.

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - CPDLC

#### **DOWNLINK MESSAGES**

CPDLC - Downlink Messages are messages sent from the aircraft to the ATS unit. *Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*

#### **3-4-6 ADS-C**

Applicable to: ALL

Currently, not in use at Fly2Sky.



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - CPDLC

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

#### 3-5-1 GENERAL

Applicable to: ALL

Procedures published in this manual are additional to type-specific SOP published in Airbus documents and address the inherent risks associated with using the human-machine interface of datalink equipment, identified during a risk assessment process. General policy and task sharing shall be followed, as published.

#### 3-5-2 FLIGHT PREPARATION

Applicable to: ALL

##### OMC/ERM

Check datalink availability and requirements along the planned route. *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual- Enroute Data Europe-CPDLC Coverage Europe.* Refer also to any NOTAMs for the datalink requirements.

##### OFP

Check, that ATC FPL (on OFP) indicates the required aircraft equipment/datalink capability - Item 10. 10a includes the appropriate CPDLC equipment descriptor (e.g. 'J1' for ATN B1 airspace, 'J4' for FANS 1/A airspace). 10b includes the appropriate ADS-C descriptor for Fly2Sky FANS C aircraft ('D1' for FANS 1/A airspace and/or 'G1' for ATN airspace). Item 18 includes the registration number of the aircraft under REG and the aircraft address (alphanumeric code of six hexadecimal characters) under CODE.

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Appendix 2 – Flight Plan*

#### 3-5-3 PRELIMINARY COCKPIT PREPARATION

Applicable to: ALL

##### AIRCRAFT TECHNICAL STATUS

Check the MEL status of the aircraft against the airspace requirements along the planned route. When necessary, coordinate with OCC in order to ensure, that:



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

- The filed ATC FPL reflects the equipment status of the aircraft;  
*Note: OCC is provided with a regular report on aircraft status therefore will ensure, that aircraft equipment indicated in ATC FPL will reflect the actual aircraft status.*
- The planned route/level has changed, if needed in order to avoid airspace where establishing datalink connection is mandatory;
- The pre-flight fuel calculation caters for any changes in the planned route/level.

## 3-5-4 COCKPIT PREPARATION

Applicable to: ALL

### DATALINK INITIALIZATION

In normal operations, the datalink system is automatically initialized on all Fly2Sky aircraft during cockpit preparation. In case of unsuccessful logon, the system settings can be checked and a manual initialization may be performed

*Refer to: FCOM AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO INITIALIZE*

## 3-5-5 LOGON

Applicable to: ALL

The PM performs a logon and advises PF on the notification status. A CPDLC connection requires a successfully completed datalink logon procedure before the ATS unit can establish a CPDLC connection with the aircraft.

Logon notification can be sent while on the ground if ATC datalink signal coverage is available. Otherwise, notification shall not be sent until after takeoff/initial climb when workload has reduced. It is recommended to wait until levelled off for cruise, but if workload permits the logon can be performed in climb, after passing FL100.

*Refer to FCOM DSC-AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO NOTIFY* for detailed type-specific logon procedure.



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

#### 3-5-6 ESTABLISHING CPDLC CONNECTION

Applicable to: ALL

The ATS unit initiates a CPDLC connection by sending a CPDLC connection request to the aircraft. Each time a CPDLC connection is established, the flight crew should ensure the identifier displayed on the aircraft system matches the logon address for the controlling authority.

*Refer to: FCOM DSC-AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO CONNECT* for detailed type-specific information.

#### 3-5-7 CPDLC COMMUNICATION

Applicable to: ALL

##### **GENERAL**

CPDLC shall not be used:

- Before passing FL100 in climb;
- After passing FL 150 in descent.

##### **CAUTION**

Both pilots may be naturally tempted to get occupied with the handling of a CPDLC uplink/downlink message at the same time. The head-down status of both pilots may lead to the loss of situational awareness. To ensure proper task-sharing according to SOP, one pilot must be 'head-up' the aircraft at all times.

##### **UPLINK MESSAGE FROM ATC**

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication* for the detailed description of different uplink messages.

*Refer to: FCOM DSC-AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO ANSWER*

After receiving and individually reviewing an uplink message, all flight crew members briefly



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

discuss the appropriate option to select in order to answer the received message.

Note: The flight crew shall not use printer based information as a reference when reading the message.

The following prompts may be available for selection as a reply depending on the situation:

- STBY - if further discussion is needed to provide an appropriate answer to the message received
- UNABLE - if it is agreed that the request/instruction cannot be complied with
- WILCO - if it is agreed that the request/instruction can be complied with
- AFFIRM - when the answer is positive (yes) to a request
- NEGATIVE - when the answer is negative (no) to a request
- ROGER - when the notification is understood by all flight crew members

Note: Options causing changes related to the control of aircraft trajectory (e.g. "LOAD" which will result in loading parameters from the CPDLC system to the flight management system), shall be selected by the PF.

| Crew coordination                                |                                                                                                               |                                                                                                                      |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| EVENT                                            | PF                                                                                                            | PM                                                                                                                   |
| CPDLC message received (Glare shield: 'ATC MSG') |                                                                                                               | Calls out <b>"ATC MESSAGE" (1)</b>                                                                                   |
|                                                  | Silently and independently read the message from the display, then discuss the prompt (reply) to be selected. |                                                                                                                      |
| Option discussed and decided calls               |                                                                                                               | Selects the appropriate prompt in accordance with the flight crew agreement, then calls out <b>"CONFIRM"</b>         |
|                                                  | checks the selected prompt, then out <b>"CONFIRMED/NEGATIVE"</b>                                              |                                                                                                                      |
|                                                  |                                                                                                               | If PF calls <b>"CONFIRMED"</b> : Sends the message, If PF calls <b>"NEGATIVE"</b> : Corrects, or cancels the message |



A320/A321

OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

|                                                                 |                                         |                            |
|-----------------------------------------------------------------|-----------------------------------------|----------------------------|
| Message received by ATC<br>(‘RECEIVED BY ATC’ (2)<br>displayed) | Perform the agreed action(s), if any    |                            |
|                                                                 | Reads out the relevant<br>FMA change(s) |                            |
|                                                                 |                                         | selects ‘CLOSE’ prompt (3) |

- (1) *If PM does not make the call, PF shall make it.*
- (2) *This message may not always be shown after replying to an uplink request of changing voice communication frequency.*
- (3) *Close messages only after the agreed actions (e.g. turn to a waypoint or check-in to a new frequency) have been performed.*

### **CLOSING UPLINK MESSAGES**

The PM shall close all uplink messages after the related/agreed actions are performed. This is to avoid congestion of open messages. Do not close messages answered by WILCO before executing the related actions. Do not close uplink messages requiring a change of voice frequency before contact on the next voice frequency has been established.

### **DOWNLINK MESSAGE (CREW REQUEST) TO ATC**

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication*

Refer to FCOM DSC-AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO SEND REQUEST TO ATC

Before sending any downlink message to ATC, flight crew members shall discuss the planned action(s).



| Crew coordination                     |                                                                |                                                                                                                  |
|---------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| EVENT                                 | PF                                                             | PM                                                                                                               |
| Planned<br>discussed<br><br>action(s) | "REPORT/REQUEST<br>CPDLC" VIA                                  |                                                                                                                  |
|                                       |                                                                | Composes the message on MCDU transfers to the DCDU, then Calls out <b>"MESSAGE IS READY, CONFIRM"</b>            |
|                                       | Checks the message, then Calls out <b>"CONFIRMED/NEGATIVE"</b> |                                                                                                                  |
|                                       |                                                                | If PF calls <b>"CONFIRMED"</b> Sends the message, If PF calls <b>"NEGATIVE"</b> Corrects, or cancels the message |



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

## POSITION REPORTS

Position reports may be required in airspaces where there is no ATC radar coverage (e.g. remote parts of Oceanic airspace). When position reports are required, those can be sent automatically, or manually.

*Refer to: FCOM DSC-AIRCRAFT SYSTEMS-INFORMATION SYSTEMS-DATALINK-HOW TO-HOW TO SEND POSITION REPORT*

### 3-5-8 CLOSING CPDLC CONNECTION

Applicable to: ALL

Approximately 15min after exiting CPDLC and/or ADS-C areas, or when passing FL 150 in descent, the PM: checks and performs CPDLC disconnection, then call out: **“CPDLC DISCONNECTED”**.

### 3-5-9 EMERGENCY PROCEDURES

Applicable to: ALL

On FANS B+ equipped aircraft (most of the Fly2Sky fleet – refer to aircraft configuration summary), emergency message elements are not supported. Therefore, in case of emergency, revert to voice communication.

### 3-5-10 NON-ROUTINE PROCEDURES

Applicable to: ALL

## GENERAL

Non-routine procedures address communication problems encountered during using CPDLC and assume, voice communication is still available. *Refer to: FCOM PROCEDURES-ABNORMAL AND EMERGENCY PROCEDURES-DATALINK* for related type-specific procedures.

## COMMUNICATION PROCEDURES

*Refer to: Jeppesen FD Pro X-Pubs-General Airway Manual-Controller Pilot Datalink Communication for guidance on: Datalink initiation failure;*



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

- Datalink system failure;
- Using CPDLC to relay messages.

#### **REPORTING**

Occurrences for which it is mandatory to file an occurrence report, especially effecting:

- Air Navigation Services – *Refer to: OM-A 11-2-3 MANDATORY OCCURANCE REPORTING*
- Air Navigation Services and Facilities – *Refer to: OM-A 11-2-3 MANDATORY OCCURANCE REPORTING*
- Datalink initiation failure – an ASR shall be filed in order to notify state/regional monitoring agencies;
- Datalink system failure – The flight crew shall notify the ATS unit by voice and shall open a new Defect as per OM-A procedures *Refer to: OM-A 8-1-11 TECHNICAL/FLIGHT LOGBOOK*



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC DATALINK APPLICATIONS - SOP

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

#### 3-6-1 RADIO USAGE DISCIPLINE

Applicable to: ALL

Radiotelephony provides the means by which pilots and ground personnel communicate with each other. Used properly, the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. However, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology.

The importance of using correct and precise standard phraseology cannot be over-emphasised. The need for clear and unambiguous communication of level change and heading instructions, including the correct use of callsigns and readback requirements between Air Traffic Control (ATC) and the Flight Deck Crew, has long been recognised as an important factor in assisting the safe and expeditious operation of aircraft. It is therefore vital that the RT discipline practised by both pilots and controllers alike reflects this philosophy.

#### **WHY IS RT DISCIPLINE IMPORTANT**

When RT discipline is relaxed, for example by the use of non-standard procedures or phraseology, misunderstandings can arise. There are many examples throughout the world where these misunderstandings have directly contributed to fatal accidents, AIRPROX events, and other safety-related incidents.

#### **WHAT CAN RT DISCIPLINE ACHIEVE**

By adhering to standard phraseology and technique, pilots and ATC can play a very important part in preventing accidents and incidents. The following tangible benefits are readily apparent:

- Standard phraseology prevents misunderstandings or language difficulties, particularly where English may not be the pilot's first language.
- Standard phraseology can assist pilots in building up situational awareness of the other airspace users in their vicinity.
- By making standard reports and correctly carrying out readbacks, the need for further confirmation by the ATC from pilots can be reduced, leading to workload reductions and a decrease in frequency congestion.

- Potential errors by either ATC or aircrew can be detected and corrected, thus preventing potential accidents, AIRPROX events, and incidents.

### **WHAT CAN I DO TO IMPROVE MY RT DISCIPLINE**

The following points will help you to improve your RT discipline:

- Always aim for accurate, brief, and clear transmissions. Listen carefully to transmissions and don't just hear what you expect to hear;
- Before transmitting, it is important to listen out first. Ensure that you don't interrupt a dialogue or block another transmission;
- Always use your full callsign, except where the ground station has abbreviated it;
- On first contact with an ATC Centre pilots must report their actual Flight Level/Altitude and cleared Flight Level/Altitude if different. On a Standard Instrument Departure (SID) pilots must report the passing altitude, initially cleared level and SID identification. These reports provide ATC with a safety check and level verification and allow other airspace users to build up situational awareness;
- All instructions and clearances should be passed in a clear and unambiguous manner using Standard phraseology. This is especially important for heading and level instructions which should contain the correct term (Height, Altitude, Flight Level or Heading);
- Controllers should endeavour to limit the number of instructions passed in any one transmission to a maximum of three - ideally only two if practicable. Where there are large amounts of numbers to be passed, then speak clearly and slowly;
- Pilots should always read back the ATC messages. Controllers should always ensure that they receive these readbacks;
- If you are in doubt about any transmission received or do not receive an expected read back, then check and ask for verification.

### **ADVICE TO FLIGHT CREW**

- If in doubt about an ATC instruction, do not use readback for confirmation.
- Positively confirm instructions with ATC if any doubt exists between crew members.
- Use headsets, especially during times of high RTF loading.
- Do not clip transmissions.
- Confirm unexpected instructions for any particular stage of flight.
- Advise ATC if it is suspected that any other aircraft has misinterpreted an instruction. ATC may be unaware of this fact.

- Exercise particular caution when members of the flight crew are involved in other tasks

and may not be monitoring the RTF.

- At the critical stage of flight actively monitor ATC instructions and compliance with them.
- Use full RTF call sign at all times.
- Use correct RTF procedures and discipline at all times.
- In case of callsign confusion, the flight crew should inform the OCC department and fill ASR if safety was jeopardized due to callsign confusion (i.e. other traffic repeated a clearance and practised which actually was given to you or vice-versa).

### **3-6-2 TRANSMITTING TECHNIQUE**

Applicable to: ALL

The following transmitting techniques will assist in ensuring that transmitted speech is clearly and satisfactorily received.

- Before transmitting check that the receiver volume is set at the optimum level and listen out on the frequency to be used to ensure that there will be no interference with a transmission from another station.
- Be familiar with microphone operating techniques and do not turn your head away from it whilst talking or vary the distance between it and your mouth. Severe distortion of speech may arise from:
  - Talking too close to the microphone;
  - Touching the microphone with the lips; or
  - Holding the microphone
- Use a normal conversational tone, speak clearly and distinctly.
- Maintain an even rate of speech not exceeding 100 words per minute - when it is known that elements of the message will be written down by the recipients, speak at a slightly slower rate.
- Maintain the speaking volume at a constant level.
- A slight pause before and after numbers will assist in making them easier to understand.
- Avoid using hesitation sounds such as 'er'.
- Avoid excessive use of courtesies and entering into non-operational conversations.
- Depress the transmit switch fully before speaking and do not release it until the message is complete. This will ensure that the entire message is transmitted.
- However, do not depress transmit switch until ready to speak.
- Be aware that the mother tongue of the person receiving the message may not be English.

Therefore, speak clearly and use standard radiotelephony (RTF) words and phrases wherever possible.

- Messages should not contain more than three specific phrases, comprising a clearance, instruction or pertinent information. In cases of doubt, e.g. a foreign pilot having difficulty with the English language or an inexperienced pilot unsure of the procedures, the controller should reduce the number of items and if necessary these should be passed, and acknowledged, singly.

One of the most irritating and potentially dangerous situations in radiotelephony is a 'stuck' microphone button. Always ensure that the button is released after a transmission and the microphone placed in an appropriate place that will ensure that it will not inadvertently be switched on. After a call has been made, a period of at least 10 seconds should elapse before a second call is made. This should eliminate unnecessary transmissions while the receiving station is getting ready to reply to the initial call.

### 3-6-3 CLEARANCE ISSUE AND READ BACK REQUIREMENTS

Applicable to: ALL

Controllers will pass a clearance slowly and clearly since the pilot needs to write it down; wasteful repetition will thus be avoided. Whenever possible, a route clearance should be passed to an aircraft before start-up and the aircraft's full callsign will always be used. A route clearance and local departure instructions shall not be passed in the same transmission. Generally, controllers will avoid passing a clearance to a pilot engaged in complicated taxiing manoeuvres and on no occasion when the pilot is engaged in a lineup or take-off manoeuvres.

An ATC route clearance is NOT an instruction to take-off or enter an active runway. The words TAKE-OFF are used only when an aircraft is cleared for take-off. At all other times, the word DEPARTURE is used. The stringency of the read back requirement is directly related to the possible seriousness of a misunderstanding in the transmission and receipt of ATC clearance and instructions. ATC route clearances shall always be read back unless otherwise authorised by the appropriate ATS authority in which case they shall be acknowledged in a positive manner. Read backs shall always include the aircraft callsign.

The ATS messages listed below are to be read back in full by the pilot. If a readback is not received the pilot will be asked to do so. Similarly, the pilot is expected to request that instructions are repeated or clarified if any are not fully understood:

- Taxi/Towing Instructions
- Level Instructions



- Heading Instructions
- Speed Instructions
- Airways or Route Clearances
- Approach Clearances
- Runway-in-Use
- Clearance to Enter, Land On, Take-Off On, Backtrack, Cross, or Hold Short of any Active Runway.
- SSR Operating Instructions
- Altimeter Settings
- VDF Information
- Frequency Changes
- Type of ATS Service
- Transition Levels

If at any time a pilot receives a clearance or instruction with which he cannot comply, he should advise the controller using the phrase UNABLE (TO COMPLY) and give the reason(s). When an amendment is made to a clearance the new clearance shall be read in full to the pilot and shall automatically cancel any previous clearance. Controllers must be aware, therefore, that if the original clearance included a restriction, e.g. "cross KTN FL150 or below" then the issue of a revised clearance automatically cancels the earlier restriction, unless it is reiterated with the revised clearance. Pilots shall confirm if such a restriction do not appear at the additional route clearance.

When any doubt exists as to whether a message containing critical information has been passed by the controller or received and understood by the pilot, the message must be repeated. Critical information is information, other than that required to enable routine flight, which must be received by pilots to ensure the safety and effective operation of their aircraft. The following can be considered as examples of critical information:

- Low Visibility Procedures
- Windshear Warnings
- Essential Aerodrome Information
- Equipment serviceability (i.e. ILS/navigational aids)
- Weather hazards (thunderstorms, hail, icing, etc.)



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

#### 3-6-4 SIMULTANEOUS TRANSMISSIONS

Applicable to: ALL

Direct communications between pilots and ATSU can be adversely affected by simultaneous transmissions which, effectively, block all or part of intended messages. Moreover, whilst the situation may be apparent to the controller or another pilot, the individuals who inadvertently make such transmissions may be unaware. On hearing a simultaneous transmission it can be helpful for the controller (or another pilot if it is the controller's transmission that has been blocked) to draw attention to the situation using the word 'blocked'.

Pilots are expected to comply with ATC instructions as soon as they are issued. However, when a climb/descent is left to the discretion of the pilot, the words 'when ready' shall be used. When pilots are instructed to report leaving a level, they should advise ATC that they have left an assigned level only when the aircraft's altimeter indicates that the aircraft has actually departed from that level and is maintaining a positive rate of climb or descent, in accordance with published procedures.

#### 3-6-5 FORMAT OF INITIAL CALLS

Applicable to: ALL

Pilots of aircraft flying Instrument Departures (including those outside controlled airspace) shall include the following information on initial contact with the first Enroute ATS Unit

- Callsign;
- SID or Standard Departure Route Designator (where appropriate);
- Current or passing level;
- Initial climb level (i.e. the first level at which the aircraft will level off unless otherwise cleared. For example, on a Standard Instrument Departure that involves a stepped climb profile, the initial climb level will be the first level specified in the profile).

#### 3-6-6 SUBSEQUENT FREQUENCY CHANGES

Applicable to: ALL

Unless otherwise instructed or previous paragraph (being on an SID) applies, when changing communication channel to an ATC unit (including changes within the same ATS unit), the



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

initial call on the new channel shall include aircraft identification, level and the point of navigation.

Level information should be included in the report as follows:

- If the aircraft is in level flight but cleared to another level, the call shall include the aircraft identification followed by the current level and the cleared level;
- If the aircraft is not in level flight, the call shall include passing level;
- If aircraft has been assigned a speed or a heading, the initial call shall also include the assigned speed or heading.

### 3-6-7 LOW VISIBILITY PROCEDURES

Applicable to: ALL

Aerodromes that wish to continue operating in poor visibility or are available for instrument approaches in conditions of low cloud are required to develop and maintain Low Visibility Procedures (LVP). Controllers shall advise pilots of the implementation and subsequent cancellation of LVP at an aerodrome.

### 3-6-8 DELAYS

Applicable to: ALL

Where an aircraft is required to hold before making an approach the expected delay shall be passed to the pilot. Expected Approach Time (EAT) is the time that Approach Control estimate that an aircraft will be able to leave the holding facility, following a delay, to commence its approach to land. If for reasons other than weather, e.g. an obstruction on the runway, the extent of the delay is not known, aircraft are to be advised "delay not determined" followed by the reason for the delay.

### 3-6-9 AERODROME CONTROL SERVICE PHRASEOLOGY

Applicable to: ALL

Concise and unambiguous phraseology used at the correct time is vital to the smooth, safe and expeditious running of an aerodrome and associated terminal zone. It is not only the means by which instructions and information are passed but it also assists pilots in maintaining an awareness of other traffic in their vicinity, particularly in poor visibility conditions.



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

Messages will not be transmitted to an aircraft during take-off, the last part of the final approach or the landing roll, unless it is necessary for safety reasons, because it will be distracting to the pilot at a time when the cockpit workload is often at its highest.

### 3-6-10 DEPARTURE INFORMATION AND ENGINE START PROCEDURES

Applicable to: ALL

Where no ATIS is provided the pilot will ask for current aerodrome information during flight preparation. On the first occasion of a request for engine start/pushback or route clearance, the pilot will state the location of the aircraft and acknowledge receipt of the departure ATIS broadcast identifying letter together with the QNH (QFE if the local procedure requires it). When the pilot request pushback the stand to ATC will be reported again for easy identification. When there will be a delay for push back or engine start-up the controller will normally indicate a time to start up or expect to start up.

### 3-6-11 TAXI INSTRUCTIONS

Applicable to: ALL

Taxi instructions issued by a controller will always contain a clearance limit, which is the point at which the aircraft must stop unless further permission to proceed is given. For departing aircraft, the clearance limit will normally be the holding point of the runway in use, but it may be any other position on the aerodrome depending on the prevailing traffic. Taxi clearances should, wherever possible, be noted down by pilots (by PM to the OFP or MCDU).

Controllers are not to instruct aircraft or vehicles to cross illuminated red stop-bars used at the runway and intermediate taxiway holding positions. The aerodrome operator may decide, on the grounds of safety, that inoperable stop-bars and associated taxiways be withdrawn from service and alternative routes used where practicable.

On the occasions when the withdrawal of inoperable stop-bars is not possible and the stop-bars cannot be readily suppressed, under exceptional circumstances, an aircraft may be instructed to cross such an illuminated stop-bar. For this occasion follow me the car will guide the aircraft to cross the inoperable stop bar.

If the instructions given to surface traffic involve crossing a runway in use, clearance to cross should normally be withheld until no conflict exists. However, to achieve greater efficiency of operation, clearance to cross may be given subject to aircraft, which are landing or taking off. The conditional clearance shall contain sufficient information to enable the pilot of the taxiing aircraft or vehicle driver to identify the other traffic and should be related to one movement



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

only.

It is Fly2Sky procedure to switch ON Strobe light (unless dispatch with MEL in case of inoperative Strobe light) and transponder while crossing an active runway after crossing the runway strobe and transponder to be switched as required by the situation. Both pilots must be on active controlling frequency when clearance for crossing is issued and acknowledged by the pilot.

### 3-6-12 PRE-DEPARTURE MANOEUVRING

Applicable to: ALL

Meticulous care has been taken to ensure that the phraseology which is to be employed during the pre-departure manoeuvres cannot be interpreted as a take-off clearance. This is to avoid any misunderstanding in the granting or acknowledgement of take-off clearances and the serious consequences that could result.

At busy aerodromes with a separate ground and tower function, aircraft are usually transferred to the tower frequency at or approaching the holding point. Air Traffic controllers may ask if a pilot can accept an intersection departure.

When line-up will take place at a position other than for a full-length runway departure the intermediate Holding Point designator shall be included in the line-up instruction. If a back track is approved by ATC it should also be clearly communicated by the ATC unit and will be acknowledged by the pilot.

### 3-6-13 TAKE OFF CLEARANCE

Applicable to: ALL

Controllers will use the following phraseology for take-off: **“SOFIAJET\_, CLEARED FOR TAKE OFF”** which will be acknowledged by the aircraft as: **“CLEARED FOR TAKE OFF, SOFIAJET\_”**.

The surface wind will be passed by the ATC unit if there is a significant difference to that already passed. It need not be read-back by the pilot but it is required to make sure it is within limits for the operation of the aircraft. A take-off clearance shall be issued separately from any other clearance message by the ATC unit. For traffic reasons, a controller may consider it necessary for an aircraft to take off without any delay.

Therefore, when given the instruction; **“SOFIAJET\_, CLEARED FOR IMMEDIATE TAKEOFF”**. The pilot is expected to act as follows:

- At the holding point: taxi immediately onto the runway and commence take-off without stopping the aircraft.
- If already lined up on the runway: take-off without delay. Should an immediate take-off not be possible, the pilot is to advise the ATC personnel.

### 3-6-14 FINAL APPROACH AND LANDING

Applicable to: ALL

A final report is made when an aircraft has turned onto the final approach during a visual traffic pattern. The landing/touch and go/low approach clearance will include the runway designation. Where equipped, an 'outer marker' report is necessary as instructed by the ATC unit. The interception of ILS must be reported (unless requested otherwise by ATC) which will also include the runway in use.

The runway may be obstructed when the aircraft makes its 'final' or 'outer marker' report at 4 NM from touchdown but is expected to be available in good time for the aircraft to make a safe landing. On these occasions, the controller will delay landing clearance. The controller may or may not explain why the landing clearance has been delayed but the instruction to 'continue' is NOT an approval to land and the pilot must wait for landing clearance.

#### **LOW PASS**

A pilot may request to fly past the control tower or other observation point for the purpose of visual inspection from the ground. If the low pass is made for the purpose of observing the undercarriage, one of the following replies could be used to describe its condition but these examples are not exhaustive:

- Landing gear appears down;
- Right, left, or nose wheel appears up (or down);
- Wheels appear up;
- The right, left, or nose wheel does not appear up (or down).

The information given by the ATC unit is information only and the final responsibility and decision lie on the captain, as it is hard to determine the position of the gear and its locking status from distance.

**MISSED APPROACH**

Instructions to carry out a missed approach may be given to avert an unsafe situation. When a missed approach is initiated cockpit workload is inevitably high. Any transmissions to aircraft going around shall be brief and kept to a minimum. An aircraft on an instrument approach is to carry out the published missed approach procedure (unless instructed otherwise) and an aircraft operating VFR is to continue into the normal traffic circuit unless instructions are issued to the contrary. In the event of missed approach being initiated by the pilot, the phrase "Going-around" shall be used.

**RUNWAY VACATING AND COMMUNICATING AFTER LANDING**

Unless absolutely necessary, controllers will not give taxi instructions to pilots until the landing roll is complete. Unless otherwise advised, pilots should remain on tower frequency until the runway is vacated.

**3-6-15 RADAR PHRASEOLOGY**

Applicable to: ALL

The phrase "Radar Control" shall only be used when a radar control service is being provided. Normally, however, the callsign suffix used by the radar unit is sufficient to indicate its function. In a radar environment heading information given by the pilot and heading instructions given by controllers are normally in degrees magnetic. However, the track to be flown may also be given in certain areas. The A32F PFD shows both track and heading information to the pilot.

An aircraft must be identified before it can be provided with an ATS surveillance service. However, the act of identifying aircraft is not a service in itself and pilots should not assume that they are receiving an ATS surveillance service, particularly when they are flying outside controlled airspace. When a controller has identified an aircraft he will inform the pilot, according to the circumstances, of the following:

- That the aircraft is identified;
- The position of the aircraft.

The pilot will be warned if identification is lost, or about to be lost, and appropriate instructions are given.

## **RADAR VECTORING**

Aircraft may be given specific vectors to fly in order to establish separation.

It may be necessary for a controller to know the heading of an aircraft as separation can often be established by instructing an aircraft to continue on its existing heading:

- **“SOFIAJET \_\_, CONTINUE PRESENT HEADING”**
- **“SOFIAJET \_\_, CONTINUE PRESENT HEADING AND REPORT THAT HEADING”**
- **“SOFIAJET \_\_, CONTINUE HEADING 050 DEGREES”**

*Note: “DEGREES” is used by ATC and repeated by pilots to ensure heading is not mistaken with flight level. The word “degrees” is only necessary when the heading instruction finishes “0”.*

Heading instructions may also be combined with a turn instruction:

- **“SOFIAJET \_\_, TURN LEFT BY 30 DEGREES AND REPORT HEADING”**
- **“SOFIAJET \_\_, CONTINUE TURN HEADING 240 DEGREES”**

A controller may not know the aircraft’s heading but does require the aircraft to fly a particular heading:

- **“SOFIAJET \_\_, FLY HEADING 275”**

The controller may instruct the aircraft to fly a particular heading after passing a specific point:

- **“SOFIAJET \_\_, LEAVE TPS HEADING 270 DEGREES”**

When vectoring is complete, pilots will be instructed to resume their own navigation, given position information if considered necessary by the controller and appropriate instructions as necessary. Where a direct route is required, the controller shall include this in the instructions:

- **“SOFIAJET \_\_, RESUME OWN NAVIGATION DIRECT (WAYPOINT NAME)”**



**DECONFLICTION SERVICE**

Not to be confused with the UK Deconfliction service - ATS outside controlled airspace specific to the UK only. If a pilot requests descent below ATC unit terrain safe levels, controllers shall no longer provide a Deconfliction Service but should instead, subject to surveillance and RTF coverage, apply a Traffic Service.

If a controller detects a conflict when an aircraft is below the ATC unit terrain safe level whilst departing from an aerodrome and climbing to the ATC unit terrain safe level, traffic information without deconfliction advice shall be passed. However, if the pilot requests deconfliction advice or the controller considers that a definite risk of collision exists, the controller shall immediately offer such advice.

If a controller detects a conflict when an aircraft is conducting a pilot interpreted instrument approach, controllers shall provide avoiding action advice and an associated terrain safe level to climb to or fly at.

**3-6-16 NAT HLA PHRASEOLOGY**

Applicable to: ALL

Fly2Sky currently operates within the NAT HLA in the Shanwick (EGGX FIR) and Reykjavik (BIRD FIR), routing to/from Keflavik airport. Consequently, the Fly2Sky procedures and RT discipline laid down here are tailored for this specific routing. For general information on NAT HLA, *Refer to: OM-C 10-1-6 NORTH ATLANTIC HIGH LEVEL AIRSPACE*

Certain routes entering Reykjavik (BIRD FIR) from Scottish (EGPX FIR) have radar and VHF coverage and there are no specific requirements associated with them, except for obtaining an oceanic clearance. However, the routes without radar coverage and VHF coverage, including the routes entering Reykjavik (BIRD FIR) from Shanwick (EGGX FIR) have no VHF coverage and therefore require HF equipment and specific procedures such as HF communication, SELCAL operation, position reports and with the restrictions based on the communication equipment of the current fleet, flying below FL285.

**CONTACTING REYKJAVIK**

Unless on HF radio, all communication with BIRD FIR is made via VHF. Westbound clearance should be requested from Iceland Radio on VHF 2 at least 20 minutes prior to

entering BIRD FIR on 127.850 (primary) or 129.625 (secondary). However, experience has shown it may not be until about 60-80 nm prior to entry that they can be reached on VHF.

Note: *Iceland Radio are not Controllers - they are a relay station and will communicate the Clearance between Aircraft and Reykjavik ACC.*

Eastbound Oceanic Clearance will be provided by Keflavik DLV with the departure clearance since the flight will enter MNPS very soon after take-off.

### **CONTACTING SHANWICK CONTROL**

When the flight is planned through Shanwick Oceanic (EGGX), the crew must obtain oceanic clearance at least 40 min before reaching the OCA entry point. This is done on 127.650 (primary) or 123.950 (secondary) by voice. After receiving the clearance, the crew will be instructed on the required actions in the OCA and will be given a primary and secondary HF frequency.

On the same frequency and before entering the OCA, the crew may request a SELCAL check which if successful omits the requirement to monitor continuously the HF frequency which usually suffers from strong static noises.

Note: *All aircraft departing from Dublin shall obtain oceanic clearance when airborne.*

### **CONTENT AND FORMAT OF CLEARANCE**

Clearance requests should include:

- **“REQUEST CLEARANCE”**
- Flight identification (additionally, state frequency when using HF);
- OCA entry point and ETO (Estimated Time Over Significant Point);
- Requested Mach number and Flight Level;
- Any change to Flight Plan affecting OCA;
- The highest acceptable Flight Level at the OCA entry point.

Read back of any Lat/Long waypoint should be read using the format: 63N010W - **"SIX, THREE, NORTH, ZERO, ONE, ZERO, WEST"**. Longitude must contain three characters.



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

#### **POSITION REPORTS**

Unless otherwise instructed, pilots shall perform a position report over every point in the OCA. Such report shall include:

- **“POSITION”**
- Flight identification (additionally, state frequency when using HF);
- Present position, time and flight level overhead;
- Next estimated position and time overhead;
- Next subsequent position;
- Next higher FL requested at position or time (if applicable);
- Any further information (if applicable).

#### **WHEN LEAVING THE OCA**

Unless and until otherwise instructed, pilots shall maintain the previously instructed Mach number in the domestic controlled airspace.

#### **3-6-17 COMMUNICATION FACILITIES**

Applicable to: ALL

*Refer to: FCOM DSC-23 COMMUNICATIONS*

#### **3-6-18 CURRENT PHRASEOLOGY**

Applicable to: ALL

*Refer to: Acceptable Means of Compliance and Guidance Material to Regulation (EU) No 923/2012 Issue 1, Amendment 4*



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### ATC VOICE COMMUNICATION

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### NAVIGATION AIDS

#### 3-7-1 GENERAL

Applicable to: ALL

Fly2Sky aircraft are fitted with a comprehensive suite of navigation equipment. Irrespective of the particular fit, however, the general principle for all operations is that all such equipment shall be checked for serviceability and normal operations before each flight.

Standard navigational procedures and system requirements including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path followed by the aircraft are detailed in the appropriate FCOM volume.

In-flight all navigation equipment, which is required for the given type of flight, shall be selected and used.

Reliance shall not be placed on information derived from ground beacons until the appropriate code signal has been identified and confirmed by the pilots. Flight crewmembers must remain alert to the possibility of errors in programming or in performance. Operations shall only be conducted along routes or within areas, for which:

- Ground facilities and services, including meteorological services, are provided which are adequate for the planned operation;
- The performance of the aeroplane intended to be used is adequate to comply with minimum flight altitude requirements;
- The equipment of the aeroplane intended to be used meets the minimum requirements for the planned operation;
- Appropriate maps and charts are available
- Adequate aerodromes are available within the time/distance limitations.

#### **NAVIGATION SOURCES**

The aircraft position can be determined by the following navigation sources:

- DME/DME;
- VOR/DME;
- INS (with radio updating or the length of time that a particular IRS can be used to maintain P-RNAV accuracy without an external update is determined at the time of certification);



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### JEPPESEN DOCUMENTATION

- GNSS.

For normal and contingency procedures relating to RNAV problems *Refer to: OM-A 8-3-2 NAVIGATION PROCEDURES*

### **OTHER REFERENCES**

For navigation purposes, Fly2Sky use electronic charts which are part of the paperless cockpit philosophy. The chart provider is Jeppesen with its system Jeppesen FD Pro X. For more information about the charts *Refer to: OM-C 8 Maps and Charts.*

Aircraft onboard equipment, procedures and systems being involved in navigation are detailed in the FCOM in the following chapters:

- *Refer to: FCOM DSC - 22 Auto Flight*
- *Refer to: FCOM DSC - 31 Indicating and recording system*
- *Refer to: FCOM DSC - 34 Navigation*
- *Refer to: FCOM PRO - SUP 31 Indicating and recording system*
- *Refer to: FCOM PRO - SUP 34 Navigation*

### **3-8-1 GENERAL**

Applicable to: ALL

*Refer to: Jeppesen FD Pro X-Publications (Pubs)*



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FACILITIES AND NAVIGATION AIDS

### JEPPESEN DOCUMENTATION

Intentionally left blank

## **4. AERODROME AND OPERATING SITE FACILITIES**



Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### PRELIMINARY PAGES

### TABLE OF CONTENTS

#### 4.1 GENERAL

|                                                                     |   |
|---------------------------------------------------------------------|---|
| 4-1-1 AERODROMES OPERATING SITE FACILITIES .....                    | A |
| 4-1-3 RESCUE AND FIRE FIGHTING FACILITIES .....                     | B |
| 4-1-3 AIRCRAFT CLASSIFICATIONS NUMBER AND TYPE REFERENCE CODE ..... | C |
| 4-1-4 SUITABLE AERODROMES — ASSESSMENT .....                        | D |

#### 4.2 DE/ANTI-ICING ON GROUND

|                                      |   |
|--------------------------------------|---|
| 4.2.1 DE/ANTI-ICING PROCEDURES ..... | A |
|--------------------------------------|---|



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### GENERAL

#### 4-1-1 AERODROMES OPERATING SITE FACILITIES

Applicable to: ALL

Airports selected by Fly2Sky are analysed if they meet the criteria set up in different ICAO annexes in regards to aerodrome operations. Airport's operation certificate and procedures are checked to ensure a safe operation.

When pilots are scheduled on a flight to an airport they will receive a briefing via OM-C Airports where all important messages are detailed. The crew must check Jeppesen Publications, including the Airway Manual and OM-C Airports to be familiar with the airports before their operation.

The ACN (Aircraft Classification Number) and PCN (Pavement Classification Number) of a particular airport are also compared and the necessary steps are agreed upon with the airport and competent authorities if necessary.

Runway information including dimensions and lighting facilities are available on the eRM charts or in the NOTAM if it is issued. Aerodrome terminals facilities from a passenger handling point of view are checked by the ground operations team for adequacy and satisfaction of the minimum required level at Fly2Sky. Ground Operations and Flight Operations departments perform a pre-assessment visit on an airfield before it is accepted for operation as per regulation of EASA and ICAO Annexes.

Before an airport is accepted for operations the performance team, flight operations and training department are involved in airport categorisation.

#### 4-1-2 RESCUE AND FIRE FIGHTING FACILITIES

Applicable to: ALL

For general *Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES*. For Airport Specific RFF, *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual-Airport Data*



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### GENERAL

#### 4-1-3 AIRCRAFT CLASSIFICATIONS NUMBER AND TYPE REFERENCE CODE

Applicable to: ALL

The aircraft classification number is available in the Jeppesen FD Pro X for the particular aircraft including the A320/A321. The crew will be able to check the actual information based on aircraft undercarriage system and ground movement areas information including its material, strength and tyre pressure limit.

Fly2Sky operations team is following the regulation in this subject and before an operation is accepted to an airport as this is one of the factors which is carefully analysed. ICAO allow overload operations to ground movement areas however it will be the airport responsibility to take extra measures for runway quality checks in order to ensure safe operations.

An airport must agree and contact their competent Authorities in case of overload operation. Further information is available including A320/A321 values based on different factors as mentioned above in the Jeppesen FD Pro X, *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual-Airport Data*. These values are information only to a crew member as the operations team follow this subject carefully.

Both A320 and A321 ICAO type reference code is **4C**. Before an airport is accepted for an operation this value is compared with the aerodrome reference code, as it will dictate if an aerodrome is feasible to accommodate a particular aircraft type considering its dimensions. This information is available in

Aeronautical information publication (AIP) of airports and crosschecked by the operations team. Flight crew do not need to check this before their line flight and must assume the airport is feasible for operation if it is in OM-C Airports and/or selected as the destination or alternates airport by the Navigation department and specified on the OFP (Operation Flight Plan).

#### **4-1-4 SUITABLE AERODROMES — ASSESSMENT**

Applicable to: ALL

*Refer to: (AMC1 SPA.LVO.110), (GM2 SPA.LVO.110), (GM8 SPA.LVO.110)*

The assessment of the suitability of an aerodrome, including instrument flight procedures, for the intended operations comprises the availability of:

- Suitable navigation facilities and associated instrument flight approach procedures;
- Suitable aerodrome operating procedures, including LVPs, and the compatibility with the intended aircraft operations; and
- Suitable runway and runway environment characteristics and facilities.

The assessment of the suitability of an aerodrome, including instrument flight procedures, for the intended operations should be made by means of one or a combination of the following:

- An assessment of previous operational data for the particular aerodrome, runway and instrument flight procedures. This entails the verification of the availability of previous operational data, such as records of approaches flown in the same aerodrome, with the same procedures and aircraft type.
- A desktop assessment of the:
  - Aerodrome data;
  - Instrument flight procedures; and
  - The aircraft data and capabilities.

This desktop assessment compares aircraft data and capabilities and the aerodrome and instrument approach characteristics. If the aircraft data is compatible with the aerodrome and instrument approach procedure characteristics, the aerodrome and runway should be considered suitable for the intended LVO;

- An operational assessment: This is meant to be used if the suitability of the aerodrome for the intended operations could not be positively assessed by means of the other methods. In that case, an operational assessment becomes necessary, and actual flights should be performed. The operational assessment should consider the level of complexity of the aerodrome characteristics.





A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### GENERAL

#### **ASSESSMENT OF PREVIOUS OPERATIONAL DATA**

Previous operational data refers to data from:

- The operator itself, or when not available;
- The following entities:
  - The State of the aerodrome or the competent authority issuing the operator's LVO approval;
  - The type certificate holder of the aircraft; or
  - Other operators.

Previous operational data should only be used if:

- It concerns the same runway and there were no relevant changes to the runway and runway environment;
- It is derived in accordance with Table 1 below for the intended operation; and
- There is no safety concern for such operation.

Previous operational data may be credited to an aircraft if it is from:

- The same aircraft make and model, unless the credit from the same aircraft make and model is restricted by any of the entities in point above; or
- Another aircraft model, if stated in the AFM or additional data from the TC/STCholder.

| Table 1                                               |                                                                                                |                                                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Intended operation                                    | Operation from which previous operational data was derived                                     | Remarks                                               |
| CAT II — auto-coupled to below DH with manual landing | CAT II — auto-coupled to below DH with manual landing<br>CAT II or CAT III — automatic landing |                                                       |
| CAT II — automatic landing                            | CAT II — automatic landing<br>SA CAT II — automatic landing<br>CAT III automatic landing       | Automatic landing in hybrid systems may also be used. |



A320/A321

OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### GENERAL

CAT III— automatic landing

CAT III — automatic landing

If the hybrid system uses automatic landing, then the data may be used as any CAT III system.

Note: Previous operational data should be based on the same kind of xLS (e.g. ILS to ILS, MLS to MLS or GLS to GLS). Data related to landing system performance derived from infrastructure systems with lower performance may be used on systems with higher performance (e.g. data derived from a CAT II ILS may be used on a CAT III ILS). However, an ILS may qualify a GLS operation under the following conditions:

- The performance of the ILS installation on which the data is based can only be credited to the ILS point promulgate.
- An ILS facility performance category II installation can only be credited an operation using GAST C.
- An ILS facility performance category III installation can only be credited to an operation GAST C or GAST D.

## **DESKTOP ASSESSMENT**

The desktop assessment should correspond to the nature and complexity of the operation intended to be carried out and should take into account the hazards and associated risks inherent in these operations.

The assessment should include the AFM or additional data from the TC/STC holder, instrument flight procedures and aerodrome data. For landing systems, the runway or airport conditions should include as a minimum:

- The approach path slope;
- The runway elevation;
- The type of xLS navigation means intended to be used;
- The average slope of the LSAA; and
- The ground profile under the approach path (pre-threshold terrain). The distance should be calculated from the published threshold. It should be 300 metres, unless otherwise stated by the AFM or additional data from the TC/STC holder, the State of the aerodrome or AIP data, or the competent authority issuing the operator's LVO approval.

Note: The above points assume a CAT II or CAT III runway. For other types of runways, the operator may need to consider other factors.

*xLS means the facilities external to the aircraft and the associated limitations (if any) which have been used as the basis for certification.*

In addition to the above-mentioned, additional elements may need to be included in the assessment if stated by:

- The AFM, or additional data from the TC/STC holder; or
- The State of the aerodrome or AIP data; or
- The competent authority issuing the operator's LVO approval.

### **OPERATIONAL ASSESSMENT**

When performing an operational assessment, the operator should verify each aircraft type and runway combination by successfully completing the determined number of approaches and landings according to the process in the point below and the conditions determined in Table 2.

| Table<br>2       |                                                                                             |
|------------------|---------------------------------------------------------------------------------------------|
| Type of approach | RVR/VIS                                                                                     |
| CAT III          | CAT II conditions if the approach was previously successfully assessed in CAT II operations |
| CAT II & CAT III | CAT I conditions                                                                            |

The operational assessment should validate the use and effectiveness of the aircraft flight guidance systems, and operating procedures for the intended operation applicable to a specific instrument flight procedure and runway.

The process to determine the number of approaches and landing should be based on identified risks and agreed with the competent authority, and comprise the following steps:

- Identify the risks related to the landing system (based on the AFM or additional data from the TC/STC holder) which may include limitations in the conditions during the operational assessment (e.g. to perform the assessment under a non-commercial flight).
- Determine complexity of the runway based on:
  - A set of criteria based on the certification assumptions identified in the AFM or additional data from the TC/STC holder;
  - Availability and quality of runway data supporting the risk assessment;

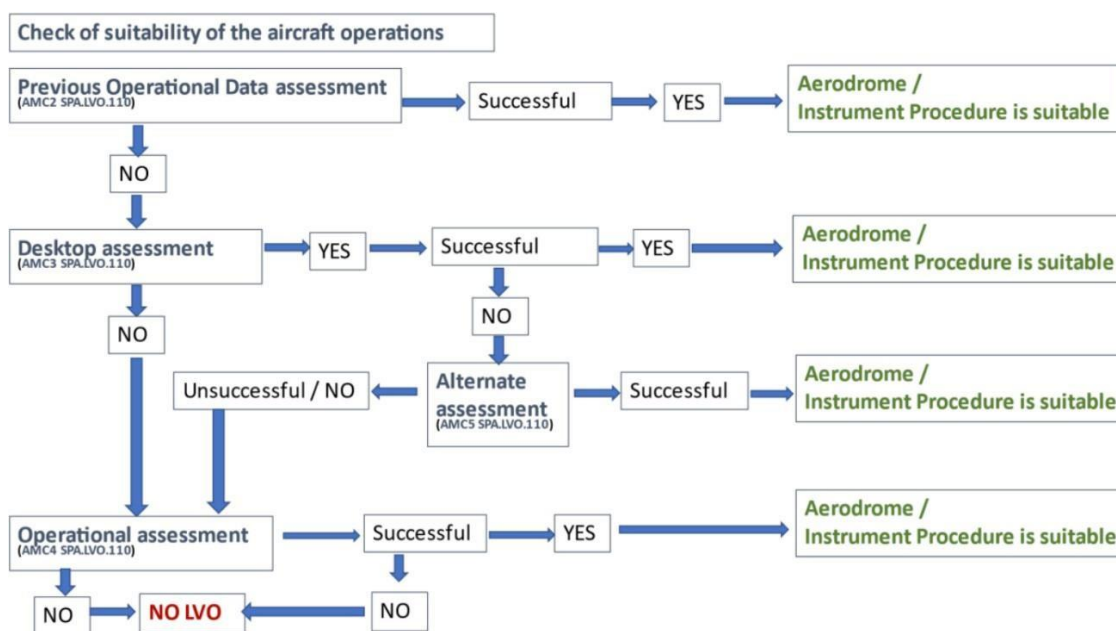
- Other known factors identified.
- Scale the number of required approaches based on complexity.  
The operational assessment may be performed in a commercial flight. If the operator has different variants of the same type of aircraft, utilising the same landing systems, the operator should show that the variants have satisfactory operational performance, but there is no need to conduct a full operational assessment for each variant/runway combination.

The operator may replace partially or completely the approaches and landings to a particular runway, if approved by the competent authority, with:

- Simulations made by the aircraft manufacturer or approved design organisations, if the terrain is properly modelled in the simulation;
- A verification using an FSTD, if the FSTD is suitable for the operational assessment.

If the AFM stipulates specific requirements for approach procedures, the operational assessment should include a determination of whether these requirements can be met.

## **ASSESSMENT OF AERODROMES FOR THE INTENDED OPERATIONS**



## **OPERATIONAL ASSESSMENT**

In case two subsequent unsuccessful approaches or automatic landings on certain aerodrome's runway, the LVO approaches for that particular runway are suspended and further investigation shall be carried out.

### **AVAILABILITY OF SUITABLE NAVIGATION FACILITIES**

As detailed above, the assessment of the suitability of an aerodrome, including instrument flight procedures, for the intended operations comprises the availability of suitable navigation facilities and associated instrument flight approach procedures. When assessing the availability of suitable navigation facilities, the following information is relevant.

Classification for ILS: the ILS classification, e.g. 'III/E/4', II/T/3, 'I/C/2', etc., is defined in ICAO Annex 10 Volume 1 by using three characters:

- I, II or III: this character indicates conformance to the facility performance category which is usually associated with the approach operational category.
- A, B, C, T, D or E: this character defines the ILS points to which the localiser/glide path has been verified to be conformal to the course structure of a localiser CATII/III or glide path CAT II/III (where glide path is always limited to T).
- 1, 2, 3 or 4: this number indicates the level of integrity and continuity of service. The integrity relates to the trust which can be placed in localiser or glide path not radiating false guidance signals. The continuity of service relates to the rarity of signal interruptions. The minimum levels of integrity and continuity of service are represented by a single descriptor 'level' which would typically be associated as follows:
  - Level 1: the localiser's or glide path's integrity or continuity of service have not been demonstrated or they have been demonstrated but at least one of them does not meet the level 2 requirements.
  - Level 2 is the performance objective for ILS equipment used to support LVOs when ILS guidance for position information in the landing phase is supplemented by visual cues/references.
  - Level 3 is the performance objective for ILS equipment used to support operations which place a high degree of reliance on ILS guidance for positioning through touchdown.
  - Level 4 is the performance objective for ILS equipment used to support operations which place a high degree of reliance on ILS guidance throughout touchdown and roll-out.

Further information may be found in ICAO Annex 10 Volume 1.

#### 4-1-4-1 Suitable Aerodromes for CAT III Autoland A320/A321

The table below contains aerodromes in the area of operation of Fly2sky. The aerodromes, the runways and the approaches are assessed and approved for CAT III Autoland by the following methods:

- Previous operational data
- Desktop assessment
- Operational assessment

Procedures for the assessment is described in the previous charts.

The list of the airports approved for CAT II and CAT III Autoland is up to date as of 12.03.2025. If a new airport has to be added, it will be assessed and the table below will be updated. The list of the aerodrome will be available in the Centric.

| Country  | Airport Name   | ICAO | IATA | Runway CATII/III                                     | Method of assessment* |
|----------|----------------|------|------|------------------------------------------------------|-----------------------|
| Austria  | Vienna         | LOWW | VIE  | 16 CAT III<br>29 CAT III                             | Autoland              |
| Belgium  | Brussels       | EBBR | BRU  | 25LCATIII<br>25RCATIII                               |                       |
| Bulgaria | Sofia          | LBSF | SOF  | 27 CAT III                                           |                       |
| Egypt    | Cairo          | HECA | CAI  | 05CCATII<br>05RCATII<br>23CCATII<br>23LCATII         |                       |
| Estonia  | Tallin         | EETN | TLL  | 08 CAT II<br>26 CAT II                               |                       |
| Finland  | Helsinki       | EFHK | HEL  | 04LCATIII<br>22LCATII<br>22RCATIII                   |                       |
| France   | Basle-Milhouse | LFSB | MLH  | 15 CATIII                                            |                       |
|          | Paris Orli     | LFPO | ORY  | 06 CAT III<br>07 CAT III<br>24 CAT III<br>25 CAT III |                       |



A320/A321

OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### GENERAL

|             |                   |      |     |                                                                              |  |
|-------------|-------------------|------|-----|------------------------------------------------------------------------------|--|
| Germany     | Bremen            | EDDW | BRE | 09 CAT III<br>27 CAT III                                                     |  |
|             | Hannover          | EDDV | HAJ | 09LCATIII<br>27RCATIII                                                       |  |
|             | Munich            | EDDM | MUC | 08LCATIII<br>08RCATIII<br>26LCATIII<br>26RCATIII                             |  |
| Greece      | Athens            | LGAV | ATH | 03LCAT II<br>03RCATII<br>21LCATII<br>21RCATII                                |  |
| Iceland     | Keflavik          | BIKF | KEF | 10 CAT II                                                                    |  |
| Italy       | Rome              | LIRF | FCO | 16LCATIII<br>16RCATIII                                                       |  |
| Kosovo      | Pristina          | BKPR | PRN | 17 CAT III                                                                   |  |
| Latvia      | Riga              | EVRA | RIX | 18 CAT II<br>36 CAT II                                                       |  |
| Netherlands | Amsterdam         | EHAM | AMS | 06 CAT III<br>18CCATIII<br>18RCATIII<br>27 CAT III<br>36CCATIII<br>36RCATIII |  |
| Nigeria     | Kano              | DNKK | KAN | 06 CAT II<br>24 CAT II                                                       |  |
| Norway      | Stavanger         | ENZV | SVG | 18 CAT II                                                                    |  |
| Portugal    | Lisbon            | LPPT | LIS | 02 CAT III<br>20 CAT III                                                     |  |
|             | Porto             | LPPR | OPO | 17 CAT II                                                                    |  |
| Spain       | Palma de Mallorca | LEPA | PMI | 24LCATIII                                                                    |  |
| Switzerland | Zurich            | LSZH | ZRH | 14 CAT III<br>16 CAT III                                                     |  |
| Turkey      | Istanbul          | LTFM | IST | 35RCATIII<br>16LCATIII                                                       |  |
| Uzbekistan  | Samarkand         | UTSS | SKD | 09 CAT II                                                                    |  |





A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### DE/ANTI-ICING ON GROUND

#### 4-2-1 DE/ANTI-ICING PROCEDURES

Applicable to: ALL

The De/Anti-Icing procedures, as well as the Holdover Time Tables for the relevant year and the guidelines for applying the various fluids are available in OM-C Airports. *Refer to: OM-C AIRPORTS 2 HOLDOVER TIMES*



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME AND OPERATING SITE FACILITIES

### DE/ANTI-ICING ON GROUND

Intentionally left blank

## **5. APPROACH, MISSED APPROACH AND DEPARTURE**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE

PRELIMINARY PAGES

TABLE OF CONTENTS

### 5.1 GENERAL

|                                                  |   |
|--------------------------------------------------|---|
| 5.1.1 APPROACH PROCEDURES .....                  | A |
| 5.1.2 MISSED APPROACH PROCEDURES .....           | B |
| 5.1.3 DEPARTURE PROCEDURES .....                 | C |
| 5.1.4 NOISE ABATEMENT DEPARTURE PROCEDURES ..... | D |



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE

### GENERAL

#### 5-1-1 APPROACH PROCEDURES

Applicable to: ALL

An aircraft should not descend in IMC below the minimum (sector) safe altitude (MSA) as shown on the instrument approach chart until it is established in the approved approach, holding procedure, or under positive radar control.

In the vicinity of the aerodrome, an approach may be conducted by visual manoeuvring (circling) under IFR rules if this type of approach is cleared by the ATC and if weather conditions permit it. If visual reference is lost, the circling approach must be aborted.

The minima for a specific type of approach and landing procedure are considered applicable if:

- The ground equipment shown on the respective chart required for the intended procedure is operative;
- The aircraft systems required for the type of approach are operative;
- The required aircraft performance criteria are met; and
- The crew is qualified accordingly

Before commencing an approach to land, the commander must satisfy himself that, according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe approach, landing or missed approach. The in-flight determination of landing distance should be based on the latest available report.

#### 5-1-2 MISSED APPROACH PROCEDURES

Applicable to: ALL

For instrument approaches with a missed approach gradient greater than 2.5% flight crew to check the expected landing weight of the aircraft allows a missed approach with a climb gradient equal to or greater than the applicable missed approach gradient in the one-engine inoperative missed approach configuration and speed. The requirement specified above is to be checked using the FlySmart+ Landing module.

For instrument approaches with decision heights below 200 ft, the flight crew must use this software to verify that the approach weight of the aircraft, taking into account the take-off weight and the fuel expected to be consumed in flight, allows a missed approach gradient of climb, with the critical engine failed and with the speed and configuration used for go-around of at least 2.5%, or the published gradient, whichever is the greater.

The required missed approach gradient may not be achieved when operating at a high landing weight and in engine-out conditions. Weight, altitude and temperature limitations and wind for the missed approach should be considered.

The missed approach, after an approach has been flown using the CDFA technique, shall be executed when reaching the minimum decision altitude (height) or the MAPt, whichever occurs first. The lateral part of the missed approach procedure must be flown via the MAPt unless otherwise stated on the approach chart.

An instrument approach shall be discontinued if a visual reference has not been attained or cannot be maintained, and:

- Warning flags indicate a failure (except standby instruments);
- The call sign of the primary aid ceases;
- Indications are in doubt;
- The aeroplane is displaced vertically and/or laterally beyond pre-determined limits;
- If it is obvious that any component of the stabilization criteria will not/has not been achieved by the required point.
- If the approach becomes unstable below the required point.
- At any time it is suggested by PM.

If the decision to carry out a missed approach is taken when the aircraft is positioned on the approach axis (track) defined by radio-navigation aids, the published missed approach procedure specified for the instrument approach must be followed. When the aircraft commences visual manoeuvring, the missed approach procedure (in case of loss of visibility with the landing runway) should be confirmed with ATC.

In the case of an unstabilised approach (in visual conditions) and if ATC did not specify a missed approach procedure during the visual manoeuvring, plan a turning climb in the direction of the circuit back to circling altitude for a second approach.

### **5-1-3 DEPARTURE PROCEDURES**

Applicable to: ALL

Instrument departure established by the State in which the aerodrome is located has to be used. However, a Commander may accept an ATC clearance that deviates from above, provided obstacle clearance criteria are observed and full account is taken of the operating



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE GENERAL

conditions.

Before commencing take-off, a Commander must satisfy himself that:

- The RVR or visibility in the take-off direction of the aeroplane is equal to or better than the applicable minimum; and
- The condition of the runway intended to be used should not prevent a safe takeoff and departure.

### 5-1-4 NOISE ABATEMENT DEPARTURE PROCEDURES

Applicable to: ALL

Noise abatement procedures ensure that the necessary safety of flight is maintained whilst minimising exposure to noise on the ground. Flight Crews must ensure that safety has priority over noise abatement considerations. There are two procedures, one of which shall meet the close-in noise abatement objective and the other the distant noise abatement objective. The

Noise abatement procedures for each type are described in the Jeppesen FD Pro X., For flight procedures *Refer to: OM-B 2-6-1 NOISE ABATEMENT PROCEDURES.*



A320/A321  
OPERATIONS MANUAL PART C

## APPROACH, MISSED APPROACH AND DEPARTURE GENERAL

Intentionally left blank

## **6. COMMUNICATION FAILURE PROCEDURES**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

PRELIMINARY PAGES

TABLE OF CONTENTS

### 6.1 CALCULATION SYSTEM

|       |                                                                                                       |                   |
|-------|-------------------------------------------------------------------------------------------------------|-------------------|
| 6.1.1 | <a href="#">GENERAL COMMUNICATION FAILURE PROCEDURES.....</a>                                         | <a href="#">A</a> |
| 6.1.2 | <a href="#">COMMUNICATION FAILURE DURING VMC CONDITION</a> <a href="#">COMMUNICATION FAILURE.....</a> | <a href="#">B</a> |
| 6.1.3 | <a href="#">DURING IMC CONDITION.....</a>                                                             | <a href="#">C</a> |
| 6.1.4 | <a href="#">SPECIFIC RADIO COMMUNICATION FAILURE PROCEDURES FOR EUROPE.....</a>                       | <a href="#">D</a> |
| 6.1.5 | <a href="#">COMMUNICATION FAILURE PROCEDURES FOR MNPS AIRSPACE.....</a>                               | <a href="#">E</a> |



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

### CALCULATION SYSTEM

#### 6-1-1 GENERAL COMMUNICATION FAILURE PROCEDURES

Applicable to: ALL

If a communication failure precludes compliance, the aircraft shall comply with the communication failure procedures as per below, and with such of the following procedures as are appropriate. In addition, the aircraft, when forming part of the aerodrome traffic at a controlled aerodrome, shall keep a watch for such instructions as may be issued by visual signals.

#### 6-1-2 COMMUNICATION FAILURE DURING VMC CONDITION

Applicable to: ALL

If in visual meteorological conditions, the aircraft shall:

- Continue to fly in visual meteorological conditions;
- Land at the nearest suitable aerodrome (to the aerodrome where Visual traffic circuit is initiated if it remains adequate and suitable); and
- Report its arrival by the most expeditious means to the appropriate air traffic control unit.

#### 6-1-3 COMMUNICATION FAILURE DURING IMC CONDITION

Applicable to: ALL

If in instrument meteorological conditions or, when conditions are such that it does not appear feasible to complete the flight in accordance with (see Note) the aircraft shall:

1. Unless otherwise prescribed on the basis of regional air navigation agreement, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan;
2. Proceed according to the current flight plan to the appropriate designated navigation aid serving the destination aerodrome and, when required to ensure compliance with (3) below, hold over this aid until the commencement of descent;
3. Commence descent from the navigation aid specified in (2) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated

**COMMUNICATION FAILURE PROCEDURES****CALCULATION SYSTEM**

time of arrival resulting from the current flight plan;

4. Complete a normal instrument approach procedure as specified for the designated navigation aid; and
5. Land, if possible, within thirty minutes after the estimated time of arrival specified in (3) or the last acknowledged expected approach time, whichever is later.

**Note:** *As evidenced by the meteorological conditions prescribed therein, relates to all controlled flights, whereas relates only to IFR flights.*

*The provision of air traffic control service to other flights operating in the airspace concerned will be based on the premise that an aircraft experiencing communication failure will comply with the rules as per above.*

**6-1-4 SPECIFIC RADIO COMMUNICATION FAILURE PROCEDURES FOR EUROPE**

Applicable to: ALL

As soon as it is known that two-way communication has failed, ATC shall maintain separation between the aircraft having the communication failure and other aircraft based on the assumption that the aircraft will operate in accordance with VMC or IMC.

In VMC condition the general procedure applies, however in IMC the following regulation must be maintained:

A controlled flight experiencing communication failure in IMC, or where it does not appear feasible to continue in VMC shall:

- Set transponder to code 7600.
- Maintain for a period of 7 minutes the last assigned speed and level or the minimum flight altitude, if the minimum flight altitude is higher than the assigned level. The period of 7 minutes commences:
  - If operating on a route without compulsory reporting points or if instructions have been received to omit position reports:
    - At the time the last assigned level or minimum flight altitude is reached; or
    - At the time the transponder is set to Code 7600 whichever is later.
  - If operating on a route with compulsory reporting points and no instruction to omit position report has been received: At the time the last assigned level or

## COMMUNICATION FAILURE PROCEDURES

### CALCULATION SYSTEM

minimum flight altitude is reached, or

- At the previously reported pilot estimate for the compulsory reporting point, or
- At the previously failed report of position over a compulsory reporting point, whichever is later.

**Note:** *The period of 7 minutes is to allow the necessary air traffic control and coordination measures.*

- Thereafter, adjust level and speed in accordance with the filed flight plan.

**Note:** *With regard to changes, the filed flight plan, which is the flight plan as filed with an ATS unit by the pilot or a designated representative without any subsequent changes, will be used.*

- If being radar vectored or proceeding offset according to RNAV without a specified limit, proceed in the most direct manner possible to re-join the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude.

**Note:** *With regard to the route to be flown or the time to begin descending to the arrival aerodrome, the current flight plan (which is the flight plan, including changes, if any, brought about by subsequent clearances) will be used.*

- Proceed according to the current flight plan route to the appropriate designated navigation aid serving the destination airport and, when required to ensure compliance with (6th bullet) below, hold over this aid until the commencement of descent.
- Commence descent from the navigational aid specified in (5th bullet) above at, or as close as possible to, the expected approach time last received and acknowledged or, if no expected approach time has been received and acknowledged, at or as close as possible to, the estimated time of arrival resulting in the current flight plan.
- Complete a normal instrument approach procedure as specified for the designated navigation aid.
- Land, if possible, within 30 minutes after the estimated time of arrival specified in (6th bullet) above or the last acknowledged expected approach time, whichever is later.

**Note:** *Pilots are reminded that the aircraft may not be in an area of secondary surveillance radar coverage.*

For more information about Communication failures including receiver failures or transponder,



A320/A321  
OPERATIONS MANUAL PART C

## COMMUNICATION FAILURE PROCEDURES

### CALCULATION SYSTEM

failure. *Refer to: OM-A 12-1-3 COMMUNICATION PROCEDURES*

### 6-1-5 COMMUNICATION FAILURE PROCEDURES FOR MNPS AIRSPACE

**Applicable to: ALL**

*Refer to: OM-C 10-1-6 NORTH ATLANTIC HIGH LEVEL AIRSPACE*

## **7. SEARCH AND RESCUE FACILITIES**

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

### PRELIMINARY PAGES

### TABLE OF CONTENTS

#### 7.1 GENERAL

|        |                                                         |   |
|--------|---------------------------------------------------------|---|
| 7.1.1  | DEFINITIONS .....                                       | A |
| 7.1.2  | SEARCH AND RESCUE SERVICES AND REGIONS .....            | B |
| 7.1.3  | SEARCH AND RESCUE COMMUNICATIONS.....                   | C |
| 7.1.4  | PROCEDURES FOR RCC DURING EMERGENCY PHASES.....         | D |
| 7.1.5  | INITIATION OF SEARCH AND RESCUE ACTION BY ATC .....     | E |
| 7.1.6  | PROCEDURES AT THE SCENE OF AN ACCIDENT .....            | F |
| 7.1.7  | PROCEDURES FOR INTERCEPTING DISTRESS TRANSMISSIONS..... | G |
| 7.1.8  | SEARCH AND RESCUE SIGNALS .....                         | H |
| 7.1.9  | AIRCRAFT EQUIPMENT .....                                | I |
| 7.1.10 | EMERGENCY LOCATOR TRANSMITTER (ELT) .....               | J |
| 7.1.11 | SEARCH AND RESCUE FACILITIES BY COUNTRIES.....          | K |



A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

Intentionally left blank

## 7-1-1 DEFINITIONS

Applicable to: ALL

### **ALERTING POST**

Any facility intended to serve as an intermediary between a person reporting an emergency and a rescue coordination centre or rescue subcentre.

### **ALERT PHASE**

A situation wherein apprehension exists as to the safety of an aircraft or marine vessel, and of the persons on board.

### **COSPAS-SARSAT**

A satellite system designed to detect distress beacons transmitting on the frequencies of 121.5 MHz and 406 MHz

### **DISTRESS PHASE**

A situation wherein there is a reasonable certainty that a vessel or other craft, including an aircraft or a person, is threatened by grave and imminent danger and requires immediate assistance.

### **DITCHING**

The forced landing of an aircraft on water.

### **EMERGENCY PHASE**

A generic term means as the case may be, uncertainty phase, alert phase or distress phase.

### **JOINT RESCUE CO-ORDINATION CENTRE (JRCC)**

A rescue coordination centre responsible for both aeronautical and maritime search and rescue incidents.

## **OPERATOR**

A person, organization or enterprise engaged in or offering to engage in an aircraft operation.

## **PILOT-IN-COMMAND**

The pilot responsible for the operation and safety of the aircraft during flight time.

## **RESCUE**

An operation to retrieve persons in distress, provide for their initial medical or other needs, and deliver them to a place of safety.

## **RESCUE CO-ORDINATION CENTRE (RCC)**

A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

## **RESCUE SUB-CENTRE (RSC)**

A unit subordinate to a rescue coordination centre, established to complement the latter according to particular provisions of the responsible authorities

## **SEARCH**

An operation, normally coordinated by a rescue coordination centre or rescue sub-centre, using available personnel and facilities to locate persons in distress.

## **SEARCH AND RESCUE AIRCRAFT**

An aircraft provided with specialized equipment suitable for the efficient conduct of search and rescue missions.

## **SEARCH AND RESCUE FACILITY**

Any mobile resource, including designated search and rescue units, used to conduct search and rescue operations.

## **SEARCH AND RESCUE SERVICE**

The performance of distress monitoring, communication, coordination and search and rescue functions, including the provision of medical advice, initial medical assistance or medical evacuation, through the use of public and private resources, including cooperating aircraft, vessels and other craft and installations.

## **SEARCH AND RESCUE MISSION COORDINATOR (SMC)**

The official was temporarily assigned to coordinate response to an actual or apparent distress situation.

## **SEARCH AND RESCUE REGION (SRR)**

An area of defined dimensions, associated with a rescue coordination centre, within which search and rescue services are provided.

## **SEARCH AND RESCUE UNIT (SRU)**

A unit composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue operations.

## **SEARCH OBJECT**

A ship, aircraft, or other craft missing or in distress or survivors or related search objects or evidence for which a search is being conducted.

## **STATE OF REGISTRY**

The State on whose register the aircraft is entered.

## **UNCERTAINTY PHASE**

A situation wherein doubt exists as to the safety of an aircraft or a marine vessel, and of the persons on board.

## **VESSEL**

A maritime craft.

## SEARCH AND RESCUE FACILITIES

### GENERAL

#### 7-1-2 SEARCH AND RESCUE SERVICES AND REGIONS

Applicable to: ALL

Contracting States shall, individually or in cooperation with other States, arrange for the establishment and prompt provision of search and rescue services within their territories to ensure that assistance is rendered to persons in distress. Such services shall be provided on a 24-hour basis.

Contracting States through regional air navigation agreements shall delineate the search and rescue regions within which they will provide search and rescue services. Such regions shall not overlap and neighbouring regions shall be contiguous. Neighbouring states will cooperate to establish search and rescue services within a single SAR region as per ICAO ANNEX 12.

#### 7-1-3 SEARCH AND RESCUE COMMUNICATIONS

Applicable to: ALL

Each rescue coordination centre shall have means of rapid and reliable communication with:

- Associated air traffic services units;
- Associated rescue sub-centres;
- Appropriate direction-finding and position fixing stations;
- Where appropriate, coastal radio stations capable of alerting and communicating with surface vessels in the region.
- The headquarters of search and rescue units in the region;
- All maritime coordination centres in the region and aeronautical, maritime or joint rescue coordination centres in adjacent regions;
- A designated meteorological office or meteorological watch office;
- Search and rescue units;
- Alerting posts;
- The Cospas-Sarsat Mission Control Centre servicing the search and rescue region when the rescue co-ordination centre has been designated SAR point of contact.

*Note: Many vessels can communicate with aircraft on 2182 kHz, 4125 kHz and 121.5 MHz. However, these frequencies, and in particular 121.5 MHz, may not be monitored by vessels for calling purposes. Therefore, vessels may have to be advised by search and rescue authorities to monitor these frequencies when situations arise in which they need to be called by aircraft.*



## 7-1-4 PROCEDURES FOR RCC DURING EMERGENCY PHASES

Applicable to: ALL

### UNCERTAINTY PHASE

During the uncertainty phase, the rescue coordination centre or rescue sub-centre shall cooperate to the utmost with air traffic services units and other appropriate agencies and services in order that incoming reports may be speedily evaluated.

### ALERT PHASE

Upon the occurrence of an alert phase, the rescue coordination centre shall immediately alert search and rescue units and initiate any necessary action.

### DISTRESS PHASE

Following the alert phase, further unsuccessful attempts to establish communication with the aircraft and more widespread unsuccessful inquiries point to the probability that the aircraft is in distress, or when the fuel onboard is considered to be exhausted, or to be insufficient to enable the aircraft to reach safety, or when information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely, or when

Information is received or it is reasonably certain that the aircraft is about to make or has made a forced landing.

Except when there is reasonable certainty that the aircraft and its occupants are not threatened by grave and imminent danger and do not require immediate assistance. When an aircraft is believed to be in distress, or when a distress phase exists, the rescue coordination centre will:

- Initiate action by search and rescue units in accordance with the appropriate search and rescue plan;
- Ascertain the position of the aircraft, estimate the degree of uncertainty of this position, and, on the basis of this information and the circumstances, determine the extent of the area to be searched;
- Notify the operator, where possible, and keep the operator informed of developments;

## SEARCH AND RESCUE FACILITIES

### GENERAL

- Notify other rescue coordination centres, the help of which seems likely to be required, or which may be concerned in the operation;
- Notify the associated air traffic services unit, when the information on the emergency has been received from another source;
- Request at an early stage such aircraft, vessels, coastal stations, or other services not specifically included in a) as are in a position to do so, to:
  - Maintain a listening watch for transmission from the aircraft in distress, from survival radio equipment, or from an emergency locator transmitter. The frequencies contained in the specifications for emergency locator transmitters (ELTs) given in Annex 10, Vol. III, are 121.5 MHz and 406 MHz;
  - Assist the aircraft in distress as far as practicable;
  - Inform the rescue coordination centre of any developments
- From the information available, draw up a detailed plan of action for the conduct of the search and/or rescue operation required and communicate such plan for the guidance of the authorities immediately directing the conduct of such an operation;
- Amend as necessary, in the light of circumstances, the guidance already given in g);
- Notify the appropriate accident investigation authorities;
- Notify the State of Registry of the aircraft either directly or through the national accident investigation authority.

The order in which these actions are described shall be followed unless circumstances dictate otherwise.

### 7-1-5 INITIATION OF SEARCH AND RESCUE ACTION BY ATC

**Applicable to: ALL**

In the event that an emergency phase is declared in respect of an aircraft whose position is unknown and maybe in one of two or more search and rescue regions, the following shall apply when a rescue coordination centre is notified of the existence of an emergency phase and is unaware of other centres taking appropriate action, it shall assume responsibility for initiating suitable action in and confer with neighbouring rescue coordination centres with the objective of designating one rescue co-ordination centre to assume responsibility forthwith.

Unless otherwise decided by common agreement of the rescue co-ordination centres

## SEARCH AND RESCUE FACILITIES

### GENERAL

concerned, the rescue co-ordination centre to co-ordinate search and rescue action shall be the centre responsible for:

- The region in which the aircraft was according to its last reported position; or
- The region to which the aircraft was proceeding when its last reported position was at the boundary of two search and rescue regions; or
- The region to which the aircraft was destined when it was not equipped with suitable two-way radio communication or not under obligation to maintain radio communication.

After the declaration of the distress phase, the rescue co-ordination centre with overall coordination responsibility, coordinating search and rescue action shall inform all rescue co-ordination centres that may become involved in the operation, of all the circumstances of the emergency and subsequent developments. Likewise, all rescue co-ordination centres becoming aware of any information pertaining to the incident shall inform the rescue co-ordination centre which is coordinating the search and rescue action.

### 7-1-6 PROCEDURES AT THE SCENE OF AN ACCIDENT

#### Applicable to: ALL

When a pilot-in-command observes that either another aircraft or a surface craft is in distress, the pilot shall, unless unable to do so, or when the pilot considers it is unreasonable or unnecessary:

- Keep the craft in distress in sight until it is no longer necessary;
- Determine the position of the craft in distress;
- Report to the rescue coordination centre or air traffic services unit as much of the following information as possible:
  - Type of craft in distress, its identification and condition;
  - Its position expressed in geographical coordinates or in the distance and true bearing from a distinctive landmark or from a radio navigation aid;
  - Time of observation expressed in hours and minutes UTC;
  - Number of persons observed;
  - Whether persons have been seen to abandon the craft in distress;
  - The apparent physical condition of survivors;
  - On scene weather conditions
- Act as instructed by the rescue coordination centre or the air traffic services unit.



A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

### GENERAL

#### 7-1-7 PROCEDURES FOR INTERCEPTING DISTRESS TRANSMISSIONS

Applicable to: ALL

Whenever a distress transmission is intercepted by a pilot-in-command of an aircraft, the pilot shall:

- Acknowledge the distress transmission;
- Record the position of the craft in distress if given;
- If possible take a bearing on the transmission;
- Inform the appropriate rescue coordination centre or air traffic services unit of the distress transmission, giving all available information;
- At the pilot's discretion, while awaiting instructions, proceed to the position given in the transmission.

#### 7-1-8 SEARCH AND RESCUE SIGNALS

Applicable to: ALL

Symbols shall be at least 2.5 metres (8 feet) long and shall be made as conspicuous as possible.

Note: Symbols may be formed by any means such as strips of fabric, parachute material, pieces of wood, stones or such like material; marking the surface by tramping, or staining with oil, etc.

*Attention to the above signals may be attracted by other means such as radio, flares, smoke, reflected light, etc.*

| Ground-Air Visual Signal Code for Use by Survivors |                            |         |
|----------------------------------------------------|----------------------------|---------|
| !!                                                 | Message Code               | Symb ol |
| 1                                                  | Require Assistance         | V       |
| 2                                                  | Require Medical Assistance | X       |
| 3                                                  | No or Negative             | N       |
| 4                                                  | Yes or Affirmative         | Y       |
| 5                                                  | Proceed in this direction  | f       |



A320/A321  
OPERATIONS MANUAL PART C

## SEARCH AND RESCUE FACILITIES

### GENERAL

#### Ground-Air Visual Signal Code for Use by Rescue Units

| !! | Message Code                                                         | Symbol |
|----|----------------------------------------------------------------------|--------|
| 1  | Operation completed                                                  | LLL    |
| 2  | We have found all personnel                                          | LL     |
| 3  | We have found only some personnel                                    | ++     |
| 4  | We are not able to continue, returning to the base                   | XX     |
| 5  | Have divided into two groups. Each proceeding in direction indicated |        |
| 6  | Information received that aircraft is in this direction              | →→     |
| 7  | Nothing found, we will continue to search                            | NN     |

#### 7-1-9 AIRCRAFT EQUIPMENT

Applicable to: ALL

Flight Crew in case of emergency must follow the procedures detailed in OMB Chapter 3 'Emergency and abnormal procedures'. *Refer to: OM-B 3 ABNORMAL AND EMERGENCY PROCEDURES.* 121,5 must be set in VHF 2 and must be monitored continuously by both pilots unless VHF 2 is in use for Weather monitoring or ground handling communication.

If the Aircraft transmits a distress message the rescue and search centers will be informed by the appropriate ATC unit.

#### 7-1-10 EMERGENCY LOCATOR TRANSMITTER (ELT)

Applicable to: ALL

##### **FIXED ELT**

Flight Crew in case of emergency must follow the procedures detailed in OM-B. *Refer to: OM-B 3 ABNORMAL AND EMERGENCY PROCEDURES.* 121,5 must be set in VHF 2 and must be monitored continuously by both pilots unless VHF 2 is in use for Weather monitoring or ground handling communication.

If an Aircraft is transmitting a distress message the rescue and search centers will be informed by the appropriate ATC unit.

## **PORTABLE ELT**

The ELT is a triple frequency emergency transmitter able to send the emergency signal during at least 24 hours and it is part of the equipment in all Fly2Sky aircraft. The portable ELT can be removed from its mounting bracket. Activation is automatic by immersion of the ELT in water provided that the ELT Four-position switch is set to the ARM position (the presence of water is detected by a sensor that, in turn, activates the ELT).

Activation is manual on land where the four-position switch on the bottom of the ELT must be set to XMT mode. The antenna automatically erects upon immersion in water and is manually deployed by unhooking the antenna from the antenna retainer clip.

## **MANUAL DEPLOYMENT IN WATER**

- Open quick-release latches of stowage bracket and remove the ELT;
- Break tape holding cord wound on a lanyard and pull the ELT;
- Tie cord securely to the floating device or yourself;
- Make sure the 4 position switch is in ARM position;
- Place the ELT inside the water.
- After 10 seconds, the flashing LED light will be visible, after 5 minutes, the antenna will deploy.

## **MANUAL DEPLOYMENT ON LAND**

The requirement for a Pre-flight check of the transmitter is described in the cabin attendant manual.

- Open quick-release latches of stowage bracket and remove the ELT;
- Move the ELT to an area clear of obstruction (highest point);
- Manually set the 4-position switch to "XMT" mode;
- With hand over the antenna, break the tape holding the antenna;
- Stand clear of antenna for best transmission.

## **7-1-11 SEARCH AND RESCUE FACILITIES BY COUNTRIES**

Applicable to: ALL

*Refer to: Jeppesen FD Pro X for Alert, Search and Rescue Services*

## **8. MAPS AND CHARTS**

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## MAPS AND CHARTS

### PRELIMINARY PAGES

### TABLE OF CONTENTS

#### 8.1 GENERAL

|       |                                        |   |
|-------|----------------------------------------|---|
| 8.1.1 | MAPS AND CHARTS .....                  | A |
| 8.1.2 | PUBLICATIONS PART .....                | B |
| 8.1.3 | MAP PART .....                         | C |
| 8.1.4 | TRAINING REQUIREMENTS FOR PILOTS ..... | D |



A320/A321  
OPERATIONS MANUAL PART C

MAPS AND CHARTS

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

MAPS AND CHARTS

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

MAPS AND CHARTS

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## MAPS AND CHARTS

### GENERAL

#### 8-1-1 MAPS AND CHARTS

Applicable to: ALL

Fly2Sky uses Jeppesen FD Pro X for charts and aeronautical information. This application is installed on aircraft iPads and is part of the Fly2Sky EFB. The User Guide for the latest application can be found in the application itself.

#### CONTENT AND STRUCTURE

Jeppesen FD Pro X is divided into two parts, the Publications part and Maps part. Information contained in this manual must not be given to a third party except agreed in advance between Fly2Sky and the chart provider.

#### 8-1-2 PUBLICATIONS PART

Applicable to: ALL

For the exact up-to-date structure and content of the Publications part, *Refer to: Jeppesen FD Pro X.*

#### 8-1-3 MAP PART

Applicable to: ALL

For the exact up-to-date structure and content of the Map part, *Refer to: Jeppesen FD Pro X.*

#### 8-1-4 TRAINING REQUIREMENTS FOR PILOTS

Applicable to: ALL

Pilots must self-brief on the Jeppesen FD Pro X using classroom training during the company conversion when joining the company.



A320/A321  
OPERATIONS MANUAL PART C

## MAPS AND CHARTS

### GENERAL

Intentionally left blank

## **9.AERONAUTICAL INFORMATION AND METEOROLOGICAL SERVICES**

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

PRELIMINARY PAGES

TABLE OF CONTENTS

### 9.1 GENERAL

|                                               |   |
|-----------------------------------------------|---|
| 9.1.1 INTRODUCTION.....                       | A |
| 9.1.2 FLIGHT PLAN AND BRIEFING RETRIEVAL..... | B |



A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

PRELIMINARY PAGES  
SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

PRELIMINARY PAGES  
SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

### GENERAL

#### 9-1-1 INTRODUCTION

Applicable to: ALL

General Aeronautical and Meteorological information can be found in the Jeppesen FD Pro X and the Operations Manual. This chapter refers to the most relevant of these sources and also provides guidance on how crew access the Flight Planning and briefing information for their flights.

#### 9-1-2 FLIGHT PLAN AND BRIEFING RETRIEVAL

Applicable to: ALL

Fly2Sky uses the PPS Flight Planning system provided by Air Support to calculate Operational Flight Plans (OFP) and accompanying Briefing Packages (BP). OFP are pre-calculated by an automatic server several hours before departure. The crew subsequently access and print the OFP and BP via email.

A full, detailed description of the OFP content and background calculations is available in the OM-A. *Refer to: OM-A 8-1-10 OPERATIONAL FLIGHT PLAN*



A320/A321  
OPERATIONS MANUAL PART C

## AERONAUTICAL INFORMATION AND MET SERVICES

### GENERAL

Intentionally left blank

## **10. EN-ROUTE COM/NAV PROCEDURES**

Intentionally left blank





A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

### PRELIMINARY PAGES

### TABLE OF CONTENTS

#### 10.1 GENERAL

|        |                                   |   |
|--------|-----------------------------------|---|
| 10.1.1 | RADAR ADVISORY SERVICE.....       | A |
| 10.1.2 | RADAR INFORMATION SERVICE .....   | B |
| 10.1.3 | ESTABLISHING A RADAR SERVICE..... | C |
| 10.1.4 | AREA-SPECIFIC PROCEDURES .....    | D |
| 10.1.5 | ONBOARD DOCUMENTATION .....       | E |

#### 10.2 NAT HLA OPERATIONS

|         |                                                                   |   |
|---------|-------------------------------------------------------------------|---|
| 10.2.1  | OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS.....        | A |
| 10.2.2  | THE ORGANISED TRACK SYSTEM (OTS).....                             | B |
| 10.2.3  | ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS .....              | C |
| 10.2.4  | FLIGHT PLANNING .....                                             | D |
| 10.2.5  | OCEANIC ATC CLEARANCES .....                                      | E |
| 10.2.6  | COMMUNICATIONS AND POSITION REPORTING PROCEDURES .....            | F |
| 10.2.7  | APPLICATION OF MACH NUMBER TECHNIQUE.....                         | G |
| 10.2.8  | NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES .....            | H |
| 10.2.9  | RVSM FLIGHT IN THE NAT HLA .....                                  | I |
| 10.2.10 | ATS SURVEILLANCE SERVICES IN THE NAT HLA.....                     | J |
| 10.2.11 | PROCEDURES IN THE EVENT OF NAVIGATION DEGRADATION OR FAILURE..... | K |
| 10.2.12 | SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES .....              | L |
| 10.2.13 | GUIDANCE FOR DISPATCHERS.....                                     | M |
| 10.2.14 | FLIGHT OPERATIONS BELOW THE NAT HLA .....                         | N |
| 10.2.15 | MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE .....           | O |



A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

PRELIMINARY PAGES

TABLE OF CONTENTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title                                                  | Toc<br>Index | ID | Reason                                            |
|------------------------------------------------------------------------|--------------|----|---------------------------------------------------|
| 10-2-8 NAT HLA<br>FLIGHT<br>OPERATIONS AND<br>NAVIGATION<br>PROCEDURES | I            | 1  | NEW REGULATION NAT DOC 007 V.2026-1<br>MARCH 2026 |
| 10-2-12 SPECIAL<br>PROCEDURES FOR<br>IN-FLIGHT<br>CONTINGENCIES        | M            | 2  | NEW REGULATION NAT DOC 007 V.2026-1<br>MARCH 2026 |



A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

PRELIMINARY PAGES

SUMMARY OF HIGHLIGHTS

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

### GENERAL

#### 10-1-1 RADAR ADVISORY SERVICE

Applicable to: ALL

Radar advisory service is an air traffic service in which the controller will provide, only to flights under IFR rules (in VMC or IMC weather conditions) advices necessary to maintain separation (minimum 5 NM or 3000 ft) between aircraft participating in the advisory service (bearing, distance, and, if known, level of conflicting non-participating traffic together with advice on action necessary action to resolve the conflicts).

The controller can also give advice on avoiding action. Controllers expect the pilot to accept vectors or level allocations that may require flight in IMC. There is no legal requirement for a pilot flying outside Controlled Airspace to comply with instructions. However, a pilot who chooses not to comply with advisory avoiding action must inform the controller. The pilot will then become responsible for initiating any necessary avoiding action.

The pilot must advise the controller before changing the heading or level. In the event of the sudden appearance of unknown traffic or unpredictable changes in the flight path of traffic, it is not always possible to achieve the separation. Information on conflicting traffic will be passed until the conflict is resolved. The pilot remains responsible for terrain clearance.

#### 10-1-2 RADAR INFORMATION SERVICE

Applicable to: ALL

Radar Information Service is an air traffic service in which the controller will inform the flights (IFR or VFR – IMC or VMC) of the bearing, distance, and, if known, the level of the conflicting traffic. No avoiding action is provided. The pilot is responsible for maintaining separation whether or not the controller has passed traffic information.

The controller will update details of conflicting traffic, after the initial warning, at the pilot's request or if the controller considers that the conflicting traffic continues to be a hazard. The controller may provide radar vectors for tactical planning or at the request of the pilot. However, vectors will not be provided to maintain separation from other aircraft, which remains the responsibility of the pilot. There is no requirement for a pilot to accept vectors.

The pilot must advise the controller before changing the level, or route. Requests for a Radar information service to become a Radar advisory service can be accepted subject to the



A320/A321  
OPERATIONS MANUAL PART C

## EN-ROUTE COM/NAV PROCEDURES

### GENERAL

controller's workload; prescribed separation will be applied as soon as practicable. The pilot remains responsible for terrain clearance.

#### 10-1-3 ESTABLISHING A RADAR SERVICE

Applicable to: ALL

When requesting a radar service, the pilot must state the flight rules under which he is operating and whether he requires a Radar Advisory Service or a Radar Information Service. After identification of the aircraft, the controller will confirm the type of service he is about to provide, and the pilot must give a read-back of the service.

The identification procedure does not imply that radar service is being provided and the pilot must not assume that he is in receipt of a RAS or a RIS until the controller makes a positive statement to that effect. If a controller is unable to provide a service he will inform the pilot.

#### 10-1-4 AREA-SPECIFIC PROCEDURES

Applicable to: ALL

Due to political, regulatory or other peculiarities, several areas and FIRs overflowed by Fly2Sky require special procedures to be applied. These are dynamic in nature and are therefore defined and communicated to crew via Company NOTAM (short term) or the OM-C Airports manual (medium to long term). The crew are expected to read and apply these as appropriate to the routing they fly on each duty.

#### 10-1-5 ONBOARD DOCUMENTATION

Applicable to: ALL

The following onboard documentation provides published Enroute information:

- Navigation procedures, *Refer to: OM-A 8-3-2 NAVIGATION PROCEDURES*
- RVSM, *Refer to: OM A 8-3-2-14 REDUCED VERTICAL SEPARATION MINIMA - RVSM*
- PANS-OPS, *Refer to: Jeppesen FD Pro X-Pubs-Regions-Airway Manual*
- Navigation and charts, *Refer to: Jeppesen FD Pro X*
- RSI, *Jeppesen FD Pro X-Pubs-Regions*



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

### 10-2-1 OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

Applicable to: ALL

Flight crews may fly across the North Atlantic within NAT High Level Airspace (HLA) only if they are in possession of the appropriate NAT HLA and RVSM approvals issued by the State of Registry of the aircraft or by the State of the operator. The Minimum Equipment List (MEL) for operations must be strictly observed.

#### **GENERAL**

NAT HLA is that volume of airspace between FL285 and FL420 within the oceanic control areas of Bodo Oceanic, Gander Oceanic, New York Oceanic East, Reykjavik, Santa Maria and Shanwick, excluding the Shannon and Brest Ocean Transition Areas.

It is implicit in the concept of the NAT HLA that all flights within the airspace achieve the highest standards of horizontal and vertical navigation performance and accuracy. Formal monitoring programmes are undertaken to quantify the achieved performances and to compare them with standards required to ensure that established Target Levels of Safety (TLS) are met.

Aircraft operating within the NAT HLA are required to meet the RNAV 10 (RNP 10) or RNP 4 navigation performance in the horizontal plane through the carriage and proper use of navigation equipment that meets the identified standards and has been approved as such by the Bulgarian CAA for the purpose.

All aircraft intending to operate within the NAT HLA must be equipped with altimetry and height-keeping systems which meet RVSM Minimum Aircraft System Performance Specifications (MASPS). The ultimate responsibility for checking that a NAT HLA/RVSM flight has the necessary approval(s) rests with the commander.

Fly2Sky must maintain a database of all aircraft approvals for NAT HLA and RVSM and report to the North Atlantic Central Monitoring Agency (NAT CMA). The database must be updated regularly and submitted as per ICAO requirements.

The following table provides a summary of the equipment and performance requirements for aircraft planning to operate in the NAT HLA and other parts of the NAT airspace. Refer to the appropriate sections of the document for detailed description of each requirement.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

|                                 | VHF | LRCS <sup>(1)</sup> | HF                | CPDLC          | ADS-C          | SATCOM DATA | ADS-B ES                | LRNS           | RNP                       |
|---------------------------------|-----|---------------------|-------------------|----------------|----------------|-------------|-------------------------|----------------|---------------------------|
| NAT WITHOUT RESTRICTIONS        | VHF | 2 LRCS              | HF                | CPDLC (RCP240) | ADS-C (RSP180) | SATCOM DATA | ADS-B ES                | 2 LRNS         | RNP4 and RNP2 Continental |
| NAT HLA DLM                     |     | 2 LRCS              | HF                | CPDLC          | ADS-C          | SATCOM DATA |                         | 2 LRNS         | RNAV 10 or RNP4           |
| NAT HLA PBCS TRACKS             |     | 2 LRCS              | HF                | CPDLC (RCP240) | ADS-C (RSP180) | SATCOM DATA |                         | 2 LRNS         | RNP4                      |
| NAT HLA OUTSIDE DLM             |     | 2 LRCS              | HF                |                |                |             |                         | 2 LRNS         | RNAV 10 or RNP4           |
| NAT CORRIDORS <sup>(4)(5)</sup> | VHF |                     |                   |                |                |             | ADS-B ES <sup>(5)</sup> | <sup>(2)</sup> |                           |
| T9, T290 <sup>(3)</sup>         | VHF | 1 LRCS              | HF                |                |                |             | ADS-B ES                | 1 LRNS         | RNP2 Continental          |
| OUTSIDE HLA                     |     | 2 LRCS              | HF <sup>(1)</sup> |                |                |             |                         |                |                           |

The following are required in all airspaces:

- TCAS 7.1.;
- SSR Mode A/C; and
- RVSM between FL285 and FL420.

(1) When outside VHF coverage.

(2) Certified installation of equipment providing the ability to navigate along the cleared track.

(3) The requirements for T13, T16, T25 and T213 are the same as the requirements for "NAT HLA DLM" and "NAT OUTSIDE HLA" depending on the operating altitude.

(4) The NAT corridors offer a solution for aircraft that are lacking data link and/or communication and/or navigation equipment meeting NAT HLA requirements.

(5) See section 1.7.5 for details.

## APPROVAL

All flights within the NAT HLA must have the approval of the Bulgarian CAA. Aircraft operating in RVSM airspace are required to be compliant with the altimetry Minimum Aircraft System Performance Specifications (MASPS) and hold an issued approval. Approval for NAT HLA operations will require the checking by the Bulgarian CAA, of various aspects affecting navigation performance.



**APPENDICES****NAT HLA OPERATIONS****OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS**

These aspects include: the navigation equipment used, together with its installation and maintenance procedures; plus the flight crew navigation procedures employed and the flight crew training requirements.

Since the NAT HLA is designated as RVSM airspace at all levels, all NAT flight crews/operators must be approved by the Bulgarian CAA specifically for NAT RVSM operations and each aircraft intended to be flown in the NAT HLA must have State RVSM Airworthiness approval.

**HORIZONTAL NAVIGATION REQUIREMENTS****LONGITUDINAL NAVIGATION**

Time-based longitudinal separations between subsequent aircraft following the same track (in-trail) and between aircraft on intersecting tracks in the NAT HLA are assessed in terms of differences in ATA/ETO at common points. The time-based longitudinal separation minima currently used in the NAT HLA are thus expressed in clock minutes. The maintenance of in-trail separations is aided by the application of the Mach Number Technique (MNT) described later in this subsection. However, aircraft clock errors resulting in waypoint ATA errors in position reports can lead to an erosion of actual longitudinal separations between aircraft. It is thus vitally important that the time-keeping device intended to be used to indicate waypoint passing times is accurate and synchronised to an acceptable UTC time signal before commencing flight in the NAT HLA.

Operations without an assigned fixed speed (OWAFS) were implemented in July 2019. This implementation allows flight crew to select a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number or the Mach number entered in the RCL message as appropriate.

**LATERAL NAVIGATION****EQUIPMENT**

There are two navigational equipment requirements for aircraft planning to operate in the NAT HLA. One refers to the navigation performance that should be achieved, in terms of accuracy. The second refers to the need to carry standby equipment with comparable performance characteristics (ICAO Annex 6 (Operation of Aircraft) refers).

The navigation system accuracy requirements for NAT HLA operation should only be



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

based on the PBN specifications, RNP 10 (PBN application of RNAV 10) or RNP 4. Long Range Navigation Systems, including INS, IRS or GNSS, have demonstrated the requisite navigation accuracy required for operations in the NAT HLA. Consequently, State approval of unrestricted operation in the NAT HLA may presently be granted to an aircraft equipped as follows:

- With at least two fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following:
  - One Inertial Navigation System (INS);
  - One Global Navigation Satellite System (GNSS); or
  - One navigation system using the inputs from one or more Inertial Reference System (IRS) or any other sensor system complying with the NAT HLA requirement.
- Each LRNS shall be capable of providing to the flight crew a continuous indication of the aircraft position relative to desired track.

If a LRNS is a GPS, it must be approved in accordance with FAA/EASA (E)TSO-C129, (E)TSO-C145, (E)TSO-C146 or (E)TSO-C196 as Class A1, A2, B1, B2, C1 or C2, or later standard. (Note: (E)TSO-C129 is currently superseded and no new C-129 equipped aircraft will enter into service). Some States may have additional requirements regarding the carriage and use of GPS (e.g. a requirement for FDE RAIM) and flight crews should check with their own State of Registry to ascertain what, if any, they are. These above mentioned documents can be found at:

- <https://drs.faa.gov> and
  - <https://www.easa.europa.eu/en/certification-specifications/cs-etso-european-technical-standard-orders>

## FLIGHT CREW TRAINING

It is essential that flight crews obtain proper training for NAT HLA and RVSM operations in line with procedures described in the OM-D.

## ATS SURVEILLANCE SERVICE AREAS IN THE NAT REGION

ATS Surveillance services (radar, ADS-B and Multilateration) are provided within some portions of the NAT HLA, where radar- and/or ADS-B and/or Multilateration coverage exists. All aircraft operating as IFR flights anywhere within the NAT region are required to be equipped with a pressure-altitude reporting SSR transponder and may therefore



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

benefit from such radar and multilateration air traffic services, currently offered in parts of the NAT region.

ADS-B services are provided within portions of the NAT region. North Atlantic States providing ADS-B Air Traffic Services maintain a common exclusion list of aircraft that are known to not satisfy the conditions described above. The purpose of the exclusion list is to ensure that ADS-B reports received from such aircraft are not utilized by the air traffic control system for separation services. Operators wishing to receive an exemption from the procedures for an individual flight shall apply for an exemption to the ATS unit(s) in accordance with AIP directives. Any approvals for such exemptions may be contingent on specific conditions such as routing, flight level and time of day.

#### **DATA LINK REQUIREMENTS**

The NAT Data Link Mandate (DLM) requires aircraft to be equipped with, and operating, CPDLC and ADS-C in the NAT region. Currently, the mandate incorporates FL290 to FL410 inclusive.

The DLM is not applicable to aircraft operating in:

- Airspace north of 80° North;
- New York Oceanic East flight information region (FIR);
- Airspace where an ATS surveillance service is provided by means of radar, multilateration and/or ADS-B, coupled with VHF voice communications as depicted in State Aeronautical Information Publications (AIP), provided the aircraft is suitably equipped (transponder/ADS- B extended squitter transmitter). Refer to Airspace excluded from DLM.

Certain categories of flights may be allowed to plan and operate through the mandated airspace with non-equipped aircraft, namely non-equipped flights that file STS/FFR, HOSP, HUM, MEDEVAC SAR, or STATE in Item 18 of the flight plan. Depending on the tactical situation at the time of flight, however, such flights may not receive an ATC clearance which fully corresponds to the requested flight profile.

Any aircraft not equipped with FANS A (or equivalent) systems may request to climb or descend through the NAT DLM airspace. Other requests for operation of non-DLM equipped aircraft in the NAT DLM airspace will be considered on a tactical basis, as outlined below:

- Altitude reservation (ALTRV) requests and requests for "special operations" (e.g., for scientific research or weather observations) will be considered on a case-by-case basis, irrespective of the equipage status of the participating aircraft;

## APPENDICES

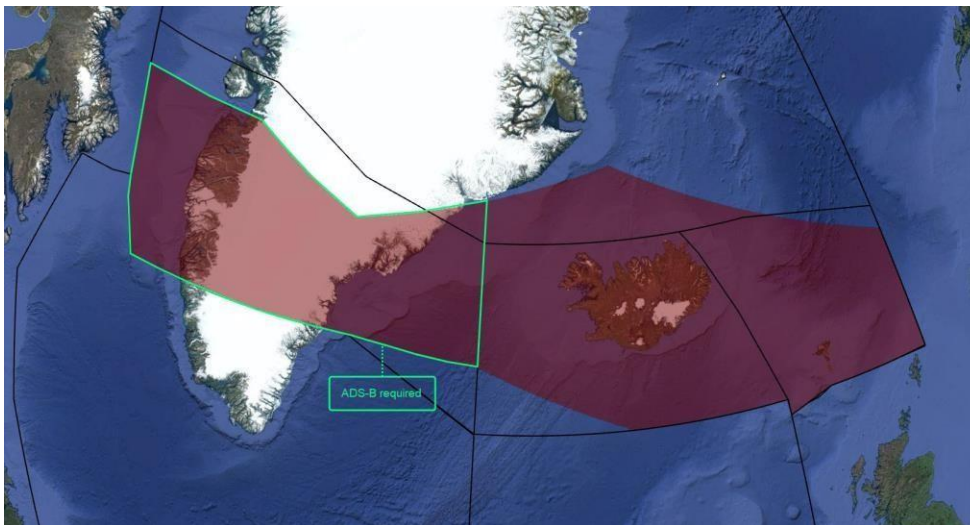
### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

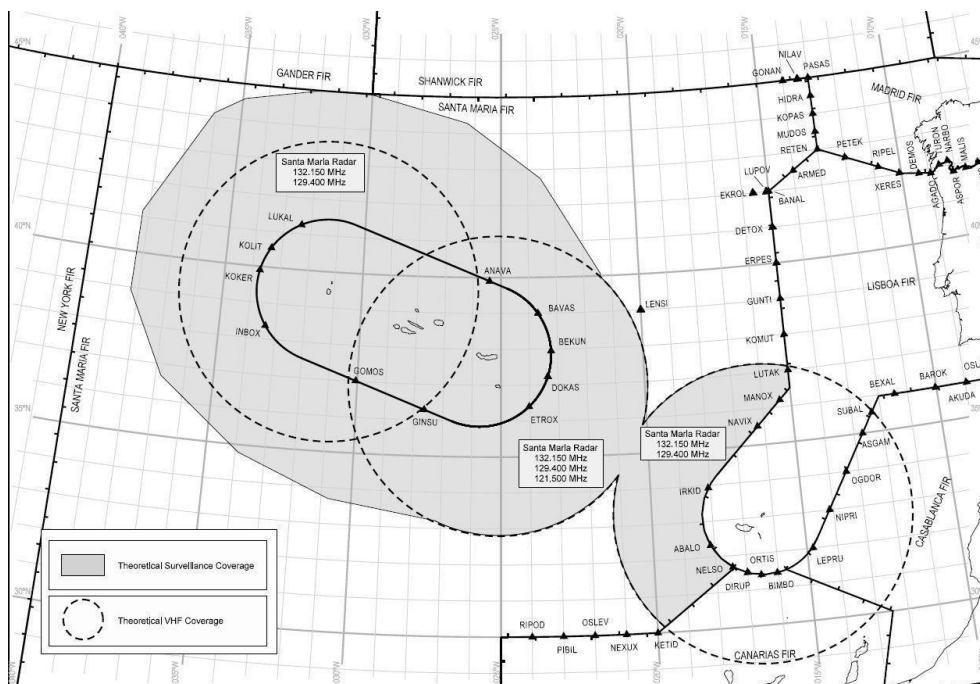
- If a flight experiences an equipment failure after departure which renders the aircraft unable to operate FANS A (or equivalent) CPDLC and/or ADS-C systems, requests to operate in the NAT DLM airspace will be considered on a tactical basis. Such flights must notify ATC of their status PRIOR TO ENTERING the airspace;
- If a FANS A data link equipment failure occurs while the flight is operating within NAT DLM airspace, ATC must be immediately advised. Such flights may be re-cleared so as to avoid the airspace, but consideration will be given to allowing the flight to remain in the airspace, based on tactical considerations;
- If a flight experiences an equipment failure prior to departure which renders the aircraft non-DLM compliant, the flight should re-submit a flight plan so as to remain clear of the NAT regional DLM airspace.

Airspace excluded from the DLM is as follows:

- Iceland – Greenland corridor:



- ADS-B is required west of 30W;
- For planning purposes, this area is bounded by the following: Northern boundary: 65N000W - 67N010W - 69N020W - 68N030W - 67N040W - 69N050W - 69N060W - BOPUT. Southern boundary: GUNPA (61N000W) - 61N007W - 6040N010W - RATSU (61N010W) - 61N020W - 63N030W - 6330N040W - 6330N050W - EMBOK.
- Azores corridor:



- Traffic flying to/from Azores Islands is allowed to operate in the NAT HLA, when the oceanic portion of the planned route is contained inside the Santa Maria FIR ATS Surveillance airspace and VHF coverage, typically via MANOX, NAVIX or IRKID direct 350000N 0200000W or 360000N 0200000W direct Azores Islands, for aircraft equipped with SSR Mode S/ADS-B transponders.
- Bodo corridor:

Aircraft need to be equipped with transponder with ADS-B extended squitter transmitter.

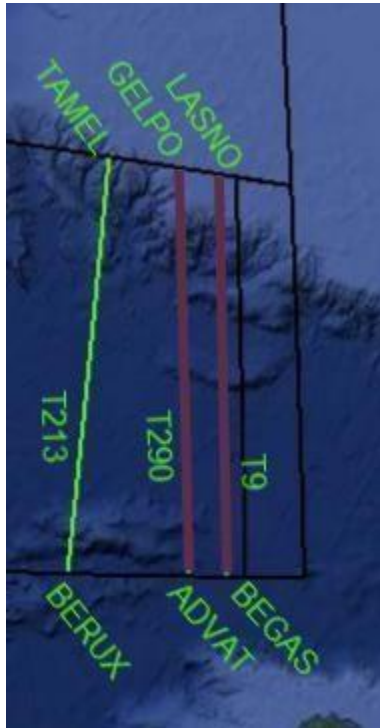
For flight planning purposes, the following coordinates can be used to define the ATS surveillance airspace within Bodø OCA:

6645N 00000E - 7110N 01140E - 7500N 00430E - 8100N 00130E -  
8100N 03000E - 7100N 03000E - 7120N 02800E - 7120N 02500E -  
7000N 01500E - 6545N 00700E - 6303N 00403E - 6315N  
00000E - (6645N 00000E).





Shanwick Tango Routes T9 and T290



*Note: Details in State Aeronautical Information Publications (AIP).*

**PERFORMANCE MONITORING**

The horizontal (i.e. latitudinal and longitudinal) and vertical navigation performance of operators within the NAT HLA is monitored on a continual basis. If a deviation is identified, follow-up action after flight is taken, both with the operator and the State of Registry of the aircraft involved, to establish the cause of the deviation and to confirm the approval of the flight to operate in NAT HLA and/or RVSM airspace. The overall navigation performance of all aircraft in the NAT HLA is compared to the standards established for the region, to ensure that the relevant TLSs are being maintained.

A NAT regional monitoring programme to assess actual communication and surveillance performance against RCP and RSP specifications is being undertaken to monitor individual aircraft performance and to determine whether and what, if any, corrective action is required by contributing entities (Operators, ANSPs, CSPs, SSPs, etc.) to ensure achievement of the system performance required for continued PBCS based separation operations.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### OPERATIONAL APPROVAL AND AIRCRAFT SYSTEM REQUIREMENTS

### **PBCS OPERATIONS**

Performance Based separation minima as small as 15 NM lateral and 14 NM longitudinal predicated on PBCS and PBN, in accordance with Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444) has been implemented in the ICAO NAT Region. Operators should consult the AIS of relevant NAT Provider States for the detailed application of these separation minima in each of the NAT OCAs. To benefit from these separations Operators must obtain State Approvals in accordance with Annex 6 to file in the flight plan RCP/RSP capabilities including aircraft equipage where RCP and/or RSP specifications are prescribed for the communications and/or surveillance capabilities supporting this ATS provision. Guidance material for implementation of communication and surveillance capability supporting these separation minima is contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869) and the Global Operational Data Link (GOLD) Manual (Doc 10037).

Within the OTS the 42.6 km (23 NM) lateral separation minimum is implemented by applying 42.6 km (23 NM) lateral spacing through whole and half degrees of latitude between PBCS designated NAT OTS Tracks between flight levels FL 340 to FL 400 inclusive, except when the OTS occurs in the New York OCA East. In addition to requiring RNP 4 Approval, Operators must appreciate that unlike the filing criteria for the half degree spaced Tracks, the simple equipage and operation of CPDLC and ADS-C will not be a sufficient criteria for planning and flying on the designated PBCS-based OTS Tracks. To utilize these tracks the aircraft must have formal State Authorization for filing RCP 240 and RSP 180.

Application of the reduced lateral and longitudinal separation minima in the NAT Region is dependent on a smooth functioning FANS 1/A data link system. Various known data link related deficiencies in aircraft systems and poor data link performance have a detrimental effect on the air traffic control system and impede aircraft operator's efforts to obtain performance-based communication and surveillance (PBCS) authorizations. Many of these known deficiencies have already been fixed by aircraft manufacturers and software upgrades are available. To ensure the best possible functioning of the NAT air traffic control system, it is of utmost importance that aircraft operators always operate the latest available

FANS 1/A related software version in aircraft that fly in the NAT high level airspace (HLA) and that the aircraft systems are configured in an optimal manner. Meanwhile, implementation of improvements and corrections is also a priority undertaking for the ground and network segments of the overall FANS A system.

NAT OPS Bulletin 2019\_003 provides a list of recommended data link performance improvement options and recommended software versions for NAT data link operations. Aircraft operators are advised to review this OPS Bulletin to identify if some of the issues identified in the Bulletin apply to their operations. The bulletin will be updated on regular basis.

Some NAT ANSPs have implemented the message latency monitor function which is designed to prevent pilots from acting on a CPDLC uplink message that has been delayed in the network. The most serious of such cases would be the pilot executing a clearance that was no longer valid. Because aircraft implementations are varied, it is impossible for ATC to tailor the uplink of the message SET MAX UPLINK DELAY VALUE TO 300 SEC to different aircraft types. It has therefore been decided among the NAT ANSPs to uplink this message to all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight.

***Note:** When operating in the NAT airspace, aircraft operators can expect a value of 300 seconds for the delayed message parameter.*

## 10-2-2 THE ORGANISED TRACK SYSTEM (OTS)

Applicable to: ALL

### **GENERAL**

As a result of passenger demand, time zone differences and airport noise restrictions, much of the North Atlantic (NAT) air traffic contributes to two major alternating flows: a westbound flow departing Europe in the morning, and an eastbound flow departing North America in the evening. The effect of these flows is to concentrate most of the traffic uni-directionally, with peak westbound traffic crossing the 30W longitude between 1130 UTC and 1900UTC and peak eastbound traffic crossing the 30W longitude between 0100 UTC and 0800 UTC.

The flight levels normally associated with the OTS are FL340 to FL400 inclusive. These flight levels, and their use have been negotiated and agreed by the NAT ATS providers and are published as the Flight Level Allocation Scheme (FLAS). The FLAS also determines flight levels available for traffic routing partly or wholly outside of the OTS as well as flights operating outside of the valid time periods of the OTS; often referred to as "transition times".

The hours of validity of the two Organised Track Systems (OTS) are as follows:

- (Westbound) Day-time OTS 1130 UTC to 1900 UTC at 30°W
- (Eastbound) Night-time OTS 0100 UTC to 0800 UTC at 30°W

***Note:** Changes to these times can be negotiated between Gander and Shanwick OACCs and the specific hours of validity for each OTS are indicated in the NAT track message. For flight planning, operators should take account of the times as*



*specified in the relevant NAT track message(s). Tactical extensions to OTS validity times can also be agreed between OACCs when required, but these should normally be transparent to operators.*

Use of the OTS tracks is not mandatory. Aircraft may flight plan on random routes which remain clear of the OTS or may fly on any route that joins, leaves, or crosses the OTS. Operators must be aware that while ATC will make every effort to clear random traffic across the OTS at requested levels, re-routes or significant changes in flight level from those planned are likely to be necessary during most of the OTS traffic periods. A comprehensive understanding of the OTS and the FLAS may assist flight planners in determining the feasibility of flight profiles.

## **CONSTRUCTION OF THE ORGANISED TRACK SYSTEM (OTS)**

### **GENERAL PROCESSES**

The appropriate OACC constructs the OTS after determination of basic minimum time tracks; with due consideration of airlines' preferred routes and taking into account airspace restrictions such as danger areas and military airspace reservations. The night-time OTS is produced by Gander OACC and the day-time OTS by Shanwick OACC (Prestwick), each incorporating any requirement for tracks within the New York, Reykjavik, Bodø and Santa Maria Oceanic Control Areas (OCAs). OACC planners co-ordinate with adjacent OACCs and domestic ATC agencies to ensure that the proposed system is viable. They also take into account the requirements of opposite direction traffic and ensure that sufficient track/flight level profiles are provided to satisfy anticipated traffic demand. Random routes and OTS tracks eastbound typically start with a "named" oceanic entry point, followed by LAT/LONG waypoints, and typically end with 2 "named" waypoints, the first being the oceanic exit point, and the second being a "named" waypoint inside domestic airspace. Random routes and OTS tracks westbound typically start with a "named" oceanic entry point, followed by LAT/LONG waypoints, and typically end with a "named" waypoint that is the oceanic exit point.

When the expected volume of traffic justifies it, tracks may be established to accommodate the EUR/CAR traffic axis. Extra care is required when planning these routes as they differ slightly from the 'core tracks' in that they may cross each other (using vertical separations via different flight level allocations), and in some cases may not extend from coast-out to coast-in (necessitating random routing to join or leave).

Note: *The "named" waypoint inside domestic airspace ensures application of oceanic North Atlantic separations beyond the common boundary allowing time for domestic agency to establish identification, establish direct controller pilot communications via VHF voice, and to issue instructions as necessary*

*OTS tracks can start at "named" waypoints or LAT/LONG waypoints in NAT oceanic airspace (i.e., not at oceanic entry point or exit point). OTS track design of this nature is most commonly seen within New York East and Reykjavik OCAs.*

### **COLLABORATIVE DECISION-MAKING PROCESS**

Operators proposing to execute NAT crossings during the upcoming OTS period are encouraged to contribute to the OTS planning process. A comprehensive set of Collaborative Decision Making (CDM) procedures for NAT track design is now employed.

To ensure emphasis is placed on operators' preferred routes, the CDM process begins with the Preferred Route Message (PRM) system. All NAT operators (both scheduled and non-scheduled) are urged to provide information by AFTN message to the appropriate OACCs regarding optimum routing for any/all of their flights intending to operate during upcoming peak traffic periods. Such information should be provided, in the correct format, as far in advance as possible, but not later than 1900 UTC for the following day-time OTS and 1000 UTC for the following night-time OTS. The details for submitting operators' preferred routes in respect of day-time westbound flights are specified in the UK AIP. The filing of night-time eastbound preferred routings is an element of the NAV CANADA Traffic Density Analyser (TDA) tool (see Chapter 16).

Subsequently, following the initial construction of the NAT tracks by the publishing agencies, the proposed tracks are published on an internet site for interested parties to view and discuss. One hour is allocated for each of the proposals during which any comments will be considered by the publishing agency and any changes which are agreed are then incorporated into the final track design. This internet site is currently operated by NAV CANADA. Access to this site is by password which any bona fide NAT operator may obtain on application to NAV CANADA - see Canada AIP for details. Requests for access should be sent to [noc@navcanada.ca](mailto:noc@navcanada.ca).

## **SPLIT WESTBOUND STRUCTURE**

On occasions, when a strong westerly Jetstream closely follows the Great Circle of the dominant NAT traffic flow between London and New York, the resulting daytime Westbound minimum time tracks can be located both north and south of this great circle. In such cases, Shanwick may publish a "split" track structure, leaving at least two adjacent exit points and landfalls at the Eastern NAT boundary for use by the daytime eastbound traffic flow.

## **THE NAT TRACK MESSAGE**

The agreed OTS is promulgated by means of the NAT track message via the AFTN to all interested addressees. A typical time of publication of the day-time OTS is 2200 UTC and of the night-time OTS is 1400 UTC.

This message gives full details of the coordinates of the organised tracks as well as the flight levels that are expected to be in use on each track. In most cases there are also details of domestic entry and exit routings associated with individual tracks (e.g., NAR). In the westbound (day-time) system the track most northerly, at its point of origin, is designated Track 'A' (Alpha) and the next most northerly track is designated Track 'B' (Bravo) etc. In the eastbound (night-time) system the most southerly track, at its point of origin, is designated Track 'Z' (Zulu) and the next most southerly track is designated Track 'Y' (Yankee), etc.

The originating OACC identifies each NAT track message, within the Remarks section

appended to the end of the NAT track message, by means of a 3-digit Track Message Identification (TMI) number equivalent to the Julian calendar date on which that OTS is effective. For example, the OTS effective on February 1st will be identified by TMI 032. (The Julian calendar date is a simple progression of numbered days without reference to months, with numbering starting from the first day of the year.) If any subsequent NAT track amendments affecting the entry/exit points, route of flight (coordinates) or flight level allocation are made, the whole NAT track message will be re-issued. The reason for this amendment will be shown in the Notes and a successive alphabetic character, i.e. 'A', then 'B', etc., will be added to the end of the TMI number (e.g., TMI 032A).

The remarks section is an important element of the NAT track message. Included is essential information for operators that may vary greatly from day to day. The Remarks may also include details of special flight planning considerations, reminders of ongoing initiatives (e.g., Data Link Mandate), planned amendments to NAT operations, or active NOTAMS referencing airspace restrictions. The remarks section of both the Westbound and Eastbound OTS Messages will identify any designated PBCS tracks. The Eastbound OTS Message will also include important information on appropriate clearance delivery frequency assignments.

### **OTS CHANGEOVER PERIODS**

To ensure a smooth transition from night-time to day-time OTSs and vice-versa, a period of several hours is interposed between the termination of one system and the commencement of the next. These periods are from 0801 UTC to 1129 UTC: and from 1901 UTC to 0059 UTC.

During the changeover periods some restrictions to flight planned routes and levels are imposed. Eastbound and westbound aircraft operating during these periods should file flight level requests in accordance with the Flight Level Allocation Scheme (FLAS) as published in the UK and Canada AIPs and shown at Attachment 5.

It should also be recognised that during these times there is often a need for clearances to be individually co-ordinated between OACCs and cleared flight levels may not be in accordance with those flight planned. If, for any reason, a flight is expected to be level critical, operators are recommended to contact the initial OACC prior to filing of the flight plan to ascertain the likely availability of required flight levels.

## **10-2-3 ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS**

**Applicable to: ALL**

### **ROUTES WITHIN THE NAT HLA**

Routes within the NAT HLA (illustrated in *Figure 3-1*) are as follows:

- a) routes between Northern Europe and Spain/Canarias/Lisboa FIR. (T9\*#, T290\*#, T13, T213 and T16. State approval for NAT HLA operations is required.); and
- b) T25 between the Azores and Lisboa FIR.

*Note 1: \*routes/routings identified with an asterisk in sub paragraph (a) above may be flight planned and flown by approved aircraft equipped with normal short-range navigation equipment (VOR, DME, ADF) and at least one approved fully operational LRNS.*

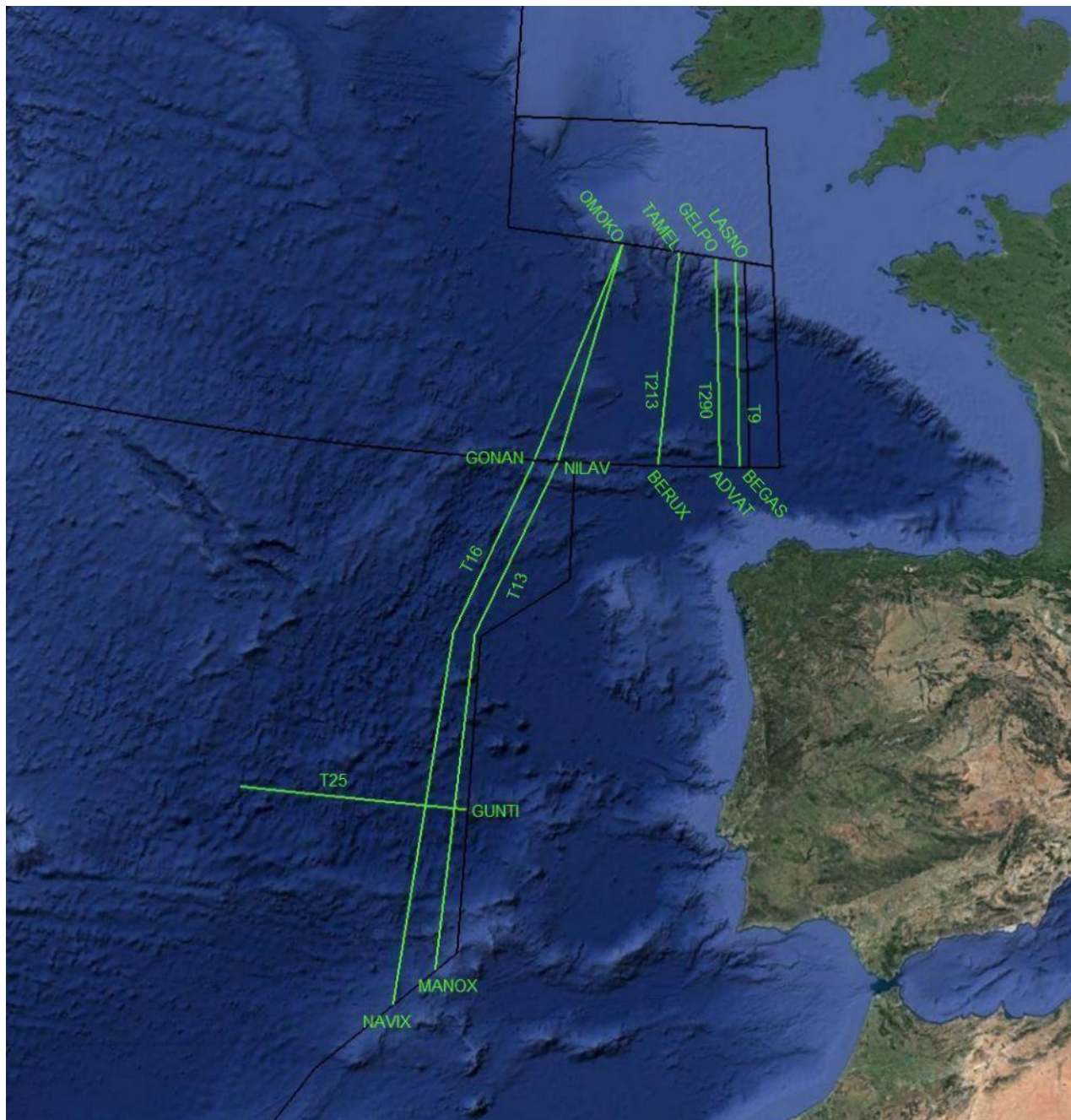
*Note 2: #routes T9 and T290 may be flight planned and flown by approved aircraft equipped with and operating ADS-B (1090 MHz ADS-B 'out' capability), VHF and capable of RNP 2 (Continental).*



## NAT HLA OPERATIONS

## ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS

*Figure 3-1 Tango routes*



## NORTH AMERICAN ROUTES (NARS)



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS

The North American Routes (NARs) consist of a numbered series of predetermined routes which provide an interface between NAT oceanic and North American domestic airspace. The NAR System is designed to accommodate major airports in North America.

Full details of all NAR routings (eastbound and westbound) together with associated procedures are published in two saleable documents:

- The United States Chart Supplement – Northeast U.S., currently available through the following: [https://www.faa.gov/air\\_traffic/flight\\_info/aeronav/productcatalog/supplementalcharts/AirportDirectory/](https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/supplementalcharts/AirportDirectory/) with an electronic version currently available through the following link: [https://www.faa.gov/air\\_traffic/flight\\_info/aeronav/digital\\_products/dafd/](https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/); and
- The Canada Flight Supplement.

It should be noted that these routes are subject to occasional changes and are re-published/updated on a regular AIRAC 56-day cycle.

### US EAST COAST TRANSITIONS

Aircraft operators are encouraged to refer to FAA Air Traffic Control System Command Centre Advisory Database (<https://nasstatus.faa.gov/>) for NAT Advisory Message, published daily, for specified transitions from select US airports to the NAT Entry Points. Additionally, route advisories are published, as necessary, to address special route requirements eastbound and westbound through the New York Oceanic FIR/CTA.

### ROUTES BETWEEN NORTH AMERICA AND THE CARIBBEAN AREA

The West Atlantic Route System (WATRS) resides within the New York OCA West, the Miami oceanic airspace, and the San Juan oceanic airspace. Details of these routes and associated procedures are contained in the United States AIP.

### NORTHERN OCEANIC TRANSITION AREA (NOTA) AND SHANNON OCEANIC TRANSITION AREA (SOTA)

Parts of the Shanwick OCA are designated as the Shannon Oceanic Transition Area (SOTA) and the Northern Oceanic Transition Area (NOTA).

NOTA:

- 5400N 01500W – 5700N 01500W – 5700N 01000W – 5434N 01000W – 5400N 01500W





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

ROUTES, ROUTRE STRUCTURES, AND TRANSITION AREAS

- FL 060 TO FL 600 INCLUSIVE
- NAT HLA FL285 TO FL420

Air Traffic Services are provided by Shannon ACC using the call sign SHANNON CONTROL. Full details of the service provided and the procedures used are contained in AIP Ireland.

SOTA:

- 5100N 01500W- 5100N 00800W – 4830N 00800W – 4900N 01500W – 5100N 01500W
- FL 060 TO FL 600 INCLUSIVE
- NOT INCLUDED IN NAT HLA

Note: Flights transitioning through SOTA and requiring an oceanic clearance FL285 to FL420 inclusive must meet NAT HLA requirements.

### BREST OCEANIC TRANSITION AREA (BOTA)

Part of the Shanwick OCA is designated as the Brest Oceanic Transition Area (BOTA):

- 4834N 00845W – 4830N 00800W – 4500N 00800W – 4500N 00845W – 4834N 00845W
- FL060 TO FL600 INCLUSIVE
- NOT INCLUDED IN NAT HLA

Note: Flights transitioning through BOTA and requiring an oceanic clearance FL285 to FL420 inclusive must meet NAT HLA requirements.

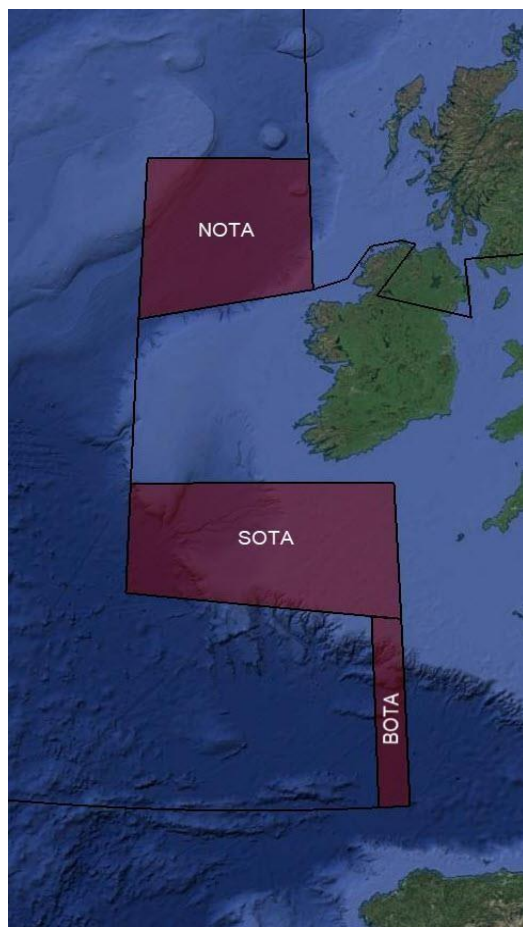


A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

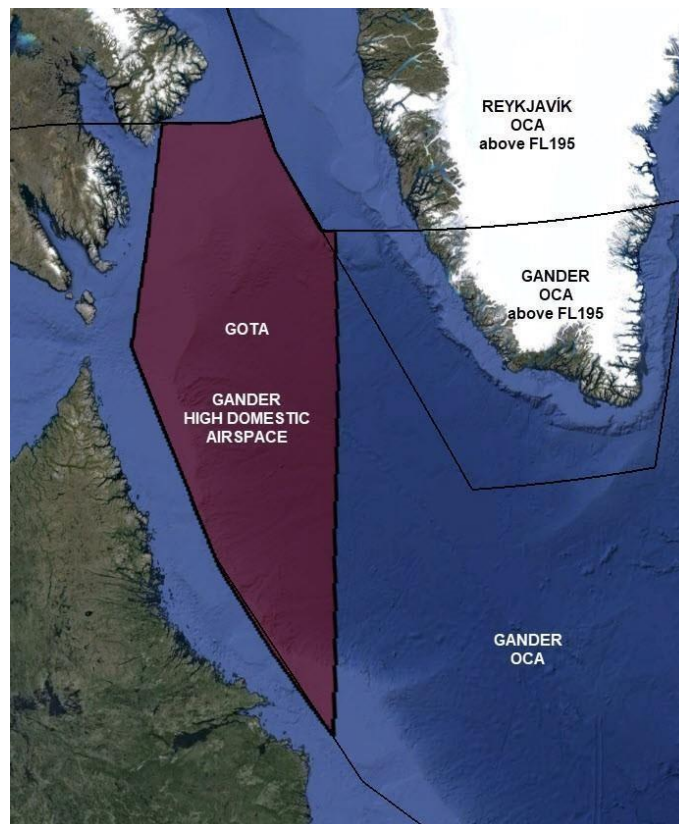
ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS





**APPENDICES****NAT HLA OPERATIONS****ROUTES, ROUTE STRUCTURES, AND TRANSITION AREAS**

Air Traffic service is provided by the Brest ACC, call sign BREST CONTROL.

**GANDER OCEANIC TRANSITION AREA (GOTA)**

Part of the Gander OCA is designated as the Gander Oceanic Transition Area (GOTA):

6523N 06238W - 6530N 06000W - 654236N 0582356W - 6500N 05745W - 6330N 05540W - 6330N 05500W - 5352N 05458W - 5700N 05900W - 582816N 0602104W - 6100N 06300W - 6519N 06300W - 6523N 06238W.

FL 290 to FL 600 inclusive NAT HLA FL 285 to FL 420

Air Traffic service is provided by the Gander ACC, call sign GANDER CENTRE. For details of the service provided and the procedures used refer to the Canadian AIP.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### FLIGHT PLANNING

Air Traffic service is provided by the Gander ACC, call sign GANDER CENTRE. Full details of the service provided and the procedures used are contained in Canada Flight Supplement (CFS).

### 10-2-4 FLIGHT PLANNING

**Applicable to: ALL**

#### **GENERAL**

Doc 7030, in conjunction with State AIPs, provides detailed routing constraints reference flight planning in the NAT. Refer to Doc 7030 and relevant State AIP for details. General rules are paraphrased below.

All flights which generally route in an eastbound or westbound direction should normally be flight planned so that specified ten degrees of longitude (20°W, 30°W, 40°W etc.) are crossed at whole or half degrees of latitude; and all generally northbound or southbound flights should normally be flight planned so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.) are crossed at whole degrees of longitude. Exceptions apply in the case of flights routing north of 70°N, these are noted below.

In Bodo OCA, Shanwick OCA, and Santa Maria OCA, operators can flight plan their user-preferred routes (UPRs)/free route airspace operations without the need to satisfy the flight planning requirements of this section in accordance with requirements specified in the relevant State AIPs.

Additionally, relevant State AIPs may detail areas of ATS Surveillance coverage and VHF voice coverage. These areas may allow flight planning between defined entry and exit points without requiring adherence to the above provisions.

#### **ROUTINGS**

Operators are allowed to flight plan on the OTS, across the OTS or to join or leave the OTS. While ATC will make every effort to clear random traffic affecting the OTS at published flight levels, operators should be aware that re-routes or significant changes in flight level may occur during most of the OTS traffic periods.

Outside of the OTS periods, operators flying against the pending OTS may flight plan any random routing, except:

- Eastbound flights that cross 30°W less than one hour prior to the pending Westbound OTS (i.e. after 1029 UTC); or

**APPENDICES****NAT HLA OPERATIONS****FLIGHT PLANNING**

- Westbound flights that cross 30°W less than one hour prior to the pending Eastbound OTS (i.e., after 2359 UTC), should plan to remain clear of the pending OTS structure. Flight crews of all NAT flights at or above FL290, even those that will transit the NAT either above the NAT HLA, or laterally clear of the OTS, must carry a copy of the NAT track message, including any amendments. In the case of amendments, Note One of the NAT track message will generally contain a brief explanation of the amendment and, if warranted, a revised TMI with an alpha suffix.

**Note:** *A revised TMI with an alpha suffix will be issued for changes to: any track coordinate(s), including named points; published track levels; or named points within European routes west. A TMI revision will not be issued for changes to other items such as NARs.*

**FLIGHT LEVELS**

Flight planning in the NAT between FL290 and FL410 inclusive is restricted by the Data Link Mandate. Chapter 1 indicates equipment required within this level band.

Flights which are planned to remain entirely clear of the OTS, or which join or leave an OTS track (i.e. follow an OTS track for only part of its published length), are all referred to as Random Flights. Flight crews intending to fly on a random route or outside the OTS time periods may plan anyflight level, taking into account feasibility of flight profiles due OTS and traffic flows, additional guidance described paragraphs below.

Note: This FLAS is published in the UK and Canadian AIPs.

Note: Flight level allocation arrangements for routes T9 and T290 are published in the UK AIP at ENR 3.3.

Flights which are planned to follow an OTS track for its entire length (during the OTS periods) may plan any levels, keeping in mind PBCS and DLM requirements.

Note: PBCS tracks will be identified in Note 3 of the OTS message. Operators planning to operate in the altitude band FL 340 - FL 400 on the PBCS OTS are subject to equipage and authorization requirements as outlined in NAT OPS Bulletin, "Implementation of Performance Based Separation Minima".

Operators may include climbs in the flight plan, although each change of level during flight must be requested from ATC by the flight crew. Approval of such requests will be entirely dependent upon potential traffic conflicts. ATC may not always be able to accommodate requested flight level changes and prudent pre-flight fuel planning should take this into consideration.



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### FLIGHT PLANNING

If a flight is expected to be level critical, operators should contact the initial OAC prior to filing of the flight plan to determine the likely availability of specific flight levels. Aircraft planning to land at airports in Greenland south of 6330N may be restricted to low flight levels due to larger separation minima applicable in this airspace.

#### Speed

The planned Mach number must be included in the ICAO flight plan for aircraft capable of maintaining an assigned Mach.

ATC uses speed information, along with position information to calculate estimated times along the cleared route. These times are used as the basis for longitudinal separation and for coordination with adjacent units.

### FLIGHT PLANS

Correct completion and addressing of the ICAO flight plan is extremely important as errors can lead to delays in data processing and the subsequent issuing of clearances to the flights concerned. Detailed explanations of how to correctly complete a flight plan with respect to the NAT portion of a flight are contained in Chapter 16 of this Manual.

Operators are reminded that they must indicate their aircraft and flight crew capabilities (e.g., RNP, RNAV, RCP 240 and RSP 180 authorization, RVSM, FANS 1/A data link, ADS-B and NAT HLA approval) in the flight plan. Separation criteria and safety improvement initiatives in the NAT region are made available to all appropriately equipped flights based on filed flight plan information. This also supports planning for future initiatives by providing more accurate information regarding the actual capabilities of the fleet operating in the ICAO NAT region.

### FLIGHT PLANNING REQUIREMENTS

If (and only if) the flight is planned to operate along the entire length of one of the organised tracks (as detailed in the NAT track message), from oceanic entry point to oceanic exit point, Item 15 of the flight plan may be defined by using the abbreviation 'NAT' followed by the track letter assigned to the track.

Flights wishing to join or leave an organised track at some intermediate point are considered to be random route aircraft and full route details must be specified in the flight plan. The track letter must not be used to abbreviate any portion of the route in these circumstances.

The planned Mach number and flight level should be specified at either the last domestic reporting point prior to oceanic airspace or the organised track commencement point.

**APPENDICES****NAT HLA OPERATIONS****FLIGHT PLANNING**

Each point at which a change of Mach number or flight level is planned must be specified by geographical coordinates in latitude and longitude or as a named waypoint and followed in each case by the next significant point.

The accumulated estimated elapsed time to each oceanic FIR boundary shall be specified in Item 18 of the FPL following the EET/ indicator.

**FLIGHT PLANNING ON RANDOM ROUTE SEGMENTS IN A PREDOMINANTLY EAST - WEST DIRECTION**

Doc 7030 states that flights operating between North America and Europe shall generally be considered as operating in a predominantly east-west direction. However, flights planned between these two continents via the North Pole shall be considered as operating in a predominantly north-south direction. Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, the following applies:

- For flights operating at or south of 70°N, the planned tracks shall normally be defined by significant points formed by the intersection of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees from the Greenwich meridian to longitude 70°W.
- For flights operating north of 70°N and at or south of 80°N, the planned tracks shall normally be defined by significant points formed by the intersection of parallels of latitude expressed in degrees and minutes with meridians normally spaced at intervals of 20 degrees from the Greenwich meridian to longitude 60°W, using the longitudes 000W, 020W, 040W and 060W.
- For flights operating at or south of 80°N, the distance between significant points shall, as far as possible, not exceed one hour's flight time. When the flight time between successive significant points is less than 30 minutes, one of these points may be omitted. Additional significant points should be established when deemed necessary due to aircraft speed or the angle at which the meridians are crossed, e.g.:
  - At intervals of 10 degrees of longitude (between 5°W and 65°W) for flights operating at or south of 70°N; and
  - At intervals of 20 degrees of longitude (between 10°W and 50°W) for flights operating north of 70°N and at or south of 80°N.

For flights operating north of 80°N, the planned tracks shall normally be defined by points of intersection of parallels of latitude expressed in degrees and minutes with meridians



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### FLIGHT PLANNING

expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.

#### FLIGHT PLANNING ON RANDOM ROUTES IN A PREDOMINANTLY NORTH - SOUTH DIRECTION

Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, the following applies:

- For flights whose flight paths at or south of 80°N are predominantly oriented in a north-south direction, the planned tracks shall normally be defined by significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude which are spaced at intervals of 5 degrees.
- For flights operating north of 80°N, the planned tracks shall be defined by points of intersection of parallels of latitude expressed in degrees and minutes with meridians expressed in whole degrees. The distance between significant points shall normally equate to not less than 30 and not more than 60 minutes of flying time.

#### FLIGHT PLANNING TO ENTER OR LEAVE THE NAT REGION VIA THE NORTH AMERICAN REGION

To provide for the safe and efficient management of flights to/from the NAT region, a transition route system is established in the NAM region (North American Routes - NARs). This system details particular domestic routings associated with each oceanic entry or landfall point. These routes are promulgated to expedite flight planning; reduce the complexity of route clearances and minimize the time spent in the route clearance delivery function. The NAR System is designed to accommodate major airports in North America where the volume of North Atlantic (NAT) traffic and route complexity dictate a need to meet these objectives. It consists of a series of pre-planned routes from/to coastal fixes and identified system airports. Most routes are divided into two portions:

- Common Portion — that portion of the route between a specified coastal fix and specified Inland Navigation Fix (INF).
- Non-common Portion — that portion of the route between a specified INF and a system airport.

The routes are prefixed by the abbreviation "N," with the numbering for the common portions orientated geographically from south to north. The odd numbers have eastbound application while the even numbers apply to westbound. An alpha character may follow the one to three digit identifying code indicating an amendment. Together it forms the route





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### FLIGHT PLANNING

identifier. The alpha numeric identifier is associated with the common routes only and not with the non-common route portions.

The use of NARs is not compulsory for every oceanic exit point. The Eastbound NAT track message includes recommended NARs for each track which enters oceanic airspace through Canadian domestic airspace. The Westbound NAT track message carries the annotation "NAR Nil" for each track with the exception of tracks terminating at CARAC, JAROM, or RAFIN where NARs must be filed. Operators may file on any one of the destination appropriate NARs published from that relevant coastal fix. Westbound NAR details are listed in the Canada Flight Supplement and Moncton FIR issues daily NOTAMS showing "recommended NARs". Operators may file them if desired.

Canadian Domestic route schemes and the US East Coast Link Routes are also published. All of these linking structures are referenced in Chapter 3 of this Manual and account must be taken of any such routing restrictions when planning flights in this category.

#### FLIGHT PLANNING TO OPERATE WITHOUT USING HF COMMUNICATIONS

When operating outside of VHF coverage the carriage of fully functioning HF is mandatory throughout the NAT, however some exceptions may apply, refer to State AIPs for further details. Aircraft with only functioning VHF communications equipment should plan their route according to the information contained in the appropriate State AIPs and ensure that they remain within VHF coverage of appropriate ground stations throughout the flight.

#### FLIGHT PLANNING TO OPERATE WITH A SINGLE FUNCTIONING LRNS

Information on specific routes that may be flight planned and flown by aircraft equipped with normal short-range navigation equipment (VOR, DME, ADF) and at least one approved fully operational LRNS can be found in Chapter 3.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

### 10-2-5 OCEANIC ATC CLEARANCES

Applicable to: ALL

#### **GENERAL**

There are three elements to an oceanic clearance: Route, Level, and Speed (if required). These elements serve to provide for the three basic elements of separation: lateral, vertical, and longitudinal.

Oceanic clearances are required for all flights within NAT controlled airspace (at or above FL060). Flight crews should request oceanic clearances from the ATC responsible for the first OCA within which they wish to operate, following the procedures and the time-frame laid down in appropriate AIPs and NAT OPS Bulletins. Such clearances are applicable only from that entry point.

To assist in optimum airspace utilisation, when requesting an oceanic clearance the flight crew should:

- Advise of any required changes to oceanic flight planned level, track, or speed;
- Advise the maximum acceptable flight level at the oceanic boundary;
- Advise of preferred alternative NAT track if applicable.

Specific information on how to obtain oceanic clearance from each NAT OACC is published in State AIPs and NAT OPS Bulletins.

When flight crews are requesting oceanic clearance, they are required to maintain contact on the control frequency, unless having received permission to leave the frequency.

If an aircraft encounters an in-flight equipment failure relevant to the airspace enroute to the NAT oceanic airspace, then the flight crew must advise ATC when requesting an oceanic clearance.

The flight crew should monitor the forward estimate for oceanic entry, and if this changes by 3 minutes or more, unless providing position reports via ADS-C, pass a revised estimate to ATC. As planned longitudinal spacing by these OACCs is based on the estimated times over the oceanic entry fix or boundary, failure to adhere to this ETO amendment procedure may jeopardise planned separation between aircraft, thus resulting in a subsequent re-clearance to a less economical track/flight level for the complete crossing. Any such failure may also penalise following aircraft.



**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

If any of the route, flight level or speed in the clearance differs from that flight planned, requested or previously cleared, attention may be drawn to such changes when the clearance is delivered (whether by voice or by data link). Flight crews should pay particular attention when the issued clearance differs from the flight plan. (N.B. a significant proportion of navigation errors investigated in the NAT involve an aircraft which has followed its flight plan rather than its differing clearance).

If the entry point of the oceanic clearance differs from that originally requested and/or the oceanic flight level differs from the current flight level, the flight crew is responsible for requesting and obtaining the necessary domestic re-clearance to ensure that the flight is in compliance with its oceanic clearance when entering oceanic airspace.

If flight crews have not received their oceanic clearance prior to reaching the OCA boundary, they must follow the guidance provided in the appropriate State AIP.

Unless otherwise stated the oceanic clearance issued to each aircraft is at a specified flight level and cruise Mach number. Subsequent en route changes to flight level or Mach number should not be made without prior ATC clearance, except in an urgency situation, (e.g., encountering unanticipated severe turbulence).

With the implementation of OWAFS, flight crews can expect ATC to issue the clearance RESUME NORMAL SPEED when traffic permits after oceanic entry. This clearance allows the flight crew to select a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

**CONTENTS OF CLEARANCES**

An abbreviated clearance is issued by Air Traffic Services when clearing an aircraft to fly along the whole length of an organised track. The flight crew should confirm the current NAT track message by using the TMI number (including any appropriate alpha suffix) in the readback. There is no requirement for the flight crew to read back the NAT track coordinates. If any doubt exists as to the TMI or the NAT track coordinates, the flight crew should request the complete track coordinates. Similarly, if the flight crew cannot correctly state the TMI, confirmation will include NAT track coordinates in full and a full read back of those coordinates will be required.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

If the term, "via flight plan route" is used when issuing an oceanic clearance, the flight crew is required to readback the full coordinates of the flight plan route, from the oceanic entry point to the exit point.

#### **OCEANIC CLEARANCES FOR WESTBOUND FLIGHTS ROUTING VIA 61°N 010°W**

5.3.1 The provision of air traffic service at RATSU (61°N 010°W) has been delegated by Shanwick to Reykjavik. Flights intending to enter NAT oceanic airspace via RATSU (61°N 010°W) should not call Shanwick for an oceanic clearance. The required oceanic clearance will be issued by Reykjavik Control. There are three points established at the boundary of delegated airspace from Scottish to Reykjavik, BESGA, DEVBI and BARKU on routes to RATSU. Reykjavik will issue oceanic clearances from those points. Aircraft that have not received their oceanic clearance prior to those points shall enter Reykjavik airspace at the domestic cleared flight level while awaiting such oceanic clearance.

#### **OCEANIC FLIGHTS ORIGINATING FROM THE NAM, CAR OR SAM REGIONS AND ENTERING THE NAT HLA VIA THE NEW YORK OCA EAST**

For flights planning to enter the NAT directly from the New York Oceanic East FIR, the IFR clearance to destination received at the departure aerodrome constitutes the route portion of the oceanic clearance. Once airborne, and prior to entry into the NAT, aircraft will be assigned an altitude and a speed (if required) by New York Centre. The receipt of all three elements of an oceanic clearance: route, flight level, and speed constitutes the complete oceanic clearance. A subsequent change to any element(s) of the oceanic clearance does not alter the others.

Flights entering the southern portion of New York Oceanic East FIR from Piarco CTA will be issued all three components of the oceanic clearances prior to entering New York OCA.

In cases where aircraft have been cleared via a NAT track, the TMI number will be confirmed prior to reaching the NAT track entry fix.

#### **CLEARANCES INCLUDING VARIABLE FLIGHT LEVEL**

Clearances which include variable flight level may be requested and granted, traffic permitting. Clearance requests for a variable flight level may be made by voice or CPDLC.

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

Within the NAT, on occasion when traffic permits, aircraft are cleared for a cruise climb or to operate within a block of flight levels. The operational difference between cruise climbs and block of flight levels is in accordance with the following:

- Cruise climb: Only climb or maintain a level, NEVER DESCEND;
- Block of flight levels: Climb and/or descend freely within the assigned block of flight levels.

A cruise climb should be requested when a flight crew wants to operate with a “flexible” vertical profile and gradually climb as the aircraft weight decreases and the optimum flight level increases. A block of flight levels should be requested when the flight crew wants to operate with a flexible vertical profile and the aircraft’s altitude will vary up or down due to factors such as turbulence or icing.

ATC will still make the most efficient use of airspace with the block of levels by adjusting the clearance as levels are cleared. For cruise climb, levels below the aircraft are automatically released as the aircraft climbs.

**ERRORS ASSOCIATED WITH OCEANIC CLEARANCES**

Errors associated with oceanic clearances fall into several categories of which the most significant are ATC System Loop errors and Waypoint Insertion errors.

**COMMUNICATION ERRORS**

A communication error is any error caused by a misunderstanding between the flight crew and the controller regarding the assigned flight level, speed, or route to be followed. Such errors can arise from: incorrect interpretation of the NAT track message by dispatchers; errors in coordination between OACCs; or misinterpretation by flight crews of oceanic clearances or re-clearances. Errors of this nature, which are detected by ATC from flight crew position reports will normally be corrected. However, timely ATC intervention cannot always be guaranteed, especially as it may depend on the use of third-party relayed HF, GP/VHF or SATVOICE communications.

**WAYPOINT INSERTION ERRORS**

Experience has shown that many of the track-keeping errors in the NAT HLA occur as a result of flight crews programming the navigation system(s) with incorrect waypoint data. These are referred to as Waypoint Insertion Errors. They frequently originate from:



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

- Failure to observe the principles of checking waypoints to be inserted in the navigation systems, against the cleared route;
- Failure to load waypoint information correctly; or
- Failure to crosscheck on-board navigation systems.

Many of the navigation error occurrences are the product of one or more of the foregoing causes. It is therefore extremely important that flight crew double check each element of the oceanic clearance on receipt, and at each waypoint, since failure to do so may result in inadvertent deviation from cleared route and/or flight level.

#### 10-2-6 COMMUNICATIONS AND POSITION REPORTING PROCEDURES

**Applicable to: ALL**

### ATS COMMUNICATIONS

#### EQUIPAGE REQUIREMENTS

Operations in the NAT outside VHF coverage require the carriage of two long range communication systems, one of which must be HF, SATVOICE and/or CPDLC (appropriate to route of flight) may satisfy the requirement of the second-long range communication system. Due to coverage limitations, an Inmarsat CPDLC or SATVOICE system does not qualify as a long-range communication system when operating north of 80°N. Aircraft that are equipped with both Inmarsat (J5) and Iridium (J7) data link capability should use Iridium when north of 80°N.

Flights planning to operate outside VHF coverage may request waivers from the HF requirement provided the flight falls into one of the following categories:

- Air carriers with HF unserviceable wishing to return to base for repairs, or
- Ferry or delivery flights, or
- Special event flights.

Relief from the HF requirement in accordance with 6.1.2 may be granted by the Air Traffic Control Centres serving the route of flight provided the aircraft has at least two other long-range communication systems appropriate for route of flight. See State AIPs for details.

#### HF VOICE COMMUNICATIONS

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

It is important that flight crews appreciate that routine\* air/ground ATS voice communications in the NAT region are conducted via aeronautical radio stations (hereafter referred to as radio stations) staffed by radio operators who have no executive ATC authority. Messages are relayed by the ground station to/from the air traffic controllers in the relevant OACC. This is the case, whether communications are via HF, GP/VHF or SATVOICE.

There are six radio stations in the NAT: Bodø Radio (Norway), Gander Radio (Canada), Iceland Radio (Iceland), New York Radio (USA), Santa Maria Radio (Portugal) and Shanwick Radio (Ireland).

Even with the growing use of data link communications a significant volume of NAT air/ground communications are conducted using voice on SSB HF frequencies and GP VHF frequencies. To support air/ground ATC communications in the North Atlantic region, twenty-four HF frequencies have been allocated, in bands ranging from 2.8 MHz to 18 MHz. Additionally, Shanwick Radio, Santa Maria Radio, and Iceland Radio operate a number of Regional and Domestic Air Route Area (RDARA) frequencies in accordance with operating requirements and agreements between the stations.

There are a number of factors which affect the optimum frequency for communications over a specific path. The most significant is the diurnal variation in intensity of the ionisation of the refractive layers of the ionosphere. Hence frequencies from the lower HF bands tend to be used for communications during night-time and those from the higher bands during day-time. Generally, in the North Atlantic frequencies of less than 6 MHz are utilised at night and frequencies of greater than 5 MHz during the day.

The 24 NAT frequencies are organized into six groups known as Families. The families are identified as NAT Family A, B, C, D, E and F. Each family contains a range of frequencies from each of the HF frequency bands. A number of stations share families of frequencies and co-operate as a network to provide the required geographical and time of day coverage. A full listing of the frequencies operated by each NAT radio station is contained in the "HF Management Guidance Material for the North Atlantic Region" (NAT Doc 003), available at [www.icao.int/EURNAT/](http://www.icao.int/EURNAT/), following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 003".

Each individual flight may be allocated a primary and a secondary HF frequency before the oceanic boundary.

Radio operators usually maintain a continuous air-ground communication watch on more than one single frequency therefore it is useful for flight crews to state the frequency used

when placing the initial call to the radio station.

## HF PHRASEOLOGY APPLICABLE WHEN USING DATA LINK

The integrity of the ATC service remains wholly dependent on establishing and maintaining HF or VHF voice communications with each ATS unit along the route of flight. The procedures in this section are applicable only in NAT airspace and pertain only to ATS data link operations.

Prior to or upon entering each NAT oceanic CTA, the flight crew should contact the appropriate aeronautical radio station.

If the flight enters an oceanic CTA followed by another oceanic CTA, the flight crew should, on initial contact:

- Not include a position report;
- After the radio operator responds, request a SELCAL check and state the next CTA;
- The radio operator will assign primary and secondary frequencies, perform the SELCAL check and designate the position and frequencies to contact the aeronautical radio station serving the next oceanic CTA. If the communications instructions are not issued at this stage, the crew should assume that the frequencies to use prior or upon entering the next CTA will be delivered at a later time by CPDLC or voice.

Example (Initial contact from an eastbound flight entering Gander Oceanic):

- **"GANDER RADIO, SOFIA JET 123, SELCAL CHECK, SHANWICK NEXT"**
- **"SOFIA JET 123, GANDER RADIO, HF PRIMARY 5616 SECONDARY 2899, AT 30 WEST CONTACT SHANWICK RADIO HF PRIMARY 8891 SECONDARY 4675, (SELCAL TRANSMITTED)"**
- **"GANDER RADIO, SOFIA JET 123, SELCAL OKAY, HF PRIMARY 5616 SECONDARY 2899. AT 30 WEST CONTACT SHANWICK RADIO, HF PRIMARY 8891 SECONDARY 4675"**

If the flight will exit an oceanic CTA into continental airspace or airspace where the primary means of communication is VHF voice and an ATS surveillance service is available, on initial contact with the oceanic CTA, the flight crew should:

- Not include a position report;

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

- After the radio operator responds, request a SELCAL check;

Example (Initial contact from an eastbound flight about to enter SHANWICK Oceanic):

- **SHANWICK RADIO, SOFIA JET 123, SELCAL CHECK**
- **SOFIA JET 123, HF PRIMARY 2899 SECONDARY 5616 (SELCAL TRANSMITTED)**
- **SHANWICK RADIO, SOFIA JET 123, SELCAL OKAY, HF PRIMARY 2899**

**SECONDARY 5616.**

For flights on T9 and T290, monitor VHF channel 128.360 as advised by Shanwick Radio. Exceptionally, in the event of navigational non-conformance or in an emergency, controllers may communicate directly with the flight. Controllers will use the callsign **“SHANWICK CONTROL”**.

Depending on which data link services are offered in the oceanic CTA and the operational status of those services, the aeronautical radio operator will provide appropriate information and instructions to the flight crew.

If a data link connection cannot be established, maintain normal voice communication procedures. In the event of data link connection failure in a NAT CTA after a successful logon revert to voice and notify the appropriate radio station. Inform the OAC in accordance with established problem reporting procedures. Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

To reduce frequency congestion, flight crews of flights using ADS-C should not additionally submit position reports via voice unless requested by aeronautical radio operator.

ADS-C flights are exempt from all routine voice meteorological reporting; however, the flight crew should use voice to report unusual meteorological conditions such as severe turbulence to the aeronautical radio station.

For any enquiries regarding the status of ADS-C connections, flight crew should use CPDLC. Should the ATS unit fail to receive an expected position report, the controller will follow guidelines for late or missing ADS-C reports.

When leaving CPDLC/ADS-C or ADS-C-only airspace, the flight crew should comply with all communication requirements applicable to the airspace being entered.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

If the flight crew does not receive its domestic frequency assignment by 10 minutes prior to the flight's entry into the next oceanic CTA, the flight crew should contact the aeronautical radio station and request the frequency, stating the current CTA exit fix or coordinates. Flights on Tango 9 or Tango 290 should contact Shanwick Radio on HF voice.

## SELCAL

When using HF, SATVOICE, or CPDLC, flight crews shall maintain a continuous air-ground communication watch on the assigned frequency, unless SELCAL equipped, in which case they should ensure the following sequence of actions:

- Provide the SELCAL code in the flight plan; (any subsequent change of aircraft for a flight will require refile of the flight plan or submitting a modification message (CHG) which includes the new registration and SELCAL);
- Check the operation of the SELCAL equipment, at or prior to entry into oceanic airspace, with the appropriate radio station. (This SELCAL check shall be completed prior to commencing SELCAL watch); and
- Maintain thereafter a SELCAL watch.

It is important to note that it is equally essential to comply with the foregoing SELCAL provisions even if SATVOICE or CPDLC are being used for routine air/ground ATS communications. This will ensure that ATC has a timely means of contacting the aircraft.

Flight management staff and flight crews of aircraft equipped with SELCAL equipment should be made aware that SELCAL code assignment is predicated on the usual geographical area of operation of the aircraft. If the aircraft is later flown in geographical areas other than as originally specified by the aircraft operator, the aircraft may encounter a duplicate SELCAL code situation. Whenever an aircraft is to be flown routinely beyond the area of normal operations or is changed to a new geographic operating area, the aircraft operator should contact the SELCAL Registrar and request a SELCAL code appropriate for use in the new area.

When acquiring a previously owned aircraft equipped with SELCAL, many aircraft operators mistakenly assume that the SELCAL code automatically transfers to the purchaser or lessee. This is not true. As soon as practical, it is the responsibility of the purchaser or lessee to obtain a SELCAL code from the Registrar, or, if allocated a block of codes for a fleet of aircraft, to assign a new code from within the block of allocated codes.



**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

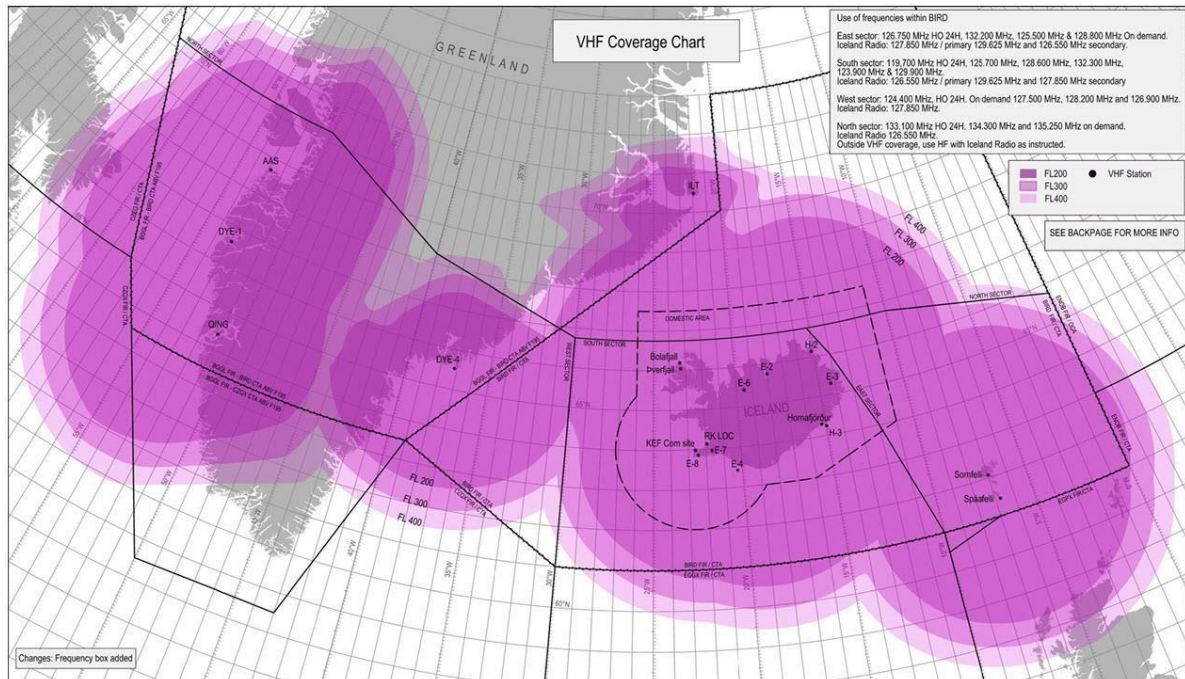
Issues associated with duplicate SELCALs should be made to the SELCAL Registrar, Aviation Spectrum Resources, Inc. (ASRI). The SELCAL Registrar can be contacted via the AFTN address KDCAXAAG, and by including "ATTN. OPS DEPT. (forward to SELCAL Registrar)" as the first line of message text or via online at <https://www.asri.aero/selcal/>.

**VHF VOICE COMMUNICATIONS**

Radio stations are also responsible for the operation of General Purpose VHF (GP/VHF) outlets. North Atlantic flights may use these facilities for all regular and emergency communications with relevant OACCs, except that VHF Channel 128.360 may not be used for routine communication on routes Tango 9 and Tango 290. Such facilities are especially valuable in the vicinity of Iceland, Faroes and Greenland since VHF is not as susceptible to sunspot activity as HF. Outlets are situated at Prins Christian Sund, which is operated by Gander Radio, and at Kangerlussuaq (Sondrestrom), Kulusuk, several locations in Iceland and the Faroes, via Iceland Radio. It is important for the flight crew to recognise that when using GP/VHF, as with HF and SATVOICE, these communications are with a radio station and the flight crew is not normally in direct contact with ATSU. However, contact between the flight crew and ATC can be arranged, for example via patch-through on HF or GP/VHF frequencies by Iceland Radio and Shanwick Radio.

Reykjavik centre operates a number of Direct Controller Pilot Communications (DCPC) VHF stations in Iceland, Faroe Islands and Greenland. At jet flight levels the coverage is approximately 250 NM as indicated in Figure 6-1 below. Those stations are used to provide tactical procedural control and ATS Surveillance services within the South, East and West sectors of the Reykjavik area. The callsign of the Reykjavik centre is "Reykjavik Control" or just "Reykjavik" and indicates that the flight crew is communicating directly with an air traffic controller. The callsign of Iceland radio is "Iceland radio" and indicates that the flight crew is communicating with a radio operator who is relaying messages between the flight crew and the appropriate control facility.

*Note:* Due to technical data link interoperability requirements, CPDLC uplink messages refer to Iceland Radio as "Iceland Radio Centre". This is done to enable the flight crew of capable aircraft to automatically load the specified frequency into the aircraft communication system.



## SATVOICE COMMUNICATION

The Aeronautical Mobile Satellite (Route) Service (AMS(R)S), more commonly referred to as SATVOICE, can be used as a supplement to HF & CPDLC communications throughout the NAT region for any routine, non-routine or emergency ATS air/ground communications. NAT ATS provider State AIPs contain the necessary telephone numbers and/or short-codes for air-initiated call access to radio stations and/or direct to OACCs. Since oceanic traffic typically communicates with ATC through radio facilities, routine SATVOICE calls should be made to such a facility rather than the ATC Centre. Only when the urgency of the communication dictates otherwise should SATVOICE calls be made to the ATC Centre. SATVOICE communication initiated due to HF propagation difficulties does not constitute urgency and should be addressed to the air-ground radio facility. The use of SATVOICE is described in The SATVOICE Operations Manual (Doc 10038).

The provisions governing the use of SATVOICE for ATS communications in the NAT region are contained in Doc 7030. These provisions include that even when using SATVOICE, flight crews must simultaneously operate SELCAL or maintain a continuous air-ground communication watch on the assigned HF/VHF frequency.

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

Operators must also recognise that they are bound by their own State of Registry's regulations regarding carriage and use of any and all long-range ATS communications equipment. Some States do not authorise the carriage of SATVOICE as redundancy for HF equipage.

**DATA LINK COMMUNICATIONS**

Data link communications have been gradually introduced into the NAT for position reporting (via ADS-C and CPDLC) and air/ground ATC communications using FANS 1/A CPDLC. Operational procedures are specified in Doc 10037, Global Operational Data Link (GOLD) Manual. AIP publications of the NAT ATS provider States should be consulted to determine the extent of current implementation in each of the North Atlantic OCAs.

When a CPDLC aircraft is operating in an airspace beyond the range of VHF voice communications, and CPDLC is available, then:

- a) CPDLC will be the primary means of communication, and
- b) Voice will be used as the alternative means of communication (for example, third party HF or SATVOICE).

Within VHF coverage, an ATSU may provide CPDLC service as the primary means of communication to alleviate frequency congestion or to enable the use of automation associated with the use of CPDLC. In such airspace, VHF voice communication is the alternative means of communication for CPDLC aircraft.

Flights equipped with CPDLC and /or ADS-C and SATCOM should ensure that the data link system is logged on to the appropriate OAC. This applies even when the aircraft is using VHF voice communications.

When operating CPDLC, the aircraft data link system provides indication to flight crews of any degraded performance which results from a failure or loss of connectivity. The flight crew should then notify the ATS unit of the failure as soon as practicable. Timely notification is essential to ensure that the ATS unit has time to assess the situation and apply a revised separation standard, if necessary.

Similar to SATVOICE usage, flight crews using Data link communications for regular ATS communications in the ICAO NAT region remain responsible for operating SELCAL (including completion of a SELCAL Check), or maintaining a continuous air-ground

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

communication watch on the assigned HF frequency outside VHF coverage. As stated in section 2.1.4 of the ICAO Global Operational Data Link (GOLD) Manual (Doc 10037) ANSPs are required to notify operators, using the AIP or other appropriate AIS, the detail of all the supported data link services. Such notification will include advice when the aircraft SATCOM system is not serviceable. In such circumstances, when the planned route of flight is to extend beyond VHF data link coverage, the ANSP may restrict the use of CPDLC and ADS-C, even within VHF data link coverage areas, if so Operators should then ensure that the relevant CPDLC/ADS-C descriptors (J5/J7/D1) are not filed.

**INTER-PILOT AIR-TO-AIR VHF FACILITY 123.450 MHZ AND 121.5 MHZ**

The frequency 121.5 MHz should be continuously monitored by all aircraft operating in the NAT region so as to be prepared to offer assistance to any other aircraft advising an emergency situation.

An air-to-air VHF frequency has been established for world-wide use when aircraft are out of range of VHF ground stations which utilise the same or adjacent frequencies. This frequency, 123.450 MHz, is intended for pilot-to-pilot exchanges of operationally significant information (N.B. It is not to be used as a "chat" frequency).

123.450 MHz may be used to relay position reports via another aircraft in the event of an air-ground communications failure.

This frequency (123.450 MHz) may also be used by flight crews to contact other aircraft when needing to coordinate offsets required in the application of the Strategic Lateral Offset Procedures (SLOP).

If necessary initial contact for relays or offset coordination can be established on 121.5 MHz, although great care must be exercised should this be necessary, in case this frequency is being used by aircraft experiencing or assisting with an ongoing emergency.

Therefore, in order to minimise unnecessary use of 121.5 MHz, it is recommended that when possible aircraft additionally monitor 123.450 MHz when flying through NAT airspace.

**POSITION REPORTING****TIME AND PLACE OF POSITION REPORTS**

Unless otherwise requested by ATC, position reports from flights on routes which are not defined by designated reporting points shall be made at the significant points listed in the flight plan.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

ATC may require any flight to report its position at any intermediate waypoints when deemed necessary.

In requiring aircraft to report their position at intermediate points, ATC is guided by the requirement to have positional information at approximately hourly intervals and also by the need to accommodate varying types of aircraft and varying traffic and MET conditions.

Unless providing position reports via ADS-C, if the estimated time for the 'next position', as last reported to ATC, has changed by three minutes or more, a revised estimate must be transmitted to the ATS unit concerned as soon as possible.

Flight crews must always report to ATC as soon as possible on reaching any new cruising level.

### CONTENTS OF POSITION REPORTS

For flights outside domestic ATS route networks, position should be expressed in terms of latitude and longitude except when flying over named reporting points. Except in those areas defined in State AIPs where operators meeting specified requirements can flight plan their user-preferred trajectories, flights whose tracks are predominantly east or west, latitude should be expressed in degrees and minutes, longitude in degrees only. For flights whose tracks are predominantly north or south, latitude should be expressed in degrees only, longitude in degrees and minutes. However, it should be noted that when such minutes are zero then the position report may refer solely to degrees.

All times should be expressed in four digits giving both the hour and the minutes UTC.

Radio operators may simultaneously monitor and operate more than one frequency. Therefore, when initiating an HF voice contact it is helpful if the flight crew include advice on the frequency being used (see examples below).

### OPERATIONS NORMAL REPORTS

When "operations normal" reports are transmitted by flight crews, they should consist of the prescribed call followed by the words "OPERATIONS NORMAL".

### STANDARD MESSAGE TYPES

Standard air/ground message types and formats are used within the NAT region and are published in State AIPs and Atlantic Orientation charts. To enable ground stations to process messages in the shortest possible time, flight crew should observe the following





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### COMMUNICATIONS AND POSITION REPORTING PROCEDURES

rules:

- Use the correct type of message applicable to the data transmitted;
- State the message type in the contact call to the ground station or at the start of the message;
- Adhere strictly to the sequence of information for the type of message;
- All times in any of the messages should be expressed in hours and minutes UTC.

The message types are shown below with examples:

#### POSITION

- Pilot: "Shanwick Radio, SOFIA JET 456, Position on 8831"
- Radio operator: "SOFIA JET 456, Shanwick Radio"
- Pilot: "Shanwick Radio, SOFIA JET 456, RESNO at 1235, Flight Level 330, Estimating 56 North 020 West at 1310, Next 56 North 030 West"

#### POSITION REPORT AND REQUEST CLEARANCE

- Pilot: "Shanwick Radio, SOFIA JET 123, Request Clearance on 8831"
- Radio operator: "SOFIA JET 123, Shanwick Radio"
- Pilot: "Shanwick Radio, SOFIA JET 123, 56 North 020 West at 1308, Flight Level 330, Estimating 56 North 030 West at 1340, Next 56 North 040 West. Request Flight Level 350"

#### REQUEST CLEARANCE

- Pilot: "Shanwick Radio, SOFIA JET 212, Request Clearance on 3476"
- Radio operator: "SOFIA JET 212, Shanwick Radio"
- Pilot: "Shanwick Radio, SOFIA JET 212, Request Flight Level 370"

#### REVISED ESTIMATE

- Pilot: "Shanwick Radio, SOFIA JET 212, Revised Estimate on 3476"
- Radio operator: "SOFIA JET 212, Shanwick Radio"
- Pilot: "Shanwick Radio, SOFIA JET 212, 57 North 040 West at 0305"

**MISCELLANEOUS**

- Plain language – free format

**WHEN ABLE HIGHER (WAH) REPORTS**

The provision of WAH reports advises ATC of the time or position that a flight will be able to accept the next higher level allowing controllers to more effectively utilise their airspace and provide aircraft more fuel-efficient profiles. A WAH report should be provided by all flights when entering the Santa Maria OCA. Provision of WAH reports on entering other NAT OCAs is optional or they may be requested by any OACC.

Information provided of the aircraft's future altitude "ability" will not automatically be interpreted by ATC as an advance "request" for a climb. It will be used as previously indicated to assist ATC in planning airspace utilisation.

It should be noted that ATC acknowledgement of a WAH report (and any included requests) is NOT a clearance to change altitude.

**METEOROLOGICAL REPORTS**

In accordance with ICAO Annex 3 - Meteorological Service for International Air Navigation, aircraft are no longer required to provide voice reports of MET observations of wind speed and direction nor outside air temperature.

When an ATS unit establishes an ADS-C contract, it may also request the MET group, which contains wind and temperature data, to satisfy the MET authorities' requirements for the provision of MET data. However, it must be appreciated that any such automated MET Reports do not include information on any observations of special or non-routine significant meteorological phenomena, such as moderate/severe turbulence or icing, volcanic ash, thunderstorms, etc. Therefore, any flight crew providing position reports via data link, who encounters any such significant meteorological phenomena should report this information via voice or, if appropriate, via a CPDLC free text downlink message. The format to be used for the reporting of such observations should, where appropriate, be by reference to geographical coordinates.

**VOLMET SERVICES**

This is a H24 continuous voice broadcast of weather information consisting of SIGMETs for the NAT region, terminal forecasts and actual weather observations for the principal airports in North America & Europe provided by Gander, New York and Shanwick. Consult State AIPs and NAT Doc 003-HF Management Guidance Material for the North Atlantic Region.

**HF COMMUNICATIONS FAILURE**

Rules and procedures for the operation of an aircraft following a radio communications failure (RCF) are established to allow ATC to anticipate that aircraft's subsequent actions and thus for ATC to be able to provide a service to all other flights within the same vicinity, so as to ensure the continued safe separation of all traffic. The general principles of such rules and procedures are set out in Annexes 2 and 10 to the ICAO Convention. States publish in their AIPs specific RCF rules and regulations to be followed within their particular sovereign airspace.

It must be recognised that there is in general an underlying premise in "normal" radio communications failure procedures that they are for use when a single aircraft suffers an on-board communications equipment failure. Within the NAT region and some adjacent domestic airspace (e.g. Northern Canada), where HF Voice is used for air-ground ATC communications, ionospheric disturbances resulting in poor radio propagation conditions can also interrupt these communications. While it is impossible to provide guidance for all situations associated with an HF communications failure, it is, however, extremely important to differentiate between two distinct circumstances: - firstly, an on-board communications equipment failure, resulting in an individual aircraft losing HF communications with ATC and; secondly, the occurrence of poor HF propagation conditions (commonly referred to as "HF Blackouts"), which can simultaneously interrupt HF air-ground communications for many aircraft over a wide area.

In the case of an on-board communications equipment failure, even though ATC loses contact with that aircraft, it can anticipate that aircraft's actions and, if necessary, modify the profiles of other aircraft in the same vicinity in order to maintain safe separations.

However, the occurrence of poor HF propagation conditions can simultaneously interrupt HF air-ground communications for many aircraft over a wide area and ATC may then be unable to make any interventions to assure safe traffic separations using HF.



**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

Notwithstanding the growing use of Data link and SATVOICE for regular air-ground ATS communications in the NAT region, all flight crews must recognise that, pending the mandatory carriage and use of such means, an HF blackout will impact the ability of ATC to ensure the safe separation of all traffic. Hence, even if using other than HF for regular communications with ATC, flight crews should still exercise appropriate caution when HF blackout conditions are encountered.

The following procedures are intended to provide general guidance for aircraft which experience a communications failure while operating in, or proposing to operate in, the NAT region. These procedures are intended to complement and not supersede State procedures/regulations.

**GENERAL PROVISIONS**

The flight crew of an aircraft experiencing a two-way ATS communications failure should operate the SSR Transponder on identity Mode A Code 7600 and Mode C.

When so equipped, an aircraft should use SATVOICE to contact the responsible radio station via special telephone numbers/short codes published in State AIPs (see also NAT Doc 003, "HF Management Guidance Material for the North Atlantic Region" which can be downloaded from the [www.icao.int/EURNAT/](http://www.icao.int/EURNAT/), following "EUR & NAT Documents", then "NAT Documents"). However, it must be appreciated that pending further system developments and facility implementations the capability for Ground (ATC)-initiated calls varies between different NAT OACCs.

If the aircraft is not equipped with SATVOICE then the flight crew should attempt to use VHF to contact any (other) ATC facility or another aircraft, inform them of the difficulty, and request that they relay information to the ATC facility with which communications are intended.

The inter-pilot air-to-air VHF frequency, 123.450 MHz, may be used to relay position reports via another aircraft. (N.B. The emergency frequency 121.5 MHz should not be used to relay regular communications, but since all NAT traffic is required to monitor the emergency frequency, it may be used, in these circumstances, to establish initial contact with another aircraft and then request transfer to the inter-pilot frequency for further contacts).

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

In view of the traffic density in the NAT region, flight crews of aircraft experiencing a two-way ATS communications failure should broadcast regular position reports on the inter-pilot frequency (123.450 MHz) until such time as communications are re-established.

**COMMUNICATIONS PROCEDURES FOR USE IN THE EVENT OF AN ON-BOARD HF EQUIPMENT FAILURE**

Use SATVOICE communications, if so equipped. If not SATVOICE equipped try VHF relay via another aircraft.

**COMMUNICATIONS PROCEDURES FOR USE DURING POOR HF PROPAGATION CONDITIONS**

Poor HF propagation conditions are the result of ionospheric disturbances. These are usually caused by sun-spot or solar flare activity creating bursts of charged particles in the solar wind which can spiral down around the Earth's magnetic lines of force and distort or disturb the ionised layers in the stratosphere which are utilised to refract HF radio waves. As with the Aurora Borealis, which is of similar origin, these ionospheric disturbances most commonly occur in regions adjacent to the Magnetic Poles. Since the Earth's North Magnetic Pole is currently located at approximately 87N 150W, flights through the North Atlantic and Northern Canada regions can, on occasion, experience resulting HF communications difficulties.

SATVOICE communications are unaffected by most ionospheric disturbances. Therefore, when so equipped, an aircraft may use SATVOICE for ATC communications.

If not SATVOICE equipped, in some circumstances it may be feasible to seek the assistance, via VHF, of a nearby SATVOICE equipped aircraft to relay communications with ATC.

Whenever aircraft encounter poor HF propagation conditions that would appear to adversely affect air-ground communications generally, it is recommended that all flight crews then broadcast their position reports on the air-to-air VHF frequency 123.450 MHz. Given the density of traffic in the NAT region and the fact that in such poor propagation conditions ATC will be unable to maintain contact with all aircraft, it is important that even those aircraft that have been able to establish SATVOICE contact also broadcast their position reports.

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

If for whatever reason SATVOICE communications (direct or relayed) are not possible, then the following procedures may help to re-establish HF communications. Sometimes these ionospheric disturbances are very wide-spread and HF air-ground communications at all frequencies can be severely disrupted throughout very large areas (e.g. simultaneously affecting the whole of the NAT region and the Arctic). However, at other times the disturbances may be more localised and/or may only affect a specific range of frequencies.

In this latter circumstance, HF air-ground communications with the intended radio station may sometimes continue to be possible but on a frequency other than either the primary or secondary frequencies previously allocated to an aircraft. Hence, in the event of encountering poor HF propagation conditions flight crews should first try using alternative HF frequencies to contact the intended radio station.

However, while the ionospheric disturbances may be severe, they may nevertheless only be localized between the aircraft's position and the intended radio station, thus rendering communications with that station impossible on any HF frequency. But the radio stations providing air-ground services in the NAT region do co-operate as a network and it may, even then, still be possible to communicate with another radio station in the NAT network on HF and request that they relay communications. Efforts should therefore be made to contact other NAT radio stations via appropriate HF frequencies.

Nevertheless, as previously indicated, there are occasions when the ionospheric disturbance is so severe and so widespread that HF air-ground communications with any radio station within the NAT region network are rendered impossible.

**RATIONALE FOR LOST COMMUNICATIONS OPERATIONAL PROCEDURES**

Because of the density of oceanic traffic in the NAT region, unique operational procedures have been established to be followed by flight crews whenever communications are lost with ATC. If communications with the relevant OACC are lost at any time after receiving and acknowledging a clearance then the aircraft must adhere strictly to the routing and profile of the last acknowledged clearance until exiting the NAT region. Flight crews must not revert to their filed flight plan.

## OPERATIONAL PROCEDURES FOLLOWING LOSS OF HF COMMUNICATIONS PRIOR TO ENTRY INTO THE NAT

### ON-BOARD HF COMMUNICATIONS EQUIPMENT FAILURE

Due to the potential length of time in oceanic airspace, it is strongly recommended that a flight crew, experiencing an HF communications equipment failure:

- Prior to departure:
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined.
  - Include any coordinated HF waiver relief details in Item 18 of the flight plan.
- After departure and prior to entering the NAT:
  - Coordinate with the initial NAT OAC according to flight planned route to determine if eligible for HF relief waiver as outlined.

If, however, an oceanic clearance cannot be obtained, the individual aircraft suffering radio communications equipment failure should enter oceanic airspace at the first oceanic entry point, level and speed contained in the filed flight plan and proceed via the filed flight plan route to landfall. The initial oceanic level and speed included in the filed flight plan must be maintained until landfall. Any subsequent climbs included in the filed flight plan must not be executed.

### HF BLACKOUT

In the case of aircraft that lose ATC communications as a result of poor propagation conditions (HF Blackouts) when approaching NAT airspace through domestic airspace where ATC communications are also conducted via HF (e.g., entering the NAT through Northern Canadian airspace into the Reykjavik OCA), it is probably less advisable to execute unscheduled landings. These poor propagation conditions are very likely to affect many aircraft simultaneously and multiple diversions of “lost comms” aircraft might create further difficulties and risks.

As with the equipment failure situation, aircraft approaching the NAT and losing ATC communications as a result of poor HF radio propagation conditions should, if already in receipt of an oceanic clearance, follow the routing specified in that clearance and

**APPENDICES****NAT HLA OPERATIONS****COMMUNICATIONS AND POSITION REPORTING PROCEDURES**

maintain the initial cleared level and speed throughout the oceanic segment, i.e. through to landfall.

However, in these HF Blackout circumstances, if no oceanic clearance has been received, the aircraft must remain at the last cleared domestic flight level, not only to the ocean entry point but also throughout the whole subsequent oceanic segment (i.e. until final landfall). This is in stark contrast to the equipment failure case. In such HF Blackouts, flight crews must not effect level changes to comply with filed flight plans. Such aircraft should, maintain the last cleared level and, enter oceanic airspace at the first oceanic entry point and speed contained in the filed flight plan, then proceed via the filed flight plan route to landfall.

The rationale here must be appreciated. In such circumstances it is likely that ATC will have simultaneously lost HF communications with multiple aircraft in the same vicinity. Should flight crews then wrongly apply the "normal" radio failure procedures and "fly the flight plan", there is a possibility that two such aircraft may have filed conflicting flight paths/levels through the subsequent oceanic airspace, and without communications with either aircraft, ATC would then be unable to intervene to resolve the conflict. Since safe aircraft level separation assurance has already been incorporated into the current domestic clearances, it is consequently imperative that under such (domestic and oceanic) HF-blackout circumstances, all aircraft electing to continue flight into NAT oceanic airspace without a received and acknowledged oceanic clearance, should adhere to the flight level in the last received domestic clearance. No level changes should be made to comply with a filed oceanic level that is different from that of the domestic clearance in effect at the time that ATC air-ground communications were lost.

**OPERATIONAL PROCEDURES FOLLOWING LOSS OF HF COMMUNICATIONS AFTER ENTERING THE NAT**

If the HF communications equipment failure occurs or HF Blackout conditions are encountered after entering the NAT then: The flight crew must proceed in accordance with the last received and acknowledged oceanic clearance, including level and speed, to the last specified oceanic route point (normally landfall). After passing this point, the flight crew should conform with the relevant AIP specified State procedures/regulations and if necessary rejoin the filed flight plan route by proceeding, via the published ATS route structure where possible, to the next significant point contained in the filed flight plan. Note: the relevant State procedures/regulations to be followed by an aircraft in order



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

to rejoin its filed flight plan route are specified in detail in the appropriate State AIP. Aircraft with a destination within the NAT region should proceed to their clearance limit and follow the ICAO standard procedure to commence descent from the appropriate designated navigation aid serving the destination aerodrome at, or as close as possible to, the expected approach time. Detailed procedures are promulgated in relevant State AIPs. Summary of Operational Procedures Required following Loss of Air/Ground ATS Communications in the NAT Region

The foregoing detailed operational procedures can be simply summarised as follows:

- Equipment Failure before receiving an oceanic clearance:
  - Divert or fly the flight plan route, speed and initial planned oceanic level to landfall.
  - Blackout encountered (in an HF comms Domestic ATC environment) before receiving an oceanic clearance:
  - Continue at Domestic cleared level and follow flight planned route and speed to landfall.
- Equipment Failure or Blackout after receiving an oceanic clearance:
  - Fly that clearance to landfall.

In all cases, after landfall rejoin, or continue on, the flight planned route, using appropriate State AIP specified procedures for the domestic airspace entered.

## 10-2-7 APPLICATION OF MACH NUMBER TECHNIQUE

Applicable to: ALL

### DESCRIPTION OF TERMS

Mach Number Technique (MNT) is a technique whereby aircraft operating successively along suitable routes are cleared by ATC to maintain a Mach number for a portion of the enroute phase of flight.

The ATC clearance RESUME NORMAL SPEED allows the flight crew to fly a cost index (ECON) speed instead of a fixed Mach number with the condition that ATC must be advised if the speed changes by plus or minus Mach .02 or more from the last assigned Mach number.

**APPENDICES****NAT HLA OPERATIONS****NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES****OBJECTIVE**

MNT is used by ATC to control the longitudinal spacing between pairs of aircraft that are close to minimum longitudinal separation. When two or more aircraft are operating along the same route at the same flight level and maintaining the same Mach number, the time interval between them is more likely to remain constant than by using any other method.

**PROCEDURES IN NAT OCEANIC AIRSPACE**

Oceanic clearances include assigned Mach numbers (when required) which are to be maintained until ATC issues the clearance RESUME NORMAL SPEED. Aircraft capable of maintaining an assigned Mach must flight plan their requested Mach number. ATC uses assigned Mach number or other speed information, along with position information to calculate estimated times along the cleared route. These times are used as the basis for longitudinal separation and for coordination with adjacent units.

ATC will try to accommodate flight crew/dispatcher requested or flight planned Mach numbers when issuing oceanic clearances. It is rare that ATC will assign a Mach number more than 0.01 faster or 0.02 slower than that requested and will issue the clearance RESUME NORMAL SPEED when traffic permits.

The monitoring and maintenance of longitudinal separation is dependent upon the provision of accurate times in position reports.

An assigned Mach number must be maintained. If an immediate temporary change in an assigned Mach number is essential (due to turbulence for example), ATC must be so informed.

If a Mach number has been assigned, flight crews should maintain the assigned Mach number during climbs. If due to aircraft performance this is not feasible ATC should be advised at the time of the request for the climb.

**PROCEDURE AFTER LEAVING OCEANIC AIRSPACE**

After leaving oceanic airspace flight crews maintain their assigned Mach number in domestic controlled airspace unless and until the appropriate ATC unit authorises a change.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

## 10-2-8 NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

Applicable to: ALL

### INTRODUCTION

Today's aircraft navigation systems necessary for flying in the NAT HLA are capable of high-performance standards.

ICAO specifies the navigation system performance required for operations within a given airspace. This concept is referred to as "Performance Based Navigation" (PBN). Within this philosophy some navigation specifications, in addition to stating the accuracies to be achieved, also require on-board automatic integrity monitoring and alerting functions. Such specifications are referred to as Required Navigation Performance (RNP X), where X represents a lateral accuracy of 95% containment in X NMs. However, specifications requiring the same accuracies but not requiring on-board monitoring/alerting are referred to as RNAV X.

The majority of modern turbine powered aircraft worldwide are capable of "RNP 10" approvals. To conform with the PBN standard terminology, as indicated above, this system should actually be designated as "RNAV 10". However, it has been recognised that re-classifying such a widespread existing approval designation would create significant difficulties for both operators and State regulators. Consequently, it has been agreed that this designation of "RNP 10" will remain as such, even though the navigation specifications here are, in PBN terminology, effectively "RNAV 10".

With current technology, on-board automatic performance monitoring can only be carried out using Global Navigation Satellite Systems (GNSS). Hence GNSS is mandatory for true RNP airspace (e.g. RNP 4) but is not required for RNAV airspace, including that historically and still designated as "RNP 10". For more detailed information on RNP see Doc 9613 – 'Performance Based Navigation Manual'.

Regardless of how sophisticated or mature a system is, it is still essential that stringent navigation and crosschecking procedures are maintained if Gross Navigation Errors (GNEs) are to be avoided. A GNE within NAT airspace is defined as a deviation from cleared route of 10 NM or more. The importance of employing strict flight deck navigation system operating procedures, designed to avoid the insertion of inaccurate waypoints or misunderstandings between the flight crew and ATC over cleared routes, cannot be overstated.

All reported navigation errors in North Atlantic airspace are thoroughly investigated.





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

Records show that navigation equipment or system technical failures are rare. However, when they do occur, they can sometimes be subtle or progressive, resulting in a gradual and not immediately discernible degradation of performance. Chapter 11 of this Manual provides guidance on detection and recovery when such problems are encountered.

About half of NAT flights are routed via an Organized Track System (OTS) track and a large portion of the remaining random-route flights follow routes that at some point approach within one or two degrees of latitude from the outermost OTS tracks. One consequence of this is that a single digit error in the latitude of one significant point of an aircraft's route will likely lead to a conflict with another aircraft operating correctly. When such errors are made, the risk of an actual collision between two aircraft operating via a common point is further exacerbated by the improved technical accuracy of the modern lateral navigation and height keeping equipment.

Many of the procedures listed in this chapter are not equipment specific and others may not be pertinent to every aircraft. For specific equipment, reference should be made to Airplane Flight Manuals, Operators' Flight Operations Manuals, and other operator specific guidance material.

There are various references in this material to "two" pilots; however, when additional pilots (augmented crew) are on duty, they should all be involved in pre-flight planning, flight deck pre-flight briefings, any route amendments and in all crosscheck procedures to the extent practicable. Complete navigation crosschecks should be performed independently by at least two flight crew members. Maintaining the highest standard of navigation performance is essential to safety in the NAT HLA. Maintain situational awareness. Take advantage of every available means to ensure you are proceeding according to your ATC clearance.

Regardless of FMC waypoint format and entry method, flight crew procedures should be designed to promote strong crew resource management techniques, to prevent opportunities for error occurring as a result of confirmation bias and to generally maintain an attitude of healthy suspicion.

Avoid casual R/T procedures. A number of GNEs have been the result of a misunderstanding between flight crew and controller as to the cleared route and/or flight level. Adhere strictly to proper R/T phraseology and do not be tempted to clip or abbreviate details of waypoint coordinates.

#### **FLIGHT OPERATIONS AND NAVIGATION PROCEDURES FLIGHT PLANNING**

Perform the following:



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

- Review the ATS flight plan with emphasis on Items 10a and 10b and Item 18.
- Ensure that the appropriate CNS and Performance-based Navigation codes are properly filed in Items 10 and 18 of the flight plan.
- Review aircraft MELs to ensure CNS equipment capability is correctly reported on the flight plan.

## OCEANIC DOCUMENTS

Operators are encouraged to develop a flight planning checklist, specific to the aircraft/fleet, to ensure they have the necessary documents before departure. The checklist should include, but is not limited to, the following:

- Master Document (i.e., master flight plan).
- NOTAMs for departure, destination, alternate(s), Extended Diversion Time Operations (EDTO) alternates (as applicable) and oceanic FIRs.
- Weather for departure, destination, alternate(s), EDTO alternates (as applicable).
- Track Message(s).
- SIG WX Chart.
- ETP(s).
- GPS NOTAMs (as applicable).
- Volcanic Ash Information.
- PIREPs.
- Plotting/Orientation Charts.
- AIREP Form (as applicable) for position report.
- Filing of the ATC FPL.
- Space Wx (as appropriate).

## FLIGHT PLAN

The document designated as the Master Document should be carefully checked for date, aircraft type, fuel load and performance requirements. Crosschecks should also be done for routing and forecast ground speeds. The Master Document should be carefully checked against the filed flight plan to ensure the routing agrees with both documents. The enroute time on the Master Document should be compared against the distance to destination for a reasonable groundspeed. The enroute time should also be compared against the total distance for a reasonable fuel load.

## PLOTTING/ORIENTATION CHART



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

A plotting/orientation chart of appropriate scale or a programmed Electronic Flight Bag (EFB)/Tablet indicating published oceanic routes and tracks should be used for oceanic operations. ICAO groups who review oceanic errors have determined that the routine use of a plotting/orientation chart is an excellent aid to reduce lateral errors. A plotting/orientation chart/EFB can also serve as a critical aid in case of partial or total navigation failure. It should be noted that the pilot should read from the plotting/orientation chart/EFB back to the Master Document when verifying data. To read from the Master Document to the plotting/orientation chart/EFB has led to errors based on "seeing what we expect to see". Plot your currently cleared route from oceanic entry (OEP) to oceanic exit (OXP). Be sure to update this whenever your route clearance changes.

### EQUAL TIME POINT (ETP)

ETPs should be computed for contingencies such as medical divert, engine loss or rapid depressurization. Performance with an engine loss and rapid depressurization should also be calculated. This is a Critical Fuel Analysis. It is advisable to note the ETPs on the plotting/orientation chart/EFB. Pilots should review with each other the appropriate diversion airport(s) when crossing ETPs. Pilot procedures should also include a manual method for computing ETPs. Pilots should not enter ETPs in the active route of the Flight Management System (FMS) as this could create out-of-conformance alerts on ground-based monitoring systems and could create confusion in the event of a revised route clearance.

### EXTENDED DIVERSION TIME OPERATIONS (EDTO)

Verify EDTO alternates meet the appropriate limitations (e.g., 120 minutes, 180 minutes). Identify EDTO entry and exit points.

### CONTINGENCY PROCEDURES AND PLANS

Operators and Pilots should understand airspace-specific contingency procedures (for in-flight contingencies and weather deviations) as well as plans for any enroute diversion. (See Chapter 13). Pilots should comply with ATC clearances. If a given contingency requires deviation from the current clearance, timely and effective coordination can help re-establish a new ATC clearance for the changed flight profile.

### TRACK MESSAGE

Pilots shall have access to a current track message even if filed for a random route or filed above North Atlantic High Level Airspace (HLA). Reviewing the date, effective UTC time



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

and Track Message Identifier (TMI) ensures having a current track message on board. The TMI is linked to the Julian Date. Operators must also ensure that their flight planning and operational control process notify pilots in a timely manner of any amendments to the daily track message. Amendments will be identified by an alpha character to the TMI number for each revision (e.g., TMI031A). Awareness of adjacent tracks can improve situational awareness while executing a contingency procedure.

## WEATHER ANALYSIS

Pilots must note enroute temperature and turbulence forecasts as well as diversion/emergency airport weather, volcanic activity, magnetic storms, and solar flares affecting the route of flight.

## PRE-FLIGHT

A master clock, as designated on board, should be synchronized to UTC or GPS. This time source, which is typically the Flight Management System (FMS), must be used for all ETOs and ATAs.

## MAINTENANCE LOG

Before entering a special area of operation, pilots should focus on any maintenance write-ups that affect communication, navigation, surveillance, EDTO or RVSM requirements. Any discrepancies noted in the maintenance log or during the walk-around may require delays or rerouting.

## RVSM

Required equipment includes two primary independent altimetry sources, one altitude alert system and one automatic altitude control system. In most cases a functioning transponder that can be linked to the primary altimetry source is also required. Pilots should note any issues that can affect accurate altimetry.

## ALTIMETER CHECKS

Before taxi, pilots should set their altimeters to the airport QNH. Both primary altimeters must agree within  $\pm 75$  feet of field elevation. The two primary altimeters must also agree within the limits noted in the aircraft operating manual.

## WIND SHEAR OR TURBULENCE FORECAST

Pre-flight preparations should include the projected wind shear and turbulence forecast.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

Forecast severe turbulence supported by PIREPS, could lead to RVSM suspension. Operators are cautioned against flight planning through areas of forecast greater than moderate turbulence.

### DUAL LONG RANGE NAV SYSTEM (LRNS)

Two operational LRNSs are required for remote oceanic operations. A single FMS receiving inputs from two navigation sensors is not considered to be two LRNSs. Aircraft with an "Alternate NAV" capability may be able to dispatch with one FMS INOP.

### LONG RANGE COMMUNICATION SYSTEMS (LRCS)

Long range communication system checks:

- High Frequency (HF) Radio

An HF check should be conducted on the primary and secondary HF radios. If possible, the HF checks should be done on the ground or before entering oceanic airspace. A SELCAL check shall also be accomplished at each Oceanic Control Area (OCA) boundary even if datalink equipped.

- SATCOM

Ensure SATCOM pre-flight check is complete to comply with FANS/CPDLC requirements.

### CONFIRM PRESENT POSITION COORDINATES

Before taxi, both pilots should independently verify the Present Position coordinates using either published ramp coordinates or determine position from the airfield diagram. They should not rely solely on the Present Position when the FMS was shut down from the previous flight.

### MASTER DOCUMENT SYMBOLS

Fly2Sky uses consistent symbols on the Master Document. For example, a circled waypoint number or LAT/LONG (2), means the Pilot Monitoring (PM) has independently verified the coordinates entered or crosschecked by the Pilot Flying (PF). A checkmark (✓) may indicate that the track and distances have been confirmed. A diagonal line (\) may indicate that the Pilot Monitoring (PM) has confirmed the



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

coordinates of the approaching and next waypoint. An X-symbol (X) may indicate having flown overhead the waypoint.

## LRNS PROGRAMMING

Check currency and software version:

- It is important to check the effective date of the database. Pilots should note if the database is projected to expire during their trip. MELs may allow relief to fly with an expired database but require the pilots to manually crosscheck all data. The software version of the database should also be confirmed in case there has been a change.
- Independently verify the full/expanded LAT/LONG of oceanic waypoint entries.

Regardless of the operator, FMS oceanic waypoint format of either full LAT/LONG or ARINC 424, it is critical that both the PF and the PM independently verify the full/expanded LAT/LONG of all unnamed oceanic waypoints. Full LAT/LONGs are truncated in the FMS and cannot be verified without displaying the full LAT/LONGs. ARINC 424 waypoints are coded waypoints susceptible to incorrect coding. Pilots should read from the FMS back to the Master Document when verifying data. Reading from the Master Document to the FMS has led to errors based on "seeing what we expect to see".

### Upload winds:

- FMS units generally allow the crew to upload forecast winds. This procedure supports more accurate reporting of ETOs.

## GROUNDSPED CHECK

The groundspeed should be noted before taxiing the aircraft. Pilots should expect the groundspeed to read zero (0) knots. This procedure is a good practice to detect an error that may be developing in the LRNS.

## CLIMB-OUT

After climbing above the sterile cockpit altitude, and time permitting, pilots should verify ETOs from departure to destination. These should be noted on the Master Document. This is a crosscheck against ETOs computed by the FMS.

## PRIOR TO OCEANIC ENTRY

~~Send RCL message only to Bodo, Gander, Santa Maria and Shanwick~~

VAW

OM-C ISSUE 2 REVISION 6

10-2 P 62/198

16 MAR 26



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

*Note: For Reykjavik, if an RCL is sent, the flight crew will be notified that RCL is not required by BIRD*

An RCL is a voice or data link message via ACARS used to provide ETO at OEP, requested flight level, and speed. There is a requirement to send an RCL message prior to the OEP as follows:

- Gander OCA 90-60 minutes;
- Shanwick OCA 90-30 minutes;
- Santa Maria OCA at least 40 minutes;
- Bodo OCA at least 20 minutes;

**Note: The RCL, or "RCL RECEIVED", is not a clearance.**

The ACARS or voice RCL must contain all of the following information:

- Oceanic Entry Point (OEP);
- ETO for the OEP;
- Mach number (based on FMS cost index (ECON));
- Requested flight level;
- The highest acceptable Flight Level which can be attained at the OEP (via free text);
  - Provide the highest acceptable Flight Level as MAX FL
    - Example: Requesting FL360 – enter free text MAX F380
  - If requested Flight Level is the highest acceptable; provide the requested Flight Level as MAX FL
    - Example: Requesting FL360 – enter free text MAX F360

Voice shall be used to submit an RCL message if;

- Not ACARS data link equipped;
- ACARS data link is not operational;
- ETO for OEP is less than 30 minutes (other than Reykjavik);





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

- RCL REJECTED is received by the aircraft;
- No response to RCL is received within 15 minutes of sending RCL.

The following response message to the RCL will be generated automatically by the ANSP and delivered to the aircraft via ACARS or voice as appropriate:

RCL RECEIVED BY [ANSP]

#### **Note:**

Due to delayed OCR implementation by Shanwick Oceanic, Oceanic Clearances will continue to be issued by **SHANWICK OCEANIC only**, following submission of an RCL until further notice.

Revert to voice if RCL REJECTED is received.

Note: There will be no clearance sent via the traditional ACARS method. Flight crew should continue the flight in accordance with their existing ATC clearance.

Note: If ATC cannot accept the requested OEP altitude, the closest oceanic FL to the one requested (RCL) will be determined and a clearance to climb or descend issued prior to the OEP. The "MAX FL" will never be violated.

Note: Flight crews are reminded that a change in FL, Speed or Route can be requested at any time after the OEP.

The information provided in the RCL message is processed as follows:

| RCL data item                          | ATC Processing                                                                                                                                                                                                                   |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oceanic Entry Point (OEP) and ETO time | Information is used to update the currently held ATC data.                                                                                                                                                                       |
| Mach Number                            | ATC will use the requested Mach speed information as the reference speed for cost index (ECON) operations. The aircraft should continue to operate on FMS cost index (ECON) unless it is assigned a fixed Mach speed by ATC. ATC |

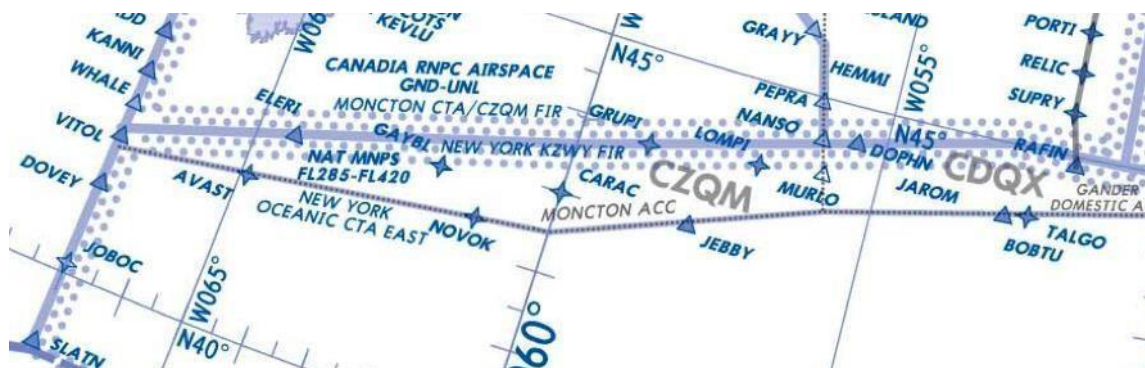


|                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>A320/A321<br/>OM-C AIRPORTS</p> | <p><b>APPENDICES</b></p> <p><b>NAT HLA OPERATIONS</b></p> <p>NAT HLA FLIGHT OPERATION &amp; NAVIGATION PROCEDURES</p>                                                                                                                                                                                                                                                            |
|                                                                                                                      | <p>must be advised if the speed changes by Mach 0.02 or more from the Mach in the RCL.</p>                                                                                                                                                                                                                                                                                       |
| <p>Flight Level</p>                                                                                                  | <p>ATC will store the requested flight level information. The aircraft shall not change flight level unless it is cleared for a flight level change by ATC.</p> <p>Flight crews are reminded that a change in Flight Level can be requested at any time after the OEP as the traffic situation constantly changes and previously blocked flight levels may become available.</p> |
| <p>Max Flight Level</p>                                                                                              | <p>Max FL shall be provided in the RCL.</p> <p>ATC will store the Max Flight Level Information for traffic planning purposes.</p> <p>If no Max Flight Level is provided, the RCL requested Flight Level will be considered as the highest acceptable flight level at OEP.</p>                                                                                                    |
| <p>Other Information</p>                                                                                             | <p>Information is brought to the attention of the controller.</p>                                                                                                                                                                                                                                                                                                                |

Aircraft routing from Gander Domestic to New York Oceanic via TALGO are required to send an RCL for TALGO to Gander Oceanic.

Aircraft routing from New York Oceanic to Gander Domestic via BOBTU are required to send an RCL for their OEP (RAFIN or north) to Gander Oceanic.

*Note:* In all cases, any necessary changes to route, level or speed will be issued by the jurisdictional controller.





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

#### Oceanic Route Change prior to the OEP

Any route amendment will be issued either by voice or CPDLC loadable route clearance uplink.

Route amendments are the number one scenario leading to Gross Navigation Errors. Pilots must be particularly cautious when receiving a route amendment.

- a) Both pilots should confirm the new routing and conduct independent crosschecks after the FMS, Master Document and plotting/orientation chart are updated.
- b) Ensure the expanded coordinates for new waypoints are checked and confirmed. It is critical that pilots check the magnetic course and distance between the new waypoints as noted in PREFLIGHT under the paragraph "FMS Programming".
- c) Brief all relief pilots on the amended route prior to them assuming cockpit duties. It is also good practice for relief pilots to independently check the amended route in the FMS.

Abbreviated route clearance may be issued by Air Traffic Services prior to the oceanic entry point when re-clearing an aircraft to fly along the whole length of an organised track. The flight crew should confirm the current NAT track message by using the TMI number (including any appropriate alpha suffix) in the read back. There is no requirement for the flight crew to read back the NAT track coordinates. If any doubt exists as to the TMI or the NAT track coordinates, the flight crew should request the complete track coordinates. Similarly, if the flight crew cannot correctly state the TMI, confirmation will include NAT track coordinates in full and a full read back of those coordinates will be required.

#### *Shanwick*

The Shanwick oceanic controller will only issue the ACARS message **CONTACT SHANWICK BY VOICE** instructing the flight crew to contact Shanwick OAC (123.950/127.650) when:

- An oceanic route amendment is necessary due to traffic;
- Shanwick OAC considers it appropriate to do so, to ensure the most efficient oceanic route and altitude.

#### ***Entry Conditions***

Enroute aircraft shall enter the oceanic airspace in accordance with their existing ATC clearance. **No oceanic clearance is required.**

Fly cost index (ECON). ATC will assign a fixed Mach number if required due to traffic and will rarely assign a fixed Mach number more than 0.01 faster or 0.02 slower than requested or filed in the VAW



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

flight plan.

**An assigned Mach number must be maintained.** If an immediate temporary change in an assigned Mach number is essential (due to turbulence for example), ATC must be informed.

#### Navigation Accuracy Check

Before oceanic entry, the accuracy of the GNSS navigation equipment (FMS) should be checked.

#### HF Checks

If the crew was unable to accomplish the HF and SELCAL checks on the ground, these checks should be accomplished before oceanic entry. Additional SELCAL checks should be conducted at each control area boundary, regardless whether CPDLC is working normally.

#### SATCOM data communication

If the aircraft is equipped, pilots should check that SATCOM data link is operational before oceanic entry.

#### Log on for CPDLC and ADS-C

If the operator is approved to use Controller Pilot Data Link Communications (CPDLC) and/or Automatic Dependent Surveillance Contract (ADS-C), the pilot should log on to the appropriate FIR 10 to 25 minutes prior to the boundary if not already logged on to ATC.

#### Verify RNP value

Pilots should verify that the RNP value set in the FMS is at least as stringent as that required for the route of flight and reflects the RNP capability indicated in the filed ATS flight plan.

#### Altimeter checks

Pilots are required to check the two primary altimeters which must be within 200 ft of each other. This check is conducted while at level flight. The stand-by altimeter should also be noted. The altimeter readings should be recorded along with the time. This is a requirement to operate in RVSM airspace.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

After oceanic entry

### ***Route Conformance Checking***

**CONFIRM ASSIGNED ROUTE** will be uplinked to FANS equipped aircraft after crossing the OEP. CPDLC loadable route clearance uplinks will be used to amend the current flight plan, when necessary, after the OEP.

### *Squawk 2000*

Except when operating in the Reykjavik CTA or transitioning Bermuda RADAR, pilots should squawk 2000 10 minutes after passing the OEP.

### *Speed*

The aircraft should maintain a cost index (ECON) speed unless ATC has issued a clearance to maintain a fixed Mach number. ATC must be advised if the speed changes by plus or minus Mach

.02 or more from the speed in the RCL message or the last assigned Mach number.

### *VHF radios*

After contacting oceanic radio (HF), and if not on an assigned VHF frequency, pilots should set their VHF radios to air-to-air (123.450 MHz) and guard frequency (121.500 MHz). Pilots must monitor these frequencies. They are not to be used for non-operational conversation.

### *Strategic Lateral Offset Procedures (SLOP)*

SLOP should be Standard Operating Procedure for all oceanic crossings. This procedure distributes traffic between the centreline and 2 NM right of centreline and greatly reduces collision risk in the airspace by virtue of randomness. SLOP should also be used when there is a need to avoid wake turbulence; coordination with other aircraft may be necessary.

Operators that have an automatic offset capability should fly up to 2 NM right of the centreline. Aircraft that do not have an automatic offset capability (that can be programmed in the FMS) should fly the centreline only. Aircraft that do not have a capability to offset in 0.1 NM increments should fly the centreline, 1 NM, or 2 NM right only. **Left offsets are prohibited.**

*Note: Pilots should make sure the "TO" waypoint is correct after entering SLOP. With some avionics, when executing an offset near the active "TO" waypoint, the FMS can sequence to the "next + 1" waypoint—skipping a point. Some GNEs have occurred as a result of this.*



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

#### Routine monitoring

If the FMS provides a predicted ETO capability, pilots should take advantage of that function in order to track the accuracy of ETOs and provide reminders for performing the "approaching waypoint" and

"10 minute after" procedures. Ensure there is an active CPDLC connection with the proper current data authority.

#### Approaching waypoints

##### Confirm next latitude/longitude

Approaching an oceanic waypoint, pilots should crosscheck the coordinates of the next and subsequent ("next + 1") oceanic waypoints. This check should be done by comparing the expanded coordinates against the Master Document based on the currently effective ATC clearance. Verify the course/heading and distance in the FMS to the next waypoint matches the Master Document. Confirm autopilot steering is engaged in the proper lateral (LNAV/NAV) mode.

#### Waypoint crossing

Confirm aircraft transitions to next waypoint When overhead an oceanic waypoint, pilots should ensure that the aircraft transitions to the next leg. This is confirmed by noting the magnetic heading and distance to the next waypoint compared against the Master Document (as updated based on the current flight plan) and that the aircraft remains in the proper lateral (LNAV/NAV) mode.

##### Confirm time to next waypoint

When transmitting waypoint position reports via voice, a change of three (3) minutes or more requires that ATC be notified in a timely manner. Inaccurate position reports adversely affect ATC's ability to safely separate aircraft.

##### Position report

After passing over the oceanic waypoint, pilots that give a position report to ATC must use the standard format. Pilots should also note and record their fuel status at each oceanic waypoint. This is especially important if the cleared route and flight level differ significantly from the filed flight plan.

#### **10** minutes after waypoint passage



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

#### Crosscheck navigational performance and course compliance

In FMS-equipped aircraft, pilots should confirm that proper lateral (LNAV/NAV) mode is engaged and the aircraft is tracking to the proper waypoint. Other methods of navigation crosschecking may be used subject to State aviation authority approval.

#### Midway between waypoints

##### Confirm ETO

It is recommended that during a wind check the pilots also confirm the ETO to the next waypoint. When transmitting waypoint position reports via voice, a change of three (3) minutes or more requires that ATC be notified in a timely manner.

#### Oceanic exit

##### Remove Strategic Lateral Offset

Any lateral offset used during the oceanic crossing must be removed prior to the OXP. It is advisable to include this as a checklist item.

##### Confirm routing beyond oceanic airspace

Before entering the domestic route structure, pilots must confirm their routing and speed assignment.

*Note: Pilots experiencing loss of communications leaving oceanic airspace should follow State guidance as published in AIPs.*

##### Speed

If ATC assigns a fixed Mach number in oceanic airspace, request NORMAL SPEED (via CPDLC or voice) after the OXP in Domestic airspace.

#### Destination / Block-in

##### Navigation accuracy check

When arriving at the destination gate, pilots should note any drift or circular error in the LRNS. A GPS Primary Means system normally should not exceed 0.27 NM for the flight. Some inertial systems may drift as much as 2 NM per hour. Because the present generation of LRNSs is highly accurate, operators should establish a drift tolerance which if exceeded would require a write-up in the Maintenance Log. RNP requirements demand that drift be closely monitored.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

#### RVSM write-ups

Problems noted in the altimetry system, altitude alert or altitude hold must be noted in the maintenance log.

## GENERAL PROCEDURES

### Provision of Climbs

Controllers will accommodate requests for climbs whenever possible. When cleared, pilots should initiate the climb without delay unless a conditional clearance was issued. Aircraft not using CPDLC/ADS-C should report leaving the old and reaching the new cruising levels. Aircraft using CPDLC/ADS-C should comply with any reporting requests.

Flight levels requested in the flight plan or through the RCL message process are stored in the NAT Air Traffic Management (ATM) systems. These systems routinely interrogate a flight's profile to determine if the requested level becomes available. When this occurs, controllers will verify the availability and offer the higher level to the flight. Additionally, Gander and Shanwick have instituted a procedure whereby pilots transiting their OCAs will be advised if any higher flight level becomes available during their flight.

Note: These advisory messages are not to be considered a clearance to change FL. ALL FL changes will ALWAYS require a clearance to climb or descend.

### Clearances including variable flight level

Clearances which include variable flight level may be requested and granted, traffic permitting. Clearance requests for a variable flight level may be made by voice or CPDLC.

Within the NAT, on occasion when traffic permits, aircraft are cleared for a cruise climb or to operate within a block of flight levels. The operational difference between cruise climbs and block of flight levels is in accordance with the following:

- Cruise climb: Only climb or maintain a level, NEVER DESCEND;
- Block of flight levels: Climb and/or descend freely within the assigned block of flight levels.

A cruise climb should be requested when a flight crew wants to operate with a "flexible" vertical profile and gradually climb as the aircraft weight decreases and the optimum flight level increases. A block of flight levels should be requested when the flight crew wants to operate with a flexible vertical profile and the aircraft's altitude will vary up or down due to factors such as turbulence or icing.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

ATC will still make the most efficient use of airspace with the block of levels by adjusting the clearance as levels are cleared. For cruise climb, levels below the aircraft are automatically released as the aircraft climbs.

#### Relief Flight Crew Members

Long range operations may include the use of relief pilots (augmented crew). In such cases operators should have procedures in place to ensure the safe continuity of the operation, particularly with respect to the management of the navigation systems, to ensure positive control of the aircraft.

A comprehensive crew briefing checklist is highly recommended. The briefing by the outgoing pilot(s) to the incoming pilot(s) should take place, in order to ensure that the incoming pilot(s) is (are) aware of any potential changes in flight level, speed, fuel/time score, weather, contingency planning, aircraft status, communication status/frequencies, conditional clearances, cabin issues, and any other operational considerations as required by the operator.

#### RNP Approval Status

In order for an aircraft to be cleared to fly in airspace where a particular RNP authorization is required, or take advantage of any preferred handling provided by a specific RNP designation, the aircraft's RNP approval status must be accurately reflected in Item 18 of the ATC flight plan. Pilots shall also verify that the corresponding RNP value is entered in the FMS, either by default or through manual input, in order to enable aircraft navigation system monitoring and alerting against the most stringent oceanic RNP capability filed in the ATC flight plan.

#### ATC Re-clearances

Where practicable, two pilots should listen to and record every ATC clearance and both agree that the recording is correct. Standard Operating Procedures (SOPs) must include independent clearance copy, data entry (coordinates and/or "named" waypoints), and independent crosschecks to verify that the clearance is correctly programmed. These procedures must also be used when enroute changes are entered. Any doubt should be resolved by requesting clarification from ATC.

In the event that a re-clearance is received when only one pilot is on the flight deck, unless the re-clearance is an ATC instruction that requires immediate compliance, any flight profile, Mach number or routing changes should not be executed, nor should the Navigation or Flight Management Systems be updated, until the second pilot has returned to the Flight Deck and a proper crosschecking and verification process can be completed.





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

### SPECIAL IN-FLIGHT PROCEDURES

#### CPDLC ROUTE CLEARANCE

#### UPLINKS

When a loadable CPDLC clearance is sent to the aircraft, pilots are to follow their Operator's SOP with the utmost discipline in order to mitigate any human error.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

CPDLC route clearance uplinks are used by ATC or flight crews to amend the oceanic routing. CPDLC route clearance uplinks allow the flight crew to LOAD the CPDLC route clearance uplink directly into the FMS without having to manually enter waypoints possibly introducing navigational errors. Flight crews should ensure that the CPDLC route clearance uplink properly "LOADs" before sending ACCEPT/WILCO.

Flight crews must be familiar with the proper loading and execution of the following CPDLC message uplinks:

| ANS<br>P    | CPDLC Loadable Route Clearance Uplinks |                           |           |                         |
|-------------|----------------------------------------|---------------------------|-----------|-------------------------|
|             | PROCEED DIRECT TO                      | CLEARED TO [position] VIA | CLEARANCE | AT [position] CLEARANCE |
| Reykjavik   | Yes                                    | Yes                       | No        | No                      |
| Shanwick    |                                        | Yes                       | No        | No                      |
| Santa Maria |                                        | Yes                       | Yes       | Yes                     |
| New York    |                                        | Yes                       | Yes       | Yes                     |
| Gander      |                                        | Yes                       | No        | No                      |
| Bodo        |                                        | No                        | No        | No                      |

#### PROCEED DIRECT TO (POSITION)

- Instruction to proceed directly to the specified position.

#### CLEARED TO (POSITION) VIA (ROUTE CLEARANCE)

- Instruction to proceed to the specified position via the specified route clearance.
- This uplink may not show the "VIA ROUTE CLEARANCE" until it is loaded in the FMS.
- This is not a "direct" to the CLEARED TO waypoint. It is a clearance to the waypoint via the route clearance specified.

#### CLEARED (ROUTE CLEARANCE)

- Instruction to proceed via the specified route clearance.
- This uplink may not show the "ROUTE CLEARANCE" until it is loaded in the FMS.

#### AT (POSITION) CLEARED (ROUTE CLEARANCE)

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

- Instruction to proceed from the specified position via the specified route clearance.
- This uplink may not show the "ROUTE CLEARANCE" until it is loaded in the FMS
- *Note: Experience shows that pilots often misunderstand the uplink message CLEARED TO (position) VIA (route clearance) when they fail to LOAD the uplink in the FMS and incorrectly fly directly to the CLEARED TO position not realizing that the "route clearance" may contain several other waypoints prior to the CLEARED TO position.*

*FMS waypoint weather data (winds and temperature) may be lost depending on the route clearance message received. Flight crews should verify the weather data as they may need to re-enter the weather data for proper FMS predictions.*

*The FMS Legs page should be reviewed to ensure there are no "discontinuities" in the route. If ANY discontinuity, it must be resolved (closed) with ample time before reaching the discontinuity.*

Flight crews should revert to voice if there is any doubt or confusion about any CPDLC uplink.

### STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)

This procedure provides for offsets within the following guidelines:

- An aircraft may fly offsets right of centreline up to a maximum of 2 NM; and
- Offsets left of centreline are prohibited.

Distributing aircraft laterally and equally across all available positions adds an additional safety margin and reduces collision risk. The SLOP procedure was developed to reduce the collision risk from highly accurate navigation systems and operational errors. SLOP is now a standard operating procedure for the entire NAT region and flight crews are required to adopt this procedure as is appropriate. It should be noted that:

- Aircraft without automatic offset programming capability must fly the centreline.
- Aircraft able to perform offsets in tenths of nautical mile should do so as it contributes to risk reduction.
- It is recommended that flight crews of aircraft capable of programming automatic offsets should randomly select flying centreline or an offset. In order to obtain lateral spacing from nearby aircraft (i.e., those immediately above and/or below), flight crews should use whatever means are available (e.g., ACAS/TCAS, communications, visual acquisition, GPWS) to determine the best flight path to fly.

**APPENDICES****NAT HLA OPERATIONS****NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES**

- An aircraft overtaking another aircraft should offset within the confines of this procedure, if capable, so as to minimize the amount of wake turbulence for the aircraft being overtaken.
- For wake turbulence purposes, flight crews should fly one of the offset positions. Flight crews may contact other aircraft on the air-to-air channel, 123.450 MHz, as necessary, to co- ordinate the best wake turbulence mutual offset option. (Note: It is recognized that the flight crew will use their judgement to determine the action most appropriate to any given situation and that the pilot-in-command has the final authority and responsibility for the safe operations of the aircraft. See also Chapter 13).
- Flight crews may apply an offset outbound at the oceanic entry point and must return to centreline prior to the oceanic exit point unless otherwise authorized by the appropriate ATS authority or directed by the appropriate ATC unit.
- There is no ATC clearance required for this procedure and it is not necessary that ATC be advised.
- Voice Position reports should be based on the waypoints of the current ATC clearance and not the offset positions.
- Aircraft shall not apply SLOP below FL 285 in the Reykjavik CTA and Bodo OCA.
- The offset should be applied from the time the aircraft reaches its cruising level until top of descent.

**UPLINK MESSAGE LATENCY MONITOR FUNCTION**

The uplink message latency monitor function is designed to prevent pilots from acting on a CPDLC uplink message that has been delayed in the network. Some NAT ANSPs uplink the latency monitor message to all CPDLC connected aircraft immediately after they enter each control area. An aircraft may therefore receive this message multiple times during a flight.

When the pilot receives the uplink CPDLC message SET MAX UPLINK DELAY VALUE TO 300 SEC he/she shall:

- Send a positive response to ATC as prompted by the avionics (ACCEPT [ROGER]) regardless of whether the aircraft supports the latency monitor function.
- If the aircraft is equipped with a correctly functioning message latency monitor, enter the specified uplink delay into the avionics in accordance with the aircraft procedures. Some avionics will automatically set the delay value in accordance with the uplink message and do not allow for a manual input.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

When a pilot receives a CPDLC uplink message with an indication that the message has been delayed the pilot shall:

- Revert to voice communications to notify the ATS unit of the delayed message received and to request clarification of the intent of the CPDLC message; and
- Respond appropriately to close the message as per the instructions of the controller.
- The pilot must not act on the delayed uplink message until clarification has been received from the controller.
- If a pilot receives a random clearance, for example a change in FL, without the pilots requesting a FL change, it is good practice to check the time-stamp in the message to ensure it is logically relevant.

### **OLDER AIRCRAFT SYSTEMS**

This section addresses those aircraft operating in the NAT HLA with reduced LRNS equipage (inertial navigation only) and/or no altimetry monitoring.

### **NAVIGATION ACCURACY CHECK PRIOR TO OEP**

Before oceanic entry, the accuracy of the LRNS should be checked against a ground-based NAVAID. The results of the accuracy check should be recorded with the time and position. A large difference between the ground-based NAVAID and the LRNS may require immediate corrective action. Operators should establish a navigation accuracy check tolerance based on the type LRNS. It is not advisable for pilots to attempt to correct an error by doing an air alignment or by manually updating the LRNS since this has often contributed to a Gross Navigation Error (GNE). A latitude/longitude radar fix from ATC can also support a navigation accuracy check in lieu of a NAVAID. Select the most accurate navigation system for auto-coupling as appropriate.

It is good practice to discuss in advance a primary and secondary ground based navigational aid that will be used to verify the accuracy of the LRNS. This planning may help to identify intended navigation aids that are limited or have a NOTAM rendering them unusable and is helpful when departing airports close to oceanic airspace. Examples include Shannon (EINN), Lisboa (LPPT), Boston (KBOS), etc. Track and distance tables are available commercially for every ten degrees of longitude.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NAT HLA FLIGHT OPERATION & NAVIGATION PROCEDURES

### COMPASS HEADING CHECK (INERTIAL NAVIGATION SYSTEMS)

It is recommended to conduct a compass heading check and record the results when inertial systems are the only means of long-range navigation. The check can also aid in determining the most accurate compass if a problem develops over water.

### HOURLY ALTIMETER CHECKS

Pilots are required to observe the primary and stand-by altimeters each hour. It is recommended that these hourly checks be recorded with the readings and times. This documentation can aid pilots in determining the most accurate altimeter if an altimetry problem develops.

### ROUTINE MONITORING

Plot the latitude/longitude on the chart being used to track flight progress. Confirm the chart. It is advisable to plot the non-steering LRNS. A 10-minute plot can alert the crew to any lateral deviation from their ATC clearance prior to it becoming a Gross Navigation Error. A good crosscheck for the position of the 10-minute plot is that it is approximately 2' of longitude past the oceanic waypoint.

Specify which FMS pages, or other appropriate displays of the navigation system are assigned to specific flight crew for monitoring (e.g. cross-track error or time/distance). The non-steering navigation system should be used to display cross-track error and track angle error, if available.

Check system-generated cross-track deviation or similar indication to confirm there is NO deviation from the programmed route of flight (e.g. XTRK is 0.0 NM). Verify the "TO" waypoint is consistent with the current flight plan.

### CROSS-CHECK WINDS

It is good practice to crosscheck winds midway between oceanic waypoints by comparing the Master Document, LRNS and upper millibar wind chart. This crosscheck will also aid pilots in case there is a need for a contingency procedure such as dead reckoning (DR).

**COMPARE GROUND-BASED NAVAID TO LRNS AFTER OCEANIC EXIT (OXP)**

When departing oceanic airspace and acquiring ground-based NAVAIDs, pilots should note the accuracy of the LRNS by comparing it to those NAVAIDs. Any discrepancy should be noted in the maintenance log.

**LATERAL NAVIGATION PERFORMANCE MONITORING**

The navigation performance of operators within the NAT HLA is monitored on a continual basis. The navigation accuracy achieved by NAT HLA aircraft is periodically measured and additionally all identified instances of significant deviation from cleared track are subject to thorough investigation by the NAT Central Monitoring Agency (CMA), currently operated on behalf of ICAO by the UK National Air Traffic Services Limited. <http://nadcma.com/>.

Operators are encouraged to cooperate as fully as possible with the CMA in its investigations of any deviations, since the objective here is to support regional safety management function. These investigations are not conducted for regulatory/punitive purposes.

The CMA also maintains a database of all NAT HLA approvals. The CMA runs a continuous monitoring process to compare this approvals list with the records of all aircraft flying in the NAT HLA. The approval status of any aircraft involved in a track deviation is specifically checked against the database and in any cases of doubt the State of the operator or the State of Registry is contacted. Chapter 10 provides full details of the monitoring processes.

Experience has shown that many of the lateral deviations in the NAT HLA occur as a result of flight crews programming the navigation system(s) with incorrect waypoint data. These are referred to as Waypoint Insertion Errors. They frequently originate from:

- failure to observe the principles of checking waypoints to be inserted in the navigation systems, against the cleared route;
- failure to load waypoint information correctly; or
- failure to crosscheck on-board navigation systems.

Lateral deviations from track could be virtually eliminated if all operators/flight crews adhere to approved operating procedures and crosschecking drills. The procedures described in Chapter 6 are designed to minimise the probability of inadvertent deviations from the cleared route and should be closely followed by flight crew.

The most common causes of lateral navigation errors are found in the Oceanic Errors Safety Bulletin (NAT OPS Bulletin 2017 002).





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE

### 10-2-9 RVSM FLIGHT IN THE NAT HLA

Applicable to: ALL

#### **GENERAL**

The aircraft altimetry and height keeping systems necessary for flying in RVSM airspace are capable of high-performance standards. However, it is essential that stringent operating procedures are employed, both to ensure that these systems perform to their full capabilities and to minimise the consequences of equipment failures and possible human errors. Should any of the required components fail, ATC must be informed.

Operational errors in the vertical plane occur. Aircraft are sometimes flown at levels other than those for which an ATC clearance has been issued. The potential collision risk of even a single incidence of flying at an un-cleared level can be significant. The NAT HLA risk estimates in the vertical plane, as a result of operational errors or un-cleared departures from flight level, exceed those arising from lateral gross navigation errors.

It is essential that flight crews do not take modern technology for granted. They should at all times, especially during periods of low workload, guard against complacency and over-confidence, by adhering rigidly to approved cockpit/flight deck procedures which have been formulated over many years, in order to help stop operational errors.

In the event of severe turbulence, RVSM procedures may be suspended.

The aircraft altimetry and height keeping systems necessary for flying in RVSM airspace are capable of high-performance standards. However, it is essential that stringent operating procedures are employed, both to ensure that these systems perform to their full capabilities and to minimise the consequences of equipment failures and possible human errors. Should any of the required components fail, ATC must be informed.

In the event of severe turbulence, RVSM procedures may be suspended.

#### **PRE-FLIGHT**

For flight through the NAT HLA the aircraft and the operator must have the appropriate State approvals for both NAT HLA and RVSM operations. The flight crew must be qualified for flight in RVSM airspace and all aircraft intending to operate within the NAT HLA must be equipped with altimetry and height-keeping systems which meet RVSM Minimum Aircraft System Performance Specifications (MASPS). RVSM MASPS are contained in Doc 9574 (Manual on implementation of a 300m (1,000ft) Vertical Separation Minimum between FL 290 and FL 410 inclusive) and detailed in FAA Advisory Circular (AC) 91-85 which can currently be accessed through:





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE

[https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.information/documentID/1035328](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1035328)

Also, further guidance from EASA on where to find information related to Airborne RVSM Equipment and Performance Requirements is contained within CS-ACNS (Certification Specification and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance), in the EUROCONTROL Library, at:

<https://www.skybrary.aero/articles/reduced-vertical-separation-minima-rvsm>

A 'W' must be entered into Item 10 of the ICAO flight plan to indicate that the aircraft is approved for flight at RVSM levels. For operations in NAT HLA, flight crews are required to perform standard pre-flight checks of altimeters.

Special arrangements exist for non-RVSM approved aircraft/operators to climb or descend through NAT RVSM airspace; and in very specific circumstances arrangements may be made for non-approved aircraft to fly at RVSM levels in the NAT region.

### IN-FLIGHT – BEFORE OPERATING IN THE NAT HLA

Most flights will approach the NAT HLA through European or North American RVSM airspaces. It is therefore expected that continuous monitoring of the serviceability of the aircraft's height keeping systems will have been undertaken. Nevertheless, in view of the significant change of operating environment (i.e. to indirect surveillance and communications) it is recommended that a final confirmation of the aircraft systems serviceability is performed immediately prior to entering the NAT HLA. Check to ensure the two primary altimeters are reading within 200 feet of each other (or lesser value if specified in your aircraft's flight manual). Conduct this check while at level flight. You should also note the stand-by altimeter reading. The readings of the primary and standby altimeters should be recorded to be available for use in any possible contingency situations.

### IN-FLIGHT – ENTERING AND FLYING IN THE NAT HLA

One automatic altitude-control system should be operative and engaged throughout the cruise. This system should only be disengaged when it is necessary to re-trim the aircraft, or when the aircraft encounters turbulence and operating procedures dictate.

When passing waypoints, or at intervals not exceeding 60 minutes (whichever occurs earlier), or on reaching a new cleared flight level, a crosscheck of primary altimeters

**APPENDICES****NAT HLA OPERATIONS****MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE**

should be conducted. If at any time the readings of the two primary altimeters differ by more than 200 ft, the aircraft's altimetry system should be considered defective and ATC must be informed.

To prevent unwanted TCAS/ACAS warnings or alerts, when first approaching any cleared flight level in NAT RVSM airspace, flight crews should ensure that the vertical closure speed is not excessive. It is considered that, with about 1500 ft to go to a cleared flight level, vertical speed should be reduced to a maximum of 1500 ft per minute and ideally, to between 1000 ft per minute and 500 ft per minute. Additionally, it is important to ensure, by manually overriding, if necessary, that the aircraft neither undershoots nor overshoots the cleared level by more than 150 ft.

It must also be recognised that even under normal operations when using such indirect communication methods, there does exist the potential for misunderstanding between flight crew and controller regarding the detail of any issued clearances or re-clearances. Occasionally, such "ATC Loop Errors" can lead to an aircraft being flown at a level other than that expected by the controller. In such circumstances separation safety margins may be eroded. To avoid possible risks from any of the foregoing situations, it is therefore essential in the NAT HLA that flight crews not using CPDLC/ADS-C always report to ATC immediately on leaving the current cruising level and on reaching any new cruising level.

**EQUIPMENT FAILURES**

The following equipment failures must be reported to ATC as soon as practicable following their identification:

- Loss of one or more primary altimetry systems; or
- Failure of all automatic altitude-control systems

The aircraft should then follow the appropriate procedure described in Chapter 12 – "Procedures in the Event of Navigation System Degradation or Failure", or as instructed by the controlling ATC unit.

**VERTICAL NAVIGATION PERFORMANCE MONITORING**

The vertical navigation performance of operators within the NAT HLA is monitored on a continual basis by the NAT CMA. Such monitoring includes both measurement of the technical height- keeping accuracy of RVSM approved aircraft and assessment of collision risk associated with all reported operational deviations from cleared levels.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE

## 10-2-10 ATS SURVEILLANCE SERVICES IN THE NAT HLA

Applicable to: ALL

### **GENERAL**

ATS Surveillance services are provided within the NAT HLA where radar, ADS-B or multilateration coverage exists in accordance with ATS Surveillance procedures in the Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM, Doc 4444).

Although ADS-B coverage exists throughout a large section of the NAT, ADS-B equipage is not mandated except on routes Tango 9 and Tango 290.

If ADS-B equipment B1 or B2 has been filed in Item 10b of the ICAO FPL, the pilot shall consider that the aircraft is identified when the aircraft is operating above FL 285 in the Gander CTA, Shanwick CTA, Santa Maria CTA and the Reykjavik CTA. The controller will not inform the pilot of the identification. The controller will inform the pilot if the aircraft is not identified. This procedure is established to facilitate application of ATS surveillance separation using CPDLC by eliminating the need to inform every aircraft via CPDLC that the aircraft is identified.

### **OPERATION OF SSR TRANSPONDERS**

All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder.

Unless otherwise directed by ATC, pilots flying in NAT airspace shall operate transponders continuously in Mode A/C Code 2000, except that the last assigned code shall be retained for a period of 30 minutes after entry into NAT airspace or after leaving a surveillance service area. Pilots should note that it is important to change from the last assigned domestic code to Code 2000 since the original domestic code may not be recognized by the subsequent Domestic Radar Service on exit from the oceanic airspace. The following exceptions apply:

- Reykjavik ACC provides a radar control service in the south-eastern part of its area and consequently transponder codes issued by Reykjavik ACC must be retained throughout the Reykjavik OCA until advised by ATC.
- New York OAC provides radar control service within a 180-mile radius of Bermuda and consequently transponder codes previously issued must be retained throughout the Bermuda RADAR airspace until advised by ATC.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### MONITORING OF SYSTEMS AND FLIGHT CREW PERFORMANCE

This procedure does not affect the use of the special purpose codes (7500, 7600 and 7700) in cases of unlawful interference, radio failure or emergency. However, given the current heightened security environment flight crews must exercise CAUTION when selecting Codes not to inadvertently cycle through any of these special purpose codes and thereby possibly initiate the launching of an interception.

### **OPERATION OF ADS-B TRANSMITTERS**

ADS-B services are already available in some continental airspaces immediately adjacent to the NAT region as well as within some portions of the NAT HLA. ADS-B equipage is not mandated except on routes Tango 9 and Tango 290.

The Flight ID is the Aircraft Identification (ACID) and is used in both ADS-B and Mode S SSR technology. Up to seven characters long, it is usually set by the flight crew during pre-flight. The Flight ID is used by the ATC ground system to correlate the ADS-B information with the flight plan data and to identify the aircraft on the ATC situation display system. To allow correlation of a Flight ID to a flight plan, the Flight ID must exactly match the ACID entered in Item 7 of the ICAO flight plan. It is important that the Flight ID is correctly entered, or ADS-B service may be denied.

Aircraft operators wishing to receive an exemption from the procedures specified above for an individual flight shall apply for an exemption to the ATS unit(s) in accordance with AIP directives. Any approvals for such exemptions may be contingent on specific conditions such as routing, flight level and time of day.

Some DO-260 compliant ADS-B transmitters incorporate a single emergency bit for the squawk codes 7500, 7600 and 7700 and therefore do not indicate the nature of the emergency. Thus, when activated, the flight crew will need to contact ATC to communicate the type of emergency. Such ADS-B transmitters are also unable to squawk ident while the general emergency mode is being transmitted.

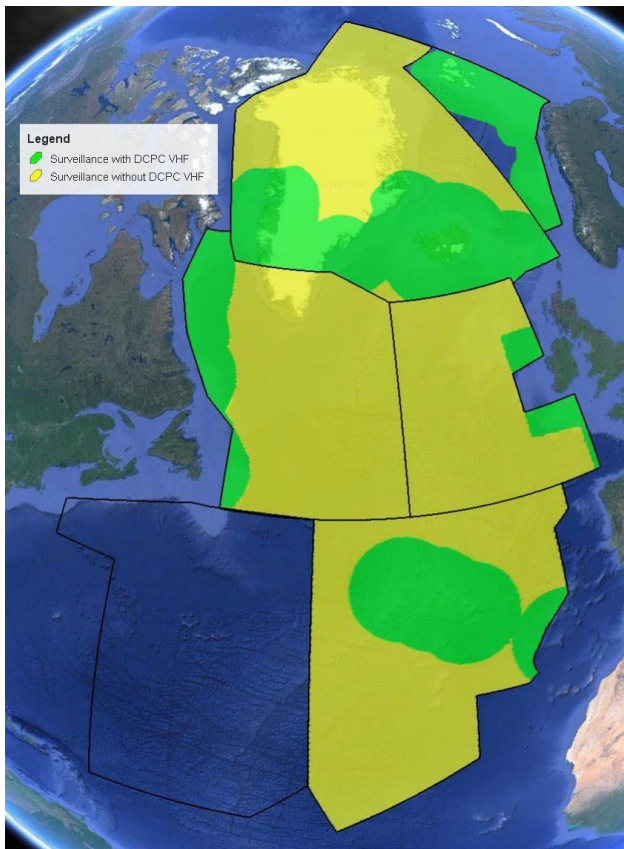
**AIRBORNE COLLISION AVOIDANCE SYSTEMS (ACAS)**

Turbine-engined aircraft having a maximum certificated take-off mass exceeding 5,700 kg or authorized to carry more than 19 passengers are required to carry ACAS II in the NAT region. The technical specifications for ACAS II are contained in ICAO Annex 10 Volume IV. Compliance with this requirement can be achieved through the implementation of traffic alert and collision avoidance system (TCAS) Version 7.1 as specified in RTCA/DO-185B or EUROCAE/ED-143.

Flight crews should report all ACAS/TCAS Resolution Advisories which occur in the NAT region to the controlling authority for the airspace involved.

**NAT HLA ATS SURVEILLANCE COVERAGE**

The figures below indicate the coverage of ATS surveillance systems (radar, ADS-B and multilateration) and Direct Controller Pilot VHF Voice Communications (DCPC VHF) in the NAT HLA.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

## 10-2-11 PROCEDURES IN THE EVENT OF NAVIGATION DEGRADATION OR FAILURE

Applicable to: ALL

### GENERAL

Aircraft navigation systems are generally very accurate and very reliable; as a result, GNEs due to system failures are rare in the NAT HLA. However, when failures do occur, their potential effects on the aircraft's navigation capability can be subtle or progressive, resulting in a gradual and perhaps not immediately discernible degradation of performance. The risks that such errors pose can be significant and flight crews must employ rigorous procedures to ensure early detection of any possible errors and hence mitigation of the ensuing risk. The NAT CMA thoroughly investigates the circumstances of all reported GNEs in the NAT HLA. The majority are the result of human error, and diligent application by flight crews of operating procedures such as those described in Chapter 6 should help to minimise the frequency of such errors. 'Vigilance' must be the watchword when navigating in the NAT HLA. 'Complacency' has no place here.

For unrestricted operation in the NAT HLA an approved aircraft must be equipped with a minimum of two fully serviceable LRNSs. Aircraft not meeting these requirements can operate, in accordance with the provisions of section 1.4, within the three corridors described in section

If abnormal navigation indications relating to INS or IRS systems occur after take-off, they should be analysed to discover their cause. Under no circumstances should a flight continue into oceanic airspace with unresolved navigation system errors, or with errors caused by inertial platform misalignment or initial position insertion.

Flight crew training and consequent approval for NAT HLA operations should include instruction on what actions are to be considered in the event of navigation system failures. This chapter provides guidance on the detection of failures and what flight crew action should be considered, together with details of the routes that may be used when the aircraft's navigation capability is degraded below that required for unrestricted operations in the NAT HLA.

#### Detection of Failures

Normally, navigation installations include comparator and/or warning devices, but it is still necessary for the flight crew to make frequent comparison checks. When an aircraft is fitted with three independent systems, the identification of a defective system should be straightforward. Any degradation of navigation capability should be reported to ATC immediately.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

Normally, navigation installations include comparator and/or warning devices, but it is still necessary for the flight crew to make frequent comparison checks. When an aircraft is fitted with three independent systems, the identification of a defective system should be straightforward. Any degradation of navigation capability should be reported to ATC immediately.

#### Methods of Determining which System is Faulty

With only two systems on board, identifying the defective unit can be difficult. If such a situation does arise in oceanic airspace any or all of the following actions should be considered: checking malfunction codes for indication of unserviceability; obtaining a fix. It may be possible to use the following:

the weather radar (range marks and relative bearing lines) to determine the position relative to an identifiable landmark such as an island; or

the ADF to obtain bearings from a suitable long-range NDB, in which case magnetic variation at the position of the aircraft should be used to convert the RMI bearings to true; or

if within range, a VOR, in which case the magnetic variation at the VOR location should be used to convert the radial to a true bearing (except when flying in the Canadian Northern Domestic airspace where VOR bearings may be oriented with reference to true as opposed to magnetic north).

contacting a nearby aircraft on VHF, and comparing information on spot wind, or ground speed and drift; or

if such assistance is not available, and as a last resort, the flight plan wind speed and direction for the current DR position of the aircraft, can be compared with that from navigation system outputs.

#### Action if the Faulty System Cannot be Identified

Occasions may still arise when distance or cross track differences develop between systems, but the flight crew cannot determine which system is at fault. The majority of operators feel that the procedure most likely to limit gross tracking errors under such circumstances is to fly the aircraft half way between the cross track differences as long as the uncertainty exists.

#### Guidance on What Constitutes a Failed System

Operations or navigation manuals should include guidelines on how to decide when a navigation system should be considered to have failed, e.g. failures may be indicated by a red warning light, or by self-diagnosis indications, or by an error over a known position exceeding the value agreed between an operator and its certifying authority.

#### Inertial System Failures

INSs have proved to be highly accurate and very reliable in service. Manufacturers claim a drift rate of less than 2 NM per hour; however in practice IRSs with laser gyros are proving to be capable of maintaining accuracy to better than 1 NM per hour. This in itself can lead to complacency, although failures do still occur. Close monitoring of divergence of output between individual systems is essential if errors are to be avoided and faulty units identified.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

#### GNSS Failures

GNSS are also very accurate and typically very reliable. Unlike inertial systems, GNSS failures can come about as a result of malfunctions of the aircraft, e.g., failures affecting the performance of one of more GNSS satellites. Some failures (e.g., loss of RAIM) may not affect navigation performance but rather affect the ability of the aircraft's GNSS equipment to monitor the reliability of the navigation solution. Similarly, a loss of fault detection and exclusion (FDE) capability may still allow accurate navigation but could also allow a defective satellite to provide faulty navigation data to the aircraft, without the flight crew's knowledge. In the event of loss of RAIM or FDE, flight crews should crosscheck the aircraft GNSS position by any means available, both on and off the aircraft. Procedures for responding to an aircraft GNSS malfunction should be provided in aircraft flight manuals. Flight crews should inform ATC of any GNSS malfunction. ATC aircraft separation minimums may be affected by the GNSS malfunction.

#### Satellite Fault Detection Outage

If the GNSS receiver displays an indication of a fault detection function outage (i.e. RAIM/FDE is not available), navigation integrity must be provided by comparing the GNSS position with the

position indicated by another LRNS sensor (i.e. other than GNSS), if the aircraft is so equipped. However, if the only sensor for the approved LRNS is GPS, then comparison should be made with a position computed by extrapolating the last verified position with airspeed, heading and estimated winds. If the positions do not agree within 10 NM, the flight crew should adopt navigation system failure procedures as subsequently described, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of malfunction.

#### Fault Detection Alert

If the GNSS receiver displays a fault detection alert (i.e. a failed satellite), the flight crew may choose to continue to operate using the GNSS-generated position if the current estimate of position uncertainty displayed on the GNSS from the FDE algorithm is actively monitored. If this exceeds 10 NM, the flight crew should immediately begin using the following navigation system failure procedures, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of alert.

#### LOSS OF NAVIGATION/FMS CAPABILITY

Some aircraft carry triplex equipment (3 LRNSs) and hence if one system fails, even before take-off, the two basic requirements for NAT HLA operations may still be met and the flight can proceed normally. The following guidance is offered for aircraft having State approval for unrestricted operations in the NAT HLA and which are equipped with only two operational LRNSs:

One System Fails Before Take-Off The flight crew must consider:

delaying departure until repair is possible;





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

obtaining a clearance above or below the NAT HLA; routing through the corridors described in paragraph 1.7.5. One System Fails Before the OCA Boundary is Reached The flight crew must consider:

landing at a suitable aerodrome before the boundary or returning to the aerodrome of departure; diverting via one of the corridors described in paragraph 1.7.5.;

obtaining a re-clearance above or below the NAT HLA. One System Fails After the OCA Boundary is Crossed

Once the aircraft has entered oceanic airspace, the flight crew should normally continue to operate the aircraft in accordance with the current flight plan or as amended by ATC, appreciating that the reliability of the total navigation system has been significantly reduced.

The flight crew should however,

assess the prevailing circumstances (e.g. performance of the remaining system, remaining portion of the flight in the NAT HLA, etc.);

advise and consult with ATC as to the most suitable action (e.g. request/expect clearance above or below the NAT HLA, turn-back, obtain clearance to fly within the corridors described in paragraph 1.7.5;

obtain appropriate re-clearance prior to any deviation from the last acknowledged clearance.

When the flight continues in accordance with its current flight plan or as amended by ATC (especially if the distance ahead within the NAT HLA is significant), the flight crew should begin a careful monitoring programme:

to take special care in the operation of the remaining system bearing in mind that routine methods of error checking are no longer available;

to check the main and standby compass systems frequently against the information which is still available;

to check the performance record of the remaining equipment and if doubt arises regarding its performance and/or reliability, the following procedures should be considered:

attempting visual sighting of other aircraft or their contrails, which may provide a track indication;

calling the appropriate OAC for information on other aircraft adjacent to the aircraft's estimated position and/or calling on VHF to establish contact with such aircraft (preferably same track/level)

to obtain from them information which could be useful. (e.g. drift, groundspeed, wind details).

The Remaining System Fails After Entering the NAT HLA The flight crew should:

immediately notify ATC;

make best use of procedures specified above relating to attempting visual sightings and establishing contact on VHF with adjacent aircraft for useful information;

keep a special look-out for possible conflicting aircraft, and make maximum use of exterior lights;

if no instructions are received from ATC within a reasonable period consider climbing or descending 500 feet, broadcasting action on 121.500 MHz and advising ATC as soon

as



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

possible.

This procedure also applies when a single remaining system gives an indication of degradation of performance, or neither system fails completely but the system indications diverge widely and the defective system cannot be determined.

#### Complete Failure of Navigation Systems Computers

A characteristic of the navigation computer system is that the computer element might fail, and thus deprive the aircraft of steering guidance and the indication of position relative to cleared track, but the basic outputs of the IRS (LAT/LONG, Drift and Groundspeed) are left unimpaired. A typical drill to minimise the effects of a total navigation computer system failure is suggested below. It requires comprehensive use of the plotting chart.

use the basic IRS/GPS outputs to adjust heading to maintain mean track and to calculate ETOs. draw the cleared route on a chart and extract mean true tracks between waypoints.

at intervals of not more than 15 minutes plot position (LAT/LONG) on the chart and adjust heading to regain track.

EAG Chart AT (H) 1; No 1 AIDU (MOD) Charts AT(H)1, 2, 3 & 4; the Jeppesen North/Mid Atlantic Plotting Charts and the FAA North Atlantic Route Planning Chart are considered suitable for this purpose.

## **GENERAL**

Aircraft navigation systems are generally very accurate and very reliable; as a result, GNEs due to system failures are rare in the NAT HLA. However, when failures do occur, their potential effects on the aircraft's navigation capability can be subtle or progressive, resulting in a gradual and perhaps not immediately discernible degradation of performance. The risks that such errors pose can be significant and flight crews must employ rigorous procedures to ensure early detection of any possible errors and hence mitigation of the ensuing risk. The NAT CMA thoroughly investigates the circumstances of all reported GNEs in the NAT HLA.

For unrestricted operation in the NAT HLA an approved aircraft must be equipped with a minimum of two fully serviceable LRNSs. Aircraft may be approved for NAT HLA operations when equipped with only a single LRNS. However, such aircraft are only permitted to plan and fly routes specified for this purpose and on other particular routings serving individual traffic axes e.g. the Tango routes, routings between the Iberian Peninsula and the Azores/Madeira and routes between Iceland and Greenland.

If abnormal navigation indications relating to the IRS systems occur after take-off, they should be analysed to discover their cause. Under no circumstances should a flight continue into oceanic airspace with unresolved navigation system errors, or with errors caused by

inertial platform misalignment or initial position insertion.

Flight crew training and consequent approval for NAT HLA operations should include instruction on what actions are to be considered in the event of navigation system failures. This chapter provides guidance on the detection of failures and what flight crew action should be considered, together with details of the routes that may be used when the aircraft's navigation capability is degraded below that required for unrestricted operations in the NAT HLA.

## DETECTION OF FAILURES

Normally, navigation installations include comparator and/or warning devices, but it is still necessary for the flight crew to make frequent comparison checks. When an aircraft is fitted with three independent systems, the identification of a defective system should be straightforward. Any degradation of navigation capability should be reported to ATC immediately.

## METHODS OF DETERMINING WHICH SYSTEM IS FAULTY

With only two systems on board, identifying the defective unit can be difficult. If such a situation does arise in oceanic airspace any or all of the following actions should be considered:

- Checking malfunction codes for indication of unserviceability;
- Obtaining a fix. It may be possible to use the following:
  - The weather radar (range marks and relative bearing lines) to determine the position relative to an identifiable landmark such as an island; or
  - The ADF to obtain bearings from a suitable long-range NDB, in which case magnetic variation at the position of the aircraft should be used to convert the RMI bearings to true; or
  - If within range, a VOR, in which case the magnetic variation at the VOR location should be used to convert the radial to a true bearing (except when flying in the Canadian Northern Domestic airspace where VOR bearings may be oriented with reference to true as opposed to magnetic north).
- Contacting a nearby aircraft on VHF, and comparing information on spot wind, or ground speed and drift; or
- If such assistance is not available, and as a last resort, the flight plan wind speed and direction for the current DR position of the aircraft, can be compared with that from

**APPENDICES****NAT HLA OPERATIONS****PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE**

navigation system outputs.

**ACTION IF THE FAULTY SYSTEM CANNOT BE IDENTIFIED**

Occasions may still arise when distance or cross track differences develop between systems, but the flight crew cannot determine which system is at fault. The majority of operators feel that the procedure most likely to limit gross tracking errors under such circumstances is to fly the aircraft half way between the cross track differences as long as the uncertainty exists.

**GUIDANCE ON WHAT CONSTITUTES A FAILED SYSTEM**

12.1.8 Operations or navigation manuals should include guidelines on how to decide when a navigation system should be considered to have failed, e.g. failures may be indicated by a red warning light, or by self -diagnosis indications, or by an error over a known position exceeding the value agreed between an operator and its certifying authority.

**INERTIAL SYSTEM FAILURES**

INSS have proved to be highly accurate and very reliable in service. Manufacturers claim a drift rate of less than 2 NM per hour; however in practice IRSs with laser gyros are proving to be capable of maintaining accuracy to better than 1 NM per hour. This in itself can lead to complacency, although failures do still occur. Close monitoring of divergence of output between individual systems is essential if errors are to be avoided and faulty units identified.

**GNSS FAILURES**

GNSS are also very accurate and typically very reliable. Unlike inertial systems, GNSS failures can come about as a result of malfunctions of the aircraft, e.g., failures affecting the performance of one of more GNSS satellites. Some failures (e.g., loss of RAIM) may not affect navigation performance but rather affect the ability of the aircraft's GNSS equipment to monitor the reliability of the navigation solution. Similarly, a loss of fault detection and exclusion (FDE) capability may still allow accurate navigation but could also allow a defective satellite to provide faulty navigation data to the aircraft, without the flight crew's knowledge. In the event of loss of RAIM or FDE, flight crews should crosscheck the aircraft GNSS position by any means available, both on and off the aircraft. Procedures for responding to an aircraft GNSS malfunction should be provided in aircraft flight manuals. Flight crews should inform ATC of any GNSS malfunction. ATC aircraft separation minimums may be affected by the GNSS malfunction.

**SATELLITE FAULT DETECTION OUTAGE**

If the GNSS receiver displays an indication of a fault detection function outage (i.e. RAIM/FDE is not available), navigation integrity must be provided by comparing the GNSS position with the position indicated by another LRNS sensor (i.e. other than GNSS), if the aircraft is so equipped. However, if the only sensor for the approved LRNS is GPS, then comparison should be made with a position computed by extrapolating the last verified position with airspeed, heading and estimated winds. If the positions do not agree

within 10 NM, the flight crew should adopt navigation system failure procedures as subsequently described, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of malfunction.

**FAULT DETECTION ALERT**

If the GNSS receiver displays a fault detection alert (i.e. a failed satellite), the flight crew may choose to continue to operate using the GNSS-generated position if the current estimate of position uncertainty displayed on the GNSS from the FDE algorithm is actively monitored. If this exceeds 10 NM, the flight crew should immediately begin using the following navigation system failure procedures, until the exclusion function or navigation integrity is regained. The flight crew should follow flight manual procedures specified for this type of alert.

**LOSS OF NAVIGATION/FMS CAPABILITY**

Some aircraft carry triplex equipment (3 LRNSs) and hence if one system fails, even before take-off, the two basic requirements for NAT HLA operations may still be met and the flight can proceed normally. The following guidance is offered for aircraft having State approval for unrestricted operations in the NAT HLA and which are equipped with only two operational LRNSs:

**ONE SYSTEM FAILS BEFORE TAKE-OFF**

The flight crew must consider:

- Delaying departure until repair is possible;
- Obtaining a clearance above or below the NAT HLA;
- Planning on the special routes known as the 'Blue Spruce' Routes, which have been

**APPENDICES****NAT HLA OPERATIONS****PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE**

established for use by aircraft suffering partial loss of navigation capability (Note: As indicated in Chapter 1, these routes may also be flown by aircraft approved for NAT HLA operations but equipped with only a single LRNS).

Such use of the foregoing routes is subject to the following conditions:

- Sufficient navigation capability remains to ensure that NAT HLA accuracy and the ICAO Annex 6 (Part I para 7.2.9 and Part II para 2.5.2.9) requirements for redundancy can be met by relying on short-range nav aids;
- A revised flight plan is filed with the appropriate ATS unit;
- An appropriate ATC clearance is obtained.

**ONE SYSTEM FAILS BEFORE THE OCA BOUNDARY IS REACHED**

The flight crew must consider:

- Landing at a suitable aerodrome before the boundary or returning to the aerodrome of departure;
- Diverting via one of the special routes described previously;
- Obtaining a re-clearance above or below the NAT HLA.

**ONE SYSTEM FAILS AFTER THE OCA BOUNDARY IS CROSSED**

Once the aircraft has entered oceanic airspace, the flight crew should normally continue to operate the aircraft in accordance with the oceanic clearance already received, appreciating that the reliability of the total navigation system has been significantly reduced.

The flight crew should however:

- Assess the prevailing circumstances (e.g. performance of the remaining system, remaining portion of the flight in the NAT HLA, etc.);
- Prepare a proposal to ATC with respect to the prevailing circumstances (e.g. request clearance above or below the NAT HLA, turn-back, obtain clearance to fly along one of the special routes, etc.);
- Advise and consult with ATC as to the most suitable action;
- Obtain appropriate re-clearance prior to any deviation from the last acknowledged oceanic clearance.

When the flight continues in accordance with its original clearance (especially if the distance ahead within the NAT HLA is significant), the flight crew should begin a careful



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### PROCEDURES IN THE EVENT OF NAV DEGRADATION OR FAILURE

monitoring programme:

- To take special care in the operation of the remaining system bearing in mind that routine methods of error checking are no longer available;
- To check the main and standby compass systems frequently against the information which is still available;
- To check the performance record of the remaining equipment and if doubt arises regarding its performance and/or reliability, the following procedures should be considered:
  - Attempting visual sighting of other aircraft or their contrails, which may provide a track indication;
  - Calling the appropriate OACC for information on other aircraft adjacent to the aircraft's estimated position and/or calling on VHF to establish contact with such aircraft (preferably same track/level) to obtain from them information which could be useful. (e.g. drift, groundspeed, wind details).

#### THE REMAINING SYSTEM FAILS AFTER ENTERING THE NAT HLA

The flight crew should:

- Immediately notify ATC;
- Make best use of procedures specified above relating to attempting visual sightings and establishing contact on VHF with adjacent aircraft for useful information;
- Keep a special look-out for possible conflicting aircraft, and make maximum use of exterior lights;
- If no instructions are received from ATC within a reasonable period consider climbing or descending 500 feet, broadcasting action on 121.5 MHz and advising ATC as soon as possible.

*Note: This procedure also applies when a single remaining system gives an indication of degradation of performance, or neither system fails completely but the system indications diverge widely and the defective system cannot be determined.*





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

## COMPLETE FAILURE OF NAVIGATION SYSTEMS COMPUTERS

A characteristic of the navigation computer system is that the computer element might fail, and thus deprive the aircraft of steering guidance and the indication of position relative to cleared track, but the basic outputs of the IRS (LAT/LONG, Drift and Groundspeed) are left unimpaired. A typical drill to minimise the effects of a total navigation computer system failure is suggested below. It requires comprehensive use of the plotting chart.

- Use the basic IRS/GPS outputs to adjust heading to maintain mean track and to calculate ETOs.
- Draw the cleared route on a chart and extract mean true tracks between waypoints.
- At intervals of not more than 15 minutes plot position (LAT/LONG) on the chart and adjust heading to regain track.

## 10-2-12 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

Applicable to: ALL

### INTRODUCTION

Although all possible contingencies cannot be covered, the procedures here provide for the more frequent cases such as:

- Inability to comply with assigned clearance due to meteorological conditions, (13.4 refers);
- En-route diversion across the prevailing traffic flow (for example, due to medical emergencies (13.2 and 13.3 refer)); and
- Loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (13.2 and 13.3 refer). Guidance on procedures to follow when an aircraft experiences a degradation in navigation capabilities can be found in Doc 4444, Chapter 5, section 5.2.2.

The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air Traffic Control shall render all possible assistance.

### GENERAL PROCEDURES



**APPENDICES****NAT HLA OPERATIONS****SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES**

If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance shall be obtained, whenever possible, prior to initiating any action. If prior clearance cannot be obtained, the following contingency procedures should be employed until a revised clearance is received:

- 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 9.3 km (5 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 allocated on adjacent tracks,
  - The direction to an alternate airport;
  - Any strategic lateral offset being flown, and
  - Terrain clearance;
- The aircraft should be flown at a flight level and an offset track where other aircraft are less likely to be encountered.
- Maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped) leaving ACAS in RA mode at all times, unless aircraft operating limitations dictate otherwise;
- Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
- Keep the SSR transponder on at all times and, when able, squawk 7700, as appropriate;
- As soon as practicable, the pilot shall advise air traffic control of any deviation from assigned clearance;
- Use whatever means is appropriate (i.e., voice and/or CPDLC) to communicate during a contingency or emergency;
- If voice communication is used, the radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times, shall be used, as appropriate;
- 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; Additional guidance on emergency procedures for controllers and radio operators, and flight crew in data link operations can be found in the Global Operational Data Link (GOLD) Manual (Doc 10037).
- Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.450 MHz) and where appropriate on the frequency in use: aircraft identification, the nature of the distress condition, intention of the person in command, position (including the ATS route designator or the track code, as appropriate) and flight level; and

**APPENDICES****NAT HLA OPERATIONS****SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES**

- 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.

**ACTIONS TO BE TAKEN ONCE OFFSET FROM TRACK**

The pilot's judgement of the situation and the need to ensure the safety of the aircraft will determine the actions outlined here 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:

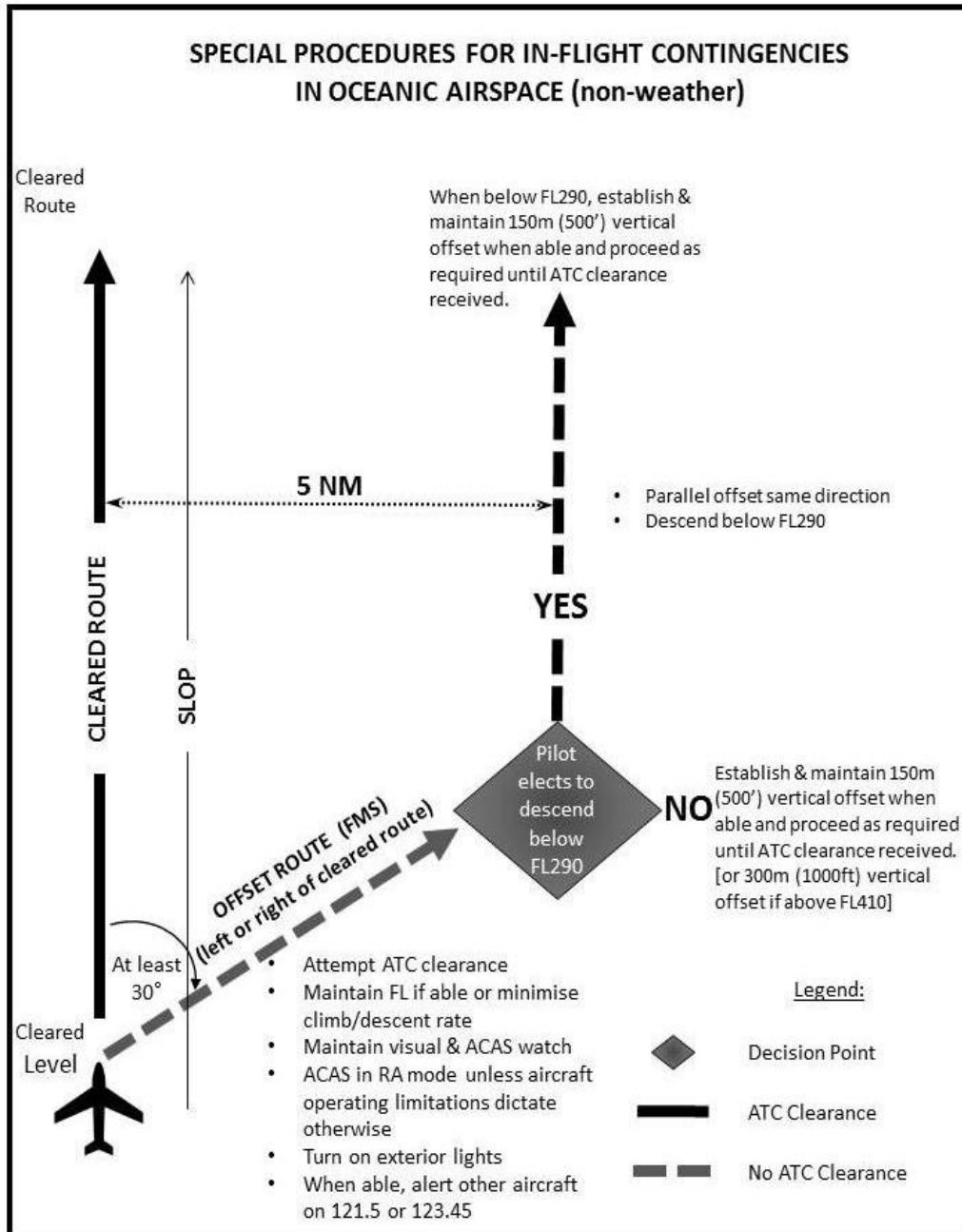
- Operation within a parallel track system,
- The potential for User Preferred Routes (UPRs) parallel to the aircraft's track or route,
- The nature of the contingency (e.g. aircraft system malfunction) and
- Weather factors (e.g. convective weather at lower flight levels).

If possible maintain the assigned flight level until established on the 9.3 km (5 NM) parallel, same direction track or route offset. If unable, initially minimize the rate of descent to the extent that is operationally feasible.

Once established on a parallel, same direction track or route offset by 9.3 km (5 NM), either:

- Descend below FL 290, and establish a 150 m (500 ft) vertical offset from those flight levels normally used, then proceed as required by the operational situation or if an ATC clearance has been obtained, proceed in accordance with the clearance; or
- 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.
- Establish a 150 m (500 ft) vertical offset (or 300 m (1000 ft) vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation, or if an ATC clearance has been obtained, proceed in accordance with the clearance.

Altimetry System Error may lead to less than actual 500 ft vertical separation when the procedures above are applied. In addition, with the 500 ft vertical offset applied, ACAS RAs may occur.



## WEATHER DEVIATION PROCEDURES

The following procedures are intended for deviations around adverse meteorological conditions.

When weather deviation is required, the pilot should contact ATC via CPDLC or voice. A rapid response may be obtained by requesting a weather deviation using a CPDLC downlink



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

message or stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response. When necessary, the pilot should initiate the communications using CPDLC downlink message (Doc 4444, Appendix 5, Emergency/urgency downlink (EMGD) refers) or by using the urgency call "PAN PAN" (preferably spoken three times).

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.

#### ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COM ARE ESTABLISHED

The pilot should contact ATC and request clearance to deviate from track or route, advising the extent of the deviation requested. The flight crew will use whatever means is appropriate (i.e., CPDLC and/or voice) to communicate during a weather deviation. 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.

ATC should take one of the following actions:

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

The pilot should take the following actions:

- Comply with the ATC clearance issued; or
- Advise ATC of intentions and execute the relevant procedure.

#### ACTIONS TO BE TAKEN IF A REVISED ATC CLEARANCE CANNOT BE OBTAINED

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:

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

- If possible, deviate away from an organized track or route system;
- Establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, 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 123.450 MHz);
- Watch for conflicting traffic both visually and by reference to ACAS (if equipped); If, as a result of actions taken under the provisions of 13.4.6 b) and c), the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.
- Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
- For deviations of less than 9.3 km (5 NM) from the originally cleared track or route remain at a level assigned by ATC;
- For deviations greater than or equal to 9.3 km (5 NM) from the originally cleared track or route, when the aircraft is approximately 9.3 km (5 NM) from track or route, initiate a level change in accordance with Table 13-1;
- 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 a 300 ft vertical offset from normal cruising levels in accordance with Table 13-1 before deviating beyond the cleared distance.
- When returning to track or route, be at its assigned flight level when the aircraft is within approximately 9.3 km (5 NM) of the centreline; and
- 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.

| Originally cleared track or CL | Deviations (5.0 NM) | Level change                                 |
|--------------------------------|---------------------|----------------------------------------------|
| EAST<br>000° – 179° magnetic   | LEFT<br>RIGHT       | DESCEND 300 ft (90 m)<br>CLIMB 300 ft (90 m) |
| WEST<br>180° – 359° magnetic   | LEFT<br>RIGHT       | CLIMB 300 ft (90 m)<br>DESCEND 300 ft (90 m) |

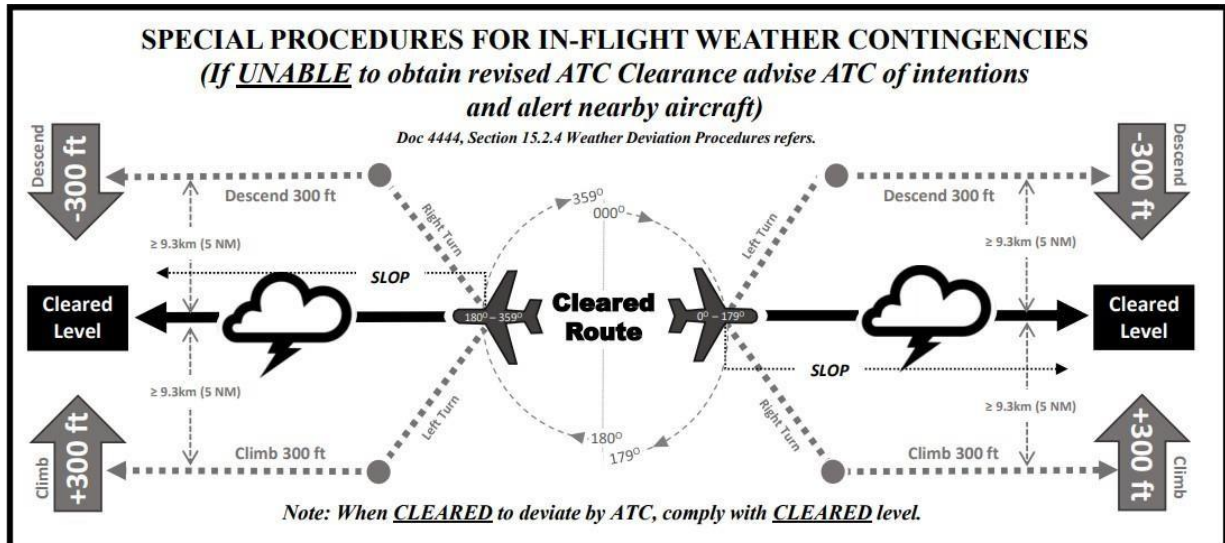


Figure 13-2. Visual aid for understanding and applying the weather contingency procedures guidance.

## WAKE TURBULENCE

ICAO collects data on wake vortex encounters. Most encounters occur in terminal operations and indeed this is where the aircraft type wake categorization scheme is used to regulate separations. Wake vortex encounters are, however, also experienced enroute, although less frequently. To accommodate the predominantly uni-directional diurnal traffic flows through the NAT, on many routes all adjacent flights levels are simultaneously used for a given traffic flow. While this arrangement may not be unique, it is not one that is commonly employed in many other areas of the world. As a result many, if not most, enroute wake vortex encounters outside the NAT arise from opposite direction passings or route crossing situations. In the NAT enroute wake vortices are encountered more commonly from a preceding aircraft following the same track, usually at the next higher level. Such encounters can thus be of a prolonged duration and mitigating flight crew action is desirable/necessary. Any application of lateral offsets to avoid wake turbulence should be made within the confines of SLOP, refer to paragraphs 8.4.3-8.4.4. See Attachment 3 for the preferred wake vortex reporting form.

## TCAS ALERTS AND WARNINGS

All turbine-engined aircraft with a certificated take-off mass exceeding 5 700 kg or authorised to carry more than 19 passengers are required to be equipped with ACAS II in the NAT region. Only TCAS Version 7.1 meets the ICAO technical specifications for ACAS II as described in the current ICAO Annex 10 Volume IV.



The provisions relating to the carriage and use of ACAS II are contained in ICAO Annexes 2, 6, 10 and 11 and in the Procedures for Air Navigation Services (PANS) Aircraft Operations (PANS-OPS, Doc 8168) and Air Traffic Management (PANS-ATM, Doc 4444). Operational procedures are fully detailed in PANS-OPS Doc 8168, Volume 1, Part VIII, Chapter 3.

All Resolution Advisories (RAs) should be reported to ATC:

- Verbally, as soon as practicable; and
- In writing, to the Controlling Authority, after the flight has landed, using the necessary procedure and forms, including, when appropriate, the 'Altitude Deviation Report Form' shown at Attachment 2 to this Manual.

### **LOSS OR SUDDEN WITHDRAWAL OF ATCS IN THE NAT REGION**

In the anticipation of situations arising which might result in the partial or total disruption of Air Traffic Services within the NAT region, NAT ATS providers have developed procedures which would ensure, as far as possible, the continued safety of air navigation. These procedures are detailed in the "Air Traffic Management Operational Contingency Plan – North Atlantic Region" (NAT Doc 006) which can be downloaded from [www.icao.int/EURNAT/](http://www.icao.int/EURNAT/), following "EUR & NAT Documents", then "NAT Documents", in folder "NAT Doc 006 - NAT Contingency Plan".

### **COMMON ANSP PROCEDURES**

The following are common ANSP procedures regarding loss or sudden withdrawal of air traffic services in the NAT:

- In the event of a loss or sudden withdrawal of Air Traffic Services in the NAT, ANSPs will notify all affected agencies and operators appropriately.
- In Limited Service situations the individual ANSP will decide upon the level of notification necessary and act appropriately.
- In "No Service" situations, it is likely that the ATC facility involved will be subject to evacuation. In this instance the ANSP will issue NOTAMs and broadcast on appropriate frequencies that contingency procedures have been initiated.
- The notification process employed by individual ANSPs is detailed in NAT Doc 006, however the general format will be as follows:
  - Issue a NOTAM advising operators of the evacuation;



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

- Broadcast an evacuation message on appropriate frequencies:

#### PILOT PROCEDURES FOR FLIGHTS OUTSIDE THE NAT

Pilots are strongly advised not to enter the airspace. Request clearance to avoid the affected OCA or land at an appropriate aerodrome.

Flights can choose to continue using pilot's discretion. Continue in accordance with the current flight plan (what is loaded in the FMS) or as amended by ATC.

#### PILOT PROCEDURES FOR FLIGHTS INSIDE THE NAT

The procedures outlined below are to be used as guidance for pilots following a loss or sudden withdrawal of the Air Traffic service as described above. Although advised not to enter the NAT OCA without Air Traffic Services, which could entail significant reroutes, flights can continue with their current flight plan (what is loaded in the FMS) or as amended by ATC:

- Pilots should continue with their current flight plan (what is loaded in the FMS) or as amended by ATC. Pilots shall use extreme caution and use all available means to detect any conflicting traffic.
- On receipt of the contingency message, pilots are requested to broadcast to other flights on 121.500 MHz and 123.450 MHz and a listening watch on these frequencies must be maintained. Pilots should continuously monitor VHF frequencies 121.5 MHz and 123.45 MHz in order to exchange position information with other flights, in the event they are unable to communicate on HF.
- Pilots should establish communication with the next OCA at the earliest opportunity stating current position, cleared flight level, next position and estimate and subsequent position. This also applies to flights using automatic position reports (ADS-C) as these reports may not have been received by the next OCA.
- Where no contact with the next OCA can be established, HF radio or SATVOICE should be used. HF frequency congestion is likely. Communications should be kept to a minimum.
- When ADS equipped flights are notified of a loss or sudden withdrawal of air traffic services, they must revert to voice position reporting until clear of current OCA or notified otherwise. Pilots should note that they may be asked to log-on to other OCAs. Pilots should not initiate this action until instructed to do so.
- Requests for changes to route, flight level, or speed should be limited to those





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

required for flight safety.

- Any flight conducting a flight level change should complete the FL change as soon as possible in accordance with the clearance.
- If unable to establish radio contact, pilots may use SATVOICE to provide position reports.
- Pilots may request their flight dispatch offices to forward position reports if they are otherwise unable to make position reports.
- Pilots may also use other flights to relay their position reports, on 123.5 MHz, if necessary.

### CONTACT DETAILS

| Oceanic Centre                | Telephone Number | SATVOICE (Short Code) |
|-------------------------------|------------------|-----------------------|
| New York                      | +1 631 468 1413  | 436623                |
| Gander                        | +1 709 651 5207  | 431613                |
| Reykjavik, via Iceland Radio  | +354 568 4600    | 425105                |
| Bodø                          | +47 755 42900    | 425702                |
| Ballygirreen (Shanwick Radio) | +353 61 368241   | 425002                |
| Santa Maria                   | +351 296 820 438 | 426305                |

### COMMON BROADCAST PROCEDURES

In the event of a loss or sudden withdrawal of Air Traffic Service in the NAT, the following communication procedures have been developed in accordance with the Traffic Information Broadcast by Aircraft (TIBA) procedures recommended by ICAO (Annex 11 – Air Traffic Services, Attachment B). These procedures should be applied when completing flight level change to comply with the oceanic clearance.

At least 3 minutes prior to the commencement of a climb or descent, the flight should broadcast on the last assigned frequency, 121.5 MHz, 243.0 MHz and 123.45 MHz the following:

**“ALL STATIONS (callsign) (direction) DIRECT FROM (position) TO (position) LEAVING FLIGHT LEVEL (number) FOR FLIGHT LEVEL (number) AT (distance)(direction) FROM (position) AT (time)”.**

When the flight level change begins, pilots should make the following broadcast:

## APPENDICES

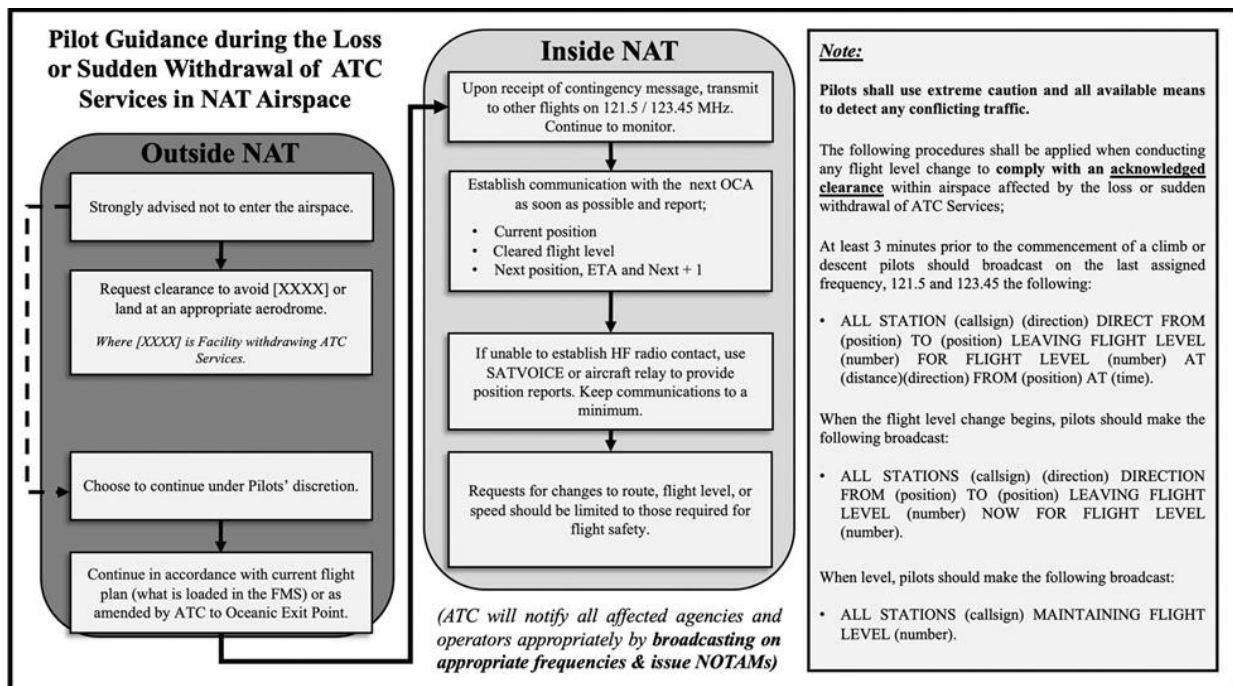
### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

**“ALL STATIONS (callsign) (direction) DIRECTION FROM (position) TO (position) LEAVING FLIGHT LEVEL (number) NOW FOR FLIGHT LEVEL (number).”**

When level, pilots should make the following broadcast:

**“ALL STATIONS (callsign) MAINTAINING FLIGHT LEVEL (number).”**



## SPACE WEATHER

### General

This section provides an overview on the effects of space weather in the NAT Atlantic and information on common/specific ANSP contingency processes that may be applied to minimize operational impacts.

Severe space weather events may cause degradation or loss of multiple ATC Systems, Aircraft Systems including GNSS, Microwave Links, Satellite reliant communications, RF issues (i.e., VHF Datalink) and may cause National Power Grid outages. Effects can be localized to only one FIR or may affect multiple FIRs, including the whole of the North Atlantic Region (NAT) and beyond.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

Various space weather types are predictable; however, the operational impact of these phenomena is hard to quantify both in severity and in location. ANSPs are aware of communication problems, e.g., HF receive/broadcast issues, fadeout, and attenuation and due to these problems have of considerable experience with mitigating the operational impacts. The impact of GNSS radio frequency interference are more significant in the NAT Region and require contingency processes such as greater spacing between aircraft as a function of phase of flight or the use of alternative means of communication, navigation and/or surveillance.

ANSPs and Operators should be aware of the range of potential difficulties that space weather phenomena can cause and should monitor space weather forecasts and have in place contingency measures to mitigate possible negative effects.

Although the solar cycle is cyclical, peaking approximately every 11 years, incidences of significant events may occur at any time.

ICAO Document 10100, Manual on Space Weather Information in Support of International Air Navigation, provides more detail on what constitutes Space Weather, its nature, effects upon Air Navigation, and how Space Weather information should be promulgated by Space Weather Centres (SWXC) that users can employ for decision-making.

#### Hazards in the NAT Region

The following hazards may be expected during (severe) space weather events:

- a) Unexpected loss of communication (HF / SATVOICE and CPDLC / SATCOM data).
- b) Degraded performance of navigation and surveillance that rely on GNSS (such as ADS-B and or ADS-C).
- c) Unanticipated non-standard performance of on-board electronics resulting in reboots and anomalies.
- d) Issues related to radiation exposure by aircrew and passengers.
- e) Increased frequency of flight crews adopting contingency procedures that may result in level change, re-routes, turn-backs and diversions.

#### Common NAT Region Space Weather Contingency Plans

The objective of this section is to provide an overview of the common contingency procedures that NAT Region ANSPs will adopt in response to a space weather event, to enable operators to make informed decisions when the event occurs in the North Atlantic Region.

Aircraft Operating Outside the NAT Region (prior to entry)

ATC will not know the expected duration of the event. Flight Crews will be advised of the situation



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

with as much information as possible, which may include (but not restricted to) the following:

- a) Confirmation of where no reliable ATC service will be available until contact with another VHF facility.
- b) Information of where communications with adjacent ATSUs can be maintained.
- c) Confirmation of where alerting service may be negatively impacted due to lack of communications.
- d) Details of all other communications facilities and satellite navigation that, may be or become completely unavailable.
- e) Confirmation that aircraft may be adopting contingency procedures and making level and route changes without reference to ATC.
- f) Details of any route and level allocation scheme implemented in the NAT Region which will inevitably have economic consequences due to the need to reserve flight levels for opposite direction and crossing traffic.

When there is a significant space weather event reported in the NAT Region, ATC will expect most aircraft to elect to avoid the area of the event which may result in level changes, re-routes, turn-backs or diversions.

ATC will expect a significant increase in workload by managing profile change requests and relaying information to flight crews who require the latest update to make operational decisions.

#### Aircraft Operating Within the NAT Region

A severe space weather event may interfere with HF communications and degrade satellite navigations systems or render them inoperable. SATCOM is also likely to be unavailable.

ATC expect aircraft to continue in accordance with their ATC clearance but anticipate an increased likelihood of flight crews electing to adopt contingency procedures which may result in level changes, re-routes, turn-backs or diversions.

Flight crews which have rerouted of their own accord, should attempt contact adjacent ATSUs using all means possible to advise of their routing.

#### Air Traffic Flow Management Actions

Workload is likely to rise considerably during the reactive phase and therefore Air Traffic Flow Management measures will be considered as an immediate action. As much detail as possible will be issued to operators via all communication means possible to allow them to make informed decisions on their actions. Operators should refer to NAT Doc 006 Part III Space Weather



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

Contingency Procedures North Atlantic Region for additional information.

#### GNSS INTERFERENCE

GNSS jamming and spoofing are no longer treated as rare edge cases. In the 2026 doc, they're framed as a normal operational hazard. The guidance highlights how GNSS interference can quietly degrade aircraft time, with knock-on effects to ADS-C, ADS-B, CPDLC, and longitudinal separation – even after position accuracy appears to have recovered.

The practical takeaway is simple: "it recovered" doesn't mean "it's fine". So operators need to think about downstream impacts before entering the NAT. More detailed guidance is in NAT Ops Bulletin 2025-001, which sets out what to watch for and what to do if you're entering the NAT with GPS problems. This mainly affects westbound flights coming out of spoofing or jamming areas. Bottom line – tell ATC early in your RCL if there are any issues. Doing so can help avoid off-track reroutes, step-downs, and delays.

Most aircraft rely on GNSS for navigation and time source. GPS, Galileo, GLONASS and BeiDou are examples of GNSS.

Recently, a significant increase in GNSS jamming and spoofing has been reported by aircraft entering the NAT Region. The most affected regions are the Black Sea area, south and eastern Mediterranean area, the Baltic Sea and the Arctic Sea.

#### GNSS Jamming

When GNSS is jammed, the jammer sends out a signal designed to interfere with signals from satellites. Any equipment using a satellite signal to determine a location or time, including aircraft, will then be affected and the GNSS location might become unreliable.

To be able to use GNSS for navigation aboard an aircraft the quality of the GNSS data must be sufficient and the aircraft must be able to receive data from a minimum number of satellites. During GNSS jamming the aircraft must rely on alternative means of navigation such as VOR/DME or inertial reference systems.

#### GNSS Spoofing

Another type of GNSS interference is spoofing. A spoofer will send out a false signal pretending to be a satellite. The actual position of the aircraft may then be different from the position displayed to the pilot or used by the avionics. In some cases, the pilot might not be presented



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

with an anomaly indication and the aircraft could drift off course. Ground-based surveillance systems like radars and multilateration do not rely on GNSS and would be able to detect the actual position of the aircraft to alert air traffic controllers of a deviation.

ADS-B and ADS-C are, however, dependent on GNSS and those systems would report the incorrect spoofed position to air traffic controllers.

#### Effects of GNSS Interference on the NAT

Although GNSS interference inside the NAT Region is unlikely, parts of Europe and Middle East are subject to constant GNSS interference that affect aircraft that subsequently enter the NAT Region. The website <https://gpsjam.org> provides information about daily occurrences of GNSS interference.

NAT ANSPs have noticed a significant increase of aircraft entering the NAT Region with degraded navigation capabilities after having been subject to GNSS interference earlier in the flight.

The interference often occurred hours before the aircraft entered the NAT Region. The symptoms observed are:

- a) ADS-B data either not transmitted by the aircraft or transmitted with low quality indicators.
- b) ADS-C reports include low Figure of Merit (FOM), which will likely result in an ATC enquiry concerning navigational status.
- c) Aircraft unable to log on to datalink (CPDLC), most likely due to incorrect clock on-board the aircraft.

The environment in the NAT region has dramatically changed in recent years with the Data Link Mandate and PBCS implementation. Separation between aircraft has decreased significantly allowing more aircraft to fly optimum routes and flight levels.

Those improvements are dependent on reliable GNSS data on-board the aircraft. When aircraft enter the NAT Region with degraded navigation and surveillance capabilities following GNSS interference, air traffic controllers are no longer able to provide the reduced separation for the aircraft. There are examples of aircraft having to accept reroutes and level changes on account of GNSS interference earlier in the flight.

#### Recommendation

The European Union Aviation Safety Agency (EASA) has issued a Safety Information Bulletin (SIB) regarding GNSS outage and alterations leading to navigation/surveillance degradation (<https://ad.easa.europa.eu/ad/2022-02R2>). The SIB includes recommendations for Civil Aviation





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES

Administrations (CAA), ANSP, aircraft operators and equipment manufacturers. The recommendations for aircraft operators relevant to the NAT Region are as follows:

- a) Ensure that flight crews are aware of and trained on the importance of prompt reporting to air traffic services of any observed interruption, degradation or anomalous performance of GNSS equipment or related avionics (e.g. map shifts, suspected GNSS spoofing, position and duration of the GNSS interference);
- b) Evaluate different possible scenarios based on the type of operations in order to provide the flight crew with timely information to increase awareness of jamming and spoofing;
- c) Ensure that GNSS outage or spoofing topic is included in the flight crew training and flight manuals, highlighting the identified operational scenarios to recognize, react in a timely manner to different jamming and spoofing cases;
- d) Assess operational risks and limitations linked to the loss of on-board GNSS capability including any on-board systems requiring inputs from a reliable GNSS signal;
- e) Ensure that operational limitations introduced by the dispatch of aircraft with inoperative radio navigation systems in accordance with the Minimum Equipment List, are considered before operating an aircraft in the affected areas;
- f) Ensure, in the flight planning and execution phase, the availability of alternative conventional arrival and approach procedures (e.g. an aerodrome in the affected area with only GNSS, including augmentation, approach procedures should not be considered as destination or alternate); and
- g) Concerning spoofing: contact aircraft or equipment manufacturers for instructions on how to deal with spoofing cases of their products and implement the recommendations in the Standard Operating Procedures.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

### **GUIDANCE FOR THE DISPATCHER:**

#### GENERAL

The NAT is essentially divided into two distinct areas for flight operation, i.e. the NAT HLA and non-NAT HLA airspace. Operations within the NAT HLA require the user to adhere to very specific operating protocols. Refer to Chapter 1 for a description of NAT airspace.

#### REGULATORY REQUIREMENTS AND CONSEQUENTIAL ROUTING LIMITATIONS

##### State Approvals (NAT HLA /RVSM)

Before planning any operations within the NAT HLA, operators must ensure that the specific State NAT HLA and RVSM approvals are in place. These requirements are addressed in Chapter 1.

Before planning any operations of ADS-B equipped aircraft into airspace where ADS-B operation is required, operators must ensure that the aircraft is approved for such flights. These requirements are addressed in Chapter 1.

##### Minimum Equipment (Navigation/Altimetry/Communications)

Chapter 1 discusses the minimum navigation equipment requirements for unrestricted flight in the NAT HLA.

The Minimum Aircraft Systems Performance Specifications for RVSM operations are common world-wide standards and are contained in Doc 9574 (Manual on a 300m (1 000ft) Vertical Separation Minimum between FL 290 and FL 410 inclusive). They are also detailed in FAA Advisory Circular AC91-85B, and in EASA documentation (refer to paragraph 7.1.5). However, notwithstanding the worldwide nature of RVSM MASPS, it must be recognised, as indicated in Chapter 1, that special provisions apply in the North Atlantic HLA and in consequence all NAT flight crews/operators must be State approved specifically for NAT RVSM operations.

Many NAT air/ground ATC communications are still conducted on single side-band HF frequencies. For operations in the NAT region fully functioning HF communications equipment is required when operating outside VHF coverage.



Special non-compliance routings

Aircraft not equipped with two functioning long range navigation systems may only fly through the NAT HLA via one of the three corridors described in paragraph 1.7.5.

Aircraft not approved for NAT HLA /RVSM operations may climb and descend through NAT HLA/RVSM airspace and in very limited, specified circumstances a NAT HLA approved aircraft that is not approved for RVSM operations may be granted permission to flight plan and operate through the NAT HLA at RVSM levels. (See Chapter 1).

Routings that may be flight planned and operated through the NAT HLA by aircraft without functioning HF communications equipment may be limited by the State of Registry of the operator or by the ATC provider. This is discussed in more detail in Chapter 4.

## ROUTE PLANNING

Route definition conventions

The letter 'X' must be included in Item 10 of the ICAO FPL to show that the aircraft satisfies NAT HLA lateral navigation performance requirements.

Outside ATS Surveillance coverage ATC depends upon aircraft supplied position reports for flight progress information. In order to provide separation assurance, ATC requires updates on the progress of flights at no more than hourly intervals. It has been determined that this criteria is met over a wide range of ground speeds if eastbound or westbound NAT flights report on passing each ten degrees of longitude. The criteria is also met by northbound or southbound flights reporting on passing each five degrees of latitude. In consequence, all flights which will generally route in an eastbound or westbound direction should normally be flight planned by specifying significant points at whole or half degrees of latitude at each crossed ten degrees of longitude (20°W, 30°W, 40°W etc.); and all generally northbound or southbound flights should normally be flight planned so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.) are crossed at whole degrees of longitude. See Chapter 4.

OTS – Rationale, Structure, CDM & NAT Track Message

As a result of passenger demand, time zone differences and airport noise restrictions, much of the North Atlantic (NAT) air traffic contributes to two major alternating flows: a westbound flow departing Europe in the morning, and an eastbound flow departing North America in the evening. The effect of these flows is to concentrate most of the traffic uni-directionally, with peak



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

westbound traffic crossing the 30W longitude between 1130 UTC and 1900 UTC and peak eastbound traffic crossing the 30W longitude between 0100 UTC and 0800 UTC.

The NAT HLA is consequently congested at peak hours and in order to provide the best service to the bulk of the traffic, a system of organised tracks is constructed to accommodate as many flights as possible within the major flows, on or close to their minimum time tracks and altitude profiles. Due to the dynamic nature of the NAT weather patterns, including the presence of jet streams, consecutive eastbound and westbound minimum time tracks are rarely identical. The creation of a different organised track system is therefore necessary for each of the major flows. Separate OTS structures are therefore published each day for eastbound and westbound flows.

The construction of these OTS structures is accomplished through a formal process of cooperation between ATC and the operators, known as the Preferred Route Message system. Details of this process are explained in Chapter 2.

The resulting OTS structures are published (twice each day) in the form of a "NAT Track Message" via the AFTN. This Message and its correct interpretation are detailed in Chapter 2.

If orientation/location of the published OTS structure appear to be appropriate for the origin and destination of a particular flight, then the operator is encouraged to flight plan the NAT route segment via one of the published tracks.

#### Random Routings

Use of OTS tracks is not mandatory. The orientation/location of the published OTS may not be appropriate for the origin and/or destination of a particular flight. A NAT route segment that does not follow a published OTS track, in its entirety, is known as a "Random Route". Aircraft may fly on random routes which remain clear of the OTS or may fly on any route that joins or leaves an outer track of the OTS. There is also nothing to prevent an operator from planning a route which crosses the OTS. However, in this case, operators must be aware that while ATC will make every effort to clear random traffic across the OTS at published levels, re-routes or changes in flight level from those planned may be necessary during most of the OTS peak traffic periods.

Outside of the OTS periods operators may flight plan any random routing. During the hour prior to each OTS period some additional restrictions apply. These are detailed in Chapter 4.

#### Adjacent Airspace, Route Structures, Links & Constraints

A large majority of flights through the NAT HLA enter and/or leave it via the North American



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

region. To facilitate these flows of traffic, various transitional airspaces and linking route structures have been established in and through the adjacent NAM region. These are described in Chapter 3 above. Of particular significance is the NAR structure. Details of these routes and associated procedures are contained in the AIP of the relevant State authorities and/or via their websites. The necessary Internet Links to obtain this information are listed in Chapter 3. Account must be taken of these route structures in planning any flight through the NAT region that starts or ends in the North American region.

## ALTITUDE & SPEED

### Flight Levels

During the OTS Periods (eastbound 0100-0800 UTC, westbound 1130-1900 UTC) aircraft intending to follow an OTS track for its entire length may plan at any of the levels as published for that track on the relevant current daily OTS Message. Aircraft following a "random route" (see above definition) or flying outside the OTS time periods, may plan any flight level(s) irrespective of direction (i.e. there is no need in the NAT HLA to plan in accordance with the ICAO Annex 2 Table of Cruising Levels). Planners should note however that the NAT provider State AIPs, both during the OTS time periods and outside them, reserve some appropriate direction levels for use by the opposite direction traffic flows that then predominate. The current usage allocation of flight levels in the NAT HLA is published in the UK and Canadian AIPs and shown at Attachment 5 below as the "North Atlantic Flight Level Allocation Scheme" (NAT FLAS). Hence, flight crews and planners should always consult the current AIPs and any supporting NOTAMs when flight planning random routes through the NAT HLA. If a flight is expected to be level critical, operators should contact the initial OAC prior to filing the flight plan to determine the likely availability of specific flight levels.

### Mach Number

In the NAT HLA the Mach number technique is used to manage longitudinal separations between aircraft following the same track. With the implementation of OWAFS, operators will have more efficiencies in the NAT. Chapter 4 provides details about ATC flight planning (ICAO FPL) requirements. Operators can flight plan cost index (ECON) provided that the planned true Mach number for any portion of the flight within the NAT is specified in Item 15 of the ICAO FPL.

## FPL COMPLETION

It is important that all of the foregoing conventions and protocols are adhered to when planning a flight through the NAT HLA. Guidance on the flight planning requirements for specific routes is

**APPENDICES****NAT HLA OPERATIONS****GUARDING A**

given in Chapter 4. Correct completion and addressing of the filed flight plan is extremely important. Non-observance of any of the NAT HLA planning principles, or even simple syntax errors in the filed FPL, can lead to delays in data processing and/or to the subsequent issuing of clearances to the flights concerned. Despite the growing use of automated flight planning systems a significant proportion of flight plans submitted in respect of flights through the North Atlantic region continue to contain errors. In some instances these errors are such that the flight plan is rejected and the operator is required to re-submit a corrected version. New and/or infrequent North Atlantic operators are earnestly recommended to make diligent reference to this document. Furthermore it should be noted that a free text editor is available on the EUROCONTROL website that can validate any proposed ICAO flight plan before filing. It will advise if a flight plan is acceptable for routes, altitudes and transitions. If the flight plan would be rejected, this editor will describe what is wrong, thereby allowing the operator to repair it before filing.

The guidance in the paragraphs that follow here refer to the ICAO model flight plan form as described in Chapter 4.4 of the Procedures for Air Navigation Services – Air Traffic Management (PANS- ATM, Doc 4444).

If filing via an OTS track, particularly during peak traffic periods, it must be appreciated that ATC may not be able to clear the aircraft as planned. ATC will, if possible, first offer a clearance on the planned track but at a different flight level. If, however, no reasonable alternative level is available, or if the offered flight level is unacceptable to the flight crew, then ATC will clear the aircraft via another route/OTS track.

In order to signify that a flight is approved to operate in the NAT HLA, the letter 'X' shall be inserted, in addition to the letter 'S', within Item 10 of the flight plan. A 'W' must also be included in Item 10 to indicate that the flight is approved for RVSM operations.

The NAT Data Link Mandate (DLM) requires aircraft to be equipped with, and operating, CPDLC and ADS-C in the NAT region from FL 290 to FL 410 inclusive. The ICAO flight plan should indicate data link equipment as follows:

- Item 10 (Equipment)
  - o "J5" (CPDLC SATCOM FANS 1/A Inmarsat)
  - o "J7" (CPDLC SATCOM FANS 1/A Iridium)
  - o "D1" (ADS-C)

Approval for RNAV 10 (RNP 10), RNP 4, RCP 240 and RSP 180 is required in order to benefit from the reduced lateral separations employed in the NAT Region. Any NAT HLA aircraft should ensure that its PBN and PBCS approval status is included in the ICAO flight plan as follows:

- Item 10 (Equipment)

|                                                                                                                 |                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>A320/A321<br>OM-C AIRPORTS | <p style="text-align: center;"><b>APPENDICES</b></p> <p style="text-align: center;"><b>NAT HLA OPERATIONS</b></p> <p style="text-align: center;">GUARDING A</p> |
|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

- o "R" (PBN approved)
- o "P2" (CPDLC RCP 240)
- Item 18 (Other Information)
- o "PBN/A1" (RNAV 10 (RNP 10) approval)
- o "PBN/L1" (RNP 4 approval)
- o "SUR/RSP180" (ADS-C RSP 180)

For flights planning to operate through specified ADS-B service areas and wishing to benefit from that service the appropriate equipage and authorisation for ADS-B use should be indicated by filing the B1 or B2 descriptor as appropriate in Item 10b of the flight plan.

## DISPATCH FUNCTIONS

### General

All US FAR Part 121 carriers (domestic and flag operators) and many non-US carriers employ aircraft dispatchers or flight operations officers (hereafter referred to as dispatchers) to provide flight planning, flight watch and/or flight monitoring services. Most of the information presented here is included in other chapters of this manual but since this chapter deals with issues primarily important to dispatchers, the information is sometimes repeated here for emphasis and additional guidance.

Nothing in this chapter should be construed as to take precedence over appropriate government regulations or individual company policy.

The dispatcher is responsible for providing the pilot-in-command with information necessary to conduct a flight safely and legally under appropriate State civil aviation authority regulatory requirements. ICAO Annex 6 defines the requirement for an en route aircraft, but when operating under US FAR Part 121, and certain other State civil aviation rules, the dispatcher shares responsibility for exercising operational control with the pilot-in-command of the flight.

## Flight Planning

### Route Planning

The daily published OTS tracks provide optimal NAT segment routings for about half of all the flights between Europe and North America. For many other flights the location of the OTS structure on the day may constrain available random routings. Consequently, the development of a successful NAT flight plan almost always requires consideration of the detail of the relevant



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

OTS structure. Operators can influence the OTS construction process by providing Preferred Route Messages and participating in this collaborative decision making (see Chapter 2).

The eastbound and westbound OTS structures are the subject of separate "NAT Track Messages" published via the AFTN. A detailed description of the NAT track message is provided in Chapter 2 above.

#### Planning on an OTS Track

Dispatchers must pay particular attention to defined coordinates, domestic entry and exit routings, allowable altitudes, track message identification number (TMI) and any other information included in the remarks section. They must also take care to be apprised of any amendments or corrections that may be subsequently issued. When such amendments are issued the TMI is appended with an alpha suffix (e.g. "123A"). Since NAT track messages are often manually entered into company flight planning systems, dispatchers should verify that all waypoints on flight plans comply with the current OTS message.

The NAT Data Link Mandate (DLM) requires aircraft to be equipped with, and operating, CPDLC and ADS-C in the NAT region. Currently, the mandate incorporates FL 290 to FL 410 inclusive. For other details, see 1.7 DATA LINK REQUIREMENTS in Chapter 1.

It is important for dispatchers to understand that transition routes specified in the NAT track message are as important as the tracks themselves. The transition route systems in North America – the North American Routes (NARs) and the US East Coast routes are described in Chapter 3. Dispatchers should comply with any specified transition route requirements in all regions. Failure to comply may result in rejected flight plans, lengthy delays and operating penalties such as in-flight re-routes and/or the flight not receiving requested altitudes.

If (and only if) the flight is planned to operate along the entire length of one of the organized tracks, from oceanic entry point to oceanic exit point, as detailed in the NAT track message, should the intended track be defined in Item 15 of the ICAO flight plan using the abbreviation "NAT" followed by the code letter assigned to the track.

The planned Mach number and flight level at the commencement point of the track should be specified at the organised track commencement point.

Each point at which a change of Mach number or flight level is requested must be specified as geographical coordinates in latitude and longitude or as a "named" waypoint.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

#### Planning a Random Route

A random route is any route that is not planned to operate along the entire length of the organised track from oceanic entry point to oceanic exit point. (See Chapter 4 for more information on filing a random route)

Random routes can be planned anywhere within the NAT HLA but the dispatcher should sensibly avoid those routes that conflict directly with the OTS. Examples of sensibly planned random routes include routes that:

- Remain clear of the OTS by at least 1 degree;
- Leave or join outer tracks of the OTS;
- Are above or below the OTS flight level stratum;
- Are planned on track coordinates before/after valid OTS times.

Care should be taken when planning random routes and it would be prudent to plan sufficient fuel to allow for potential re-routes or non-optimum altitudes. The following examples illustrate particular Issues to consider.

#### Examples:

Flights planned to initially operate below the NAT HLA/RVSM flight levels at FL 280 on routes that pass under the OTS should not plan to climb until 1 degree clear of the OTS.

Planning to join an outer track is allowable. However, the dispatcher should be aware that the clearance may not be given due to the adverse impact on track capacity. Leaving an outer track is seldom a problem as long as at least 1 degree of separation is subsequently maintained from other tracks.

Random routes paralleling the OTS 1 or 2 degrees north or south can be as busy as the OTS itself.

Dispatchers planning NAT flights originating in south Florida or the Caribbean should consider the effect of traffic from South America operating north eastwards to the USA, when deciding on flight levels. Although the dispatcher should plan optimum flight levels, adequate fuel should be carried so that a NAT flight can accept a lower altitude (FL 260 or FL 280) until east of 70°W.

Any flight planning to leave an OTS track after the oceanic entry point must be treated as a random route. The track letter must not be used to abbreviate any route segment description.

Flights operated against the peak traffic flows should plan to avoid the opposite direction OTS. Even if operating outside of the validity periods of the OTS some restrictions on routings may

apply. These can affect Eastbound traffic crossing 30°W at 1030 UTC or later; and Westbound traffic crossing 30°W at 2400 UTC and later (See Chapter 4). If in any doubt it would be prudent to co-ordinate any such routes directly with appropriate OACs.

## Flight Levels

Flight dispatchers should be aware of the North Atlantic FLAS. This is subject to change and the current FLAS is published in the UK and Canadian AIPs and shown in Attachment 5.

Chapter 2 and Chapter 4 contain details on RVSM flight level guidance. Dispatchers should be aware that some "opposite direction" levels, which may be flight planned for the NAT segment of a flight, may not be similarly allowed in adjacent domestic areas. Guidance for RVSM flight procedures in the NAT HLA can be found in Chapter 7.

RVSM allows more flight levels for planning and therefore provides better opportunity to fly closer to an optimum route/profile. It is acceptable to plan and/or request climbs within the OTS but because of traffic volumes and the difference in aircraft performance it is wise to plan conservatively. Climbs on random routes that are totally north or south of the track system are more readily approved. Flight crews should be encouraged to request a climb as aircraft decreasing weight permits.

## Communications

Operations in the NAT outside VHF coverage require the carriage of two long range communication systems, one of which must be HF. A second HF, SATVOICE and/or CPDLC (appropriate to route of flight) may satisfy the requirement of the second-long range communication system.

Many operators now use ADS-C (Automatic Dependent Surveillance Contract) and CPDLC (Controller Pilot Data Link Communications) for oceanic position reporting and clearance updating. These features improve position reporting speed and accuracy. They also reduce the chance of errors. If the aircraft is equipped with FANS-1 or FANS-A it should be utilised during the NAT segment of the flight and the appropriate descriptor should be inserted into the filed flight plan.

SATVOICE can be used as a supplement to HF communications throughout the NAT region (see Chapter 5). If the aircraft is SATVOICE equipped, the SATVOICE numbers (both radio stations and ATC) for the areas that the aircraft is planning to fly through, should be made available for the flight crew.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

#### MEL Compliance

Dispatchers planning flights within the NAT HLA must ensure that the allocated aircraft has the minimum required navigation, communications and altitude alerting/reporting equipment on board. Flight procedures for minimum equipment and standards can be found in Chapter 6 and Chapter 13 of this Manual. Particular attention must be paid to MEL Items that may affect the aircraft. Be aware that the company MEL or Operations Specifications may be more restrictive than general NAT HLA requirements.

Even though a flight that suffers a failure of a system (or component) once enroute, is not directly mandated to abide by MEL restrictions, it is important that any failures that will affect either NAT HLA or RVSM operations be promptly advised to, and closely coordinated with, the appropriate ATS facility.

An aircraft MEL (navigation, communications or altitude alerting/reporting system) may prohibit operating in the NAT HLA. Dispatchers may need to modify the flight plan and intended route of flight. Enroute failures can also affect what ATC will accept regardless of what was flight planned or filed. This situation could occur before departure or once enroute but before entering the NAT HLA. Options that should be considered by the dispatcher are:

- operate above or below the NAT HLA;
- fly within one of the three corridors described in paragraph 1.7.5..

#### ETOPS/EDTO

A large portion of NAT crossings are ETOPS operations. ETOPS rules require that one or more suitable enroute alternate airports are named prior to dispatch and then monitored while aircraft are enroute. Enroute alternate airports in the NAT region are limited to those in the Azores, Bermuda, Greenland and Iceland. In determining ETOPS alternate minima, the dispatcher must consider weather conditions, airport conditions (in addition to simple runway lengths), navigation approach aids, and the availability of ATS and ARFF facilities.

The term EDTO (Extended Diversion Time Operations) is now used throughout Annex 6 Part I. Here it states that EDTO provisions for aeroplanes with two turbine engines do not differ from the previous provisions for extended range operations by aeroplanes with two turbine engines (ETOPS). Therefore, EDTO may be referred to as ETOPS in some documents.

Recent changes have begun to attach additional conditions to 3-4 engine aircraft long range operations. In situations requiring the aircraft to operate long distances from adequate enroute airports, more stringent planning conditions may apply. Guidance can be obtained from appropriate government and industry websites.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

#### Collaborative Decision Making (CDM) Tools

It would not be practical to list all available CDM tools and available websites here. Refer to the bibliography at the end of this manual for a more complete list. The following are some of the most important sites for managing the daily operation of flights.

#### Nav Canada TDA (Traffic Density Analyser) Website

This tool was designed to introduce Collaborative Decision Making during the NAT OTS design phase. The OTS are posted in advance of formal publication so the user community can comment on whether or not they agree with the proposed OTS. A USER ID and password can be obtained from NAV CANADA. Track loading information is available and it is possible to view all filed flight plans on the OTS and random routes.

#### EUROCONTROL Website – Network Manager function

This website contains a wealth of tactical information regarding restrictions, delays, weather problems, military activity, CDRs, preferred routing schemes and transition routes.

<https://www.eurocontrol.int/network-operations>

There is a free text editor that will validate ICAO flight plan before filing and advise if the flight plan is acceptable for routes, altitudes and transitions. If the flight plan would be rejected, this editor will describe what is wrong, allowing the dispatcher to repair it before filing the ICAO flight plan.

#### FAA Websites

These websites contain complete FAR section, Airport information, airport capacity (real time) advisories with airport delays and status, NOTAMS, weather Information, RVSM and statistical data. They include [www.faa.gov](http://www.faa.gov) and <https://nasstatus.faa.gov>.

#### Flight Monitoring

#### ATC Clearances

It is important for dispatchers to verify the contents of any clearances. If the flight has received a re-route or a different altitude the Dispatcher may provide the flight with re-analysis data for fuel consumption along the revised route.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

#### Transponder

All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure- altitude reporting SSR transponder (see Chapter 8).

#### En route Contingencies

Dispatchers must also be aware of special procedures for In-Flight Contingencies as published in Chapter 10 of this manual. They include procedures for use in the event that the aircraft is unable to maintain assigned altitude for weather, turbulence, aircraft performance or maintenance problems or loss of pressurization. The general concept of the in-flight contingency procedures is to parallel offset from the assigned track by 5 NM and descend below FL 290; or once on the 5 NM parallel offset, establish a 150 m (500 ft) vertical offset (or 300 m (1000 ft) vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation.

Procedures for loss of communications and HF failure are contained in Chapter 5.

#### Dispatcher/pilot considerations for en-route diversions

Pilots and dispatchers should collaborate, when able, regarding where the flight diverts based on the nature of the en-route contingency and the viability of the otherwise adequate airports available to assure the airport is actually suitable for the diversion.

Dispatcher guidance for NAT RVSM operations.

#### References

The FAA Advisory Circular AC91-85() was developed by ICAO sponsored international working groups, to provide guidance on airworthiness and operations programmes for RVSM. ICAO has recommended that State CAA's use of AC91-85() or an equivalent State document for approval of aircraft and operators to conduct RVSM operations. Appendices 4 and 5 of AC91-85() contain practices and procedures for flight crews and dispatchers involved in RVSM operations. This particular dispatcher guidance, available at [https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.information/documentID/1035328](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1035328) was developed using those appendices as the reference.

#### Flight Planning

## NAT RVSM Airspace

This is defined as any airspace between FL 290 - FL 410 inclusive where 1,000 ft vertical separation is applied.

### Limits of Operational Authorisation

At the flight planning stage, the dispatcher is responsible for selecting and filing a route that is consistent with the carrier's operational authorisation (e.g. Operations Specifications), taking account of all route, aircraft and weather considerations, flight crew constraints and other limitations.

## MEL

When planning and filing to fly within NAT RVSM airspace, the dispatcher must ensure that the route meets the requirements of the paragraph above and that the aircraft also meets certain MEL provisions.

## Maintenance Flights

NAT ATS providers have established a policy to enable an aircraft that is temporarily non-RVSM compliant to fly in NAT RVSM airspace for the purpose of positioning the aircraft at a maintenance facility (see Chapter 1). This policy may vary and requires prior co-ordination with appropriate ATC centres so that 2,000 ft separation can be applied between the non-compliant aircraft and other aircraft. These requests must be co-ordinated with the initial OAC. The dispatcher must be aware of the policy for such operations, as published in NOTAMS, AIPs and other appropriate documents. States of Registry also vary in their policies on Maintenance Ferry Flights. Dispatchers should ensure that they fully understand any additional restrictions or limitations that may be imposed by their State of Registry.

## Delivery and Humanitarian Flights

ATS providers allow limited operations by aircraft not approved for RVSM but which are engaged on delivery or humanitarian flights. For such flights, the dispatcher must also comply with the policies published in State AIPs, NOTAMS and other appropriate documents. Co-ordinate directly with appropriate ATC facilities and the aircraft's State of Registry.

## En Route Equipage Failures



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### GUARDING A

Prior to entering NAT RVSM airspace

The following equipment is required to be operational:

- i) two independent primary altimetry systems;
- ii) one automatic altitude control system; and
- iii) one altitude alerting device.

If any required equipment fails prior to entering NAT RVSM airspace, the pilot-in-command will notify ATC and obtain an amended clearance to fly above or below NAT RVSM airspace. The flight crew should accept the new clearance contingent upon review by the dispatcher. Dispatcher actions are based on the options, identified as OPTION 1 to OPTION 3, outlined later in this chapter.

After entering NAT RVSM airspace.

The appropriate State RVSM guidance material provides for flight crew and controller actions if RVSM required aircraft equipment fails after entry into NAT RVSM airspace, or the aircraft encounters turbulence that affects the aircraft's ability to maintain its level. Should any required RVSM equipment fail, or turbulence greater than moderate be encountered, then the pilot-in-command is expected to notify ATS of the intended course of action.

Pilot-in-command options are to:

- (1) continue with the original clearance if ATC can apply another form of aircraft separation (i.e. lateral, longitudinal or 2,000 ft vertical separation); or
- (2) request ATC clearance to climb above or descend below NAT RVSM airspace if ATC cannot provide execute contingency procedures to offset from track and flight level if ATC cannot provide adequate separation from other aircraft.

#### Dispatcher Actions

OPTION (1) – if the pilot-in-command elects for Option (1) then no Dispatcher's action is required.  
OPTION (2) – if the pilot-in-command elects to follow Option (2) then the pilot-in-command should contact the dispatcher who will evaluate the clearance with due consideration for the effect on fuel consumption, time enroute, any MEL/CDL issues and/or other operational factors. The dispatcher shall make a recommendation to the pilot-in command on whether to continue on to the destination, or the dispatcher will amend the release to allow the aircraft to proceed to an intermediate airport or return back to the departure airport. The flight crew will then either confirm



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

the new clearance with ATC or request a new clearance to another airport. The final decision rests with the pilot-in command.

OPTION (3) – if the pilot-in-command elects to follow Option (3), then when time permits, the pilot-in command will advise the dispatcher of any offset made from track or/and flight level. No action by the dispatcher is required since the effect on performance should be minimal.

#### Checklist for Aircraft Dispatch into NAT RVSM Airspace.

The dispatcher must:

- i) Determine the minimum and maximum flight levels plus the horizontal boundaries of NAT RVSM airspace;
- ii) Verify that the airframe is RVSM approved;
- iii) Determine if any operating restrictions (e.g. speed or altitude limitations) apply to the aircraft for RVSM operation;
- iv) Check the MEL for system requirements related to RVSM;
- v) Check Item 10 (Equipment) of the ICAO ATS flight plan to ensure that it correctly reflects RVSM approval status. For North Atlantic operation, insertion of letter "W" indicates that the operator and aircraft are RVSM approved;
- vi) Review reported and forecast weather enroute, with specific emphasis on conditions such as turbulence, which may affect an aircraft's ability to maintain its level; and
- vii) Determine if TCAS/ACAS is operational.

#### Flight of non-RVSM compliant aircraft

The dispatcher must comply with any ATS requirements regarding flight of non-RVSM compliant aircraft for maintenance, aircraft delivery or humanitarian flights (See Chapter 1).

### 10-2-14 FLIGHT OPERATIONS BELOW THE NAT HLA

Applicable to: ALL

#### INTRODUCTION

This guidance is meant to assist international general aviation (IGA) flight crews with flight planning and operations across the North Atlantic. It is not intended to be a detailed listing of procedures or air regulations of the various States that provide air traffic service in the North Atlantic (NAT) region, and does not in any way replace the information contained in various national Aeronautical Information Publications (AIP's). Flight crews must consult relevant AIPs and Notices to Airmen (NOTAMs) when planning the flight and prior to departure.

#### ENVIRONMENTAL CONSIDERATIONS



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

##### Below FL 290

For flights at FL 290 and below, the North Atlantic weather can be far from benign. Extreme seasonal weather variations and rapidly changing weather conditions including severe icing, severe turbulence, and heavy precipitation are common, particularly in winter. Changes are often so rapid that they are difficult, if not impossible, to forecast. These harsh weather conditions, along with the rugged terrain and sparsely populated areas, make preparation, including route and emergency situation planning, important components for a successful flight. Attachment 7 provides further details of the general North Atlantic climate and the weather conditions and associated operational issues in particular areas.

##### NORTH ATLANTIC FLIGHT OPERATIONS

Most of the airspace in oceanic FIRs/OCAs is high seas airspace within which the Rules of the Air (ICAO Annex 2) apply without exception. The majority of the airspace is also controlled airspace, and instrument flight rules (IFR) apply when above FL 055.

This controlled airspace includes:

1. New York Oceanic East, Gander Oceanic, Shanwick Oceanic, Santa Maria Oceanic, Reykjavik Oceanic, GOTA and NOTA, and Bodø;
2. Bodø Oceanic above FL 195 and when operating more than 100 NM seaward from the shoreline;
3. Nuuk FIR when operating above FL 195;
4. Faroes Islands above 7500 ft;
5. Jan Mayen 2000 ft above ground level.

Canada, Denmark and Iceland require that the flight crew and aircraft be IFR rated for trans-oceanic flight, regardless of the altitude to be flown. It is highly unlikely that the flight will remain VMC when transiting the Atlantic.

##### REQUIREMENTS

Regulatory requirements are established by all States providing Air Traffic Services in the NAT. It is the responsibility of all operators to comply with these requirements and any others that may be separately imposed by the State of Registry of the aircraft or the State of the operator. Most eastbound trans- Atlantic flights by light aircraft commence their oceanic crossing from Canada. Transport Canada Aviation Regulations (CARs) detail requirements for all flights beginning their trans-Atlantic crossing from Canada. Flights entering the NAT from any ANSP must review requirements as listed in each State AIP.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

## OPERATIONAL CONSIDERATIONS

### Sparsely Settled Areas

The potential dangers associated with operating in sparsely settled areas should not be underestimated. The fact is that in sparsely settled areas, aircraft operations require special considerations. In this area radio aids to navigation, weather information, fuel supplies, aircraft servicing facilities, accommodations and food are usually limited and often non-existent.

In addition to the regulations concerning flight crew qualifications and experience, it is recommended that the flight crew have:

- a) flight experience with significant cross country, night and actual instrument time;
- b) experience in using the same navigational equipment that will be used to cross the Atlantic;
- c) experience in the same type of aircraft that will be used to cross the Atlantic.

### Icing Conditions

Freezing levels at or near the surface can be expected at any time of year over the NAT region. The dangers of airframe and/or engine icing must always be taken into account, so flight is to be conducted when there is a threat of icing, keep clear of clouds, unless the aircraft is certified for operations in icing conditions. Remember, as a general rule, the freezing level should be 3,000 feet AGL or higher to allow for ridding the aircraft of ice, if it becomes necessary.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

## FLIGHT PLANNING

It is rare to be able to conduct a flight across the Atlantic and remain in visual meteorological conditions (VMC) for the entire flight. VFR flight in this airspace deprives the flight crew of the flexibility of using the altitudes above FL 055. The higher altitudes may enable a smoother flight, free of precipitation, icing or turbulence

IFR Flights (i.e. those operating in the NAT region at FL 060 or above), or VFR Flights intending to cross an international border, need to file an ICAO flight plan. Detailed instructions for completion of the ICAO flight plan are found in the PANS-ATM (Doc 4444), Appendix 2; and in State AIPs. Chapter 4 also provides necessary guidance, with particular emphasis on NAT flight requirements.

Generally all eastbound or westbound aircraft in the NAT region must flight plan so that specified tens of degrees of longitude (60°W, 50°W, 40°W, 30°W, etc.) as applicable, are crossed at whole or half degrees of latitude. Generally northbound or southbound aircraft must flight plan so that specified parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N, 50°N, etc.) are crossed at whole degrees of longitude. More detailed information can be found in NAT provider State AIPs.

Plan the flight using current aeronautical charts, the latest edition of pertinent flight supplements, and NOTAMs, both domestic and international.

Flight crews should familiarize themselves with the nature of the terrain over which the flight is to be conducted. If unfamiliar with the area, the flight crew should consult the aviation authority officials at appropriate local aviation field offices before departure. Such officials, as well as flight crews and operators, can provide a great deal of useful advice, especially on the ever-changing supply situation, the location and condition of possible emergency landing strips, potential hazards, and enroute weather conditions. Pre-flight planning must ensure the availability of fuel, food, and services that may be required at intermediate stops and at destination.

Planning a trans-Atlantic flight for the summertime will allow the flight crew/operator to take advantage of the most favourable conditions. Not only are the ground (and water) temperatures less menacing, but also the amount of available daylight is considerably greater.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

Depth perception is poor at night. North of 60°N Latitude, which includes the most common trans-Atlantic routes flown by general aviation aircraft, there are only about 4 hours of daylight during December. To this is added an additional complication: VFR flights at night are prohibited in Greenland. Given also the increased possibility of storms during the winter it is earnestly recommended that flight crews plan to make trans-Atlantic flights preferably during the summer months.

### PHYSIOLOGICAL FACTORS

Crossing the North Atlantic in a general aviation aircraft is a long and physically demanding task. Provisions must be made to eat, drink, and take care of all necessary bodily functions.

### CLEARANCES

All flights entering OCAs are required to have an IFR clearance. When transitioning from uncontrolled airspace into controlled airspace, an IFR clearance must be obtained before entering controlled airspace.

When operating on an IFR clearance, any change of altitude requires re-clearance from ATC. Clearances for VMC climb or descent will not be granted. Changes in true airspeed must be coordinated. Review specific AIPs for details. Weather deviations of a mileage that exceeds the limits outlined in the Strategic Lateral Offset Procedure (SLOP) i.e. 2 NM right of track, requires a re-clearance from ATC. If a flight crew cannot obtain a clearance in a timely manner and needs to execute pilot-in-command authority for safety of flight, they shall so inform ATC of the maneuver as soon as practicable.

Flight crews are required to obtain a clearance from the ATS unit responsible for their area of operation prior to entering controlled airspace and to follow the procedures specified in appropriate AIPs. Where possible, clearance to enter controlled airspace should be obtained prior to take-off, as communication problems are often encountered at low altitudes.

### NAVIGATION

Navigation in the North Atlantic, or in any oceanic area for that matter, is considerably more difficult than over land. There are no landmarks, and short range navigational aids (VOR/NDB) are few and far between. Aircraft must be equipped with some type of Long Range Navigation (LRNS) equipment. (See applicable AIPs and ICAO Annexes for details.)

### ROUTE CONCERNS



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

There are a few VOR/NDB routes in the North Atlantic and there is little NAVAID coverage at the low altitudes in the NAT.

## COMMUNICATIONS

The following text highlights a number of issues particular to air-ground ATS communications in the NAT region. Further referral should be made to Chapter 5.

As mentioned earlier, VHF radio coverage is very limited in the NAT. Charts in section 8.5 depict theoretical VHF coverage in the NAT HLA. Refer to State AIPs for detailed surveillance and communication coverage including coverage in the low level airspace. Radio equipment should be tested prior to departure. For VHF equipment this is best done by calling the tower or ACC on the proper frequency for a ground radio check. HF equipment can be tested by calling the nearest Aeronautical Radio or Flight Service Station for a ground radio check. If contact cannot be made on the initial test frequency, try others. If no contact is made, have the equipment checked. Do not leave the ground until everything is working satisfactorily.

Flight crews should be aware that on most occasions when they communicate with Oceanic Air Traffic Control Centres on HF and, on some occasions VHF, they do not talk directly to controllers. Radio Communicator staff, i.e., Aeronautical Radio Inc. (ARINC) or an international flight service station (IFSS), relay messages between aircraft and ATC. Such units are not always co-located with an ACC. For example, Shanwick Radio is in the Republic of Ireland while Shanwick Control is based at Prestwick, Scotland. Also, it is important to note that controller workload associated with low level IGA flights is usually high, so some delays can be expected for responses to requests for a change of flight level, route, etc.

Remember, flights above FL 055 must be operated under IFR procedures and therefore a continuous air-ground communication watch on appropriate frequency must be maintained.

An HF SELCAL device will ease the strain of a continuous air-ground communication watch on the designated HF R/T Frequency. Ensure that the SELCAL code selected in the aircraft is valid for the NAT region (see Chapter 5). Also ensure that the Code is included in Item 18 of the filed ICAO flight plan.

Aeronautical Mobile Satellite (Route) Service (AMS(R)S), more commonly referred to as SATVOICE, may be used for any routine, non-routine or emergency ATS air/ground communications throughout the NAT region. Remember to carry the SATVOICE numbers for the areas (both ATC and radio) you are flying through. Requirements and procedures for use are



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

detailed in Chapter 5.

A continuous air-ground communication listening watch should be maintained on the 121.500 MHz emergency frequency unless communications on another frequency prevents it. 121.500 MHz is not authorized for routine use.

#### Communications failures

Procedures to follow in the event of radio communications failures in the NAT region are not those which are used in domestic airspaces. Chapter 5 and relevant national AIPs provide detail of the procedures to follow here.

Although HF coverage exists throughout the NAT, there are a few associated problems. Depending on atmospheric conditions, it can be relatively noisy with the signal fading in and out. Sometimes several attempts are required to successfully transmit or receive a single message. Additionally, sunspot activity can completely disrupt HF communications for considerable periods of time, varying from a few minutes to several hours. Notices are published whenever disruptive sunspot activity is expected. It may be possible to relay VHF or UHF communications through other aircraft operating in the NAT. 123.450 MHz should be used for air-to-air communications. Do not plan to use other aircraft as primary means of communication. There is no guarantee there will be another aircraft within range when needed. Consider this an emergency procedure and plan accordingly.

#### SURVEILLANCE

Radar and/or ADS-B coverage in the NAT region is limited. All aircraft operating as IFR flights in the NAT region shall be equipped with a pressure-altitude reporting SSR transponder. Some radar sites that do cover portions of the NAT are secondary radar equipped only. In any emergency situation (lost, out of fuel, engine failure, etc.) your chances of survival are vastly increased if you are radar or ADS-B identified and SAR services can be vectored to your position. NAT ATS Surveillance is discussed in Chapter 8 and coverage charts are shown in section 8.5 and in individual national AIPs.

#### SEARCH & RESCUE (SAR)

SAR alert procedures are initiated when:

a) no communication has been received from an aircraft within a period of thirty minutes after the time a communication should have been received, or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier, or when,



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- b) an aircraft fails to arrive within thirty minutes of the estimated time of arrival last notified to or estimated by air traffic services units, whichever is the later except when,
- c) no doubt exists as to the safety of the aircraft and its occupants.

Flight crews should request advisories or assistance at the earliest indication that something may be wrong. Most search and rescue facilities and international air carriers monitor VHF frequency 121.500 MHz continuously. SAR aircraft are generally equipped with homing devices sensitive to VHF 121.500 MHz. If unable to reach any facility, flight crews should attempt contact with other aircraft on the NAT air-to-air frequency 123.450 MHz or distress frequency 121.500 MHz. Most international carriers are also able to receive Emergency Locator Transmitter (ELTs) transmissions. In the event that manual activation of your ELT is possible, the ELT should be activated and left on continuously. The 406.000 MHz beacon provides a more accurate position and identification data, improving SAR response efficiency.

With excellent satellite coverage of the region, SAR services can ordinarily determine the general location of an aircraft in distress, provided that the ELT functions. Search and recovery may be conducted by various craft. Helicopters operate out to a maximum of 300 NM from base without air-to-air re-fueling and the latter is a very scarce enhancement. Long range SAR aircraft can localize an ELT, but their time on task in the area, on low level visual search, should that be necessary, is only in the order of 2 to 3 hours. A 24 hour search would require 8 aircraft and a visual search for a single seat life raft, even with a comparatively good datum, is a needle-in-a-haystack problem. Oceanic Air Traffic Control Centres will contact rescue coordination centres with all available details. SAR coordination centres may request other aircraft assistance while also utilizing surface craft in the area. This would often include ships or boats. The further section below on aircraft ditching provides more insights.

### Hypothermia

Hypothermia is the most significant danger to the survivors of any ditching or forced/precautionary landing in the NAT region. The causes, symptoms and preventative measures are covered in detail in Attachment 7.

### IN-FLIGHT CONTINGENCIES

Do not deviate from your current flight plan unless you have requested and obtained approval from the appropriate air traffic control unit, or unless an emergency situation arises which necessitates immediate action. After such emergency authority is exercised, the appropriate air traffic services unit must be notified of the action taken and that the action has been taken under emergency authority.



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

Make all position reports, as required, and report any problems to Air Traffic Control agencies as soon as possible. It is also good policy to report fuel remaining in hours and minutes when passing position or other relevant flight information.

If you encounter difficulty, report immediately on the appropriate VHF/HF frequency or on VHF 121.500 MHz, VHF 123.450 MHz, SATVOICE or any other communication device you may have. Don't delay in making this call, as it could take SAR forces up to four hours to reach your position.

Remember that commercial airline traffic over the North Atlantic is heavy. Do not hesitate to enlist the assistance of these aircraft in relaying a position report or discussing a problem. The VHF frequency 123.450 MHz is for exclusive use as an air-to-air communications channel. The bulk of this commercial traffic uses the Organised Track Structure (Chapter 2). During daylight hours a Westbound OTS is in effect and at night an Eastbound structure is used. The location/coordinates of these structures changes each day. Knowledge of the location of the OTS structure which is active during your flight may provide re-assurance of the proximity of such assistance. The moral support alone may be enough to settle nerves and return the thought processes to normal.

The weather at your destination should be well above IFR minimums and forecast to remain so or improve. After 10 to 14 hours at altitude, your ability to handle marginal weather conditions may be in serious doubt. Therefore, your personal weather minimums should be well above the published minimums. Alternate airports should be chosen with the same care.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

## 10-2-15 MONITORING OF AIRCRAFT SYSTEMS AND FLIGHT CREW PERFORMANCE

Applicable to: ALL

### THE MONITORING PROCESS

To ensure compliance with minimum navigation and height-keeping performance specifications, ICAO has established procedures for systematic and periodic monitoring of the actually achieved aircraft systems performance. Formal reporting by flight crews, operators and ATS providers, of specified deviations from assigned track or flight level supports this.

The monitoring process comprises four distinct actions:

- a) monitoring of aircraft navigation performance by the operator in co-operation with flight crews;
- b) monitoring of operators by the State having jurisdiction over those operators in order to ensure that acceptable operating procedures are being applied by the operator while conducting authorised flight operations;
- c) monitoring of actual aircraft systems performance in normal flight operations, as observed by means of ATS Surveillance by the ATC units of States providing service in the NAT region, and by other specialist systems designed to measure the technical height-keeping performance of aircraft; and
- d) monitoring done on the basis of position and occurrence reporting.

Because of the large variety of circumstances existing in the relationship between States of Registry and their operators engaged in NAT operations, it is not expected that all States will be able to make similar or identical arrangements. It is however expected that all States concerned will make maximum effort to comply effectively with their responsibilities and in particular to co-operate with requests for information about a particular incident from an ATS provider or from the NAT CMA.

### MONITORING OF HORIZONTAL NAVIGATION CAPABILITY

#### Monitoring by the Operators

Decisions regarding the monitoring of aircraft navigation performance are largely the prerogative of individual operators. In deciding what records should be kept, operators should take into account the stringent requirements associated with the NAT HLA. Operators are required to investigate all lateral deviations of 10 NM or greater, and it is imperative, whether these are observed on ground radar, via ADS reports or by the flight crew, that the cause(s) of track





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

deviations be established and eliminated. Therefore, it will be necessary to keep complete in-flight records so that an analysis can be carried-out.

Operators should review their documentation to ensure that it provides all the information required to reconstruct any flight, if necessary, some weeks later. Specific requirements could include:

- a) details of the initial position inserted into the Flight Management System, IRS or INS equipment plus the original flight planned track and flight levels;
- b) all ATC clearances and revisions of clearance;
- c) all reports (times, positions, etc.) made to ATC;
- d) all information used in the actual navigation of the flight: including a record of waypoint numbers allocated to specific waypoints, plus their associated ETOs and ATAs;
- e) comments on any problems (including that to do with matters concerning navigation) relating to the conduct of the flight, plus information about any significant discrepancies between INS/IRS displays, other equipment abnormalities and any discrepancies relating to ATC clearances or information passed to the aircraft following ground radar observations;
- f) detailed records of any contingency manoeuvres/procedures undertaken by the flight crew;
- g) sufficient information on accuracy checks to permit an overall assessment of performance. Records of terminal (i.e. residual) errors and of checks made against navigation facilities immediately prior to entering oceanic airspace; details of any manual updates made to IRS/INS units;
- h) where available, navigational and performance data contained in the aircraft's flight data recorders; and
- i) retention of aircraft flight data records whenever a flight crew or operator are aware of a possible report of a vertical or lateral deviation. Such records will assist in quantifying the magnitude and/or duration of any deviation.

It is also important that any forms which are used make it easy to examine key factors. For instance, documentation might include, for each flight, a question calling for flight crew assistance in this regard:

e.g. "Did a track error of 10 NM or more occur on this flight? Yes/No."

#### Monitoring of the Operator by the State

Decisions regarding the monitoring of operators by the State may be taken unilaterally, but hopefully there will be a co-operative process regarding those specifications to be achieved by the operator during planning, and when reviewing achieved performance. Much of this process will be concerned with procedures approved by the flight operations inspectorate and confirmed by means of monitoring, to ensure compliance.





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### Direct Action by ATS Provider States and the NAT CMA in the Monitoring Process

The navigation performance of operators within NAT HLA is monitored on a continual basis. The navigation accuracy achieved by NAT HLA aircraft is periodically measured and additionally all identified instances of significant deviation from cleared track are subject to thorough investigation by the NAT Central Monitoring Agency (CMA), currently operated on behalf of ICAO by the UK National Air Traffic Services Limited. The CMA also maintains a database of all NAT HLA approvals. The CMA runs a continuous monitoring process to compare this approvals list with the records of all aircraft flying in the NAT HLA. The approval status of any aircraft involved in a track deviation is specifically checked against the database and in any cases of doubt the State of Registry is contacted.

When a navigation error is identified, follow-up action after flight is taken, both with the operator and, where the deviation is 25 NM or more, the State of operator or State of Registry of the aircraft involved, to establish the circumstances and contributory factors. The format of the (navigation) Error Investigation Form used for follow-up action is as shown at Attachment 1. Operational errors can have a significant effect on the assessment of risk in the system. For their safety and the safety of other users, flight crews are reminded of the importance of co-operating with the reporting OAC in the provision of incident information.

The overall lateral navigation performance of all aircraft in the NAT HLA is continually assessed and compared to the standards established for the region, to ensure that the TLS is being maintained.

#### Monitoring of Lateral Deviations

The data collection process involves the continuous collection of data relating to all reported lateral deviations.

ANSPs capable of monitoring the boundaries of the NAT region collect data on flights within the NAT HLA, together with that on non-NAT HLA flights. The former data provides a direct input into the risk modelling of operations in the NAT HLA, while the latter provides a wider appreciation of navigation in the NAT region and allows follow-up action to be taken on a larger sample of flights believed to have experienced navigation errors.

When any lateral deviation of less than 25 NM has been detected by the ATS provider State or has been reported to ATC by the flight crew, that ATS provider unit will, in co-operation with the operator, investigate its cause. It is important that all agencies react promptly to such reports of any lateral deviations. Investigations should be made at once so that consideration can be given

**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

to the need for swift remedial action. In order that deviation reports can receive prompt attention, each airline/operator should nominate a person to be responsible for receiving reports and to initiate investigations; the name and full address of this individual should be notified to each relevant ATS authority who distributes the name to the ANSPs.

**MONITORING OF HEIGHT-KEEPING PERFORMANCE**

The vertical navigation performance of operators within the NAT HLA is monitored on a continual basis by the NAT CMA. Such monitoring includes both measurement of the technical height-keeping accuracy of RVSM approved aircraft and assessment of collision risk associated with all reported operational deviations from cleared levels.

All identified operational situations or errors which lead to aircraft deviating from ATC cleared levels are subject to thorough investigation. Follow-up action after flight is taken with the operator of the aircraft involved, to establish the reason for the deviation or cause of the error and to confirm the approval of the flight to operate in NAT HLA and RVSM airspace. Operational errors, particularly those in the vertical plane, have a significant effect on risk in the system. For their safety and the safety of other users, flight crews are reminded of the importance of co-operating with the reporting OAC in the compilation of appropriate documentation including the completion of an 'Altitude Deviation Report Form', as illustrated at Attachment 2.

The detailed circumstances of all operational errors, both in the vertical and horizontal planes, are thoroughly reviewed by the CMA, together with the Scrutiny Group of the NAT SPG, which includes current NAT flight crews, controllers and State Regulators. Any lessons learned from this review, which may help to limit the possibility of recurrences of such errors, are communicated back to NAT operators and ATS authorities. The intent is to improve standard operating procedures, thereby reducing the future frequency of operational errors and thus contribute to the safety of the overall system.

At RVSM levels, moderate and severe turbulence may also increase the level of system risk and flight crews should report ALL occasions, while flying in the NAT HLA, whenever a vertical deviation of 300 ft or more occurs. The form at Attachment 2 may also be used for this purpose.

The overall vertical navigation performance of all aircraft in NAT RVSM airspace is continually assessed and compared to the standards established for the region, to assess whether the relevant TLS is being maintained. Monitoring of Operational Height-keeping Performance

The introduction of RVSM airspace into the NAT region has increased the necessity for consistent and accurate reporting by flight crews and ATC units, of all deviations of 90 m (300 ft) or more

**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

from the cleared flight level, whatever the cause.

### Monitoring of Technical Height-keeping Performance

The technical height-keeping accuracy of aircraft flying at RVSM levels is passively monitored by analyses of ADS-B data collected by the NAT ATS providers. This monitoring allows the height-keeping accuracies of aircraft types and individual operator's fleets to be assessed. Individual airframes which do not meet required performance standards can also be identified. On such occasions the operator and the State of Registry are advised of the problem and corrective action must be undertaken before further flights in RVSM airspace are conducted. Minimum Monitoring Requirements for RVSM approval, are specified in ICAO Annex 6. Operators are required to ensure that a minimum of two aircraft from each of its type groupings are monitored at least once every two years (See Annex 6 Part I para 7.2.7 and Part II para 2.5.2.7).

### MONITORING OF ACAS II PERFORMANCE

ACAS II can have a significant effect on ATC. Therefore, there is a continuing need to monitor the performance of ACAS II in the developing ATM environment.

Following an RA event, or other significant ACAS II event, flight crews and controllers should complete an ACAS II RA report. Aircraft operators and ATS authorities should forward completed reports through established channels.

### OVERALL NAVIGATION (AND SYSTEMS) PERFORMANCE

All information relating to horizontal and vertical navigation (and systems) performance within the NAT region is provided to the NAT SPG via the CMA. Regular statistical assessments of system safety determine whether or not the overall target level of safety (TLS) is being met. On those occasions that summary statistics show that the TLS, in either the horizontal or vertical planes, has been exceeded, the NAT SPG is informed; in which case the NAT SPG will take appropriate action.

### TACTICAL MONITORING OF NAT HLA AND RVSM APPROVALS

Experience with the monitoring process indicates that a proportion of lateral deviations and other

**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

operational errors are attributable to aircraft operating in NAT HLA/RVSM airspace without the required approvals. It was for this reason that in 1990, to make random checks more effective, the NAT SPG introduced a programme of tactical monitoring to help identify aircraft operating within the NAT HLA without the required approval. In 1997, this procedure was extended to RVSM approvals, and currently Canada, Iceland and the United Kingdom participate in this programme. Flight crews who are uncertain of, or are unable to confirm their approval status, are issued a clearance to operate outside NAT HLA/RVSM airspace and a report is forwarded to the CMA for follow-up action.

## **OPERATIONAL ERROR REPORTING AND CENTRAL MONITORING AGENCY (CMA) ACTIVITIES**

### **Background**

In March 1980, the NAT SPG realised that after implementation of a 60 NM lateral separation minima, special importance would have to be placed on monitoring and assessment of navigation performance. It was therefore agreed that there was a need to collect, collate and circulate to States participating in the monitoring programme, data regarding navigation performance in the NAT region. To meet this requirement, the NAT CMA was established.

In the early 1990s, as a consequence of the planned implementation of RVSM in the NAT MNPSA, the NAT CMA acquired the responsibility for monitoring height-keeping performance. Initially, this was limited to collating data on operational errors but when the technical height-keeping programme came into being, the CMA became the data collection and collation centre. It has also become responsible, in conjunction with other Regional Monitoring Agencies, for setting the target monitoring requirements for the RVSM approval process.

In 2009, it was agreed to make adjustments to the NAT SPG working structure to accommodate the changes in emphasis to performance based requirements, as driven by the Global Air Navigation Plan (ANP), and to take account of the Global Aviation Safety Plan (GASP). At the same time, the NAT SPG approved a high level safety policy which would be applicable to its work. The NAT Safety Oversight Group (SOG) was formed. It is responsible for the continuous monitoring and improvement of the safety level of the air navigation system in the NAT region. It is composed of ATS provider and airspace user representatives and Regulators. It directs safety oversight and management in the NAT region.

The NAT Central Monitoring Agency (CMA) is responsible to the NAT SOG for certain aspects of operations monitoring and reporting in the NAT region.

**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

The NAT Scrutiny Group is a separate body comprising the NAT CMA, Regulators plus ATS provider and airspace user representation, reporting to the NAT SOG. Its function is to ensure a correct categorisation of all reported occurrences in the NAT region for the purpose of mathematical analysis and other safety management activities.

### Responsibilities

The NAT CMA is operated on behalf of the NAT SPG by United Kingdom National Air Traffic Services Limited (NATS) and is responsible for the collection, analysis and dissemination of all data relevant to vertical and horizontal navigation (and systems) performance in the NAT region. It provides participating States, ICAO and other selected operators and organisations with regular summaries of operational performance to promote awareness of NAT system safety, and with any other pertinent information.

Height monitoring by the CMA comprises collection of operational error data in the vertical dimension, and monitoring of aircraft technical height-keeping performance.

The NAT CMA will take follow-up action in the following circumstances:

a) when reports are received from ATS provider units, or other sources, that detail for any reason operational errors that have resulted in an aircraft being at a level 90 m (300 ft) or more from its cleared flight level. Follow-up action with the appropriate State of Registry will normally only be taken when the information contained in the reports is not sufficiently comprehensive to determine the cause of the deviation;

b) when reports are received from height monitoring systems indicating that aircraft altimetry system performance may not be compliant with the RVSM airworthiness requirements. i.e. measurements which are in magnitude equal to, or greater than, the following criteria:

- Total Vertical Error (TVE): 90 m (300 ft);
- Altimetry System Error (ASE): 75 m (245 ft); or
- Assigned Altitude Deviation (AAD): 90 m (300 ft) and;

c) when receiving reports from ATS provider units of height deviations of 90 m (300 ft) or more resulting from turbulence, ACAS/TCAS maneuvers or contingency action.

System risk monitoring in the NAT region is a continuous process. The vertical dimension occurrence reports as described in 13.7.8 above are used by the CMA in compiling monthly and quarterly summaries. Trends are presented graphically. The Quarterly summaries present a more detailed comparative presentation and various risk factors are quantified. An annual summary is

**APPENDICES****NAT HLA OPERATIONS**

## NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

also produced and is utilised in the development of an assessment of system vertical risk. In parallel with these processes and simultaneously, the

CMA analyses reported lateral navigation errors, leading to similar quantifications of risk factors and an assessment of lateral dimension risk.

#### Follow-up Action on Observed, Reported, and Prevented Lateral Deviations

Different administrative arrangements exist within those States participating in monitoring programmes although follow-up action on lateral deviations should, in general terms, be as indicated in the following paragraphs.

For aircraft operating within the NAT HLA:

- a) the observing ATC unit will inform the flight crew of the aircraft concerned of the observed error and also that an error report will be processed; any comment made by the flight crew at the time of notification should be recorded;
- b) the operators (including military) and any other relevant ATC units and the CMA will be notified of the observed/prevented deviation, either directly by the observing ATC unit or by an agency designated by the State concerned, using the speediest means available and with the least possible delay; and
- c) where an observed deviation is equal to or greater than 10 NM the appropriate State of Registry or the State of the operator will be sent a copy of the written confirmation along with a covering letter by the CMA seeking the State's assistance in ensuring the full cooperation of the operator in the investigation.

For aircraft operating outside the NAT HLA:

- a) the observing ATC unit should, if at all possible, inform the flight crew of the aircraft concerned of the observed error and also that an error report may be processed; any comment made by the flight crew at the time of notification should be recorded;
- b) where the observed deviation from track is 20 NM or more, the procedure detailed in the previous paragraph (covering aircraft operating within the NAT HLA) will be followed; and
- c) where the observed deviation from track is 10 NM or more but less than 20 NM, the observing ATC unit, or other agency designated by the State, will notify the CMA of the deviation with the least possible delay.

Further Follow-up Action by the Operator and/or State of Registry. Subsequent follow-up action on observed deviations of 25 NM or more, notified in accordance with the above provisions, should initially be conducted between the operator and a designated agency of the State having responsibility for the ATC unit which observed the deviation, on the understanding that:



**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

- a) the errors outlined in paragraph 13.7.12 c) (i.e. deviations 10 NM or more but less than 20 NM occurring outside the NAT HLA) will not normally require further action;
- b) the State of Registry or the State of the operator concerned may be requested to conduct a further investigation if deemed necessary;
- c) all correspondence should be copied to the CMA; and
- d) the EUR/NAT Office of ICAO will assist in those cases where no response is obtained from either the operator concerned or the State of Registry.

**Other Reports to the CMA**

Details of the following occurrences should also be reported to the CMA by the ATS provider units:

- a) erosions of longitudinal separation between aircraft, within the NAT HLA, of 3 minutes or more;
- b) occasions when action is taken to prevent a GNE;
- c) lateral deviations from cleared route of less than 25 NM;
- d) discrepancies of 3 minutes or more between an ETO/ATA at a waypoint;
- e) occasions when an operator is suspected of not being in possession of an NAT HLA/RVSM approval;
- f) diversions or turnbacks, noting in particular whether the appropriate published contingency procedure was correctly adopted;
- g) ACAS RAs;
- h) wake turbulence reports; and
- i) incorrect application of the SLOP (e.g. a left offset).

**MONITORING OF COMMUNICATION AND SURVEILLANCE PERFORMANCE**

A number of aircraft separation minima require a specified communication and surveillance performance to be achieved. The performance-based communication and surveillance (PBCS) specifications that are applicable in the NAT Region are Required Communication Performance 240 (RCP 240 applicable to CPDLC) and Required Surveillance Performance 180 (RSP 180 applicable to ADS-C).

To ensure compliance with the RCP 240 and RSP 180 performance specifications, ICAO has established procedures for systematic and periodic monitoring of the achieved end-to-end CPDLC and ADS-C communication performance. Those procedures are described in NAT Doc 011, which is available on the ICAO Paris website.

NAT ATSPs collect statistical data on RCP 240 and RSP 180 performance on all aircraft that use



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

FANS data link in the NAT Region. Each month, a report is sent to the NAT CMA listing those aircraft that are not meeting the PBCS performance requirements and have achieved at least 100 data points in a rolling three-month sample. The NAT CMA forwards those reports to the regulators responsible for each of those under-performing aircraft.

In addition, the PBCS performance of all aircraft that have used data link in the NAT Region is posted every six months on the FANS-CRA website (<https://www.fans-cra.com>), which is accessible to aircraft operators.

### ATTACHMENT 1

#### SAMPLE OF ERROR INVESTIGATION FORM

(Name and address of reporting agency):

Please complete Parts 2 and 3 (and Part 4 if applicable) of this investigation form. A copy, together with copies of all relevant flight documentation (fuel flight plan, ATC flight plan and ATC clearance) should then be returned to the above address and also to: the North Atlantic Central Monitoring

Agency, -c/o National Air Traffic Services - Room G41 - Scottish & Oceanic Area Control Centre, Sherwood Road,- Prestwick, Ayrshire - KA9 2NR

Part 1 – General Information

Operator's name

Aircraft identification

Date/time of observed deviation

Position

(latitude and longitude)

Observed by (ATC unit)

Aircraft flight level

Part 2 – Details of Aircraft and Navigation Equipment Fit

Number Type INS

GNSS IRS/FMS OTHER

(please specify)

Single Dual

Triple

Model No

Navigation system

Programme No





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

State which system coupled to autopilot

Aircraft Registration  
and Model/Series

Part 3 – Detailed description of incident

Please give your assessment of the actual track flown by the aircraft and the cause of the deviation (continue on a separate sheet if required)

Part 4 – Only to be completed in the event of Partial or Full Navigation failure

Indicate the number of equipment units which failed

INS

GNSS

IRS/FMS

OTHER

Circle estimated longitude at which equipment failed

60°W

55°W

50°W

45°W

40°W

35°W

30°W

25°W

20°W

15°W

10°W

5°W

0°E/W

Give an estimate of the duration of the equipment failure Time of failure : Time of exit from NAT HLA:

Duration of failure in NAT

At what time did you advise ATC of the failure

Thank you for your co-operation



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### ATTACHMENT 2 ALTITUDE DEVIATION REPORT FORM

MESSAGE FORMAT FOR A REPORT TO THE CENTRAL MONITORING AGENCY OF AN ALTITUDE DEVIATION OF 300 FT OR MORE, INCLUDING THOSE DUE TO ACAS/TCAS ADVISORIES, TURBULENCE AND CONTINGENCY EVENTS

1. REPORT OF AN ALTITUDE DEVIATION OF 300 FT OR MORE
2. REPORTING AGENCY
3. DATE AND TIME
4. LOCATION OF DEVIATION
5. RANDOM / OTS1
6. FLIGHT IDENTIFICATION AND TYPE
7. FLIGHT LEVEL ASSIGNED
8. OBSERVED / REPORTED<sup>1</sup> FINAL FLIGHT LEVEL<sup>2</sup>      MODE "C" / PILOT REPORT<sup>1</sup>
9. DURATION AT FLIGHT LEVEL
10. CAUSE OF DEVIATION
11. OTHER TRAFFIC
12. CREW COMMENTS WHEN NOTIFIED
13. REMARKS<sup>3</sup>

1. State one of the two choices.
2. In the case of turbulence, state extent of deviation from cleared flight level.
3. In the event of contingency action, indicate whether prior clearance was given and if contingency procedures were followed

When complete send this form to:

North Atlantic Central Monitoring Agency c/o National Air Traffic Services  
Room G41  
Scottish & Oceanic Area Control Centre, Sherwood Road,  
Prestwick, Ayrshire - KA9 2NR

[natcma@nats.co.uk](mailto:natcma@nats.co.uk)



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

## ATTACHMENT 3 WAKE TURBULENCE REPORT FORM

For use by pilots involved in Wake Vortex incidents which have occurred in the NAT HLA.

This information is requested by the North Atlantic Central Monitoring Agency and will be forwarded for inclusion in the UK National Air Traffic Services Limited Wake Vortex database.  
SECTION A

### DATE OF OCCURRENCE TIME (UTC)

\*DAY/NIGHT OPERATOR FLIGHT NUMBER  
AIRCRAFT TYPE & SERIES REGISTRATION AIRCRAFT WEIGHT (KG)  
ORIGIN & DESTINATION POSITION IN LAT & LONG CLEARED TRACK CO-ORDINATES  
FLIGHT LEVEL SPEED/MACH NBR. FLIGHT PHASE:  
\*CRUISE/CLIMB/DESCENT WERE YOU TURNING?  
\*YES/NO  
DID YOU APPLY A TRACK OFFSET?  
\*YES/NO SIZE OF TRACK OFFSET?

Nautical Miles WAS ATC INFORMED?

\*YES/NO  
MET CONDITIONS IMC  
VMC ACTUAL WEATHER  
WIND VISIBILITY  
CLOUD TEMPERATURE DEGREE OF TURBULENCE  
\*LIGHT/MODERATE/SEVERE  
OTHER SIGNIFICANT WEATHER?

(\*Circle the appropriate reply only) SECTION B

1 What made you suspect Wake Vortex as the cause of the disturbance?

2 Did you experience vertical acceleration? \*YES/NO

If YES please describe briefly

3 What was the change in attitude? (please estimate angle)

Pitch ° Roll ° Yaw °

4 What was the change in height if any? \*INCREASE/DECREASE



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- 5 Was there buffeting? \*YES/NO
- 6 Was there stick shake? \*YES/NO
- 7 Was the Autopilot engaged? \*YES/NO
- 8 Was the Auto throttle engaged? \*YES/NO
- 9 What control action was taken? Please describe briefly
- 10 Could you see the aircraft suspected of causing the wake vortex? \*YES/NO
- 11 Did you contact the aircraft suspected of causing the vortex? \*YES/NO
- 12 Was the aircraft suspected of causing the vortex detected by ACAS/TCAS? \*YES/NO
- If YES to any of questions 10 to 12, what type of aircraft was it?  
and where was it relative to your position?  
(Estimated separation distance)  
Were you aware of the preceding aircraft before the incident?  
\*YES/NO OTHER INFORMATION
- 13 Have you any other comments that you think may be useful?
- Signed

Name (BLOCK CAPITALS) DATE  
(\*Circle the appropriate reply only)

When complete send this form to: North Atlantic Central Monitoring Agency  
c/o National Air Traffic Services Room G41  
Scottish & Oceanic Area Control Centre, Sherwood Road,  
Prestwick, Ayrshire - KA9 2NR natcma@nats.co.uk  
Page 2 of 2

#### ATTACHMENT 4 SAMPLE OCEANIC CHECKLIST

Note: ICAO North Atlantic Working Groups composed of industry, ATC and state regulators have created this checklist for reference only. It is not intended to replace an operator's oceanic checklist. Operators should use an Oceanic Checklist as part of their Safety Management System. Operators without an oceanic checklist are encouraged to use this sample and tailor it to their specific needs and approvals. This checklist provides an orderly flow of tasks designed to assist in reducing oceanic errors. Operators should review Chapter 6 NAT HLA FLIGHT OPERATIONS & NAVIGATION PROCEDURES.

#### FLIGHT PLANNING

- Communication/Navigation/Surveillance (CNS) Flight Plan Codes and planning documents
- Plotting/Orientation Chart/EFB/Tablet – plot route OEP to OXP
- Equal Time Points (ETP) - plot



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- EDTO (/ETOPS) – Complete analysis
- Track message (current copy available for all crossings)
- Note nearest tracks on plotting chart/EFB/Tablet
- Weather Analysis – Note enroute temperature and turbulence forecasts as well as divert airport weather
- Review possible navigation aids for accuracy check prior to OEP (AS / IF APPLICABLE)
- Review contingency procedures and plans

#### PREFLIGHT

- Master Clock for all ETOs/ATAs
- Maintenance Log – check for any navigation/communication/surveillance or RVSM issues
- RVSM Altimeter checks (tolerance)
- Master Flight Plan (check routing, fuel load, times, groundspeeds)
- Dual Long Range NAV System (LRNS) for remote oceanic operations
- LRCS (HF, SATVOICE) check (including SELCAL)
- Confirm Present Position coordinates (best source)
- Master Flight Plan (symbols②, ✓, ✗, X)
- LRNS programming
- Check currency and software version
- Independently verify waypoint entries
- Check expanded coordinates of all oceanic waypoints
- Check course and distance ( $\pm 2^\circ$  and  $\pm 2$  NM)
- Upload winds, if applicable
- Groundspeed check

#### TAXI AND PRIOR TO TAKE-OFF

- Groundspeed check
- Present Position check

#### CLIMB OUT

- Verify ETOs above FL 180

#### PRIOR TO OCEANIC ENTRY

- If required, send an RCL message. Verify and crosscheck any route amendment independently. Confirm the ATC route clearance is properly programmed into LRNS
- Check expanded coordinates of all oceanic waypoints
- Confirm flight level, Mach and route for crossing
- Ensure aircraft performance capabilities for maintaining assigned altitude/assigned Mach
- If clearance is not what was filed – update LRNS, OFP and plotting/ orientation chart/EFB/Tablet, check course and distance for new route. Independently crosscheck and confirm new route



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- Navigation Accuracy Check – record as applicable
- Confirm HF check, if not done during pre-flight
- Confirm SATCOM/SATVOICE is operational, as applicable
- Log on to CPDLC and ADS-C 10 to 25 minutes prior, if equipped
- Verify RNP value
- Altimeter checks – record readings
- Compass heading check – record

#### AFTER OCEANIC ENTRY

- Squawk 2000 – 10 minutes after entry, except for Reykjavik OCA and Bermuda
- Maintain assigned Mach, or RESUME NORMAL SPEED if cleared
- VHF radios - set to air-to-air (123.450 MHz) and guard frequency (121.500 MHz)
- Strategic Lateral Offset Procedures (SLOP) – SOP

fly centreline or up to 2NM to the right of ATC cleared track (in 0.1 NM increments); left offsets are prohibited

- Altimeter checks - hourly (AS / IF APPLICABLE)
- Routine monitoring – assign tasks

#### APPROACHING WAYPOINTS

- Confirm latitude/longitude of next and subsequent points – expanded coordinates, using scratch pad of FMS if applicable

#### OVERHEAD WAYPOINTS

- Confirm aircraft transitions to next waypoint
- Check track and distance against Master Document
- Confirm time to next waypoint

Note: 3-minutes or more change requires ATC notification (NAT Region & voice reporting only)

- Position report – fuel

#### 10-MINUTES AFTER WAYPOINT PASSAGE

- Record time and latitude/longitude on plotting/orientation chart – non steering LRNS

- or -

- Use “nav display method” (FMS aircraft only, smallest scale)

#### MID POINT

- Midway between waypoints compare winds from OFP, LRNS and upper millibar wind charts (AS / IF APPLICABLE)

- Confirm ETO

#### COAST IN

- Compare ground based NAVAID to LRNS (AS / IF APPLICABLE)
- Remove SLOP offset prior to oceanic exit point
- Confirm routing beyond oceanic airspace

#### DESTINATION/BLOCK IN

- Navigation Accuracy Check (AS / IF APPLICABLE)



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- RVSM write-ups

## ATTACHMENT 5

### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### Flight Level Availability

##### 1.Introduction

Following statistical analysis and discussions NAT FLAS was developed to:

- (i) Utilise additional levels, made available by RVSM expansion.
- (ii) Standardise the flight level profiles available for eastbound traffic, originating in the New York East/ Santa Maria OCAs, during the eastbound flow, with a view to incorporating the functionality of ADT links.
- (iii) Ensure that economic profiles are available for westbound aircraft routing from Reykjavik OCA.

The procedures entail the establishment of a Night Datum Line, south of which is reserved principally for traffic originating in New York East/ Santa Maria OCAs.

The procedures entail the establishment of a North Datum Line, on or north of which is reserved for late running westbound traffic from Reykjavik OCA to Gander OCA.

Aircraft operators are advised that the altitude scheme described herein should primarily be used for flight planning using the flight levels specified in this document, relative to their particular flight(s). However, final altitude assignments will be assigned tactically by ATC, reference traffic, and that any requested altitude profile changes will be processed and approved if available.

#### Procedures

##### 2.General

The westbound OTS tracks are published by Shanwick OAC using FL 310 to FL 390. Gander OAC publishes the eastbound OTS tracks using FL 310 to FL 400. However, FL 310 will only be used for "New York Tracks" which are eastbound OTS tracks that originate in the New York OCA East area and are separated from the main OTS by more than one degree at 030°W.

The activation times of the westbound OTS shall be published as 1130 UTC to 1900 UTC at 30W.

The activation times of the eastbound OTS shall be published as 0100 UTC to 0800 UTC at 30W.

##### 3.Delegated Opposite Direction Levels (ODLs)

Gander OAC will accept FL 310 as a westbound level H24 subject to eastbound CAR/SAM traffic, as described in "Eastbound Traffic originating in New York/Santa Maria, during the eastbound OTS" shown below.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

During the westbound OTS, FL 330 is delegated to Shanwick OAC for westbound traffic. Night Datum Line, is established with the following coordinates:  
45N030W 49N020W SOMAX ATSUR.

North of the Night Datum Line FL 340 and FL 380 are delegated to Gander OAC for eastbound traffic.

South of the Night Datum Line FL 340 will not be used for Gander OCA eastbound traffic. To the south of the Night Datum Line or the eastbound OTS, whichever is further south, FL 340 and FL 380 will not be used for Gander OCA eastbound traffic.

North Datum Line, is established between 0300 UTC and 0700 UTC with the following coordinates: URTAK 60N050W 62N040W 63N030W

On and north of the North Datum Line FL 380 is delegated to Reykjavik OAC for westbound traffic.

In the event of a high volume of North Random Flights and/or OTS tracks the North Datum Line may be suspended to accommodate the dominant eastbound flow.

4. Eastbound Traffic originating in New York/Santa Maria, during the eastbound OTS Eastbound traffic routing, both south of the Night Datum Line, and the main OTS, should flight plan using FL 310, FL 340, FL 360 or FL 380.

Eastbound traffic remaining south of the Night Datum Line should flight plan using FL 310, FL 340 FL 380 or FL 400.

The flight levels allocated to New York tracks entering Shanwick OCA which cross, or route south of, the Night Datum Line, may be any combination of FL 310, FL 340, FL 360, FL 380, or as otherwise agreed between Santa Maria OAC and New York OAC. Additional levels will be allocated to New York tracks if the core OTS is located in that area.

For this procedure, "New York Tracks" are any eastbound OTS tracks which originate in the New York area and enter Gander or Shanwick OCAs.

#### OTS Design & Use

For all westbound tracks which landfall at or north of AVUTI, FL340 shall be omitted from that track to allow profiles for aircraft originating in the Reykjavik OCA.

FL320 on eastbound OTS lying south of Shannon Oceanic Transition Area (SOTA) and which exit the Shanwick OCA at positions OMOKO or south, will be published as not being available as track levels after 0600 UTC at 30W.



Note that Shanwick OAC may tactically release FL320 back to Gander OAC should there be insufficient demand on the TANGO routes, or that the demand on the eastbound tracks is sufficiently greater.

## 5. Summary

The availability of RVSM flight levels, between 0100 UTC and 0800 UTC (at 30W), is summarized in the following diagrams.

Diagram 1 below illustrates the use of the Night Datum line (coloured red) in a situation when there are no Gander eastbound NAT tracks in the vicinity.

Diagram 1

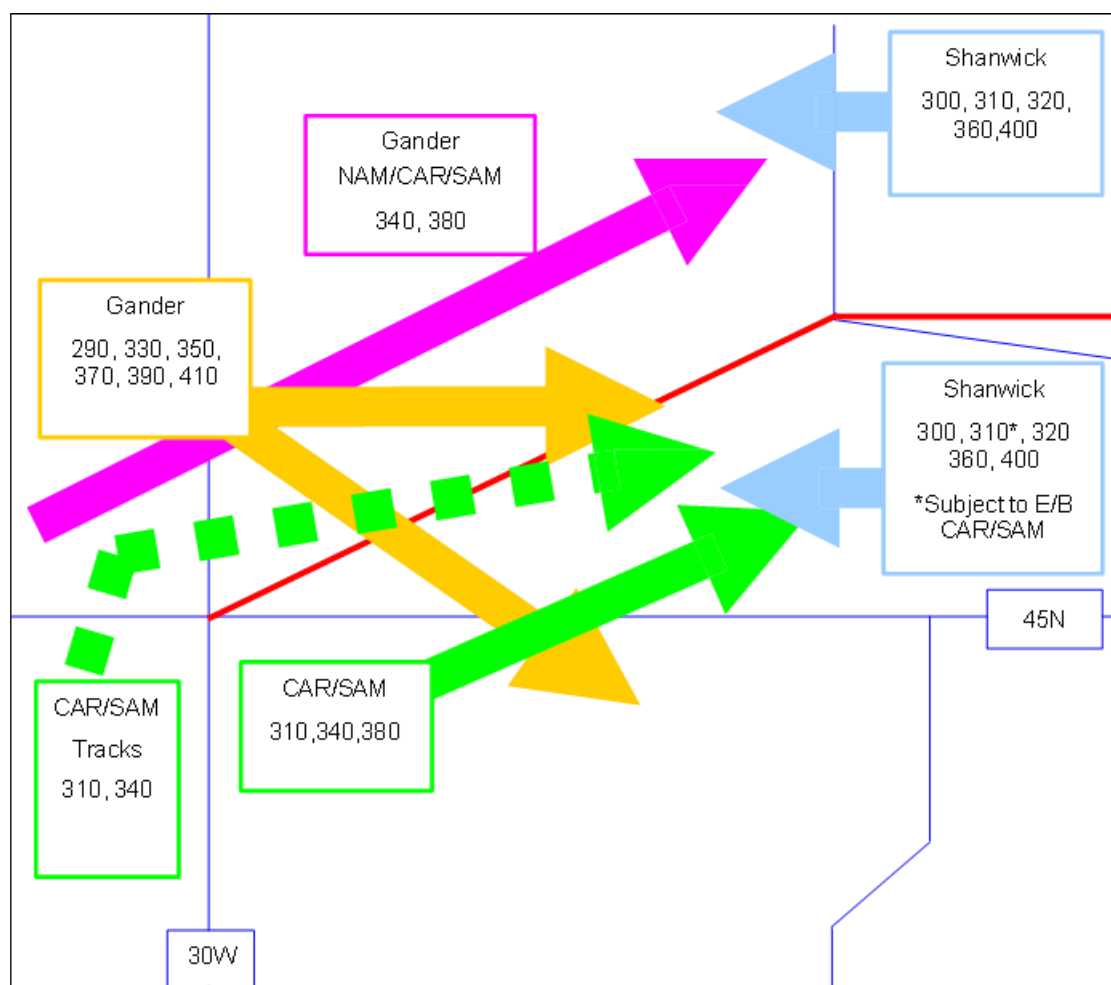
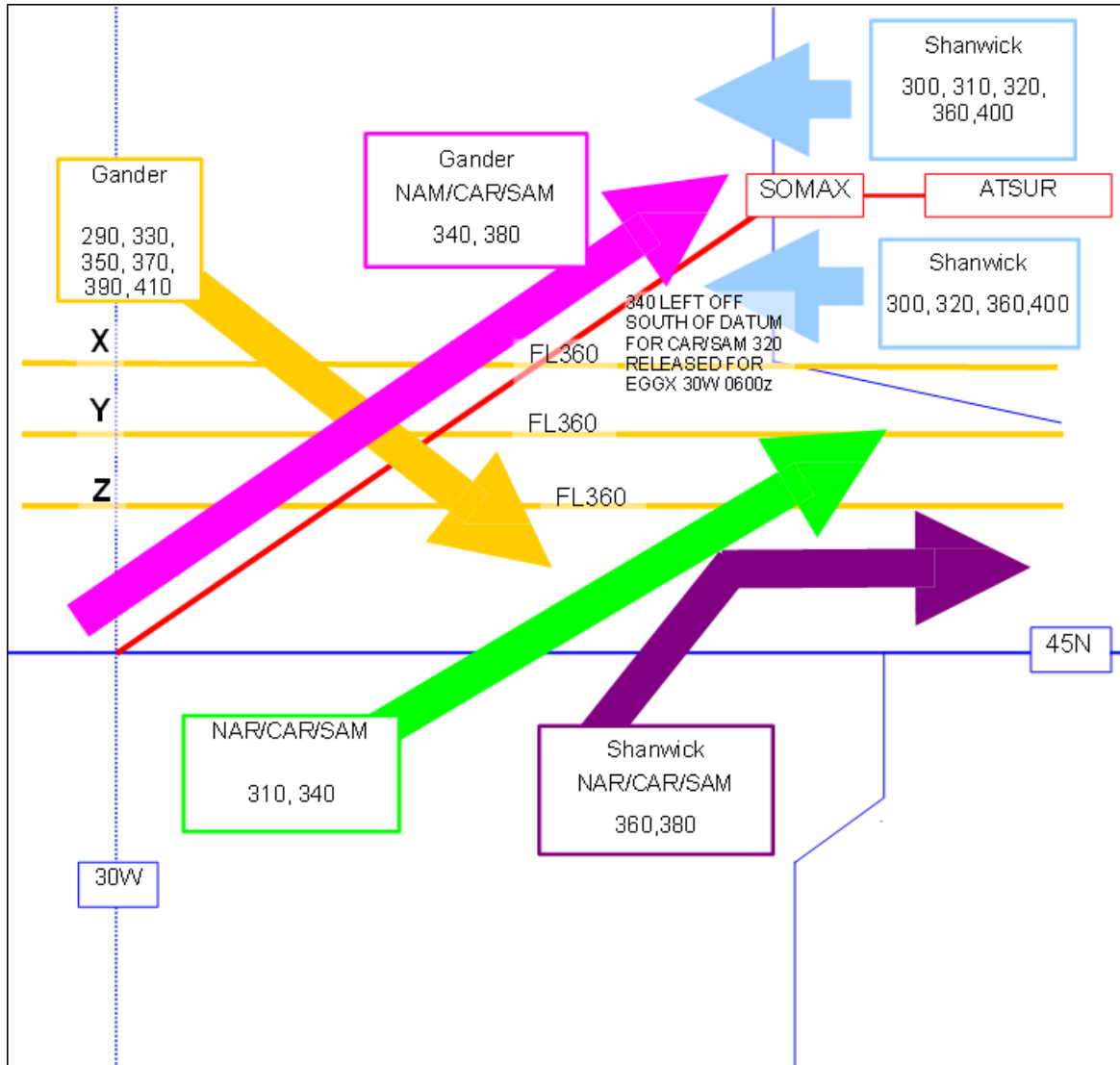


Diagram 2 illustrates the situation when there are Gander eastbound NAT tracks in the vicinity.

Diagram 2



## 6. Transition Periods

The time period between one set of OTS expiring and another set commencing is known as the transition period. The following procedures are in place to accommodate the majority of aircraft:

## 7. Basic Principles:

All times relate to 30W.

OTS Transition rules apply between 0801 UTC to 1129 UTC and 1901 UTC to 0059 UTC. During these times flight levels shall be applied in accordance with direction of flight other than as stated below.



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### 8. General principles:

Westbound traffic crossing 30W, 2230 UTC to 0059 UTC, shall remain clear of the incoming OTS and shall not use delegated ODLs (FL 340 and FL 380). After 2230 UTC, the OTS and ODLs (FL 340 and FL 380) are released to Gander OAC, who may clear eastbound aircraft, taking cognisance of, and giving priority to, already cleared westbound aircraft.

Eastbound traffic crossing 30W 1000 UTC to 1129 UTC, shall remain clear of the incoming OTS at FL 350 and shall not use delegated ODL (FL 330). After 1000 UTC, the OTS (at FL 330 and FL 350) and ODL (FL 330) are released to Shanwick OAC, who may clear westbound aircraft, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

Eastbound traffic, at FL 370 and FL 390, crossing 30W 1030 UTC to 1129 UTC, shall remain clear of the incoming OTS. After 1030 UTC, the OTS (at FL 370 and FL 390) are released to Shanwick OAC, who may clear westbound aircraft, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

At the day-OTS end-time, Westbound aircraft crossing 30W up to 1900 UTC, at ODL (FL 330) or on the OTS, shall have priority over eastbound aircraft. Eastbound aircraft shall be cleared, taking cognisance of, and giving priority to, already cleared westbound aircraft.

At the night-OTS end-time, Eastbound aircraft crossing 30W up to 0800 UTC, at ODLs (FL 340, FL 380) or on the OTS, shall have priority over westbound aircraft. Westbound aircraft shall be cleared, taking cognisance of, and giving priority to, already cleared eastbound aircraft.

The table below summarises the above:

Level Time (UTC) Direction

FL430 H24 Westbound.

May be Flight Planned as eastbound by non-RVSM aircraft.

FL410 H24 Eastbound.

FL400 0801 – 2229 Westbound.

2230 – 0059 Westbound (avoiding OTS). Eastbound OTS (subject to westbounds).

0100 – 0800 Westbound (avoiding OTS). Eastbound (OTS).

FL390 1901 – 1029 Eastbound.

1030 – 1129 Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).

1130 – 1900 Eastbound (avoiding OTS). Westbound (OTS).

FL380 0300 – 0700 Westbound (ODL, on and to the North of the North datum line).

0801 – 2229 Westbound.

2230 – 0059 Eastbound (subject to westbounds).

0100 – 0800 Eastbound (OTS and ODL).

FL370 1901 – 1029 Eastbound.

1030 – 1129 Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).

1130 – 1900 Eastbound (avoiding OTS). Westbound (OTS).



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

FL360 0801 – 2229 Westbound.

2230 – 0059 Westbound (avoiding OTS.) Eastbound OTS (subject to westbounds).

0100 – 0800 Westbound (avoiding OTS). Eastbound (OTS).

FL350 1901 – 0959 Eastbound.

1000 – 1129 Eastbound (avoiding OTS). Westbound OTS (subject to eastbounds).

1130 – 2000 Eastbound (avoiding OTS). Westbound (OTS).

FL340 0801 – 2229 Westbound.

2230 – 0059 Eastbound (subject to westbounds). Eastbound OTS (subject to westbounds).

0100 – 0800 Eastbound (OTS and ODL).

FL330 1901 – 0959 Eastbound.

1000 – 1129 Westbound (subject to eastbounds).

1130 – 1900 Westbound (OTS and ODL).

Level Time (UTC) Direction

FL320 0801 – 2229 Westbound.

2230 – 0059 Westbound (avoiding OTS). Eastbound OTS (subject to westbounds).

0100 – 0800 Westbound (avoiding OTS). Eastbound (OTS).

FL310 H24 Westbound. (ODL).

FL300 H24 Westbound.

FL290 H24 Eastbound.

## ATTACHMENT 6 CLEARANCE DELIVERY/FORMAT/CONTENT

### REVISIONS/AMENDMENTS

When delivering any subsequent Revisions/Amendments to previous delivered clearances which include changes to the level and/or route and/or speed the controller/radio operator will utilise the following format and will provide a "heads-up" to the Pilot on first contact, as to which elements are being revised.

Format of an amended clearance delivered via voice

"AMENDED <change> CLEARANCE. <atc unit> CLEARS <acid>, <clearance>" where <change> can be one or more of the following:

LEVEL, ROUTE, SPEED.

Multiple <change> elements will normally be separated with the word "AND".

Delivery Method for a clearance delivered via voice



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

1. Controller/radio operator:

"DLH458- (ATC/radio operator's unit callsign) - AMENDED LEVEL AND SPEED CLEARANCE."

Pilot:

"(ATC /radio operator's unit callsign) DLH458."

2. Controller/radio operator:

"REYKJAVIK OAC CLEARS DLH458, CLIMB TO F350, MAINTAIN M082, REPORT LEAVING, REPORT REACHING"

#### EXAMPLE CLEARANCES:

Following are examples of typical clearances that could be received by flights operating in NAT region oceanic airspace. These examples have been chosen with a view to explaining certain elements that are unique to the ICAO NAT region operational environment, or which have been shown to be subject to errors or misinterpretation.

#### Example 1 – Re-route clearances

Example 1a – Revised route clearance delivered via voice (radio)

ABC123 AMENDED ROUTE CLEARANCE SHANWICK OCEANIC RE-CLEARS ABC123 AFTER 57 NORTH 20 WEST TO REROUTE VIA 58 NORTH 015 WEST, GOMUP, GINGA. Meaning

The previously cleared route is to be followed until 57N020W. After passing 57N020W the flight is cleared direct to 58N015W, then direct to GOMUP and then direct to GINGA

Example 1b – Revised route clearance delivered via voice (DCPC)

ABC123 AMENDED ROUTE CLEARANCE ABC123 AFTER PASSING 57 NORTH 20 WEST CLEARED REROUTE VIA 58 NORTH 015 WEST, GOMUP, GINGA. Meaning

The previously cleared route is to be followed until 57N020W. After passing 57N020W the flight is cleared direct to 58N015W, then direct to GOMUP and then direct to GINGA.

Example 1c – Revised route clearance delivered via CPDLC

ABC123 ROUTE HAS BEEN CHANGED AT 44N030W CLEARED 47N020W OMOKO GUNSO  
Meaning

The previously cleared route is to be followed until 44N030W. After passing 44N030W the flight is cleared direct to 47N020W, then direct to OMOKO and then direct to GUNSO.

Example 1d – Revised route clearance delivered by CPDLC using UM79

ABC123 CLEARED TO 42N040W VIA ROUTE 42N020W 42N030W Meaning

The previously cleared route is to be followed until 42N020W.

After passing 42N020W the flight is cleared direct to 42N030W, then direct to 42N040W



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

Example 2 – level clearances – no restrictions

Example 2a – Revised level clearance delivered via voice (radio)

ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC456 CLIMB TO AND MAINTAIN FLIGHT LEVEL 340. REPORT LEAVING, REPORT REACHING.

Note- the instruction to "Report Leaving" is not a requirement, and may not always be included in clearances

issued by New York ARTCC                      Meaning

ABC456 is cleared to climb to and maintain FL 340. If the instruction to "report leaving" is included, flight is to report leaving its current level. The flight is to report reaching FL 340.

Example 2b – Revised level clearance delivered via voice (DCPC)

ABC456 CLIMB TO AND MAINTAIN FLIGHT LEVEL 340. REPORT LEAVING, REPORT REACHING.

Note- the instruction to "Report Leaving" is not a requirement, and may not be included in all clearances                      Meaning

ABC456 is cleared to climb to and maintain FL 340. If the instruction to "report leaving" is included, flight is to report leaving its current level. The flight is to report reaching FL 340.

Example 2c – the same clearance delivered via CPDLC

CLIMB TO AND MAINTAIN F340 REPORT LEAVING F320 REPORT LEVEL F340

Note- the instruction to "Report Leaving" is not a requirement, and may not always be included in clearances

issued by New York ARTCC                      Meaning

ABC456, which is currently at FL 320, is cleared to climb to and maintain FL 340. The flight is to send a CPDLC downlink message to report leaving FL 320 and to send another CPDLC downlink message to report when the flight has levelled at FL 340.

Example 3 – level clearances – with geographic restrictions/conditions

Example 3a – Revised level clearance delivered via voice (radio) – geographic restriction to reach level by POINT

ABC123 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC123 CLIMB TO REACH FLIGHT LEVEL 320 BEFORE PASSING 41 NORTH 020 WEST. REPORT LEAVING, REPORT REACHING. Meaning

ABC123 is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL 320.



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

The flight is to report leaving its current level and also to report reaching FL 320.

Example 3b – clearance with the same intent, using different phraseology

ABC123 AMENDED LEVEL CLEARANCE. GANDER OCEANIC

CLEARs ABC123 CLIMB TO AND

MAINTAIN FLIGHT LEVEL 320. CROSS 20 WEST LEVEL. REPORT

LEAVING, REPORT REACHING. Meaning

ABC123 is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W level at FL 320.

The flight is to report leaving its current level and also to report reaching FL 320.

Example 3c – Revised level clearance delivered via voice (DCPC) – geographic restriction to reach level by POINT

ABC123 CLIMB TO REACH FLIGHT

LEVEL 320 BEFORE PASSING 41

NORTH 020 WEST. REPORT LEAVING, REPORT REACHING. Meaning

ABC123 is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL 320.

The flight is to report leaving its current level and also to report reaching FL 320.

Example 3d - same clearance delivered via CPDLC

CLIMB TO AND MAINTAIN F320 CROSS 41N020W AT F320 REPORT LEAVING F310

REPORT LEVEL F320 Meaning

ABC123, which is currently at FL 310, is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level in sufficient time to cross 41N020W already level at FL 320.

The flight is to send a CPDLC downlink message to report leaving FL 310 and to send another CPDLC downlink message to report when the flight has levelled at FL 320.

Example 3e – Revised level clearance delivered via voice (radio) – geographic restriction to maintain current level until POINT

ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC

CLEARs ABC456 MAINTAIN FLIGHT LEVEL 300. AFTER PASSING 41 NORTH 020 WEST CLIMB TO FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING.

Note- the initial phrase "maintain flight level 300" is not a requirement, and may not always be included in such

clearances delivered via voice Meaning

ABC456, which is currently at FL 300, is cleared to climb to and maintain FL 320; however, climb must not commence until after the flight has passed 41N020W.

The flight is to report leaving its current level and also to report reaching FL 320.





A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

The initial phrase "MAINTAIN FLIGHT LEVEL 300" may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 3f – Revised level clearance delivered via voice (DCPC) – geographic restriction to maintain current level until POINT

ABC456 MAINTAIN FLIGHT LEVEL

300. AFTER PASSING 41 NORTH 020 WEST CLIMB TO FLIGHT LEVEL 320.

REPORT LEAVING, REPORT REACHING.

Note- the initial phrase "maintain flight level 300" is not a requirement, and may not always be included in such

clearances delivered via voice      **Meaning**

ABC456, which is currently at FL 300, is cleared to climb to and maintain FL 320; however, climb must not commence until after the flight has passed 41N020W.

The flight is to report leaving its current level and also to report reaching FL 320.

The initial phrase "MAINTAIN FLIGHT LEVEL 300" may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 3g – the same clearance delivered via CPDLC

MAINTAIN F300

AT 41N020W CLIMB TO AND MAINTAIN F320

REPORT LEAVING F300 REPORT LEVEL F320 **Meaning**

ABC456, which is currently at FL 300, is cleared to climb to FL 320; however, climb must not commence until the flight reaches 41N020W.

The flight is to send a CPDLC downlink message to report leaving FL 300 and to send another CPDLC downlink message to report when the flight has levelled at FL 320.

The initial message element "MAINTAIN F300" is intended to bring attention to the fact that the clearance is a conditional

level clearance; the level change cannot commence until the specified condition has been met.

Example 4 – level clearances – with time restrictions/conditions

Example 4a – Revised level clearance delivered via voice (radio) –restriction to reach level by TIME

ABC123      AMENDED    LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC123 CLIMB TO FLIGHT LEVEL 320 TO BE LEVEL AT

OR BEFORE 1337. REPORT LEAVING, REPORT REACHING.      **Meaning**

ABC123 is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level at FL 320 no later than 1337 UTC.





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

The flight is to report leaving its current level and also to report reaching FL 320.

Example 4b –Revised level clearance delivered via voice (DCPC) –restriction to reach level by TIME

ABC123 CLIMB TO REACH FLIGHT LEVEL 320 AT OR BEFORE 1337. REPORT LEAVING, REPORT

REACHING. Meaning

ABC123 is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level at FL 320 no later than 1337 UTC.

The flight is to report leaving its current level and also to report reaching FL 320.

Example 4c – the same clearance delivered via CPDLC

CLIMB TO REACH F320 BY 1337 REPORT LEAVING F310 REPORT LEVEL F320 Meaning

ABC123, which is currently at FL 310, is cleared to climb to and maintain FL 320. Climb must be arranged so that the flight is level at FL 320 no later than 1337 UTC.

The flight is to send a CPDLC downlink message to report leaving FL 310 and to send another CPDLC downlink message to report when the flight has levelled at FL 320.

Example 4d – Revised level clearance delivered via voice (radio) –restriction to maintain current level until TIME ABC456 AMENDED LEVEL CLEARANCE. SANTA MARIA OCEANIC CLEARS ABC456 MAINTAIN FLIGHT LEVEL 300. AT 1337 OR AFTER CLIMB TO AND MAINTAIN FLIGHT LEVEL 320.

REPORT LEAVING, REPORT REACHING.

Note- the initial phrase “maintain flight level 300” is not a requirement, and may not always be included in such clearances delivered via voice. Meaning ABC456, which is currently at FL 300, is cleared to climb to and maintain FL 320; however, climb cannot be commenced until 1337 UTC, or later.

The flight is to report leaving its current level and also to report reaching FL 320.

The initial phrase “MAINTAIN FLIGHT LEVEL 300” may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 4e – Revised level clearance delivered via voice (DCPC) –restriction to maintain current level until TIME ABC456 MAINTAIN FLIGHT LEVEL 300. AT OR AFTER 1337 CLIMB TO AND MAINTAIN FLIGHT LEVEL 320. REPORT LEAVING, REPORT REACHING.

Note- the initial phrase “maintain flight level 300” is not a requirement, and may not always be included in such clearances delivered via voice. Meaning ABC456, which is currently at FL 300,



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

is cleared to climb to and maintain FL 320; however, climb cannot be commenced until 1337 UTC, or later.

The flight is to report leaving its current level and also to report reaching FL 320.

The initial phrase "MAINTAIN FLIGHT LEVEL 300" may be included to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 4f – the same clearance delivered via CPDLC

MAINTAIN F300 AT 1337 CLIMB TO AND MAINTAIN F320

REPORT LEAVING F300 REPORT LEVEL F320 Meaning

ABC456, which is currently at FL 300, is cleared to climb to FL 320; however, climb must not commence until 1337 UTC. The flight is to send a CPDLC downlink message to report leaving FL 300 and to send another CPDLC downlink message to report when the flight has levelled at FL 320.

The initial message element "MAINTAIN F300" is intended to bring attention to the fact that the clearance is a conditional level clearance; the level change cannot commence until the specified condition has been met.

Example 5 – time restrictions/conditions – reach a point no later than a specified time

Example 5a – time restriction delivered via voice (radio), speed amended – AT OR BEFORE

ABC123 AMENDED SPEED CLEARANCE. REYKJAVIK OAC

CLEARs ABC123 CROSS 63 NORTH 030 WEST AT OR BEFORE 1428. Meaning

ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.

Example 5b – time restriction delivered via voice (DCPC), speed amended – AT OR BEFORE  
ABC123 AMENDED SPEED CLEARANCE. ABC123 CROSS 63 NORTH 030 WEST AT  
OR BEFORE 1428.

Note - the initial phrase "amended speed clearance" may not always be included in clearances issued via DCPC Meaning ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.

Example 5c – the same clearance delivered via CPDLC

CROSS 63N030W AT OR BEFORE 1428 Meaning ABC123 is to adjust its speed to ensure that the flight will reach 63N030W no later than 1428 UTC.

Example 5d – time restriction delivered by radio via voice (using different phraseology) – AT OR



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

BEFORE, then a speed instruction

GANDER OCEANIC CLEARS ABC123 CROSS 50 NORTH 040 WEST AT TIME 1428 OR BEFORE. AFTER 40 WEST

RESUME MACH 082.      Meaning

ABC123, which is currently assigned Mach 082, is to adjust its speed to ensure that the flight will reach 50N040W no later than 1428 UTC. After reaching 50N040W, the flight is to resume maintaining Mach 082.

Example 5e – the same clearance delivered via CPDLC

ABC123 CROSS 50N040W AT OR BEFORE 1428

AFTER PASSING 50N040W MAINTAIN MACH 082      Meaning

ABC123 is to adjust its speed to ensure that the flight will reach 50N040W no later than 1428 UTC. After passing 50N040W, the flight is to maintain Mach 082.

Example 6 – time restrictions/conditions – cross a point no earlier than a specified time

Example 6a– time restriction delivered via voice (radio) – AT OR AFTER ABC456 AMENDED SPEED CLEARANCE. REYKJAVIK OAC CLEARS ABC456 CROSS 63 NORTH

030 WEST AT OR AFTER 1337. Meaning ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.

Example 6b– time restriction delivered via voice (DCPC) – AT OR AFTER ABC456 AMENDED SPEED CLEARANCE. ABC456 CROSS 63 NORTH 030 WEST AT OR AFTER 1337.

Note - the initial phrase "amended speed clearance" may not always be included in clearances issued via DCPC Meaning ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.

Example 6c – the same clearance delivered via CPDLC

CROSS 63N030W AT OR AFTER 1337      Meaning ABC456 is to adjust its speed to ensure that the flight will not reach 63N030W earlier than 1337 UTC.

Example 6d – time restriction delivered by radio via voice (using different phraseology) – AT OR LATER, then a speed instruction GANDER OCEANIC CLEARS ABC456 CROSS 50 NORTH 040 WEST AT 1337 OR LATER. AFTER 40 WEST RESUME

MACH 082.      Meaning ABC456, which is currently assigned Mach 082, is to adjust its speed to ensure that the flight will not reach 50N040W earlier than 1337 UTC.

After reaching 50N040W, the flight is to resume maintaining Mach 082.

Example 6e – same clearance delivered via CPDLC CROSS 50N040W AT OR AFTER 1337



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

AFTER PASSING 50N040W MAINTAIN MACH 082 Meaning ABC456 is to adjust its speed to ensure that the flight will not reach 50N040W earlier than 1337 UTC.  
After reaching 50N040W, the flight is to maintain Mach 082.

## ATTACHMENT 7

### WEATHER CONDITIONS & CONSIDERATIONS

#### 1. GENERAL

1.1 The following text is concerned primarily with the North Atlantic region north of 27°N. The general flow of air masses and weather systems through the Atlantic are described. Followed by more detailed information on the anticipated local conditions in Greenland, Iceland and the United Kingdom.

#### 2. NORTH ATLANTIC WEATHER SYSTEMS

2.1 The weather situations affecting the safety of aviation weather services in the northern part is mainly dominated by depressions and frontal systems, but in the southern part by hurricanes and tropical storms, particularly in the Caribbean sector and the area between Cape Verde and the Leeward and Windward Islands.

##### 2.2 Semi-permanent Pressure Systems

2.2.1 The Azores or Bermuda High is a region of subsiding warm air, usually oriented in an east-west line near 30°N in the winter and about 40°N during the summer. This high reaches its peak intensity in the summer months.

2.2.2 The Icelandic Low is a feature of the mean pressure charts of the North Atlantic. It is the result of frequent low pressure systems which, after deepening off the east coast of North America, move into the Iceland region.

2.2.3 The statistical average will show low pressure, but on a daily chart it may not even exist. On occasions the subtropical high is greatly displaced. This alters the main storm track resulting in abnormal weather conditions over large sections of the Atlantic.

##### 2.3 Migratory Pressure Systems

2.3.1 Most in-flight weather is produced by frontal depressions. The North Atlantic is a region where new storms intensify or old storms redevelop. New storms may form off the Atlantic Seaboard and intensify as they move north-eastward across the ocean. These storms in particular are most intense in the winter months and have a wide variation in their tracks. Hurricane force winds may be expected near the surface. Sudden deepening of the depressions or changes in the estimated tracks can cause dramatic changes in upper air winds and consequently serious errors in wind forecasts. Winter storms over the North Atlantic should lead to extra careful planning of flights.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

2.3.2 Sometimes storms develop west of the Azores and move northward or north-eastward toward Iceland and the United Kingdom. These storms are usually associated with warm highs over western Europe.

2.3.3 Secondary lows often develop west of Greenland when a low moves northeastward across the southern tip. These lows in the Davis Strait-Baffin Bay area result in poor weather conditions in the southeastern Arctic. With the tracks of the main low pressure systems lying to the south of Greenland and Iceland from east to west towards Scotland, cold and often stationary lows form frequently over the Greenland Sea between Iceland and South Greenland. Although these lows are without typical frontal zones, active CB-clouds with snow showers often tend to join into the "semi-front" with continuous snowfall. The same happens in the so-called polar-lows which during winter may develop in arctic air masses around Iceland and between Iceland and Norway.

2.3.4 Tropical storms and hurricanes originate in the Caribbean or eastern Atlantic during the late summer and early fall. They often curve northward around the Bermuda High onto the northern portions of the Atlantic producing severe in-flight and terminal weather.

2.3.5 High pressure areas found over the Atlantic have a variety of paths. Those that move eastward off the North American continent are usually cold domes. In winter these weaken or disappear entirely after they reach the warmer waters of the Gulf Stream. During the summer they generally merge with the Bermuda-Azores High. Occasionally, a high moving eastward off the Labrador coast will continue to build up for two or three days and spread more or less straight eastward to Europe.

2.3.6 Another important facet of the North Atlantic is the effect of the Siberian High. In winter this high may extend southwestward so that its western point reaches across northern Europe and out over the northeastern Atlantic. On rare occasions this high may dominate the entire region of the North Atlantic from Greenland to Europe.

2.3.7 The Azores low is a development that is most widely divergent from the normal conditions. During periods of meridional flow, cold air from northern Canada will advance well southward into the region between Bermuda and the Azores, breaking away from the main body and causing a cold low to develop in that region. These lows usually move very slowly and can become extensive. At the same time high pressure may build up to the Iceland area producing easterly winds over the entire region north of 30N.

2.3.8 On occasions an extensive high pressure area builds up over Europe. This blocks the eastward motion of lows and forces them to curve northward, resulting in the trough over the eastern Atlantic. A ridge then develops in the mid-Atlantic. This ridge in turn blocks lows moving off North America and causes a trough to form near the east coast. These troughs and ridges may persist for days with little motion. In the trough, lows develop, deepen, move northward, and occlude. Development of these low pressure systems is often very rapid, causing sudden, unpredictable weather to occur. One of the most treacherous situations for eastern Canadian



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

terminals occurs when lows deepen or form rapidly south of the Maritimes with a trough northward over the Gulf of St. Lawrence and Labrador.

#### 2.4 Upper Air Circulation

2.4.1 The main flow is generally from west to east but many variations do exist. The winds are stronger in winter when greater horizontal gradients exist. Inevitably, the strongest winds will be located in the western Atlantic. As the air masses traverse the oceanic area, considerable modification occurs resulting in weaker thermal gradients, producing lighter winds over the eastern Atlantic.

#### 2.5 Air Masses

2.5.1 The air masses usually found over the Atlantic are those that have moved across the eastern United States, or southeastward across Canada or the Davis Strait. As these air masses move out over the Atlantic they rapidly assume maritime characteristics. The greatest change in these air masses occurs while crossing the Gulf Stream or the North Atlantic Drift either northward or southward. This modification may be sharp and very noticeable especially during winter months, when the air becomes very unstable with snow or hail showers or even thunderstorms.

#### 2.6 Oceanic Currents and Temperatures

2.6.1 The dominant feature of the North Atlantic is the warm Gulf Stream and its eastward extension, the North Atlantic Drift. As the drift reaches the European sector it branches out. One portion moves northward along the Norwegian coast, known as the Norwegian Current. Another branch flows into the English Channel area. This produces relatively warm sea temperatures along the European shores during the winter months.

2.6.2 A southward flowing branch of the North Atlantic Drift, combined with up-welling, results in a cool current along the west coast of Africa, called the Canarias Current. Cold Arctic water from the Davis Strait reaches the North American coast as far south as New England. This current is referred to as the Labrador Current.

2.6.3 The effect of these currents on the terminal weather around the coastal area of the Atlantic varies with the time of year, the type of air mass involved, and the direction of flow.

### 3. GREENLAND LOCAL CONDITIONS

#### 3.1 Seasonal Variation

3.1.1 Within the Søndrestrøm FIR, Arctic weather conditions such as intense storms, severe icing, severe turbulence, heavy precipitation, snow and water in various forms may be encountered throughout the year. Weather conditions change rapidly. Due to the mixture of warm air over the oceans and cold air over the icecap, heavy fog may build up over the coasts, closing down all of Greenland's airports simultaneously. Changes will often take place within a few minutes and will not always be included in the forecast received in your briefing prior to departure.

#### 3.2 Sea Conditions

3.2.1 The waters around Greenland are not influenced by warmer waters such as the Gulf





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

Stream. They are arctic waters with winter temperatures close to 0° Celsius. During the summer period the water temperatures may rise to 3-6° Celsius at the warmest. This is why you may encounter huge amounts of floating ice in the form of icebergs and ice floes at any time of year.

### 3.3 Terrain

3.3.1 The elevation of the highest point in Greenland is 13,120 ft, (4,006m), and the general elevation of the icecap is about 10,000 ft, (3,053m). The combination of low temperatures and high winds may under certain conditions create a lowest usable flight level of FL 235 in the area near the highest terrain, and FL 190 over the icecap. On the route between Søndrestrøm and Kulusuk the lowest usable flight level in general is about FL 130. An equally high flight level can be encountered to and from Narsarsuaq from Canada or Iceland, as crossing the icecap will require a minimum altitude of FL 130. On the route from Nuuk/Godthaab towards Iceland either direct or via Kulusuk NDB, the lowest usable flight level will often be FL 150. On the direct route via the Prince Christian Sound NDB (OZN) to and from Canada or Iceland, the lowest usable flight level to be expected and planned is FL 110.

### 3.4 Wintertime Darkness/Summertime Daylight

3.4.1 VFR flight at night is not allowed in Greenland. This means you are prevented from flying into Narsarsuaq or Kulusuk VFR at night. VFR flight is only permitted from the beginning of the morning civil twilight until the end of civil twilight. Civil twilight ends in the evening when the centre of the sun's disc is 6 degrees below the horizon, and begins in the morning when the centre of the sun's disc is 6 degrees below the horizon. Additional information may be acquired from the airport of your destination or your flight planned alternate.

## 4. ICELAND LOCAL CONDITIONS

### 4.1 Seasonal Variation

4.1.1 The climate in Iceland is largely influenced by both warm subtropical air and cold polar air currents, as well as ocean currents. The mean January (the coldest month) temperature is about 2°C to 0°C (28°F to 32°F). The mean July (the warmest month) temperature is 9°C to 11°C (48°F to 52°F).

4.1.2 Do not be misled, however, into expecting balmy temperatures and unlimited visibility. Extreme seasonal variations are to be anticipated. Like the majority of the North Atlantic, rapidly changing weather conditions involving severe icing, severe turbulence, and heavy precipitation are common, particularly during the wintertime. Again, these rapid changes make accurate forecasts extremely difficult.

### 4.2 Sea Conditions

4.2.1 Iceland is located near the border between warm and cold ocean currents. The North Atlantic Drift passes just to the south on its course northeastwards, and one of its branches, the Irminger Current encircles



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

the south, west and partly the north coasts. On the other hand, a branch of the cold East Greenland Current, known as the East Iceland Current, flows in a southerly and south-easterly direction along the east coast. The sea surface temperatures are highest off the south and southwest coasts, 7°C to 8°C in winter, but 8°C to 12°C in summer.

#### 4.3 Terrain

4.3.1 Iceland is a mountainous country with an average elevation of about 1,650 ft. The highest peak is 6,952 ft. (2119 m.) located near the southernmost edge of the island's largest glaciers. Due to the extreme variances in barometric pressure, coupled with high winds, the lowest usable flight level may be FL 120.

#### 4.4 Wintertime Darkness/Summertime Daylight

4.4.1 The shortest period of daylight falls in December. A typical day includes approximately 4 hours of daylight with long twilight periods. During summer nights, the sun remains 6° or more above the horizon, thus experiencing continuous daylight from 2 May to 25 July.

### 5. UNITED KINGDOM (SCOTLAND) LOCAL CONDITIONS

#### 5.1 Seasonal Variation

5.1.1 The climate over Scotland and the northern part of the UK is influenced by warm maritime and cold polar air masses, modified by the Gulf Stream current. Seasonal variations are to be anticipated, particularly during the wintertime with severe icing, high winds, severe turbulence and heavy precipitation.

#### 5.2 Sea Conditions

5.2.1 The average Mean Sea Surface Temperatures extrapolated for 60N 10W range from 8°C (47°F) in February to 12°C (54°F) in August.

#### 5.3 Terrain

5.3.1 The whole of Scotland is designated as a "sparsely populated area". To the west of the mainland are many groups of islands with few airstrips or NAVAIDS. Scotland is mountainous with the highest peak 4,406 ft. The lowest usable flight level may be FL 075.

### 6. WATER TEMPERATURES

6.1 In conjunction with changeable weather, the water in the North Atlantic is cold. The following temperatures were taken from the Bunkor Climate Atlas of the North Atlantic and represent average temperatures based on data assembled between 1941 and 1972. All values are in degrees Celsius.

|     | Frobisher |    | Goose Bay |      | Labrador Sea South Greenland |
|-----|-----------|----|-----------|------|------------------------------|
| JAN | 0°        | 0° | 2°        | 2-4° |                              |
| FEB | 0°        | 0° | 2°        | 2-4° |                              |





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

|     |    |      |       |      |
|-----|----|------|-------|------|
| MAR | 0° | 0°   | 2°    | 2-4° |
| APR | 0° | 0°   | 2°    | 2-4° |
| MAY | 2° | 2°   | 2°    | 2-4° |
| JUN | 2° | 4°   | 2°    | 2-4° |
| JUL | 4° | 6°   | 2°    | 2-4° |
| AUG | 6° | 6-8° | 8-10° | 6-8° |
| SEP | 6° | 6°   | 2°    | 2-4° |
| OCT | 4° | 4°   | 2°    | 2-4° |

|     |           |           |              |                 |
|-----|-----------|-----------|--------------|-----------------|
|     | Frobisher | Goose Bay | Labrador Sea | South Greenland |
| NOV | 2°        | 2°        | 2°           | 2-4°            |
| DEC | 0°        | 0°        | 2-4°         | 2-4°            |

## 7. HYPOTHERMIA

### 7.1 Causes

7.1.1 Hypothermia can develop quickly and kill you. Sometimes referred to as exposure sickness, it is a condition of the body when its inner-core temperature falls to a level at which the vital organs no longer function effectively.

7.1.2 Hypothermia is caused by cold, wetness, and/or wind chilling the body so that it loses heat faster than it can produce it. Frequently the advent of hypothermia is hastened by a deficiency of energy producing food in the body. However, the greatest single contributing factor to hypothermia is improper clothing.

7.1.3 Hypothermia can occur anywhere that the environmental temperature is low enough to reduce the body temperature to a dangerous level. It occurs most frequently at sea or in rugged mountain terrain where a person on foot can pass from a calm and sunny valley to a wind and rain-lashed mountain ridge in a few hours. Most hypothermia accidents occur in outdoor temperatures between 1° and 10° C (30° to 50°F).

### 7.2 Symptoms

7.2.1 Fortunately the approach of hypothermia is easily noticeable and its advance marked by recognizable steps or stages. If the warning signs are heeded and counter-measures taken, tragedy can be avoided.

7.2.2 Noticeable symptoms normally occur in the following stages:

1. A person feels cold and has to exercise to warm up.
2. He starts to shiver and feel numb.
3. Shivering becomes more intense and uncontrollable.
4. Shivering becomes violent. There is a difficulty in speaking. Thinking becomes sluggish and the mind begins to wander.

**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

5. Shivering decreases and muscles begin to stiffen. Coordination becomes difficult and movements are erratic and jerky. Exposed skin may become blue or puffy. Thinking becomes fuzzy. Appreciation of the seriousness of the situation is vague or nonexistent. However, the victim may still be able to maintain the appearance of knowing where he is and what is going on.
6. The victim becomes irrational, loses contact with the environment, and drifts into a stupor.
7. Victim does not respond to the spoken word. Falls into unconsciousness. Most reflexes cease to function and breathing becomes erratic.
8. Heart and lung centres of the brain stop functioning. The individual is now a fatality.

Although the above symptoms are those typically noted, one of the editors of this manual has experienced hypothermia and he recalls that his symptoms were NOT easily noticeable. In fact, he was not aware at all that he was slipping into hypothermia. His symptoms were observed by a climbing partner who took appropriate action.

### 7.3 Treatment

7.3.1 A person who is alert and aware of the potential dangers can help himself in stages 1 through 3. But once the condition has advanced to stage 4 and the person's mind begins to wander, he may not realize what is happening and may well need assistance. Further deterioration will definitely require outside aid. Anyone showing any of the above-mentioned symptoms, including the inability to get up after a rest, is in trouble and needs your help. He may not realize and deny there is a problem. Believe the symptoms, not the victim. Even mild symptoms demand immediate and positive treatment.

1. Get the victim out of the cold, wind, and rain.
2. Strip off all wet clothes.
3. If the person is only mildly impaired;
  - (a) give him warm, non-alcoholic, drinks.
  - (b) get him into dry clothes and a warm sleeping bag;
4. If the victim is semi-conscious or worse;
  - (a) try to keep him awake and give him warm drinks.
  - (b) leave him stripped: put him in a sleeping bag with another person (also stripped); skin to skin contact is the most effective treatment.
5. If he has recovered sufficiently to eat, feed him. Make sure he is dressed in warm clothing and well rested before starting on again.
6. If the victim has to be carried out, make sure his body temperature has been brought up to normal and wrap him in a good sleeping bag before starting out.

### 7.4 Prevention

7.4.1 With the exception of cases involving bodily injury, most hypothermia accidents may be prevented. The first thing to remember is that hypothermia can occur anywhere and at any time that the air temperature drops low enough so that if a body is exposed, its inner-core temperature can be reduced to the danger level. Remember, wind chills the air.



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

7.4.2 Wet clothing in cold weather extracts heat from the body nearly 200 times faster than dry clothing. Wool clothing provides better protection than cotton in wet weather. In inclement weather, an uncovered head can account for up to 60% of body heat loss. A good wool cap is essential. The most common contributors of the development of problems during cold, wet, and windy weather are lack of proper clothing, inadequate shelter, and exhaustion. The best defense against the advent of hypothermia is to avoid exposure by being prepared.

1. Dress appropriately.
2. Carry rainwear, extra dry clothes, food, and matches.
3. Bring potential dangers to the attention of anyone inappropriately dressed. It could save their life.
4. Make the basic rules of conduct for trail safety clear, and that you expect them to be observed.
5. Travel at the speed of the slowest member of your party.
6. Break frequently for rest and gear check.
7. Distribute candies or other nibble food.
8. Keep watching all members of your party for signs of fatigue or discomfort.

Items 5. and 6. above refer to the action of journeying on foot. In the case of having had to land or crash-land an aircraft in inhospitable and unpopulated territory, unless circumstances dictate otherwise, it is generally better to remain with the aircraft rather than attempting a trek to safety. The aircraft hull may be able to provide some degree of shelter and importantly, SAR services will have an easier job of locating a downed aircraft than a small group of individuals.

## ATTACHMENT 8 CHECKLIST FOR PRIVATE PILOTS

This Attachment supplements the information in this manual by providing a general checklist for pre-flight preparation, inspection and in-flight contingencies.

Be prepared for systems failure. Know what to do in advance. Always plan a way out of a situation. If a borderline decision must be made, take the safest course of action. Don't exceed pilot or aircraft limitations. If anything, including weather, equipment, or your health, is not up to par, DON'T GO.

Position survival gear so that it is readily available, but clear of controls. The best survival techniques include thorough planning, knowledge of the route, and reliable weather information. There is no room for error in trans-oceanic flight, so plan accordingly, then re-check. Allow sufficient time for a thorough briefing, planning, and administrative details. Have airplane ready the night before, avoiding the possibility of last minute mistakes.



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### Pre-Flight Preparation

The following checklist, cross-referenced to text appearing in this manual, will assist you during the preparation stages of your oceanic flight.

1. Current departure, en-route, arrival and topographical charts (Chapter 12)
2. An instrument rating (Chapter 12)
3. Long range NAVAIDS (Chapter 6)
4. Available daylight on your route (Chapter 12)
5. Aircraft inspected by a licensed mechanic for suitability for a long, over water crossing. The necessary aircraft documents (Chapter 12)
6. If transiting Canadian airspace, the required Sea/Polar Survival equipment necessary to adhere to Canadian Air Regulation 540 (Chapter 12)
7. Format to be used when filing an oceanic flight plan (Chapter 4)
8. The proper procedures to be used in obtaining an IFR clearance (Chapter 6 & Chapter 12)
9. How to prevent hypothermia (Chapter 12)
10. VHF radio coverage in the NAT Region (Chapter 5 & State AIPs)
11. A position report and a revised estimate (Chapter 5)
12. SELCAL Code (Chapter 5)
13. Flight planned for FL 285 or above approval from the State of Registry (Foreword & Chapter 1)
14. Approval for flight in ADS-B airspace (Chapter 8).
15. Search and Rescue services. The importance of an ELT (Chapter 1 & Chapter 12)
16. The relevant meteorological information (Chapter 12)
17. Current NOTAMs with special regard to the status of radio-navigation aids and airport restrictions. (Chapter 12)

#### Pre-Flight Inspection

Pull the cowling and inspect for leaks and general overall condition. Inspect:

1. Fuel system and management
2. Radio equipment and condition
3. Engine condition
4. Oil pressure, temperature, and consumption
5. Instruments

Check compass on nearest runway heading to your course.

1. Swing compass with radios and navigation lights ON
2. Check compass deviation with master switch off
3. Check compass deviation with VHF off
4. Check compass deviation with HF both ON and OFF



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

5. Check compass deviation with pilot heat ON
6. Check compass deviation with rotating beacon ON and OFF
7. Make notes on all deviations
8. Keep alternator load at 50% or less if possible
9. DO NOT assume compass card is accurate ADF may be affected by the alternator, VHF, HF, pilot heat, rotating beacon, autopilot, coastal refraction, or atmospheric conditions. Check and re-check all NAVAIDS receivers.

After a long flight, pilot's ability to handle marginal weather conditions may be in serious doubt. Therefore, weather minimums should be well above the published minimums. Alternate airports should be chosen with the same care.

In-flight contingencies.

Deviations:

Obtain clearance for deviations unless in an emergency, then the appropriate air traffic services unit must be notified of the action taken and that the action has been taken under emergency authority.

Reports:

Report any problems to Air Traffic Control agencies or on VHF 121.500 MHz as soon as possible. Use the VHF frequency 123.450 MHz as an air-to-air communications channel to ask for assistance if needed.

## ATTACHMENT 9 CHECKLIST FOR DISPATCHERS

This Attachment supplements the guidance found in the Guidance for Flight Dispatchers Chapter of NAT Doc 007. It is intended as a checklist for those planning and monitoring/tracking flights in the NAT.

### Index

1. Know your Airspace - Regulatory requirements and consequential routing limitations
2. Minimum Equipage (Navigation/Altimetry/Communications)
3. Special non-compliance routings
4. Flight planning
5. Flight Monitoring
6. En-route Equipage Failures
7. Document References
8. Separation Requirements



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

#### Checklist for Flight Dispatchers

1. Know your Airspace - Regulatory requirements and consequential routing limitations

Recall Item Check Timelines Reference

#### HLA

Boundaries Does my Routing enter the vertical & lateral boundaries of

HLA Airspace 4 February

2016 Ensure:

» HLA Ops Specs Approval

#### PBCS

Compliance - I Understand PBCS requirements 29 March

2018 These standards require your airline to be in compliance with the required communication performance (RCP) 240 and required surveillance performance (RSP)

180. ICAO Doc 9869,

Performance-based Communication and Surveillance (PBCS) Manual Appendices B and C

#### PBCS

Compliance - II Is my aircraft and crew PBCS Compliant? 29 March

2018 ICAO FPL Filings: PBC : Insert the appropriate descriptor (P2) in Item 10a

PBS: Insert relevant required surveillance performance (RSP) specification(s) (RSP180) in Item 18 of the flight plan following the SUR/ indicator.

CPDLC: Insert the appropriate descriptor

(J5 or J7) in Item 10a

Recall Item Check Timelines Reference

of the FPL (unchanged)

ADS-C: Automatic Dependent Surveillance

— Contract (ADS-C) services shall insert the D1 descriptor in Item 10b of the FPL.

Mandatory ADS-B

Carriage T9 T290

Northern boundary: 65N000W -

67N010W -

69N020W -

68N030W -

67N040W -

69N050W -

69N060W - BOPUT.

Southern boundary: GUNPA (61N000W) - 61N007W -



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

6040N010W - RATSU (61N010W)

- 61N020W - 63N030W -

64N040W -

64N050W – EMBOK Aircraft not equipped with FANS 1/A (or equivalent) systems will be allowed to operate within this area at DLM designated flight levels, provided the aircraft is suitably equipped (transponder with ADS-B extended squitter transmitter).

ICAO FPL Filings: Item 10b EB1 or EB2 or LB1 or LB2.

T9 and T290 Requirements a) VHF 8.33 KHz

equipped

a) NAT HLA

certified

b) RNP 2 certified, GNSS, RNP

c) Surveillance equipment

- SSR Mode S

- Transponder

- Mode S, including aircraft identification, pressure altitude and extended squitter (ADS-B) capability ADS-B with dedicated 1090 MHz ADS-B

'out' capability ICAO FPL Filings:

a) Item 10a Y

b) Item 10a X

c) Item 10a GRZ and Item 18 NAV/RNP2

d) Item 10b EB1 or EB2

or LB1 or LB2.

Datalink Mandate

Compliance FL 290 to FL 410

(inclusive) throughout the ICAO CPDLC: Insert the appropriate descriptor (J5 or J7) in Item 10a

Recall Item Check Timelines Reference

NAT Region. of the FPL (unchanged)

ADS-C: Automatic Dependent Surveillance

— Contract (ADS-C) services shall insert the D1 descriptor in Item 10b of the FPL.

- State Approvals (NAT HLA /RVSM) See: Chapter 1.

- Approval for flight in NAT ADS-B airspace. See: Chapter 1.

2. Minimum Equipment (Navigation/Altimetry/Communications)

NAT HLA See: Chapter 1

RVSM. See: Chapter 1 and Chapter 11

HF Communications. See: OpSpecs

DLM. ADS-C (Automatic Dependent Surveillance Contract) and CPDLC (Controller Pilot



**APPENDICES****NAT HLA OPERATIONS****NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME**

Data Link Communications). See: OpSpecs

ETOPS/EDTO. See Annex 6 Part 1

MEL provisions. See: OpSpecs

3. Special non-compliance routings

Long Range Navigation Systems. See : Chapter 1 and Chapter 9.

Not approved for NAT HLA /RVSM . See Chapter 1.

Routings without functioning HF Communications. See: Chapter 4.

Maintenance Flights, temporarily non-RVSM. See: State AIPs.

Delivery and Humanitarian Flights. See: State AIPs.

4. Flight planning

Eastbound or westbound flights should be flight planned by significant points at whole degrees of latitude at each crossed ten degrees of longitude (10°W, 20°W, 30°W, 40°W etc.);

Northbound or southbound flights should be flight planned by parallels of latitude spaced at five degree intervals (65°N, 60°N, 55°N etc.). See Chapter 4 and Chapter 11.

Separate Organised Track System (OTS) structures. See: Chapter 2 and Chapter 3.

North American Region., transitional airspaces and linking route structures in and through

NAM Region. See: Chapter 3 and AIS of the relevant State authorities and/or via their websites.

Flight Levels on OTS Track may plan at any of the levels as published for that track.

Aircraft on a random route may plan any flight level(s) irrespective of direction. See: North Atlantic Flight Level Allocation Scheme (NAT FLAS Attachment 5). States AIPs and NOTAMs.

Mach Number and cost index (ECCON) See: Chapter 4.

FPL completion. A free text editor is available on the EUROCONTROL website.

Approvals:

- NAT HLA, the letter 'X', in addition to the letter 'S', within Item 10.
- RVSM operations, the letter 'W' must also be included in Item10.
- RNP approval; in Item 10 (Equipment) with the letter "R" and annotate Item 18, PBN/A1 (RNAV 10 (RNP 10) Approval) or PBN/L1 (RNP 4 Approval). See: Chapter 4.
- ADS-B, B1 or B2 in Item 10b.
- PBCS operations, P2 in Item 10a and RSP180 in Item 18 following SUR/.

5. Flight Monitoring

ATC clearances. See: Chapter 6

Transponder Use. See: Chapter 11

Re-Routes. See: Chapter 11

En-route Contingencies. Chapter 11

Loss of communications and HF failure. See Chapter 11 and Chapter 5.

Normal Flight Tracking. See ICAO Annex 6 Part 1 Chapter 3.5.1





A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

- o 3.5.1 For appropriate aircraft, track every 15 minutes
- o 3.5.4 Retention of tracking data  
Note to 3.5.4 regarding 3rd party normal aircraft tracking...must comply with the policies and procedures of the operator
- o ICAO Circular 347 Normal Flight Tracking – Guidance for Operators
- 6. En-route Equipage Failures  
Prior to entering NAT RVSM Airspace See: OPTION 1 to OPTION 3, Chapter 11  
After entering NAT RVSM Airspace. See: State AIPs.
- 7. Document References  
Reference Check  
PBCS Manual (ICAO Doc 9869)  
PANS ATM Doc.4444  
ICAO Global Operational Data Link  
(GOLD) Manual (Doc 10037).  
EUR-NAT Supps. Doc 7030  
ICAO Annex 6 Part I  
ICAO Circular 323  
ICAO Circular 347 Normal Flight Tracking

#### ATTACHMENT 10

#### BIBLIOGRAPHY AND OTHER REFERENCE MATERIAL

ICAO Annex 2\* – Rules of the Air  
[www.icao.int](http://www.icao.int)

ICAO Annex 6\* Operation of aircraft  
[www.icao.int](http://www.icao.int)

ICAO Annex 10\* Aeronautical communications  
[www.icao.int](http://www.icao.int)

ICAO Doc 4444\* Procedures for Air Navigation Services – Air Traffic Management (PANS–ATM)  
[www.icao.int](http://www.icao.int)

ICAO Doc 7030\* (Regional Supplementary Procedures (SUPPS))  
[www.icao.int](http://www.icao.int)

ICAO Doc 8168\* Procedures for Air Navigation Services – Aircraft Operations (PANS–OPS)



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

[www.icao.int](http://www.icao.int)

ICAO Doc 8643\* Aircraft Type designators  
[www.icao.int](http://www.icao.int)

ICAO Doc 9574\* Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive  
[www.icao.int](http://www.icao.int)

ICAO Doc 9613\* Performance-Based Navigation Manual (PBN)  
[www.icao.int](http://www.icao.int)

ICAO Doc 10037\* Global Operational Data Link (GOLD) Manual  
[www.icao.int](http://www.icao.int)

ICAO Doc 9869\* Performance-based Communication and Surveillance (PBCS) Manual  
[www.icao.int](http://www.icao.int)

ICAO Doc 9849\* Global Navigation Satellite System (GNSS) Manual  
[www.icao.int](http://www.icao.int)

ICAO Doc 10100\* Manual on Space Weather Information In Support of International Air Navigation  
[www.icao.int](http://www.icao.int)

ICAO NAT HF Guidance Material (NAT Doc 003)  
[www.icao.int/EURNAT/](http://www.icao.int/EURNAT/) > EUR & NAT Documents > NAT Documents > NAT Doc 003

Oceanic Errors Safety Bulletin  
[www.icao.int/EURNAT/](http://www.icao.int/EURNAT/) > EUR & NAT Documents > NAT Documents > NAT OES Bulletins

NAT OPS Bulletins  
[www.icao.int/EURNAT/](http://www.icao.int/EURNAT/) > EUR & NAT Documents > NAT Documents > NAT OPS Bulletins

ICAO NAT Planning Documents Supporting Separation Reductions and Other Initiatives



A320/A321  
OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

[www.icao.int/EURNAT/](http://www.icao.int/EURNAT/) > EUR & NAT Documents > NAT Documents > Planning documents supporting separation and other initiatives

Canada AIP  
[www.NAVCANADA.ca/](http://www.NAVCANADA.ca/)

Canadian Flight Supplement - A saleable document which can be ordered via:  
<http://products.navcanada.ca>

EASA CS-ACNS - Certification Specifications and Acceptable Means of Compliance for Airborne Communications, Navigation and Surveillance

<https://www.easa.europa.eu/en/document-library/easy-access-rules/easy-access-rules-airborne-communications-navigation-and>

EASA AMC 20-24

<https://www.easa.europa.eu/en/certification-specifications/amc-20-general-acceptable-means-compliance-airworthiness-products-parts>

ETSO- CS-ETSO

<https://www.easa.europa.eu/en/certification-specifications/cs-etso-european-technical-standard-orders>

Iceland AIP

<http://eaip.samgongustofa.is/>

Ireland AIP

<https://www.airnav.ie/air-traffic-management/aeronautical-information-management/aip>

RTCA DO 260/A/B

<https://standards.globalspec.com/std/1994503/rtca-do-260>

UK AIP

<https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/>

USA FAA TSO-C145, TSO-C146, TSO-C196 (GPS Certification)

<https://drs.faa.gov>



A320/A321

OM-C AIRPORTS

## APPENDICES

### NAT HLA OPERATIONS

#### NORTH ATLANTIC FLIGHT LEVEL ALLOCATION SCHEME

USA FAA AC 20-138() (Airworthiness Approval of GPS) <https://drs.faa.gov>

USA FAA AC 20-165() (Airworthiness Approval of ADS-B) <https://drs.faa.gov>

USA FAA AC91-85() (RVSM MASPSs)

[https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.information/docum entID/1035328](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/docum entID/1035328)

USA FAA NAT Resource Guide for U.S. Operators

<https://www.faa.gov/about/officeorg/headquartersoffices/avs/nat-resource-guide>

USA US Airport Facility Directory (NARs)

[https://www.faa.gov/air\\_traffic/flight\\_info/aeronav/productcatalog/supplementalcharts/](https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/supplementalcharts/)

[https://www.faa.gov/air\\_traffic/flight\\_info/aeronav/digital\\_products/dafd/](https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dafd/)

USA US AIP

[https://www.faa.gov/air\\_traffic/publications/](https://www.faa.gov/air_traffic/publications/)

USA US Coastguard GPS advisory

<http://navcen.uscg.gov/gps-nanu-almanacs-opsadvisores-sof>

## **11. AERODROME CATEGORISATION AND BRIEFINGS**





A320/A321  
OPERATIONS MANUAL PART C

## AERODROME CATEGORISATION AND BRIEFINGS

PRELIMINARY PAGES

TABLE OF CONTENTS

### 11-1 GENERAL

|                               |   |
|-------------------------------|---|
| 11-1-1 INTRODUCTION .....     | A |
| 11-1-2 AIRPORT BRIEFING ..... | B |



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME CATEGORISATION AND BRIEFINGS

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title       | Toc<br>Index | ID | Reason                               |
|-----------------------------|--------------|----|--------------------------------------|
| 11-1<br>11-1-1 INTRODUCTION | A            | 1  | New matrix for runway categorisation |





A320/A321  
OPERATIONS MANUAL PART C

## AERODROME CATEGORISATION AND BRIEFINGS

### GENERAL

#### 11-1-1 INTRODUCTION

Applicable to: ALL

*Refer to: (ORO.FC.105), (AMC1 ORO.FC.105)*

Aerodromes will be categorised in ascending order of complexity from Category A to Category C. Fly2Sky provides Airport Briefings for all destination and alternate airports as an annex to Operations Manual Part C via the Centrik System, available onboard. These are under the responsibility of the Director Flight Operations but could be delegated to the Chief Pilot Flight Standards and Documents and Chief Pilot Performance in coordination with the Training Manager, the Safety Manager. The final approval is always given by the DFO.

The criteria for the determination of an airport's category are defined in the OM-A. *Refer to: OM-A 8-1-2 DETERMINING THE ADEQUACY OF AERODROMES* A special form (Airport Categorisation Form for Short-term Operation) is to be filled in when short term (less than 6 months) operation to specific airports is scheduled (for airports which will not be available in OM-C Briefings).

The airport categorization is performed in following steps:

- Receiving the intended airport in use in the OCC of the operator. The OCC/Flight Operations Officer (FOO) performs the airport assessment checklist according to OCM: runway length, width, slope, pavement (PCN), taxiways, obstacle environment, services (fire category, ATC hours, MET availability, ground handling). If not adequate – reject or restricted.
- The "Flight Operations Engineering Officer" (FOEO) checks Navigation Data base and charts in Jeppesen, performance module compatibility, NOTAMs, terrain/obstacles, any special restrictions.
- The Chief Performance Pilot, after receiving the information from the OCC Manager and the FOEO after filling the "Airport categorization form for short-term operation", performs the final airport categorization.
- The DFO approves the "Airport categorization form for short-term operation".

- After approval, the Chief Performance Pilot uploads the "Airport categorization form for short-term operation" in the Centrik. All relevant personnel are automatically notified by the Centrik.

The check list is intended to enable prompt identification of the sources of possible operational risks so as to allow the consideration of any measures for their mitigation. Content assumes the worst-case scenario. Accordingly, it will sometimes be the case that suggested 'information acquisition' will be deemed unnecessary for a particular assessment to be sufficient.

The Flight Operations Assessment is made by a group consisting of at least two of the following Company managers – Director Flight Operations, Chief Pilot Flight Standards and Documents, Chief Pilot Performance and the Training manager.

*Note: Items marked \* also apply to new aircraft type at an existing destination.*

## **AIRPORT**

- Make a general Airport Operator Safety Assessment covering airside WIP notification, FOD control, emergency services, and airport.
- Approach/ center lighting / surface marking including taxiway centerline (both standards and maintenance). Examine a copy of the Airport SMS document.
- \*Establish that the runway and taxiway pavement surface structures and dimensions are sufficient for the intended aircraft type(s).
- \*Review Aircraft ground handling contractor(s) responsibilities with particular reference to aircraft loading certification, dangerous goods procedures and the ramp handling of aircraft.
- \*Review the airside procedures of the Passenger handling contractor.
- \*Consider arrangements for aircraft line maintenance.
- Review fuel supply arrangements and any possible fuel quality issues.
- \*If appropriate, establish or review arrangements for aircraft ground de/anti-icing.
- Review standard airport security provisions and consider if there is any case for enhanced security screening of freight, baggage or passengers. In particular, consider the expected passenger profile with special regard to both the potential for disruptive behavior in flight caused by alcohol and any possibility of an increased propensity to attempt to smoke covertly in flight
- \*Review RFFS capability in relation to intended aircraft type(s).
- Establish if there is any special degree of Bird or other Wildlife Strike Hazard, including seasonally, and if so assess the appropriateness of the mitigation - especially coastal sites, urban areas with poorly controlled refuse tipping and any tendency for seasonal

shallow water bodies in the vicinity.

- ATS Ground movement practices include directed taxi routing or general guidance procedures.
- ATS runway use - is more than one active runway designated at any one time? If so, review any intersecting runway or runway crossing issues
- \*Aircraft Type-specific ground issues – dimensions re taxi routes, gates, remote parking stands etc.
- Runway undershoots or over-run issues – establish and consider if specific flight crew awareness is warranted.
- Runway Surface safety – profile issues (linear and transverse); reference friction records and cleaning of rubber deposits; braking action/friction performance when wet but not contaminated; procedures for measuring and communicating braking action when the surface is contaminated; surface water drainage characteristics (profile, pavement wearing surface, grooving).
- Weather Record - Wind Velocity, Visibility, Temperature range and prevalence of sudden short-duration heavy precipitation.

### **FLIGHT PROCEDURES AND LOCAL FLYING AREA**

- Review Terrain within 25 nm.
- \*Assess SID/STAR procedures for any possible operational issues arising (including critical engine inoperative operations).
- \*Assess Instrument Approach Procedures and consider carrying out at least some checking of the proprietary plates used by the operator against the State AIP source. Check that any noise abatement requirements are included in procedures and that there is no conflict between Company power plant failure procedures and ATC Procedures. Identify the extent to which these procedures represent a radical departure from those routinely flown by the flight crew/aircraft types which would be deployed. Decide if acceptance of discretionary visual contact approaches will be permitted by day, by night or in neither case by the Operator and if.
- \*If any (or even all) approaches will need to terminate with a visual final segment, review all aspects of such procedures carefully, including the day/night case and minimum IFV.
- \*Based upon all the above and on relevant determinations relating to aircraft performance, decide whether it is appropriate to “fly” procedures in aircraft simulators to elicit any operational issues which may not otherwise be apparent.
- Review overall ATC situation for any issues e.g. language(s) used on radiotelephony and the level of English language competency beyond routine aviation English.
- Establish the availability of ATC “safety nets” such as STCA (Short Term Conflict Alert), MSAW (Minimum Safe Altitude Warning) and ASMGCS (Surface Movement Guidance

and Control System).

- \*Review any increased likelihood of 'nuisance' EGPWS and TCAS alerts during approach or climb out.

## **ENROUTE**

- \*Consider any drift down issues and identify route sections with an MSA which would preclude an emergency descent to 10 000 ft (escape routes shall be prepared for the case of depressurisation over critical areas, the necessity for additional fuel shall be considered).
- Check if operations outside controlled airspace will be involved and if so, review the implications.
- Review the balance of expected ATC service between procedural and radar control.
- Review risks of military activity in the general vicinity of transit airspace which might be prejudicial to the safety of operations. Establish any need for special diplomatic overflight clearances.
- Review all issues concerning fuel burn calculations.

## **AIRCRAFT PERFORMANCE**

- \*Calculate the extremes of the aircraft performance envelope airborne in relation to aircraft weight, prevailing temperature and obstacles/terrain.
- \*Assess departure and missed approach procedures for terrain clearance in both normal and engine-out operations.
- \*Review the potential for Payload/Range issues given the sector(s) intended and any restrictions to aircraft loading which might be required routinely or tactically.

## **FINAL DETERMINATION**

- \*Categorise the Airport for each aircraft type or generally as:
  - A (normal - routine new destination briefing);
  - B (special flight crew briefing notes); or
  - C (special flight crew training required).

For CAT C airports consider:

- Non-standard or curved approach;
  - RNP AR required;
  - Visual segment critical;
  - Late configuration/high workload;
  - Weather phenomena (windshear, mountain waves, crosswind limitations, rapid weather change);
  - ATC/airspace complexity (altitude constraints, noise abatements constraints affecting safety margins, terrain, type of approaches etc.);
  - High airport altitude, high pressure altitude;
  - Runway slope;
  - Operational history (high go-around rate, runway excursion events, internal reports).
  - Consider as a category C by the local authorities.
- In the case of **B** or **C** categorisation, develop the necessary briefing/training material and ensure procedures to qualify all flight crew accordingly prior to operation to the new destination are put in place.

Ensure that all relevant current NOTAM and weather information can be made available to flight crew pre-flight and/or in flight.



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME CATEGORISATION AND BRIEFINGS

### GENERAL

### AIRPORT CATEGORISATION FORM FOR SHORT-TERM OPERATION



#### AIRPORT CATEGORISATION FORM FOR SHORT TERM OPERATION

|                                 |        |           |        |               |        |       |        |   |
|---------------------------------|--------|-----------|--------|---------------|--------|-------|--------|---|
| Name                            |        | ICAO      |        | IATA          |        | State |        |   |
| Category                        |        | Reason    |        |               |        |       |        |   |
|                                 | Runway | /         | Runway | /             | Runway | /     | Runway | / |
| TORA                            |        |           |        |               |        |       |        |   |
| TODA                            |        |           |        |               |        |       |        |   |
| ASDA                            |        |           |        |               |        |       |        |   |
| LDA                             |        |           |        |               |        |       |        |   |
| Width                           |        |           |        |               |        |       |        |   |
| SID (Y/N)                       |        |           |        |               |        |       |        |   |
| STAR (Y/N)                      |        |           |        |               |        |       |        |   |
| Night Ops (Y/N)                 |        |           |        |               |        |       |        |   |
| Standard Lights                 |        |           |        |               |        |       |        |   |
| G/S Angle                       |        |           |        |               |        |       |        |   |
| Threshold elevation             |        |           |        |               |        |       |        |   |
| Slope                           |        |           |        |               |        |       |        |   |
| Circling Altitude               |        |           |        |               |        |       |        |   |
| Met phenomena                   |        |           |        |               |        |       |        |   |
| Birds                           |        |           |        |               |        |       |        |   |
| Special TO profile              |        |           |        |               |        |       |        |   |
| Special LDG profile             |        |           |        |               |        |       |        |   |
| Mass limitation TO              |        |           |        |               |        |       |        |   |
| Mass limitation LDG             |        |           |        |               |        |       |        |   |
| Airport elevation               |        |           |        |               |        |       |        |   |
| Fire/Rescue CAT                 |        |           |        |               |        |       |        |   |
| Other restrictions              |        |           |        |               |        |       |        |   |
| Filed by (Name and Position)    |        | Signature |        |               |        |       |        |   |
| Approved by (Name and Position) |        | Signature |        | Date of issue |        |       |        |   |

ACFSTO | ISSUE 1 | REVISION 0 | 20/03/2022



A320/A321  
OPERATIONS MANUAL PART C

## AERODROME CATEGORISATION AND BRIEFINGS

### GENERAL

#### 11-1-2 AIRPORT BRIEFING

Applicable to: ALL

Airport briefings are available onboard on the Centrik system, which is available on the company iPads. The manual called OM-C Briefings is updated as an uncontrolled document. Indeed, due to the OM-C Airports dynamic nature and their continuous updates as well as the versatility required by the ACMI operations, the only accurate and precise handling of airport briefings is via the Appendix available onboard database.

The OM-C Airports are checked and approved by the competent authority at the time of the OM-C Manual approval. Until the next revision of the OM-C manual about all changes, the revision made in the OM-C Airports the competent authority is notified.

The issue date of OM-C Airports is the issue date of OM-C, however, the OM-C Airports contains the current issue date and the last issue date which is replaced by the current revision. Moreover, at the section of List of Effective Sections/Subsections the date of the last modification for each airport are kept up to date for easy identification by all personnel.

The briefings include information about the categorisation of the airport, restrictions if applicable operational requirements, LVO availability and Handling information.

Notes: Airport categorisation are shown on each airport briefing's header.

*Pilots must study the appropriate airport briefing before operating a route and destination.*

In case of any contradiction between the Jeppesen FD Pro X or NOTAM sources and the Airport Briefings, the information in the Jeppesen FD Pro X and the NOTAM takes precedence. In case of any discrepancy is found in the OM-C Airports crew should inform the Director Flight Operations via eMail dfo@fly2sky.aero.

## **12 SPECIAL LIMITATIONS**



Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

**SPECIAL LIMITATIONS**

**PRELIMINARY PAGES**

**TABLE OF CONTENTS**

## **12-1 GENERAL**

|                                      |   |
|--------------------------------------|---|
| 12-1-1 FUEL FREEZING .....           | A |
| 12-1-2 NARROW RUNWAY OPERATIONS..... | B |



A320/A321  
OPERATIONS MANUAL PART C

**SPECIAL LIMITATIONS**

**PRELIMINARY PAGES**

**TABLE OF CONTENTS**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## SPECIAL LIMITATIONS

### PRELIMINARY PAGES

### SUMMARY OF HIGHLIGHTS

| Localization<br>Title | Toc<br>Index | ID | Reason |
|-----------------------|--------------|----|--------|
|                       |              |    |        |



A320/A321  
OPERATIONS MANUAL PART C

**SPECIAL LIMITATIONS**

**PRELIMINARY PAGES**

**SUMMARY OF HIGHLIGHTS**

Intentionally left blank



A320/A321  
OPERATIONS MANUAL PART C

## SPECIAL LIMITATIONS

### GENERAL

#### 12-1-1 FUEL FREEZING

Applicable to: ALL

No software program exists allowing calculation of in-flight fuel temperature for the A320 family. However, Airbus has confirmed that there has never been a reported incident of this phenomenon on these aircraft so the risk is considered negligible.

An ECAM Caution is raised to pilots in case of low detected fuel temperature which should prompt them to refer to the eQRH Advisory checklist.

#### 12-1-2 NARROW RUNWAY OPERATIONS

Applicable to: ALL

A Narrow Runway is defined as a runway with a width less than 45 m and not less than 30 m. General Limitations, Performance and Procedures relating to Narrow Runways are detailed in FCOM. *Refer to: FCOM POR-SPO-60 - Operations on Narrow Runways.*

The minimum width of taxiways is 15 m. Commanders are permitted to operate on a narrow runway (CM1 or CM2) only if their narrow runway simulator training is valid.

First Officers are permitted to be PF on a narrow runway only if their narrow runway simulator training is valid.



A320/A321  
OPERATIONS MANUAL PART C

## SPECIAL LIMITATIONS

### GENERAL

Intentionally left blank

04-AUG-  
2022  
CAR

**Table of Contents**

Caribbean  
Regional SUP  
INFO

**1 CAR Region**

**Overview 2 RAR**

|         |                                                                             |                                              |
|---------|-----------------------------------------------------------------------------|----------------------------------------------|
| 2.1     | Flight Information Region (FIR) (NIL)                                       | R-21                                         |
| 2.2     | Advisory Routes, Areas, Service (NIL)                                       | R-21                                         |
| 2.3     | Controlled Airspace and ATC                                                 | 2.3. West Atlantic Route System (WATRS) R-21 |
|         | 2.4 Alerting, Search and Rescue (NIL)                                       | R-22                                         |
|         | 2.5 Airspace Restrictions (NIL)                                             | R-22                                         |
| 2.6     | General Flight Rules, Aeroplane Instruments, Equipment and Flight Documents | R-                                           |
| 2.6.1.1 | Operation of Aircraft Approved for RVSM                                     | not R-22                                     |
|         | 2.6.2 Gulf of Mexico RNAV Routes Q100, Q102, and Q103                       | R-22                                         |
| 2.7     | Visual Flight Rules (VFR) (NIL)                                             | R-22                                         |
| 2.8     | Instrument Flight Rules (IFR)                                               | R-22                                         |
| 2.9     | Units of Measurement (NIL)                                                  | R-23                                         |
| 2.10    | Altimeter Setting (NIL)                                                     | R-23                                         |
| 2.11    | Altitude Regulations (NIL)                                                  | R-23                                         |



|      |                  |        |                                             |      |
|------|------------------|--------|---------------------------------------------|------|
| 2.12 | Separation Rules | 2.12.1 | ADS-C Distance-Based Separation in New York |      |
|      |                  |        | Oceanic Airspace                            | R-23 |
|      |                  | 2.12.2 | Lateral Separation                          | R-24 |
|      |                  | 2.12.3 | Longitudinal Separation                     | R-24 |
|      |                  | 2.12.4 | Vertical Separation                         | R-25 |

Regional  
INFO

SUP

II

CAR

2.12.5 50NM Lateral Separation in Houston and Miami Oceanic Airspace R-

2.12.6 50NM Lateral Separation in New York Oceanic Airspace 25 R-30

2.13 Flight Plan and Clearance  
2.13.1 Route R-30

2.13.2 Mach Number R-30

2.14 Communication (NIL) R-40

2.15 Flight Permission (NIL) R-40

2.16 Miscellaneous (NIL) R-40

2.17 Emergency (NIL) R-40

2.18 Interception Principles and Signals (NIL) R-40

2.19 Unlawful Interference (NIL) R-40

**3 MET**

- |     |                         |    |
|-----|-------------------------|----|
| 3.1 | General Weather<br>43   | R- |
| 3.2 | Tropical Cyclones<br>43 | R- |

**4 NAV**  
**(NIL)**

**5 COM**

- |       |                                       |       |                                                           |      |
|-------|---------------------------------------|-------|-----------------------------------------------------------|------|
| 5.1   | Air-Ground<br>Communications and In-  | 5.1.1 | Continuous Listening<br>Watch in Uncontrolled<br>Airspace | R-50 |
|       | Flight<br>Reporting                   | 5.1.2 | Position Reports                                          | R-50 |
|       |                                       | 5.1.3 | ATC Clearances                                            | R-60 |
| 5.2   | Data Link Services<br>Cayenne FIR/UIR | 5.2.1 | R-62                                                      |      |
| 5.2.2 | Central America FIR/UIR               |       | R-63                                                      |      |

|             |                                                      |                        |                                      |       |
|-------------|------------------------------------------------------|------------------------|--------------------------------------|-------|
| 15-SEP-2022 | Caribbean                                            | III                    | Regional INFO                        | SUP   |
| CAR         |                                                      |                        |                                      |       |
|             | 5.2.3                                                | Mazatlan Oceanic FIR   | R-63                                 |       |
|             | 5.2.4                                                | New York Oceanic FIR   | R-64                                 |       |
|             | 5.2.5                                                | Piarco FIR             | R-66                                 |       |
|             | 5.2.6                                                | U.S. Domestic En Route | CPDLC R-67                           |       |
| 5.3         | COM Services in Anchorage, New York and Oakland OCAs |                        |                                      | R-70  |
| 5.4         | SATCOM Short Codes & PSTN Numbers                    |                        |                                      | R-80  |
| 5.5         | Beacon Code Requirement S                            | 5.5.1                  | Houston Oceanic FIR                  | R-80  |
|             |                                                      | 5.5.2                  | Miami CTA/FIR                        | R-80  |
| 6 Appendix  |                                                      |                        |                                      |       |
| 6.1         | VOLMET / ATIS                                        | 6.1.1                  | VOLMET Stations - NIL                | R-81  |
|             |                                                      | 6.1.2                  | Aerodromes Covered by VOLMET Service | R-81  |
|             |                                                      | 6.1.3                  | ATIS Frequencies                     | R-82  |
| 6.2         | SITA VHF AIRCOM ACARS Service Coverage               |                        |                                      | R-90  |
| 6.3         | HF Frequencies - CAR Region                          | 6.3.1                  | HF Networks and Overview             | R-100 |
|             |                                                      | 6.3.2                  | HF Frequency List                    | R-110 |



07-MAR-  
2019  
CAR

Caribbean  
Regional SUP  
INFO

RSI

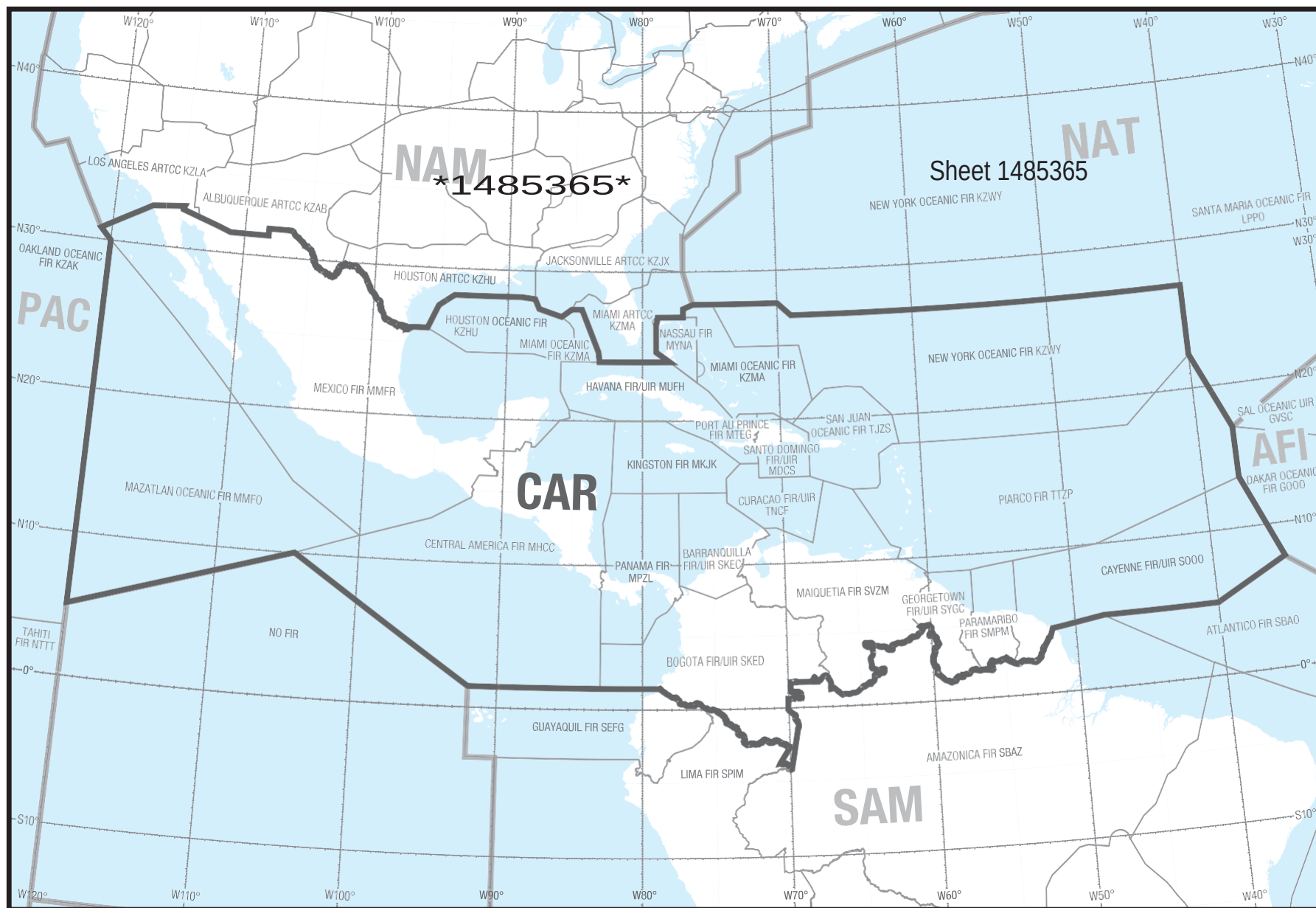
Caribbean  
Regional SUP INFO

RSI

R-10

#### 1 CAR Region Overview

The RSI CAR applies to the following FIRs/UIRs:







04-AUG-  
2022  
CAR

Caribbean  
Regional SUP  
INFO

RSI

R-21

2RAR

2.1 **Flight Information Region (FIR) (NIL)**

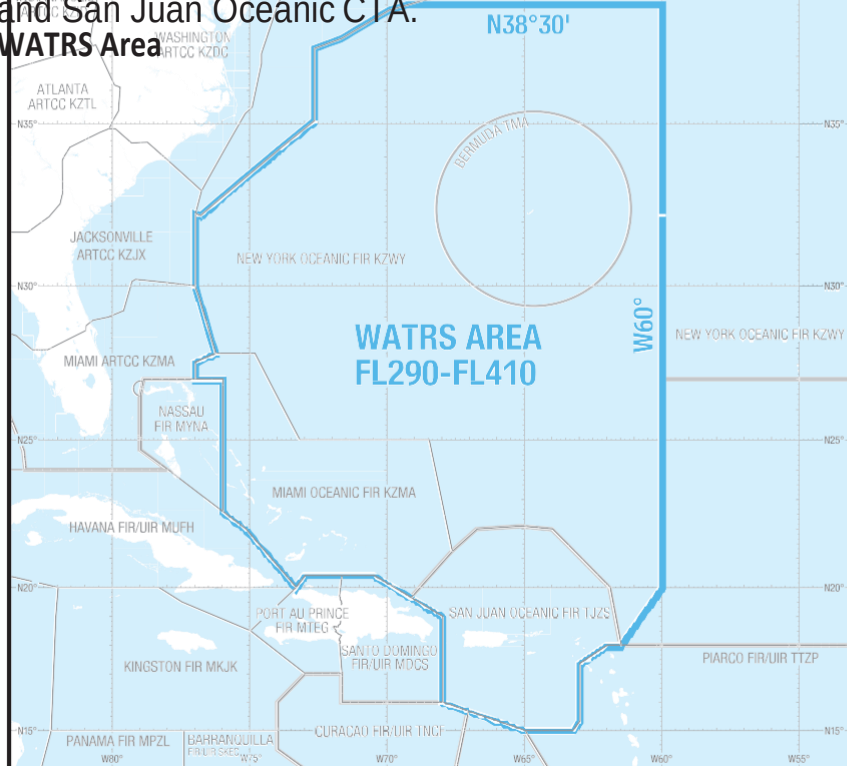
2.2 **Advisory Routes, Areas, Service (NIL)**

2.3 **Controlled Airspace and ATC**

2.3.1 **West Atlantic Route System (WATRS)**

The West Atlantic Route System (WATRS) is located in the New York Oceanic (West) CTA and includes Miami Oceanic and San Juan Oceanic CTA.

**WATRS Area**



Also

refer to: 2.12.5 50NM Lateral Separation in New York Oceanic Airspace

North Atlantic RAR

## Regional SUP INFO

R-22

CA

2.4 **Alerting, Search and Rescue (NIL)**

R

2.5 **Airspace Restrictions (NIL)**2.6 **General Flight Rules**2.6.1 **Aeroplane Instruments,  
Equipment and Flight Documents**2.6.1.1 **Operation of Aircraft not Approved  
for RVSM**

Except for areas where transition areas have been established, aircraft not approved for RVSM operations, shall not be allowed to operate in CAR/SAM RVSM airspace.

Exceptionally, aircraft that have not received RVSM State approval may be cleared to operate in airspace where RVSM may be applied in accordance with policy and procedures established by the State provided that 600m (2000ft) vertical separation is applied.

2.6.2 **Gulf of Mexico RNAV Routes Q100, Q102, and Q105**a **Introduction**

a The three Q routes over the northern portion of the Gulf of Mexico, Q100, Q102, and Q105, have different navigation equipment requirements and are not the same as the RNAV Q routes over the continental United States. Operators flying any of the three routes require ACFT equipped with a long-range navigation system, as defined in 14 CFR Part 1, § 1.1. Operators may not rely on ground-based navigation aids alone for operations on the three Gulf Q routes.

a **Operational Requirements**

a • For U.S. commercial operators, i.e., those operating under 14 CFR Parts 91 subpart K, 121, 125, and 135, navigation systems acceptable for flying the Gulf Q routes are those incorporating GPS and/or inertial systems inputs, and authorized in their Operations Specification/Management Specification/Letter of Authorization B034. For operators flying under part 91, an acceptable long-range navigation system is one approved for IFR navigation and incorporating GPS and/or inertial system inputs. Operators' Airplane Flight Manual, Pilot Operating Handbook, avionics manual, or other manufacturer-provided documentation should reference AC 20-138 as the source of guidance for airworthiness approval of

applicable positioning and navigation systems.

- a • Pilots should fly the route centerlines at all times and must notify ATC of any loss of navigation capability that affects the ACFT's ability to track the route centerline. Pilots must not use Strategic Lateral Offset Procedures (SLOP) on the three Gulf Q routes.
- a • ACFT without GPS-based RNAV capability that are relying on inertial navigation systems to fly the three Gulf Q routes are limited to 1.5 consecutive hours between inertial position updates (e.g., a DME update of the inertial navigation system). Timing of the 1.5HR limit begins when automatic updates of the inertial navigation system are no longer available or immediately following the flight crew's manual inertial system position update.
- a **Note:** ATC normally provides radar monitoring along the three Gulf Q routes. Pilots can expect ATC to advise them when radar monitoring is unavailable and to adjust ACFT separation as necessary.

## 2.7 Visual Flight Rules (VFR) (NIL)

## 2.8 Instrument Flight Rules (IFR)

Flights shall be conducted in accordance with instrument flight rules when operated above FL180 within the control areas of Miami Oceanic, Houston Oceanic and San Juan FIRs.

04-AUG-2022

CAR

R-23

Regional SUP

INFO

2.9 Units of Measurement (NIL)

2.10 Altimeter Setting (NIL)

2.11 Altitude Regulations (NIL)

2.12 Separation Rules

### 2.12.1 ADS-C Distance-Based Separation in New York Oceanic Airspace

Distance-based longitudinal separation minima using ADS-C is implemented in the New York Oceanic airspace as specified in the table below:

| Minima | RNP | Maximum<br>Periodic<br>Reporting<br>Interval | ADS-C |
|--------|-----|----------------------------------------------|-------|
| 50NM   | 10  | 27<br>min                                    |       |
| 50NM   | 4   | 32<br>min                                    |       |
| 30NM   | 4   | 10<br>min                                    |       |

Aircraft Future Air Navigation System (FANS) 1/A communications, navigation and surveillance (CNS) capabilities, interfaced with Advanced Technology and Oceanic Procedures (ATOP), are required for ADS-C distance based separation to be applied.

**Note:** ADS-C distance based separation standards may not be applied to aircraft utilizing High Frequency Data Link (HFDL).

#### Application

New York ARTCC will apply the following policies to the use of ADS-C distance based separation:

- The separation will be applied to pairs of suitably equipped pairs of aircraft;
- Published ATS routes and other tracks will continue to be laterally separated by a minimum of 50NM;
- Minimum ADS-C based lateral and longitudinal separation between 30NM eligible aircraft and 50NM eligible aircraft is 50NM; and
- Lateral and longitudinal separation standards applied between RNP 10 and non-RNP 10 aircraft remains

unchanged.

**Aircraft and Operator Eligibility for 30NM Distance-Based Separation**

The aircraft and operator must be authorized by the State of the Operator or the State of Registry, as appropriate, for RNP 4, RCP 240, and RSP 180 operations;

The aircraft must be equipped with a minimum of two approved long range navigation systems that will enable the aircraft to maintain RNP 4 for the duration of flight in the applicable airspace;

The aircraft must be equipped with a FANS1/A package (or equivalent) that includes satellite Controller Pilot Data Link Communication (CPDLC) and ADS-C that meet the standards of RTCA Document 258, Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications;

Satellite CPDLC communications and ADS-C surveillance must be conducted in accordance with the ICAO Global Operational Data Link Document (GOLD), as amended, and maintained for the duration of the flight.

**2.12.2 Lateral**

R

**Separation**

Minimum lateral separation shall be:

- a) 50NM between ACFT approved for RNP 10 or RNP 4 between flights operating on oceanic routes or areas:
  - within the following CTA/FIRs: San Juan, Houston Oceanic, Miami Oceanic (Atlantic and the Gulf of Mexico portion), Monterrey CTA and Merida High CTA within the Mexico FIR/UTA, or the WATRS; and
  - outside WATRS within the control area of the New York Oceanic FIR, except minimum lateral separation between ACFT transitioning from airspace in the New York Oceanic FIR/CTA to MNPS airspace shall be 60NM.
- b) 60NM between ACFT which meet the North Atlantic MNPS which, while operating in the control area of San Juan FIR, are in transit to or from the NAT MNPS airspace
- c) 90NM between ACFT not approved RNP 10 or RNP 4 operating between the United States, Canada or Bermuda and points in the CAR Region in the control areas of San Juan and New York Oceanic FIRs and the Atlantic portion of the Miami Oceanic control area
- d) 100NM west of 060W (only in oceanic areas) between ACFT not covered in a), b) or c) above, and between ACFT in the control area of Piarco FIR west of 055W
- e) 120NM between ACFT operating east of 060W in the New York Oceanic FIR, and between ACFT in the control area of Piarco FIR east of 055W

**Note:** Lower minima may be applied, depending on location, NAVAIDs or methods, RNAV operations.

**2.12.3 Longitudinal Separation**

- a) At or above FL280 on oceanic published routes operating in the West Atlantic Route System (WATRS), or at or

above FL280 operating west of 060W when transitioning to or from the WATRS area, the longitudinal separation shall be in accordance with time based Mach Number Technique (MNT).

- b) ACFT operating at or above FL200 and west of 060W within the Houston Oceanic, applicable parts of Mexico FIR (Merida and Monterrey CTAs), Miami Oceanic and San Juan CTA/FIR, the longitudinal separation with Mach Number Technique applied shall be:
  - 15 MIN; or
  - 10 MIN at the entry point into oceanic controlled airspace, if the preceding ACFT is maintaining a speed of at least Mach 0.03 greater than that of the following ACFT; or
  - 5 MIN at the entry point into oceanic controlled airspace, if the preceding ACFT is maintaining a speed of at least Mach 0.06 greater than that of the following ACFT.
- c) 20 MIN longitudinal separation applies between ACFT operating below FL200 west of 055W and between ACFT operating at all levels east of 055W within the San Juan and Piarco FIRs and the Paramaribo and Cayenne UIRs.
- d) Between ACFT meeting the MNPS and operating in the New York Oceanic control area wholly or partly in MNPS airspace, time based MNT shall be used. In cases where the ACFT concerned have reported over a common point and follow continuously diverging tracks until some other form of separation is provided:
  - at least 10 MIN longitudinal separation shall exist at the point where the tracks diverge; or
  - at least 5 MIN longitudinal separation will exist where lateral separation is achieved; and
  - lateral separation will be achieved at or before the next significant point (normally 10 degrees of longitude along track) or, if not, within 90 MIN of the time the second ACFT passes the common point or

within 600NM of the common point, whichever is estimated to occur first.

- e) 15 MIN for ACFT meeting the MNPS and operating in the New York Oceanic control area wholly or partly in MNPS airspace but not meeting the requirement of d) above.



04-AUG-  
2022  
CAR

R-25

Caribbean  
Regional SUP  
INFO

RSI

- g) Between ACFT operating outside MNPS airspace in the New York Oceanic control area, the minimum longitudinal separation shall be:
- 15 MIN, provided the MNT is applied and, whether in level, climbing or descending flight, the ACFT have reported over a common point and follow the same track or continuously diverging tracks until some other form of separation is provided; or
  - 15 MIN, provided the MNT is applied and, whether in level, climbing or descending flight, the ACFT have not reported over a common point, it is possible to ensure, by radar or other means approved by the State, that the appropriate time interval will exist at the common point from which they follow either the same track or continuously diverging tracks;
  - 10 or 5 MIN only when it is possible to ensure, by radar or other means approved by the State, that the required time intervals exists and will exist at the common point, provided the preceding ACFT is maintaining a greater Mach number than the following ACFT in accordance with the following:
    - 10 MIN if the preceding ACFT is maintaining a speed of at least Mach 0.03 greater than that of the following ACFT; and
    - 5 MIN if the preceding ACFT is maintaining a speed of at least Mach 0.06 greater than that of the following ACFT
  - 20 MIN between turbo-jet ACFT not covered by f) above.
  - 20 MIN between other than turbo-jet ACFT operating along routes extending between the United States, Canada or Bermuda and Caribbean terminals, or between the United States or Canada and Bermuda and 30 MIN between other than turbo-jet ACFT

operating along other routes.

#### **2.12.4 Vertical Separation**

RVSM separation of 1000ft (300m) shall be applied between FL290 and FL410 inclusive in the following FIRs:

Barranquilla, Central America, Curacao, Georgetown, Havana, Houston Oceanic, Kingston, Maiquetia, Mazatlan Oceanic, Mexico, Miami Oceanic, Panama, Paramaribo, Piarco, Port-au-Prince, Cayenne, Santo Domingo and San Juan.

#### **2.12.5 50NM Lateral Separation in Houston and Miami Oceanic Airspace**

a

**General**

**a)**

a) The FAA and the Mexican ATS providers have implemented 50NM lateral separation between RNP 10 or RNP 4 ACFT operating in Gulf of Mexico Oceanic Airspace. 50NM lateral separation is implemented in the following airspace:

a - Houston Oceanic CTA/FIR;

a - Gulf of Mexico portion of the Miami Oceanic CTA/FIR;

a - Monterrey CTA;

a - Merida CTA within the Mexico FIR/UTA.

a b) RNAV routes within Houston Oceanic Airspace are spaced a minimum of 50NM to support this reduced lateral separation in the Gulf of Mexico.

c) Information useful for flight planning and operations within the Gulf of Mexico under this 50NM lateral separation initiative can be found in the West Atlantic Route System, Gulf of Mexico, and Caribbean Resource Guide for U.S. Operators located at:  
<http://www.faa.gov/headquarters/sofices/avs/wat-gomex-and-caribbean-resource-guide>

The Guide can also be found through a web search for "WATRS, GOMEX, Caribbean Resource Guide."

a d) The 50NM lateral separation is applied at all altitudes

above the floor of controlled airspace. Lateral separation of 100NM will continue to be provided in the Houston Oceanic, Monterrey, and Merida CTA/FIRs to aircraft not authorized RNP 10 or RNP 4. Similarly, those aircraft will experience 90NM lateral separation in Miami Oceanic CTA/FIR.

Regional SUP

CA

INFO

R

- a e) Operations on certain routes that fall within the boundaries of affected CTAs are not affected by the application of 50NM lateral separation. Operation on the following routes is not affected:
  - a - Routes that are flown by reference to ICAO standard ground-based navigation aids (VOR, VOR/DME, NDB); and
  - a - Special RNAV routes Q100, Q102 and Q105 in the Houston, Jacksonville and Miami CTAs.
- a f) In the course of regular oceanic operations while flying within FAA controlled oceanic airspace pilots should use SLOP procedures.
- a **Provisions for Accommodation of Non-RNP 10 Aircraft (Not Authorized RNP 10 or RNP 4)**
  - a a) Operators of Non-RNP 10 aircraft must annotate ICAO flight plan Item 18 as follows:
    - a - "RMK/NON-RNP10" (no space between letters and numbers);
    - a - Use of flight plan item 18 codes "PBN/A1" or "PBN/L1" are restricted to operators and aircraft specifically authorized for RNP 10 or RNP 4, as applicable.
  - a b) Pilots of non-RNP 10 aircraft that operate in GoMex CTAs must report the lack of authorization by stating "Negative RNP 10":
    - a - On initial call to ATC in a Gulf of Mexico CTA; or
    - a - When approval status is requested by the controller.
  - a c) Non-RNP 10 operators/aircraft may file any route at any altitude in a Gulf of Mexico CTA. They will be cleared to operate on their preferred routes and altitudes as traffic permits. 50NM lateral separation will not be applied to non-RNP 10 aircraft.
  - a d) Non-RNP 10 aircraft should plan on completing their climb to or descent from higher FLs within radar coverage, if possible.

- a e) In order to maximize operational flexibility provided by 50NM lateral separation, operators capable of meeting RNP 10 or RNP 4 that operate on oceanic routes or areas in the Gulf of Mexico CTAs should obtain authorization for RNP 10 or RNP 4 and annotate the ICAO flight plan accordingly.

04-AUG-2022

CAR

R-30

Regional SUP

INFO

### 2.12.6 50NM Lateral Separation in New York Oceanic Airspace

- a) ATC applies 50NM lateral separation between aircraft authorized RNP 10 or RNP 4 within New York Oceanic West airspace. ATC similarly applies 50NM lateral separation in the Atlantic portion of the Miami Oceanic CTA as well as the San Juan CTA/FIR. ATC may apply 50NM lateral separation between aircraft authorized RNP 10 or RNP 4 in New York Oceanic East Airspace.
- b) Aircraft authorized RNP 10 or RNP 4 will have a better chance of obtaining their preferred routing and altitude in the most densely used airspace (below FL410) because of their ability to participate in ATC's use of 50NM lateral separation. Non-RNP 10 or non-RNP 4 aircraft will be spaced at least 90NM laterally from other aircraft.
- c) Pilots should use SLOP procedures in the course of regular Oceanic operations.
- c d) ATC will not apply 50NM lateral separation on routes that are within ATC radar and VHF voice radio coverage. New York Oceanic airspace contains the following routes or route segments, which, at and above FL310, are within ATC radar and VHF radio coverage:
  - M201 between VIRST and VEGAA; and
  - Y485, Y488, Y493, and Y494.
- c **Note:** While flying these route segments, pilots communicate directly with ATC using VHF voice radio, and domestic procedures apply. SLOP is not to be used. Oceanic data link procedures (with KZWY log-on) are also not applicable.
- e) Operators of aircraft not authorized RNP 10 or RNP 4 are expected to indicate their "non-RNP 10" status in Item 18 of their ATC flight plan. In addition, pilots are expected to inform ATC of their "non- RNP 10" status on initial call to ATC on WATRS routes and when reading back a clearance to descend through FL410.
- f) Filing a flight plan for, and conducting operations under,

RNP 10 or RNP 4 navigation specifications require the aircraft to be equipped with two operable Long-range Navigation Systems (LRNS). Operators who indicate RNP 10 or RNP 4 capability on their ATC flight plans, and subsequently experience a LRNS failure while operating on a WATRS route, must alert ATC to this failure. If the pilot believes the aircraft can continue to be navigated within 10NM of the cleared route with the single LRNS, ATC should be informed; as such, ATC may continue the aircraft on the cleared route.

- g) In the event of LRNS failure prior to joining a WATRS route, pilots must inform ATC of the failure and ensure ATC is aware the aircraft is no longer qualified for the RNP level indicated in the flight plan. In addition to this notification, pilots should request ATC to amend their flight plan to remove the RNP capability indication in Item 18 of the flight plan.

## **2.13 Flight Plan and Clearance**

### **2.13.1 Route**

Flight plans for flights or portions thereof along oceanic routes not defined by specified reporting points shall be made in accordance with the following:

- for flights with flight path generally oriented in an east-west direction, the planned track shall normally be defined by significant points formed by the intersection of half or whole degrees of latitude and meridians spaced at intervals of 10 degrees;
- for flights with flight path generally oriented in a north-south direction, the planned track shall normally be defined by significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude spaced at 5-degree intervals.

### **2.13.2 Mach Number**

For turbo-jet ACFT intending to operate within the control areas of Houston Oceanic, Mexico, Miami Oceanic and San Juan FIRs at or above FL200 and west of 060W, the planned true Mach number shall be specified in Item 15 of the FPL.

## Regional SUP INFO

R-40

CA

R

- 2.14 **Communication (NIL)**
- 2.15 **Flight Permission (NIL)**
- 2.16 **Miscellaneous (NIL)**
- 2.17 **Emergency (NIL)**
- 2.18 **Interception Principles and  
Signals (NIL)**
- 2.19 **Unlawful Interference (NIL)**





20-SEP-  
2018  
CAR

R-43

Caribbean  
Regional SUP  
INFO

RSI

### 3 MET

#### 3.1 General Weather

Contrary to the Inter Tropical Front (ITF) in West Africa, the ITF over the Caribbean Region is not a significant front. The ITF appears in a blurred way over a distance of 100-300NM. The seasonal movement area is small. The most northerly position is at the latitude of Panama - Caracas in July and the most southerly position appears in January south of Guayaquil. In summer, however, significant CBs up to FL450 may occur in the Caribbean.

The island of Montserrat south of Antigua has an active volcano named "Plymouth" that has been erupting sporadically since 1995.

#### 3.2 Tropical Cyclones

Generic term for a non-frontal synoptic-scale cyclone originating over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation.

SIGMET messages shall include tropical cyclones provided that the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 34KT (17m/s).

**Example:** TC (+ cyclone name)



20-AUG-  
2020  
CAR

R-50

Caribbean  
Regional SUP  
INFO

RSI

#### 4 NAV(NIL)

#### 5COM

##### 5.1 Air-Ground Communications and In-Flight Reporting

##### 5.1.1 Continuous Listening Watch in Uncontrolled Airspace

All VFR flights, and IFR flights outside controlled airspace, shall maintain a listening watch on the frequency where flight information service is provided and report position unless otherwise authorized by the State overflown.

##### 5.1.2 Position Reports Time or Place

Position reports additional to those required by the general position reporting procedures shall be made at the FIR boundary when entering or exiting Panama FIR.

Unless otherwise required by ATS, position reports for flights on routes not defined by designated reporting points shall be made at the significant points listed in the FPL.

Except where operational considerations dictate otherwise, reporting points should be located at intervals of 5 degrees of latitude or longitude (latitude if the route is predominantly north-south, longitude if east-west).

ACFT traversing 10 degrees of latitude or longitude in 1 HR 20 MIN or less should normally be required to report only 10-degree intervals. Slower ACFT should normally be required to report at 5-degree intervals.

For flights in oceanic areas outside the ATS routes network, the position shall be expressed in terms of latitude and longitude as follows:

- for flights operating predominantly east-west direction:
  - latitude in degrees and minutes; and
  - longitude in degrees only
- for flights operating predominantly north-south

direction:

- latitude in degrees only; and
- longitude in degrees and minutes

Unless air-ground communication is direct with the area control centre concerned, all times shall be expressed in four digits, giving both the hour and minutes, when making position reports within oceanic control areas.

**Next Position and Time Over**

Time over next position shall be expressed in four digits, giving both the hour and minutes, when making position reports within oceanic control areas.

If the estimated time over the next significant point is found to be in error by five minutes or more, a revised estimated time over shall be transmitted as soon as possible to the appropriate ATS unit.

**Level**

ACFT cleared for cruise climb shall report their flight level to the nearest 100ft (30m) - e.g. FL354.

**Transmission**

Position reports made by ACFT operating within an oceanic control area at a distance of 60NM or less from the common boundary with an adjacent oceanic control area, including ACFT operating on tracks through successive points on such boundary, shall also be made to the ACC serving the adjacent control area. Responsibility for the transmission may be delegated to the appropriate communications station(s) through local arrangements.

5.1.3 **ATC****Clearances**

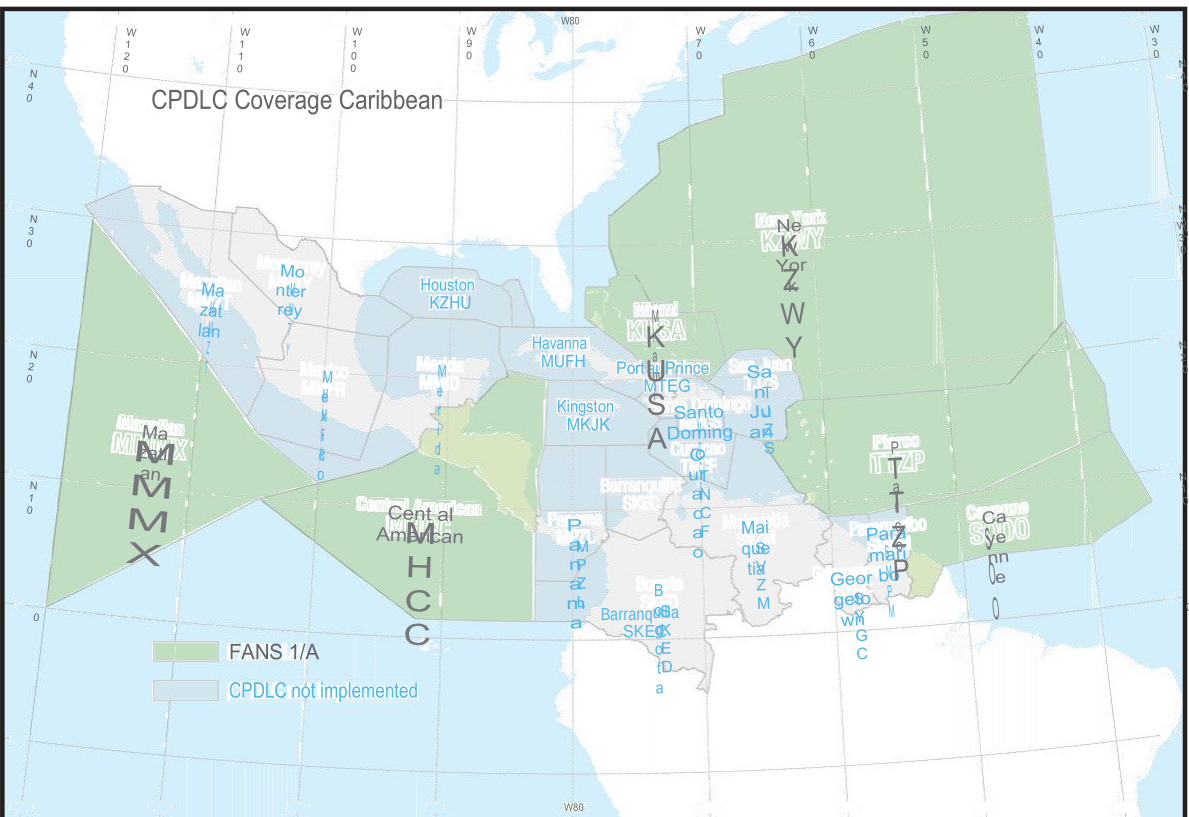
HF communication is required over large parts of the South Atlantic. The normal radiotelephone language in South America is Spanish. The ATC controllers often work on several frequencies at a time and therefore a reply to a message may not be provided right away. Especially in South America all ATC clearances should be dealt with carefully. ATC is not always according to ICAO standard.

- North Atlantic COM 5.3 Oceanic Clearance Procedures



CAR

## 5.2 DataLink Services





S  
1  
0

W  
4  
0

W  
5  
0

W  
6  
0

W  
7  
0

W  
9  
0

W  
1  
0  
0

W  
1  
1  
0

W  
1  
2  
0

S  
1  
0

RSI

## INFO

## 5.2.1 Cayenne

## FIR/UIR

| Data Authority | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|----------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Cayenne        | -               | SOO O         | 30-20min                | YES   | YES   | FANS 1/A   |

- All FANS 1/A equipped aircraft shall use CPDLC for normal operations.  
HF shall only be used as a backup in case of CPDLC/ADS-C unavailability or abnormal operations (EMERG or other).  
VHF shall be used at the discretion of ATC within VHF coverage.
- Flights entering SOOR FIR from an FIR not equipped with ADS-C/CPDLC shall make the first logon earliest at 30min but not later than 15min before entering the FIR.
- For flights entering SOOO FIR from an FIR equipped with ADS-C/CPDLC, the logon is made automatically by transfer from the transferring ACC. Flight crews shall check that this automatic logon is actually made 30min before entering the SOOO FIR. Otherwise, a manual logon to SOOO shall be initiated not later than 20min before entering the SOOO FIR.
- For any traffic departing from SOCA and SMJP airport towards Cayenne FIR, the initial logon will be made after crossing FL100, or when instructed by ATC.
- The SELCAL check by CPDLC-equipped aircraft is not required on entering SOOO FIR. Pilots listing a SELCAL code in their FPL in box 18 are deemed to have a functioning SELCAL and will maintain the SELCAL watch on the HF frequency received in the "MONITOR" instruction issued by the transferring authority.
- At SOOO entry point, the pilot shall perform a manual CPDLC position reporting.

- As soon as the pilot follows the LOGON procedure prescribed above, the cockpit will receive the following CPDLC message: "MONITOR SOOO [FREQ]". This instruction will arrive shortly after the entry into the SOOO FIR. The same message will probably have already been sent by the previous authority at the time of transfer. This monitor instruction should be understood (by pilots of aircraft equipped with FANS and in LOGON with SOOO) as the instruction to "MAINTAIN SELCAL WATCH".
- Once "WILCO" or "ROGER" message is received from the crew, Cayenne ACC will send the following message: "CPDLC SUCCESSFUL SELCAL TEST NOT REQUIRED WITH SOOO".
- In case the "CPDLC SUCCESSFUL" message is not received within 10min after FIR entry, the flight crew will comply with the usual SELCAL procedure by HF.
- For flights not flying through the SOOO FIR, but located within an area of 60NM around the SOOO FIR:
  - FPL shall be sent to the SOOO FIR AFTN address - e.g. SOOOZQZX.
  - Flight crews shall logon to SOOO the same way as they would be entering SOOO FIR. ATC requires the ADS-C reports.

22-JUL-2021

Caribbean

CAR

R-63

Regional SUP

INFO

5.2.2 Central America  
FIR/UIR

| Data Authority  | Vertical Limits | Logon Address | Logon Time Before Entry | CPDL C | ADS-C | Capability |
|-----------------|-----------------|---------------|-------------------------|--------|-------|------------|
| Central America | -               | MHC C         | -                       | YES    | YES   | FANS 1/A   |

5.2.3 Mazatlan Oceanic FIR

| Data Authority           | Vertical Limits | Logon Address | Logon Time Before Entry | CPDL C | ADS-C | Capability |
|--------------------------|-----------------|---------------|-------------------------|--------|-------|------------|
| Mazatlan Oceanic (Trial) | -               | MMM X         | -                       | YES    | YES   | FANS 1/A   |

- PRY COM via voice; full HF reporting still required

## INFO

5.2.4 New York

## Oceanic FIR

| Data Authority   | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|------------------|-----------------|---------------|-------------------------|-------|-------|------------|
| New York Oceanic | -               | KZWY          | 45-15min                | YES   | YES   | FANS 1/A   |

- The use of CPDLC and ADS-C in the New York Oceanic FIR (KZWY) is only permitted by Inmarsat and Iridium customers. All other forms of data link connectivity are not authorized. Users must ensure that the proper data link code is filed in Item 10a of the ICAO FPL in order to indicate which satellite medium(s) the ACFT is equipped with. The identifier for Inmarsat is J5 and the identifier for Iridium is J7. If J5 or J7 is not included in the ICAO FPL, then the logon will be rejected by KZWY and the ACFT will not be able to connect.
  - Flights should use ADS for position reporting and CPDLC for all other ATC communications while in the New York Oceanic Area.
- d • Prior to entering the New York Oceanic FIR, contact New York Radio and:
- Identify the flight as ADS-C and/or CPDLC connected;
  - State the name of the next CTA/FIR to be entered along with the latitude and longitude or waypoint exit point leaving the New York FIR; and
  - Request a SELCAL check.
- c **Note 1:** Expect to receive primary and secondary HF frequency assignments from New York Radio for the route of flight within the data link service area.
- c **Note 2:** Pilots must maintain HF communications capability with New York Radio at all times within the New York Oceanic FIR.
- If the flight will exit KZWY oceanic airspace into domestic airspace (including over New York Bermuda Radar):
    - Identify the flight as ADS and/or CPDLC connected;

- If operating on the Organized Track System (OTS), state the track letter;
- State the name of the next CTA/FIR to be entered along with the latitude and longitude or waypoint exit point leaving the KZWY CTA/FIR; and
- Request a SELCAL check.

c **Note:** New York Radio may require flights to contact them at 60° West for HF frequency updates.

- **Aircraft entering the New York Oceanic FIR data link service area from non-data link airspace** should:

- Logon to KZWY at least 15min but not more than 45min prior to entering the New York Oceanic CTA/FIR.

c - Prior to entering the New York Oceanic FIR contact New York Radio on HF or VHF providing the information as outlined above.

**Note:** Do not send a CPDLC position report to confirm CDA prior to, or upon crossing, the FIR.

15-SEP-  
2022  
CAR

Caribbean  
Regional SUP  
INFO

RSI

R-65

- **Aircraft entering the New York Oceanic FIR data link service area from adjacent data link airspace should:**

- Determine the status of the FANS connection when crossing the New York Oceanic FIR boundary.

**Note:** CPDLC and ADS services will be forwarded automatically between New York, Santa Maria,

and Gander OCA's. CPDLC connections will be transferred approximately 5min prior to the boundary crossing point.

- If KZWW is the active connection when crossing the New York Oceanic FIR boundary the pilot must contact New York Radio on HF providing the information as outlined above.

- If KZWW is not the active center when crossing the New York Oceanic FIR boundary the pilot must:

- Terminate the CPDLC connection, then logon to KZWW; and
- Contact New York Radio on HF providing the information as outlined above.

**Note:** Do not send a CPDLC position report to confirm CDA prior to, or upon crossing, the FIR

- Flights overflying Bermuda Radar airspace should:

- Prior to entering New York Bermuda Radar airspace, ACFT will receive an END SERVICE message that will result in termination of CPDLC.

- ACFT must re-logon to KZWW prior to re-entering the New York Oceanic CTA/FIR when they are advised by ATC to contact New York Radio on HF.

- ACFT exiting the KZWW data link service area and approaching New York Center Domestic, New York Center Bermuda RADAR, San Juan, Piarco, Jacksonville, Miami, Moncton, and Gander Domestic can expect a CPDLC uplink message containing the VHF frequency assignment for the next facility. CPDLC End Service will be sent approximately 5min prior to the boundary crossing point.

- In the event of data link failure or outages, flight crews must contact New York Radio via HF voice for routine

communications. When unable to communicate on HF, the pilot may conduct normal and routine communications with ATC via New York Radio on SATVOICE. Direct SATVOICE contact with ATC should be limited to distress and urgency situations or when other means are not available and communication is essential.



## INFO

5.2.5 **Piarco FIR**

| Data Authority | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|----------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Piarco         | -               | TTZP          | -                       | YES   | YES   | FANS 1/A   |

- In Piarco's Oceanic Airspace, CPDLC shall be the primary means of communication and voice via HF shall be the alternate.
- Within Piarco's continental Airspace (west of 57°W), CPDLC is a supplementary means of communication. Voice over radio telephony remains the primary means of communication.
- On entry to Piarco's Oceanic Airspace, a CPDLC position report should be made to verify that Piarco is the Current Data Authority (CDA). All other position reports shall be made via ADS-C.

15-SEP-2022

CAR

Regional SUP

INFO

5.2.6 U.S. Domestic En

Route CPDLC

R-67

| Data Authority | Vertical Limits | Logon Address | Logon Time Before Entry   | CPDLC | ADS-C | Capability               |
|----------------|-----------------|---------------|---------------------------|-------|-------|--------------------------|
| Miami          | -               | KUSA          | See Logon Procedure below | YES   | NO    | FANS 1/A with VDL Mode 2 |

### Eligibility

- An aircraft can only begin U.S. Domestic En Route CPDLC trial participation after submitting the required documentation to L3HARRIS.
- To determine whether your aircraft is eligible, refer to your operator.
- Detailed application processes and tutorial material can be found on the L3HARRIS website:  
<https://www.l3harris.com/datacomm>

### Logon Procedure

- CPDLC "KUSA" is the single National Data Authority (NDA) in the U.S. Domestic Airspace. Do not logon using the ARTCC identifier (e.g., KZKC for Kansas City ARTCC).
- A logon to "KUSA" can occur up to 4HR prior to the filed departure time or prior to penetrating US airspace if arriving internationally and not using CPDLC service.
- At airports with DCL service, logon should be made at least 30min prior to the proposed departure time to receive your IFR clearance.
- At Non-DCL airport: Logon at the pilot's discretion; RECOMMENDED to logon on ground.
- Flight crews should wait at least 10min after landing before initiating a new CPDLC logon to ensure that FAA's system will have enough time to clear previous flight information.

### CPDLC Messages

- Each CPDLC Clearance or message sent by ATC to the ACFT requires a response.

- a • Respond in a timely manner, workload permitting, without undue delay.
- a • ATC can use CPDLC to issue common ATC clearances. Respond ACCEPT/WILCO or UNABLE/REJECT.
- a • ATC can request a REPORT from the aircraft. Respond using the pre-formatted REPORT page.
- a • Two pre-formatted “Due To” explanation messages may be added to a REJECT/UNABLE response to an ATC CPDLC clearance or to CPDLC REQUEST:
  - a - Due To Weather;
  - a - Due To Performance.
- a • Do NOT send FREE TEXT messages - exception with EMERGENCY messages.

#### a Requests

a Do NOT send multiple requests at the same time in one message to ATC.

a Do NOT send a second request of the same type (e.g., Altitude, Route, Voice Contact) when you have not received a response to a previous request.

a The following downlink requests may be sent by pilots using CPDLC:

| Pilot Downlink Request       |
|------------------------------|
| REQUEST DIRECT TO [position] |
| REQUEST VOICE CONTACT        |
| REQUEST [altitude]           |
| REQUEST CLIMB TO [altitude]  |

a

a

## INFO

## Pilot Downlink Request

REQUEST DESCENT TO [altitude]

## a Emergency CPDLC Messages

a Voice remains primary for emergency communication.

a FREE TEXT is permitted when sending an EMERGENCY REPORT. This is an exception to the general rule and anticipates situations where VHF voice radios may be unusable.

a The flight crew may send the following EMERGENCY CPDLC messages to ATC:

## Emergency Downlink Messages

PAN PAN

MAYDAY MAYDAY

[remainingfuel] OF FUEL REMAINING AND [remainingsouls] SOULS ON BOARD

CANCEL EMERGENCY

DIVERTING TO [position] VIA [route] clearance

OFFSETTING [distanceoffset] [direction] OF ROUTE

DESCENDING TO [altitude]

[freetext]

31-MAR-2022

Caribbean

RSI

CAR

R-70

Regional SUP

INFO

5.3 **COM Services in Anchorage, New York and  
Oakland OCAs**

The FAA provides Inmarsat and Iridium SATVOICE services for air-to-ground and ground-to-air calls directly with Oakland, New York, and Anchorage Air Route Traffic Control Centers (ARTCC) and New York and San Francisco RADIO. The FAA's SATVOICE services are supplemental to HF voice communication services.

The pilot must limit direct SATVOICE contact with ATC to distress and urgency situations, or when other means are not available, and communication is essential.

When unable to communicate on HF, the pilot may conduct normal and routine communications with ATC via New York RADIO or San Francisco RADIO on SATVOICE.

The aircraft SATVOICE equipment must be approved in accordance with Advisory Circular 20-150, Airworthiness Approval of Satellite Voice (SATVOICE) Equipment Supporting Air Traffic Service (ATS) Communication.

**Note:** Portable satellite phones are NOT approved for normal and routine ATC communications.

If the flight intends to use SATVOICE capability, the operator must file the appropriate designator (M1, M2, or M3) in Item 10, and the ICAO aircraft address (hexadecimal code) in Item 18 of the flight plan.

The operator must establish procedures to ensure the flight maintains voice communications (that may include SATVOICE and any required HF SELCAL checks) with every ATS unit along the route of flight.

When using SATVOICE, the pilot must follow RTF conventions identical to HF/VHF communications in accordance with applicable standards and regulations pertaining to aeronautical communications.

Satellite service providers have assigned ICAO priority level 2/HGH/Q12 Operational high (second highest) to calls between aircraft and Air Navigation Service Providers. The pilot must verify the priority of the call and act only on ATC clearances/instructions from SATVOICE calls with priority level 2/HGH/Q12, and if in doubt terminate the call and

initiate a new call for confirmation.

The pilot must answer SATVOICE calls when contacted either by the ARTCC or RADIO facility.

When first establishing communications with New York or San Francisco RADIO via SATVOICE, the flight crew should request a "callback check." Such a check will help ensure RADIO can contact the crew during the period of SATVOICE use. The table below illustrates a sample callback check. Additionally, in the event the operator has indicated capability for SATVOICE via both Iridium and Inmarsat (by listing codes M1 and M3 in Item 10 of the ATC flight plan), the flight crew should inform the RADIO operator of the service to use for communicating with the aircraft.

| Sample Transcript of SATVOICE Callback Check |                                                                                                                                                                        |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SATVOICE call from the air:                  | "New York RADIO, Airline 123, request SATVOICE Callback check."<br><br>For aircraft equipped with both Inmarsat and Iridium: "... on Inmarsat/Iridium (as applicable)" |
| Answer from the ground:                      | "Airline 123, copy, 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!"                                                                                                              |

For SATCOM Short Codes and PSTN Numbers refer to:

- North Atlantic COM 5.6 SATCOM Short Codes & PSTN Numbers

## 5.4 SATCOM Short Codes &amp; PSTN

## Numbers

**Disclaimer:**

Inmarsat short codes are provided by courtesy of Inmarsat Global Ltd. The revision of the short codes is on a "as received from Inmarsat" basis. The linkage of the short codes with valid ACC phone numbers is under the responsibility of Inmarsat Global Ltd. Lufthansa Systems FlightNav Inc. is not taking liability for the attribution of the short codes and the programming of the respective ACC phone numbers.

Public Switched Telephone Network (PSTN) numbers have been denicted from State sources (AIPs) where available

| Country            | ATS Unit                      | Inmarsat Short Code | PSTN Number | Remarks                              |
|--------------------|-------------------------------|---------------------|-------------|--------------------------------------|
| Bahamas            | Nassau Flight Service Station | 430801              |             |                                      |
|                    | Nassau Approach Control       | 430802              |             |                                      |
| Colombia           | Barranquilla ACC              | 473001              |             |                                      |
|                    | Bogota ACC                    | 473002              |             |                                      |
| Dominican Republic | Santo Domingo ACC             | 432702              |             |                                      |
| Dutch Caribbean    | Curacao ACC                   | 424490              |             |                                      |
|                    | Curacao ACC (alternate)       | 424491              |             |                                      |
| French Guiana      | Cayenne - Rochambeau          | 463101              |             | Non-routine flight safety calls only |
| Honduras           | CENAMER ACC                   | 433401              |             |                                      |
|                    | CENAMER ACC (alternate)       | 433402              |             |                                      |
|                    | CENAMER ACC (2nd alternate)   | 433403              |             |                                      |
| Jamaica            | Kingston ACC                  | 433901              |             |                                      |
| Suriname           | Paramaribo ATC/FIS/Alerting   | 476501              |             |                                      |
| Trinidad & Tobago  | Piarco ACC                    | 436201              |             |                                      |

## 5.5 Beacon Code Requirements

### 5.5.1 Houston Oceanic FIR

All ACFT entering the Houston Oceanic CTA/FIR should remain on the last ATC assigned beacon code.

### 5.5.2 Miami CTA/FIR

- a) There is no primary radar or weather returns available from the Grand Turk, Georgetown, and Nassau radar systems. Since radar separation is dependent upon the receipt of transponder returns, all aircraft within antenna coverage of either system are required to squawk transponder codes as assigned by ATC, or, if none assigned, squawk the appropriate stratum code.
- b) Aircraft departing and overflying the Santo Domingo and Port Au Prince FIRs can expect ATC assigned codes from those ATS providers. If a code is not assigned by either Santo Domingo or Port Au Prince, pilots should request a code. The assigned code should be squawked prior to entering the Miami CTA/FIR.



18-AUG-  
2022  
CAR

Caribbean  
Regional SUP  
INFO

R-81

6 Appendix

6.1 VOLMET / ATIS

6.1.1 VOLMET Stations - NIL

There are no VOLMET stations in the CAR Region.

6.1.2 Aerodromes Covered by VOLMET Service

| ICAO                                                                    | Airport Name                | VOLMET Station | FREQ      |
|-------------------------------------------------------------------------|-----------------------------|----------------|-----------|
| MYNN                                                                    | Nassau Lynden Pindling Intl | New York       | HF (Note) |
| <b>Note:</b> For HF VOLMET Service, refer to:<br>= North Atlantic Index |                             |                |           |

6.4.2 VOLMET Stations (HF)

## INFO

## 6.1.3 ATIS

## Frequencies

| ICAO  | Airport                                      | D-ATIS | FREQ    | DEP/ARR | Language         |
|-------|----------------------------------------------|--------|---------|---------|------------------|
| MDCY  | Samana El Catey Intl                         |        | 132.650 |         | English          |
| MDPC  | Higüey Punta Cana Intl                       |        | 132.850 |         | English          |
| MDS D | Santo Domingo Jose Francisco Pena Gomez Intl |        | 127.650 |         | English, Spanish |
| MGGT  | Guatemala City La Aurora Intl                |        | 127.650 |         | Spanish, English |
| MGMM  | Santa Elena Peten Mundo Maya Intl            |        | 127.850 |         | Spanish, English |
| MHLC  | La Ceiba Goloson Intl                        |        | 127.800 |         | Spanish, English |
| MHLM  | San Pedro Sula Ramon Morales Intl            |        | 132.200 |         | Spanish, English |
| MHRO  | Roatan J M Galvez Intl                       |        | 127.850 |         | Spanish, English |
| MHTG  | Tegucigalpa Toncontin Intl                   |        | 127.750 |         | Spanish, English |
| MKJP  | Kingston Norman Manley Intl                  |        | 127.700 |         | English          |
| MKJS  | Montego Bay Sangster Intl                    |        | 127.900 |         | English          |
| MMAA  | Acapulco Gen Juan N Alvarez Intl             |        | 115.900 |         | English, Spanish |
| MMAN  | Monterrey Del Norte Intl                     |        | 127.550 |         | English          |
| MMCE  | Ciudad del Carmen Intl                       |        | 127.800 |         | English, Spanish |
| MMCL  | Culiacan                                     |        | 127.800 |         | English          |
| MMCN  | Ciudad Obregon Intl                          |        | 127.600 |         | Spanish, English |
| MMCU  | Chihuahua Gen Roberto Fierro Villalobos Intl |        | 127.900 |         | English, Spanish |
| MMCZ  | Cozumel Intl                                 |        | 127.700 |         | English          |

|          |                                                       |     |             |  |                     |
|----------|-------------------------------------------------------|-----|-------------|--|---------------------|
|          |                                                       |     | 127.<br>800 |  | English             |
| MM<br>DO | Durango Intl                                          |     | 132.<br>100 |  | English,<br>Spanish |
| MM<br>GL | Guadalajara Miguel<br>Hidalgo y Costilla Intl         |     | 127.<br>900 |  | English             |
| MM<br>HO | Hermosillo Gen<br>Ignacio Pesqueira<br>Gar Intl       |     | 127.<br>700 |  | Spanish             |
| MML<br>O | Leon De Guanajuato                                    |     | 128.<br>400 |  | Spanish             |
| MML<br>P | La Paz Gen Marquez<br>de Leon Intl                    |     | 127.<br>900 |  | English             |
| MM<br>MD | Merida Intl                                           |     | 127.<br>900 |  | English             |
| MM<br>ML | Mexicali Gen R<br>Sanchez Taboada Intl                |     | 127.<br>600 |  | Spanish,<br>English |
| MM<br>MX | Mexico City Benito<br>Juarez Intl                     | YES | 127.<br>650 |  | English,<br>Spanish |
| MM<br>MY | Monterrey Gen M<br>Escobedo Intl                      |     | 127.<br>700 |  | English             |
| MM<br>PR | Puerto Vallarta Lic<br>Gustavo Diaz Ordaz<br>Intl     |     | 127.<br>500 |  | English,<br>Spanish |
| MM<br>QT | Queretaro Intl<br>Intercontinental de                 |     | 128.<br>700 |  | English,<br>Spanish |
| MM<br>SD | San Jose Del Cabo<br>Los Cabos Intl                   |     | 127.<br>600 |  | English             |
| MM<br>SM | Mexico/Santa Lucia<br>Felipe Angeles<br>International |     | 127.<br>700 |  | English,<br>Spanish |
| MM<br>SP | San Luis Potosi<br>Ponciano Arriaga                   |     | 127.<br>150 |  | English,<br>Spanish |
| MM<br>TJ | Tijuana Gral Abelardo<br>L Rodriguez Intl             |     | 127.<br>900 |  | Spanish,<br>English |

23-JUN-  
2022  
CAR

R-83

Regional SUP  
INFO

| ICAO     | Airport                                                                      | D-ATIS | FREQ        | DEP/AR R | Language            |
|----------|------------------------------------------------------------------------------|--------|-------------|----------|---------------------|
| MMT<br>O | Toluca Lic Adolfo L<br>Mateos Intl                                           |        | 127.<br>800 |          | English             |
| MM<br>UN | Cancun Intl                                                                  |        | 127.<br>700 |          | English             |
|          |                                                                              |        | 127.<br>800 |          | English             |
| MM<br>VR | Veracruz General<br>Heriberto Jara Intl                                      |        | 127.<br>800 |          | English             |
| MN<br>MG | Managua Augusto C.<br>Sandino Intl                                           |        | 127.<br>650 |          | English,<br>Spanish |
| MPD<br>A | David Enrique<br>Malek Intl                                                  |        | 135.<br>500 |          | Spanish,<br>English |
| MP<br>MG | Panama City Marcos<br>A Gelabert Intl                                        |        | 127.<br>900 |          | Spanish,<br>English |
| MPS<br>M | Rio Hato Cap. Scarlett<br>R. Martinez Intl                                   |        | 127.<br>600 |          | English             |
| MPT<br>O | Panama City<br>Tocumen Intl                                                  |        | 127.<br>700 |          | Spanish,<br>English |
| MRL<br>B | Liberia Daniel<br>Oduber Quiros Intl                                         |        | 127.<br>775 |          | Spanish,<br>English |
| MRO<br>C | San Jose<br>Alajuela/Juan<br>Santamaria Intl                                 |        | 127.<br>675 |          | English,<br>Spanish |
| MSL<br>P | San Salvador El<br>Salvador INTL / San<br>Oscar Arnulfo<br>Romero y Galdamez |        | 127.<br>600 |          | Spanish,<br>English |
| MTP<br>P | Port-Au-Prince<br>Toussaint Louverture<br>Intl                               |        | 132.<br>075 |          | English,<br>French  |
| MUH<br>A | Havana Jose Marti<br>Intl                                                    |        | 132.<br>500 |          | Spanish,<br>English |
| MW<br>CR | Grand Cayman Owen<br>Roberts Intl                                            |        | 132.<br>350 |          | English             |
| MYA<br>M | Abaco Island Leonard<br>M. Thompson Intl                                     |        | 127.<br>650 |          | English             |
| MYA<br>T | Abaco Island<br>Treasure Cay                                                 |        | 127.<br>800 |          | English             |
| MYN<br>N | Nassau Lynden<br>Pindling Intl                                               |        | 118.<br>700 |          | English             |
| MZB<br>Z | Belize P.S.W<br>Goldson Intl                                                 | YES    | 132.<br>750 |          | English             |

|          |                                                                    |  |             |  |                     |
|----------|--------------------------------------------------------------------|--|-------------|--|---------------------|
| SKB<br>G | Bucaramanga<br>Palonegro                                           |  | 127.<br>750 |  | Spanish             |
| SKB<br>O | Bogotá Eldorado Intl                                               |  | 127.<br>800 |  | Spanish,<br>English |
| SKB<br>O | Barranquilla Ernesto<br>Cortissoz                                  |  | 127.<br>500 |  | Spanish             |
| SKC<br>C | Cucuta Camilo Daza                                                 |  | 113.<br>300 |  | Spanish             |
| SKR<br>G | Medellin/Rionegro<br>Jose Maria Cordova                            |  | 115.<br>100 |  | Spanish             |
| SKS<br>M | Santa Marta Simon<br>Bolívar                                       |  | 125.<br>000 |  | Spanish             |
| SKS<br>P | San Andres Gustavo<br>Rojas Pinilla                                |  | 113.<br>300 |  | Spanish             |
| SOC<br>A | Cayenne Felix Eboue                                                |  | 132.<br>200 |  | English,<br>French  |
| SVB<br>C | Barcelona Gen Jose<br>A Anzoategui Intl                            |  | 132.<br>300 |  | Spanish,<br>English |
| SVB<br>M | Barrquisimeto<br>Jacinto Lara Intl                                 |  | 132.<br>750 |  | Spanish,<br>English |
| SVC<br>R | Coro Jose Leonardo<br>Chirino Ntl                                  |  | 132.<br>300 |  | Spanish,<br>English |
| SVJ<br>C | Paraguana Josefa<br>Camelo Intl.                                   |  | 132.<br>350 |  | English,<br>Spanish |
| SVM<br>C | Maracaibo La Chinita<br>Intl                                       |  | 132.<br>650 |  | English,<br>Spanish |
| SVM<br>G | Margarita General<br>en Jefe Santiago<br>Marino Intl               |  | 132.<br>650 |  | Spanish,<br>English |
| SVM<br>M | Maquetia Simon<br>Bolívar Intl                                     |  | 132.<br>950 |  | Spanish,<br>English |
| SVP<br>A | Puerto Ayacucho<br>Cacique Aramare                                 |  | 131.<br>100 |  | English             |
| SVP<br>R | Ciudad Guayana<br>Gral. Manuel Carlos<br>Piar del Orinoco<br>Intl. |  | 132.<br>700 |  | Spanish,<br>English |

| ICAO     | Airport                                                    | D-ATIS | FREQ        | DEP/ARR | Language            |
|----------|------------------------------------------------------------|--------|-------------|---------|---------------------|
| SVS<br>O | Santo Domingo<br>B.A. Mayor<br>Buenaventura<br>Vivas Intl. |        | 132.<br>550 |         | English             |
| SVV<br>G | El Vigia J P Perez<br>Alfonzo                              |        | 132.<br>500 |         | English,<br>Spanish |
| SYC<br>J | Georgetown Cheddi<br>Jagan Intl                            |        | 132.<br>800 |         | English             |
| TAP<br>A | St Johns V C Bird Intl                                     |        | 132.<br>400 |         | English             |
| TBP<br>B | Barbados Grantley<br>Adams Intl                            |        | 132.<br>725 |         | English             |
| TFFF     | Martinique Aime<br>Cesaire                                 |        | 127.<br>850 |         | French,<br>English  |
| TFF<br>R | Pointe-a-Pitre Le<br>Raizet                                |        | 127.<br>600 |         | French,<br>English  |
| TIST     | St Thomas Charlotte<br>Amalie/Cyril E King                 |        | 124.<br>000 |         | English             |
| TISX     | Christiansted St Croix<br>Henry E Rohlsen                  |        | 135.<br>650 |         | English             |
| TJB<br>Q | Aguadilla Ratael<br>Hernandez                              |        | 118.<br>325 |         | English             |
| TJIG     | San Juan<br>Fernando Luis<br>Ribas Dominicci               |        | 120.<br>400 |         | English             |
| TJSJ     | San Juan Luis<br>Munoz Marin Intl                          | YES    | 125.<br>800 |         | English             |
| TLPL     | Vieux Fort<br>Hewanorra Intl                               |        | 126.<br>150 |         | English             |
| TNC<br>A | Aruba Oranjestad<br>Reina Beatrix Intl                     | YES    | 132.<br>100 |         | English             |
| TNC<br>B | Bonaire I Flamingo<br>Kralendijk                           |        | 132.<br>300 |         | English             |
| TNC<br>C | Curacao<br>Willemstad/Hato Intl                            | YES    | 132.<br>600 |         | English             |
| TNC<br>M | St Maarten Princess<br>Juliana Intl                        |        | 127.<br>650 |         | English             |
| TTC<br>P | Scarborough A N R<br>Robinson Intl                         |        | 132.<br>200 |         | English             |
| TTP<br>P | Port of Spain Piarco<br>Intl                               |        | 126.<br>700 |         | English             |
| TUP<br>J | Roadtown Terrance<br>B. Lettsome Intl.                     |        | 127.<br>750 |         | English             |
| TVS      | Kingstown/ St                                              |        | 132.        |         | English             |

|   |                     |  |     |  |  |
|---|---------------------|--|-----|--|--|
| A | Vincent Argyle Intl |  | 550 |  |  |
|---|---------------------|--|-----|--|--|

18-AUG-2022

CAR

R-90

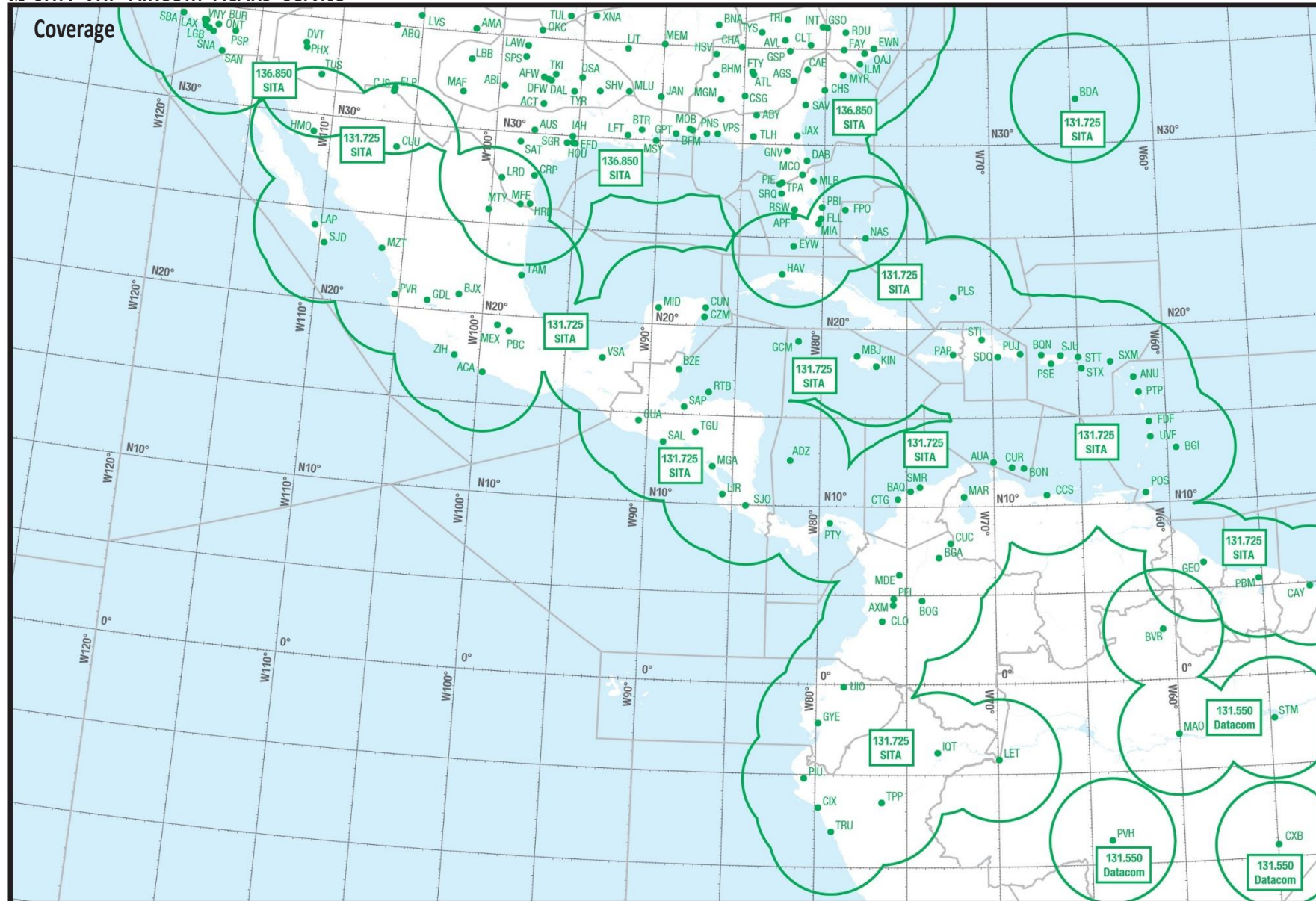
Caribbean  
Regional SUP  
INFO

RSI

RSI

Caribbean  
Regional SUP INFO

6.2 SITA VHF AIRCOM ACARS Service





### 6.3.1 HF Networks and Stations Overview

N2  
0°

N20°

New York (San  
Juan)

SAT  
-1/2

NAT-B

Cenamer (Tegucigalpa)

SA  
MA

SA  
M-2

Maiquetia  
(Caracas)

Piarco (Port Of Spain)

NAT-A/E  
CAR-B

Georgetown

SA  
M-1

CA  
R-A

SA  
N-E-1

Par

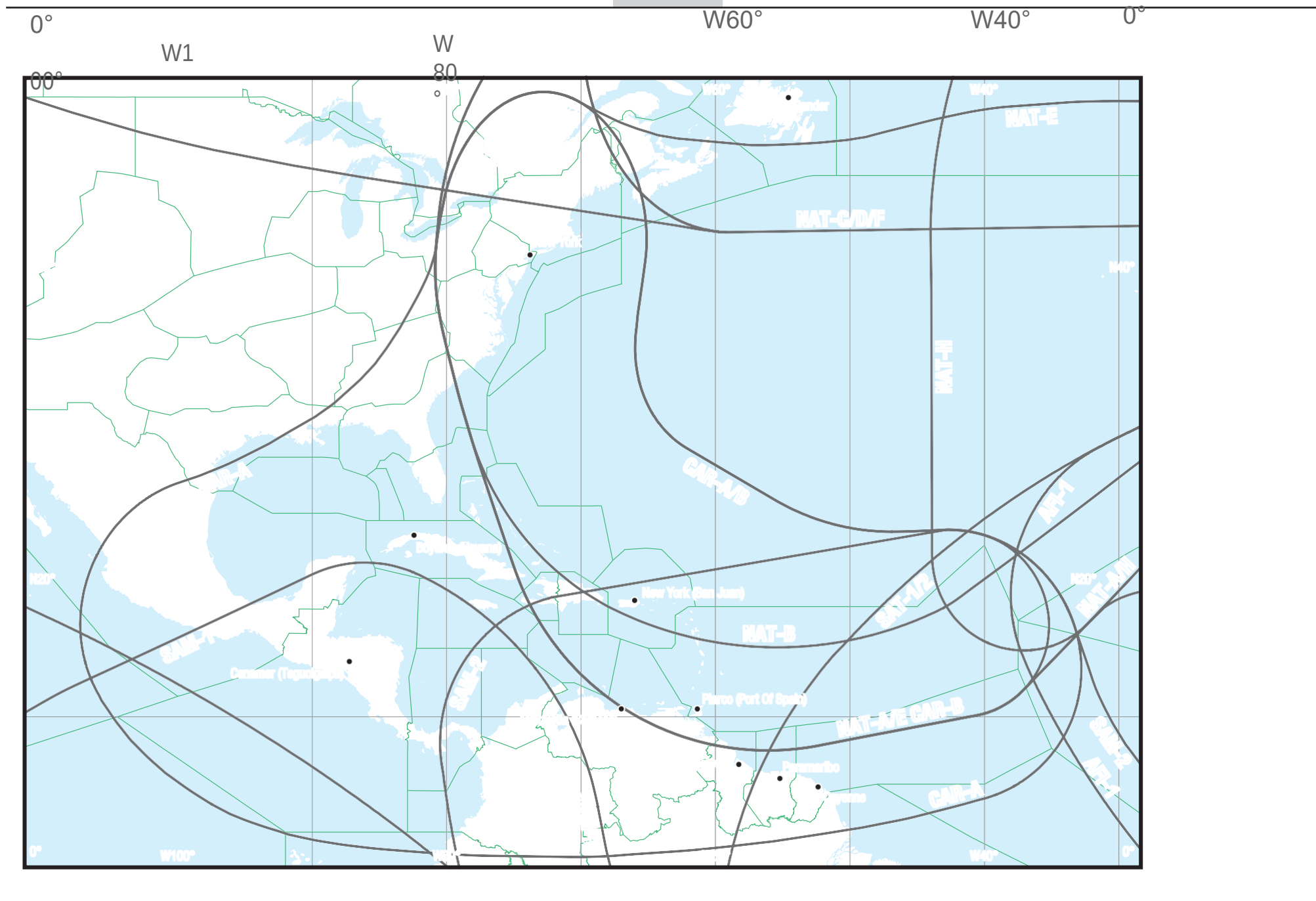
ama

ribo

Cay

enn

e



01-SEP-2022

CAR

Caribbean  
Regional SUP  
INFO

RSI RSI

Caribbean  
Regional SUP INFO

6.3.2 HF

Frequency

List

R-110

**Note 1:** Only the words in bold character are part of the call sign. Example: "**ADDIS** ABEBA" = call sign "ADDIS".

**Note 2:** SELCAL is given where published in the AIP. Not all countries publish the SELCAL capabilities.

| Call Sign (Note 1) |         | FREQ kHz | OPS HR | SELCAL (Note 2) | HF Network | PRY/SE C | Remarks |
|--------------------|---------|----------|--------|-----------------|------------|----------|---------|
| CAYENNE            | RADIO   | 13297    |        |                 | CAR-A      |          |         |
| CAYENNE            | RADIO   | 5526     |        |                 | SAM-2      |          |         |
| CAYENNE            | RADIO   | 8855     |        |                 | SAM-2      |          |         |
| CAYENNE            | RADIO   | 11291    |        |                 | SAT-2      |          |         |
| CAYENNE            | RADIO   | 3023     |        |                 |            |          |         |
| CENAMER            | CONTROL | 2887     | HN     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 5550     | HN     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 6577     | HN     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 8918     | HJ     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 11396    | HJ     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 13297    | HJ     |                 | CAR-A      |          |         |
| CENAMER            | CONTROL | 6649     | HN     |                 | SAM-1      |          |         |
| CENAMER            | CONTROL | 10024    | HJ     |                 | SAM-1      |          |         |
| GEORGETOWN         | INFO    | 8855     |        |                 | SAM-2      |          |         |
| GEORGETOWN         | INFO    | 6730.5   |        |                 |            |          |         |
| HAVANA (BOYEROS)   | RADIO   | 2887     |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 5550     |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 6577     |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 8918     |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 11396    |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 13297    |        |                 | CAR-A      |          |         |
| HAVANA (BOYEROS)   | RADIO   | 3007     |        |                 |            |          |         |
| HAVANA (BOYEROS)   | RADIO   | 5544     |        |                 |            |          |         |
| HAVANA (BOYEROS)   | RADIO   | 8927     |        |                 |            |          |         |

|                  |       |       |  |  |       |  |      |
|------------------|-------|-------|--|--|-------|--|------|
| HAVANA (BOYEROS) | RADIO | 13339 |  |  |       |  |      |
| HAVANA (BOYEROS) | RADIO | 17934 |  |  |       |  |      |
| HAVANA (BOYEROS) | RADIO | 21985 |  |  |       |  |      |
| MAIQUETIA        | RADIO | 5550  |  |  | CAR-A |  |      |
| MAIQUETIA        | RADIO | 6577  |  |  | CAR-A |  |      |
| MAIQUETIA        | RADIO | 8918  |  |  | CAR-A |  |      |
| MAIQUETIA        | RADIO | 13297 |  |  | CAR-A |  |      |
| MAIQUETIA        | RADIO | 5526  |  |  | SAM-2 |  |      |
| MAIQUETIA        | RADIO | 5536  |  |  | SAM-2 |  |      |
| MAIQUETIA        | RADIO | 8855  |  |  | SAM-2 |  |      |
| MAIQUETIA        | RADIO | 10096 |  |  | SAM-2 |  |      |
| MAIQUETIA        | RADIO | 3010  |  |  |       |  | LDOC |

| Call Sign (Note 1) |         | FREQ kHz | OPS HR | SELCAL (Note 2) | HF Network | PRY/SEC | Remarks             |
|--------------------|---------|----------|--------|-----------------|------------|---------|---------------------|
| MAIQUETIA          | RADIO   | 6643     |        |                 |            |         | LDOC                |
| MAIQUETIA          | RADIO   | 8924     |        |                 |            |         | LDOC                |
| MAIQUETIA          | RADIO   | 11345    |        |                 |            |         | LDOC                |
| MAIQUETIA          | RADIO   | 17937    |        |                 |            |         | LDOC                |
| MAIQUETIA          | RADIO   | 21976    |        |                 |            |         | LDOC                |
| MAZATLAN           | CONTROL | 3413     |        |                 |            |         | San Francisco ARINC |
| MAZATLAN           | CONTROL | 5574     |        |                 |            |         | San Francisco ARINC |
| MAZATLAN           | CONTROL | 8843     |        |                 |            |         | San Francisco ARINC |
| MAZATLAN           | CONTROL | 8915     |        |                 |            |         | San Francisco ARINC |
| MAZATLAN           | CONTROL | 13354    |        |                 |            |         | San Francisco ARINC |
| NEW YORK           | RADIO   | 2887     |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 3455     |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 5550     |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 6577     |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 8846     |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 11396    |        | YES             | CAR-A      |         |                     |
| NEW YORK           | RADIO   | 5520     |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 6586     |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 8918     |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 11330    |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 13297    |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 17907    |        | YES             | CAR-B      |         |                     |
| NEW YORK           | RADIO   | 21985    |        | YES             | CAR-B      |         |                     |
| PARAMARIBO         | RADIO   | 8855     |        | YES             | SAM-2      |         |                     |
| PIARCO OCEANIC     | CONTROL | 3016     |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 5520     |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 5598     |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 8906     |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 11396    |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 13306    |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 17946    |        |                 | NAT-A      |         | New York ARINC      |
| PIARCO OCEANIC     | CONTROL | 21925    |        |                 | NAT-A      |         | New York ARINC      |

C  
C  
C  
C  
C  
C  
C

C



A320/A321  
OPERATIONS MANUAL PART C

**SUPPLEMENT 1**  
**CARRIBEAN REGION**

Intentionally left blank





A320/A321

OPERATIONS MANUAL PART C

## SUPPLEMENT 2

NORTH AMERICA

### GENERAL

**Applicable to: ALL**

The following supplement is present due to request from the Competent Authority. For operational information, please *Refer to: Jeppesen FD Pro X – Pubs.*

23-JUN-  
2022  
NAM

Table I of Contents

North America  
Regional SUP  
INFO

1 NAM Region  
Overview 2 RAR

|       |                                       |         |                                                            |
|-------|---------------------------------------|---------|------------------------------------------------------------|
| 2.1   | Flight Information Region (FIR) (NIL) |         | R-21                                                       |
| 2.2   | Advisory Routes, Areas, Service (NIL) |         | R-21                                                       |
| 2.3   | Controlled Airspace and ATC (NIL)     |         | R-21                                                       |
| 2.4   | Alerting, Search and Rescue (NIL)     |         | R-21                                                       |
| 2.5   | Airspace Restrictions (NIL)           |         | R-21                                                       |
| 2.6   | General Flight Rules                  | 2.6.1   | Holding                                                    |
|       |                                       | R-21    |                                                            |
| 2.6.2 | Circling                              |         | R-21                                                       |
|       |                                       | 2.6.3   | Aeroplane Instruments, Equipment and Flight Documents R-21 |
|       |                                       | 2.6.3.1 | Operation of Aircraft not Approved for RVSM R-21           |
| 2.7   | Visual Flight Rules (VFR) (NIL)       |         | R-21                                                       |
| 2.8   | Instrument Flight Rules (IFR)         | 2.8.1   | IFR/VFR Operations R-21                                    |

|        |                            |         |
|--------|----------------------------|---------|
| 2.9    | Units of Measurement       | R-21    |
| 2.10   | Altimeter Setting          | R-21    |
| 2.11   | Altitude Regulations (NIL) | R-21    |
| 2.12   | Separation Rules           | Lateral |
|        | 2.12.1 Separation          | R-21    |
| 2.12.2 | Longitudinal Separation    | R-21    |
| 2.12.3 | Vertical Separation        | R-22    |

Regional

SUP

II

NAM

INFO

2.13 Flight Plan and Clearance 2.13 North American Routes for R-30  
 .1 NAT Traffic (NAR)

2.13 Anchorage Oceanic FIR R-30  
 .2

2.14 Communication (NIL) R-30

2.15 Flight Permission (NIL) R-30

2.16 Miscellaneous (NIL) R-30

2.17 Emergency (NIL) R-30

2.18 Interception Signals Principles and (NIL) R-30

2.19 Unlawful Interference (NIL) R-30

**3 MET (NIL)**

**4 NAV (NIL)**

**5 COM**

5.1 Communication in Anchorage Arctic CTA/FIR R-61

5.2 Data Services Link 5.2. Canada R-63  
 1

|              |                        |            |
|--------------|------------------------|------------|
| 5.2.         | U.S. Domestic En Route | R-81       |
| 2            | CPDLC                  |            |
| 5.2.         | Anchorage              | ArcticR-82 |
| 3            | FIR/Oceanic FIR/ARTCC  |            |
| 5.2.         | Beacon                 | CodeR-85   |
| 4            | Requirements           |            |
| 5.2.         | Miami CTA/FIR          | R-85       |
| 4.1          |                        |            |
| 5.3 SATCOM   | ShortNum               | R-90       |
| Codes & PSTN | bers                   |            |

## 6 Appendix

|                   |      |                       |     |
|-------------------|------|-----------------------|-----|
| 6.1 VOLMET / ATIS | 6.1. | VOLMET Stations (VHF) | R-  |
|                   | 1    | - NIL                 | 103 |
|                   | 6.1. | VOLMET Stations (HF)  | R-  |
|                   | 2    |                       | 103 |

## North America

18-AUG-  
2022  
NAM

III

Regional SUP  
INFO

|           |                                        |                                         |
|-----------|----------------------------------------|-----------------------------------------|
| 6.1.3     | Aerodromes Covered by VOLMET Service   | R-110                                   |
| 6.1.4     | ATIS Frequencies                       | R-121                                   |
| 6.2       | SITA VHF AIRCOM ACARS Service Coverage | R-210                                   |
| 6.3       | FISE / FSS Frequencies                 | List of Canadian FISE Frequencies R-230 |
| 6.3.1.1   | Edmonton FIC FISE RCOs North of 60°N   | R-230                                   |
| 6.3.1.2   | Edmonton FIC FISE RCOs South of 60°N   | R-230                                   |
| 6.3.1.3   | London FIC FISE RCOs Atlantic Region   | R-240                                   |
| 6.3.1.4   | London FIC FISE RCOs Ontario           | R-250                                   |
| 6.3.1.5   | Kamloops FIC FISE RCOs                 | R-260                                   |
| 6.3.1.6   | Quebec FIC FISE RCOs                   | R-270                                   |
| 6.3.1.7   | Whitehorse FIC FISE RCOs               | R-280                                   |
| 6.3.1.8   | Winnipeg FIC FISE RCOs                 | R-290                                   |
| 6.3.2     | List of US FSS Frequencies             | R-310                                   |
| 6.3.2.1   | Alaska                                 | R-310                                   |
| 6.3.2.1.1 | Kenai FSS                              | R-310                                   |
| 6.3.2.1.2 | Cold Bay FSS                           | R-320                                   |
| 6.3.2.1.3 | Dillingham FSS                         | R-320                                   |
| 6.3.2.1.4 | Kenai FSS Satellite w/o RCO            | R-320                                   |
| 6.3.2.1.5 | Fairbanks FSS                          | R-330                                   |
| 6.3.2.1.6 | Deadhorse FSS                          | R-340                                   |

|            |                                          |       |
|------------|------------------------------------------|-------|
| 6.3.2.1.7  | Kotzebue FSS                             | R-340 |
| 6.3.2.1.8  | Nome FSS                                 | R-340 |
| 6.3.2.1.9  | Northway FSS                             | R-350 |
| 6.3.2.1.10 | Fairbanks FSS Satellite w/o RCO<br>R-350 |       |
| 6.3.2.1.11 | Juneau FSS                               | R-350 |
| 6.3.2.1.12 | Ketchikan FSS                            | R-360 |
| 6.3.2.1.13 | Sitka FSS                                | R-360 |
| 6.3.2.2    | Albuquerque Radio                        | R-390 |
| 6.3.2.3    | Altoona Radio                            | R-390 |
| 6.3.2.4    | Anderson Radio                           | R-390 |
| 6.3.2.5    | Anniston Radio                           | R-390 |
| 6.3.2.6    | Bangor Radio                             | R-400 |
| 6.3.2.7    | Boise Radio                              | R-400 |
| 6.3.2.8    | Bridgeport Radio                         | R-400 |
| 6.3.2.9    | Buffalo Radio                            | R-410 |

## North America

18-AUG-2022

## Regional SUP INFO

IV

NAM

|          |                         |       |
|----------|-------------------------|-------|
| 6.3.2.10 | Burlington Radio        | R-410 |
| 6.3.2.11 | Casper Radio            | R-410 |
| 6.3.2.12 | Cedar City Radio        | R-410 |
| 6.3.2.13 | Cleveland Radio         | R-420 |
| 6.3.2.14 | Columbia Radio          | R-420 |
| 6.3.2.15 | Columbus Radio          | R-420 |
| 6.3.2.16 | Dayton Radio            | R-430 |
| 6.3.2.17 | De Ridder Radio         | R-430 |
| 6.3.2.18 | Denver Radio            | R-430 |
| 6.3.2.19 | Elkins Radio            | R-430 |
| 6.3.2.20 | Fort Dodge Radio        | R-440 |
| 6.3.2.21 | Fort Worth Radio        | R-440 |
| 6.3.2.22 | Gainesville Radio       | R-440 |
| 6.3.2.23 | Grand Forks Radio       | R-440 |
| 6.3.2.24 | Great Falls Radio       | R-450 |
| 6.3.2.25 | Green Bay Radio         | R-450 |
| 6.3.2.26 | Greenwood Radio         | R-450 |
| 6.3.2.27 | Hawthorne Radio         | R-460 |
| 6.3.2.28 | Huron Radio             | R-460 |
| 6.3.2.29 | Jackson Radio           | R-460 |
| 6.3.2.30 | Jonesboro Radio         | R-460 |
| 6.3.2.31 | Kankakee Radio          | R-460 |
| 6.3.2.32 | Lansing Radio           | R-470 |
| 6.3.2.33 | Leesburg Radio          | R-470 |
| 6.3.2.34 | Louisville Radio        | R-480 |
| 6.3.2.35 | Macon Radio             | R-480 |
| 6.3.2.36 | Mc Alester Radio        | R-480 |
| 6.3.2.37 | Mc Minnville Radio      | R-490 |
| 6.3.2.38 | Miami Radio             | R-490 |
| 6.3.2.39 | Milville Radio          | R-490 |
| 6.3.2.40 | Montgomery County Radio | R-490 |
| 6.3.2.41 | Nashville Radio         | R-500 |
| 6.3.2.42 | New York Radio          | R-500 |
| 6.3.2.43 | Oakland Radio           | R-500 |
| 6.3.2.44 | Prescott Radio          | R-500 |
| 6.3.2.45 | Princeton Radio         | R-500 |
| 6.3.2.46 | Raleigh Radio           | R-510 |
| 6.3.2.47 | Rancho Murieta Radio    | R-510 |



## North America

18-AUG-

2022

V

Regional

SUP

NAM

6.3.2.48 Reno Radio

INFO

R-520

6.3.2.49 Riverside Radio

R-520

6.3.2.50 Saint Louis Radio

R-520

6.3.2.51 Saint Petersburg Radio

R-530

6.3.2.52 San Angelo Radio

R-530

6.3.2.53 San Diego Radio

R-530

6.3.2.54 San Juan Radio

R-530

6.3.2.55 Seattle Radio

R-530

6.3.2.56 Terre Haute Radio

R-540

6.3.2.57 Wichita Radio

R-540

6.3.2.58 Williamsport Radio

R-540

6.4

HF  
Frequencies  
Region

- NAM

6.4.1 HF Networks and Stations Overview

R-550

6.4.2 HF Frequency List

R-560



07-MAR-  
2019  
NAM

North America  
Regional SUP  
INFO

RSI

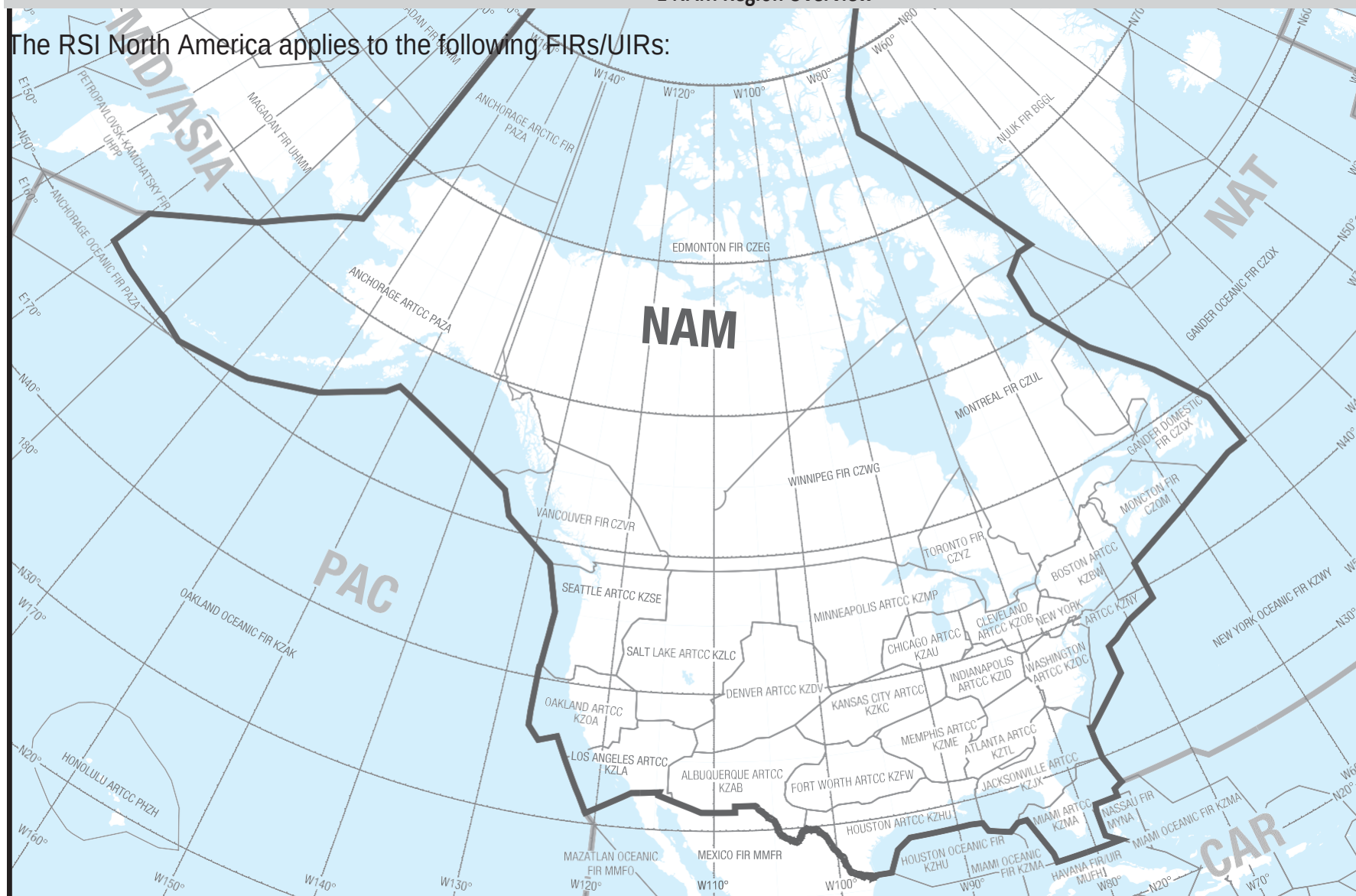
North America  
Regional SUP INFO

RSI

R-10

## 1 NAM Region Overview

The RSI North America applies to the following FIRs/UIRs:





16-NOV-  
2017  
NAM

North America  
Regional SUP  
INFO

R-21

## 2 RAR

2.1 **Flight Information Region (FIR) (NIL)**

2.2 **Advisory Routes, Areas, Service (NIL)**

2.3 **Controlled Airspace and ATC (NIL)**

2.4 **Alerting, Search and Rescue (NIL)**

2.5 **Airspace Restrictions (NIL)**

2.6 **General Flight Rules**

2.6.1 **Holding**

TERPS procedures apply.

2.6.2 **Circling**

TERPS procedures apply.

2.6.3 **Aeroplane Instruments, Equipment and Flight Documents**

2.6.3.1 **Operation of Aircraft not Approved for RVSM**

Aircraft that have not received RVSM State approval may be cleared to operate in RVSM airspace in accordance with policy and procedures established by the State provided that 600m (2000ft) vertical separation is applied.

2.7 **Visual Flight Rules (VFR) (NIL)**

2.8 **Instrument Flight Rules (IFR)**

2.8.1 **IFR/VFR Operations**

Flights in oceanic airspace must be conducted under IFR procedures when operating within the Anchorage Arctic FIR at or above FL230.

2.9 **Units of Measurement**

Altimeter Setting: Inches of Mercury

2.10 **Altimeter Setting**

At or above 18000ft MSA standard setting is 29.92 inHG.

2.11 **Altitude Regulations (NIL)**

2.12 **Separation Rules**

2.12.1 **Lateral Separation**

Minimum lateral separation in the Anchorage Arctic CTA shall be 90NM. Lower minima may be applied, depending on location, NAVAIDs or methods, RNAV operations.

**2.12.2 Longitudinal Separation**

Minimum longitudinal separation in the Anchorage Arctic CTA shall be

- 15 MIN between turbo-jet ACFT:
  - This may be reduced to 10 MIN provided the Mach Number Technique (MNT) is applied.
- 20 MIN between other ACFT.

#### 2.12.3 **Vertical Separation**

RVSM of 1000ft (300m) shall be applied between FL290 and FL410 inclusive in the following FIRs/CTAs:

Albuquerque, Anchorage Arctic/Continental, Atlanta, Boston, Chicago, Cleveland, Denver, Edmonton, Fort Worth, Gander, Houston, Indianapolis, Jacksonville, Kansas City, Los Angeles, Memphis, Miami, Minneapolis, Moncton, Montreal, New York, Oakland, Salt Lake City, Seattle, Toronto, Vancouver, Washington and Winnipeg.

03-SEP-2020

North America

NAM

R-30

Regional SUP

INFO

**2.13 Flight Plan and Clearance****2.13.1 North American Routes for NAT****Traffic (NAR)**

The North American Route Program (NRP) and the North American Route (NAR) System are described in the RSI NAT:

- **North Atlantic RAR 2.13.4 North American Routes for NAT Traffic (NAR)**

**2.13.2 Anchorage Oceanic FIR**

- a) Flights crossing the Anchorage Arctic FIR along 141W between 72N and 90N shall file their 141W crossing point as a route element in Item 15 of the ICAO flight plan.
- b) All waypoints filed in Item 15 of the ICAO flight plan (route field) must be reported as a position report.

**2.14 Communication (NIL)****2.15 Flight Permission (NIL)****2.16 Miscellaneous (NIL)****2.17 Emergency (NIL)****2.18 Interception Principles and Signals (NIL)****2.19 Unlawful Interference (NIL)**





16-NOV-  
2017  
NAM

North America  
Regional SUP  
INFO

RSI

R-41

3 MET (NIL)



16-MAY-  
2019  
NAM

Regional SUP  
INFO

R-50

4 NAV(NIL)



15-SEP-  
2022  
NAM

North America  
Regional SUP  
INFO

R-61

## 5COM

### 5.1 Communication in Anchorage Arctic CTA/FIR

- a) Aircraft operating in the Anchorage Arctic CTA/FIR beyond line of sight range of remote control VHF air/ground facilities operated from the Anchorage ARTCC, shall maintain communications with GANDER RADIO and a listening or SELCAL watch on HF frequencies of the North Atlantic D (NAT D) network (2971, 4675, 8891 and 11279 kHz).

Additionally, and in view of reported marginal reception of the Honolulu Pacific VOLMET broadcasts in that and adjacent Canadian airspace, Gander Radio can provide Anchorage and Fairbanks surface observations and terminal forecasts to flight crews on request.

- b) ARINC using Pacific common air/ground ATC frequency networks shared with other ground stations are listed below. The frequencies in use will depend on the time and conditions which affect radio propagation. International flights on the ground at Anchorage or within VHF range of the Seattle- Anchorage network that are entering the NOPAC Route System within Anchorage Centers FIR boundary should contact ARINC on VHF 129.400 to obtain primary/secondary HF frequencies and verify SELCAL before entering NOPAC. If unable 129.400, primary/secondary HF frequencies may be obtained from Anchorage ARTCC, but no SELCAL is available.
- c) High Frequency Voice Communications capability exists within the Anchorage Arctic FIR via GANDER RADIO, PETERBURG RADIO, MAGADAN CONTROL and SAN FRANCISCO RADIO.

Utilize these services as follows:

| Communication via HF Voice |                                |                                                                                                                                                                                                                                                                                                                          |
|----------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. GANDER RADIO            | 2971, 4675, 8891 and 11279 kHz | Make all East or Westbound position reports along 141° west longitude in the Arctic FIR thru GANDER RADIO. Make all Eastbound position reports over the Sankt-Peterburg/Anchorage or Magadan/Anchorage FIR boundary via GANDER RADIO. Use GANDER RADIO for all ATC communications while within the Anchorage Arctic FIR. |
| 2. PETERBURG RADIO         | 11390, 8950, 5694 or 4672 kHz  | Make all Westbound position reports over the Anchorage/Sankt-Peterburg FIR boundary via PETERBURG                                                                                                                                                                                                                        |

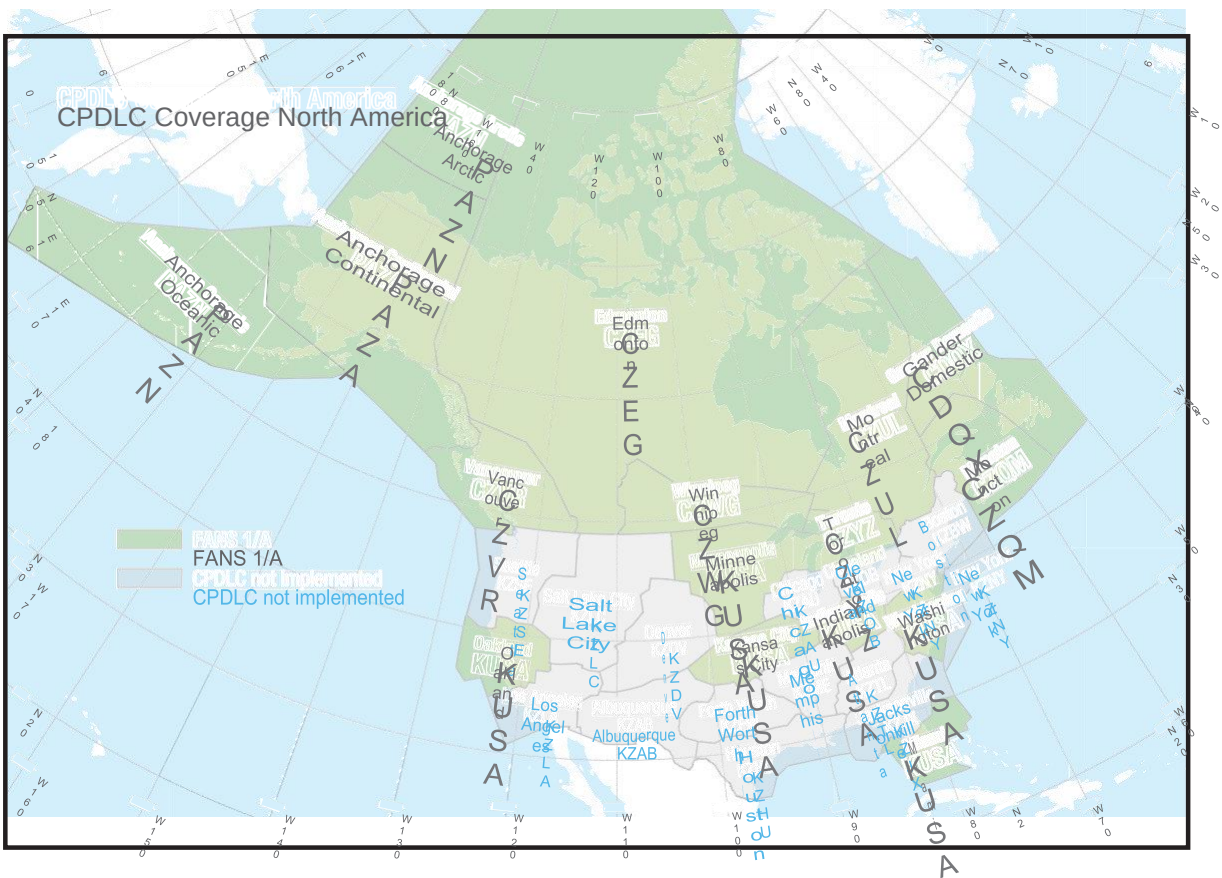
### **Position Reporting**

All flights, regardless of CPDLC status, shall make mandatory position reports, upon entering or exiting the CTA/FIR, via the appropriate HF Enroute radio.

#### **Examples:**

An aircraft progressing 141°W westbound will make a position report thru GANDER RADIO, an aircraft progressing 141°W eastbound will also make a position report thru GANDER RADIO.

An aircraft progressing ORVIT eastbound will make a position report thru GANDER RADIO and an aircraft progressing ORVIT westbound will make a position report thru MAGADAN RADIO.





31-MAR-  
2022  
NAM

R-63

North America  
Regional SUP  
INFO

5.2.1 **Canada**  
**da**

| Data Authority  | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|-----------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Edmonton        | > FL290         | CZEG          | 45-15min                | YES   | YES   | FANS 1/A   |
| Gander Domestic | > FL290         | CDQX          | 45-15min                | YES   | YES   | FANS 1/A   |
| Gander Oceanic  | -               | CZQX          | 45-15min                | YES   | YES   | FANS 1/A   |
| Montreal        | > FL290         | CZUL          | 45-15min                | YES   | YES   | FANS 1/A   |
| Moncton         | > FL290         | CZQM          | 45-15min                | YES   | NO    | FANS 1/A   |
| Toronto         | > FL290         | CZYZ          | 45-15min                | YES   | NO    | FANS 1/A   |
| Vancouver       | > FL290         | CZVR          | 45-15min                | YES   | YES   | FANS 1/A   |
| Winnipeg        | > FL290         | CZWG          | 45-15min                | YES   | NO    | FANS 1/A   |

### General

- CPDLC is available in both the Gander Oceanic FIR, and above FL290 in Canadian Domestic Airspace.
- ADS-C is used for aircraft surveillance, position reporting, and conformance checking in the following airspace:
  - Gander Oceanic;
  - Montreal FIR, north of a line from 47°N 78°10'W to 48°08'N 76°43'W to 49°10'N 68°40' W;
  - Edmonton FIR; and
  - Vancouver FIR, west of a line from 54°07'N 135°12'W to 48°02'N 128°27' W.

### Logon Procedure

- Flights entering ATS data link service areas (CPDLC and ADS-C) from airspace where no ATS data link services are available should perform an AFN logon:

- 45 to 15min prior to entering the airspace; or
  - Prior to departure, if the departure airport is adjacent to or underlying the airspace.
- Flights entering ATS data link service areas from adjacent airspace where ATS data link services are being received should not need to perform another AFN logon. Under normal circumstances, the current and next ATS facilities automatically transfer these services.
  - The CPDLC welcome message is sent by each facility to confirm two-way communication. Following a successful CPDLC connection, the following uplink message will be sent to aircraft: "THIS IS AN AUTOMATED MESSAGE TO CONFIRM CPDLC CONTACT WITH [facility name]." Upon receipt of the welcome message, flight crews are to respond with Downlink Message ROGER (DM3).
  - When making initial contact with Edmonton Centre, flights that are not identified by ATC through ATS surveillance should use "C-P-D-L-C" after the aircraft call sign, and not include a voice position report. The reply from Edmonton Centre will include acknowledgement that the flight is CPDLC, the advisory "VOICE POSITION REPORTS NOT REQUIRED," and the assigned frequency for the next station enroute.

R-64

- When making initial contact with Winnipeg, or Quebec Radio, flight crews should use "C-P-D-L-C" after the aircraft call sign, not include a voice position report, and request the SELCAL check if required. The ATS facility will advise the flight that "FREQUENCIES WILL BE ASSIGNED VIA CPDLC"; and issue:
  - Communication instructions for the next ATS facility;
  - Communication instructions and the frequency to contact the appropriate ATS facility approaching, or over the exit point; or
  - Instructions for the flight to contact the next ATS facility at a time or location, prior to the boundary or exit point.
- In lieu of the standard welcome message, approximately 5min after entering Gander Oceanic airspace, equipped flights will receive a message advising them to set the latency timer. This message serves two purposes: to confirm two-way communications and to ensure that flight crews set the latency timer so that any message delayed in the network is identified to flight crews or not delivered at all after expiration.
- When possible, flight crews should not insert non-ATC waypoints in the cleared route of flight. If deviations around weather are required, flight crews should establish voice contact and advise ATC of their intentions. Position reports via voice should be made abeam waypoints until the flight is back on its cleared route.
- In Gander Oceanic airspace, a UM137 CONFIRM ASSIGNED ROUTE will be sent approximately 10min after ocean entry (5min after the welcome message). The expected response from the aircraft is ASSIGNED ROUTE [route clearance] (DM40).
- The oceanic ground system will use this to confirm the rest of the ocean route in the flight management system (FMS) matches what is in the air traffic management (ATM) oceanic ground system.

- The crew shall not send a free text or append any free text to the ASSIGNED ROUTE [route clearance] (DM40).
- If the crew is unable to send the ASSIGNED ROUTE [route clearance] (DM40) then they should respond with free text “UNABLE TO SEND ROUTE”.
- Supported downlink messages are shown in the following table. Any downlink message other than indicated will generate a “MESSAGE NOT SUPPORTED BY THIS FACILITY” response from the ground system.

| DM # | Downlink Message                       | Message supported by Facility (Y/N) |      |      |      |      |      |      |
|------|----------------------------------------|-------------------------------------|------|------|------|------|------|------|
|      |                                        | CZVR                                | CZEG | CZWG | CZYZ | CZUL | CZQM | CDQX |
| 0    | WILCO                                  | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 1    | UNABLE                                 | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 2    | STANDBY                                | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 3    | ROGER                                  | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 4    | AFFIRM                                 | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 5    | NEGATIVE                               | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 6    | REQUEST (ALT)                          | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 7    | REQUEST BLOCK (ALT) TO (ALT)           | Y                                   | Y    | N    | N    | N    | N    | Y    |
| 8    | REQUEST CRUSIE CLIMB TO (ALT)          | N                                   | N    | N    | N    | N    | N    | N    |
| 9    | REQUEST CLIMB TO (ALT)                 | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 10   | REQUEST DESCENT TO (ALT)               | Y                                   | Y    | Y    | Y    | Y    | Y    | Y    |
| 11   | AT (POSITION) REQUEST CLIMB TO (ALT)   | N                                   | Y    | N    | N    | N    | N    | N    |
| 12   | AT (POSITION) REQUEST DESCENT TO (ALT) | N                                   | Y    | N    | N    | N    | N    | N    |

C

C

31-MAR-  
2022  
NAM

North America  
Regional SUP  
INFO

RSI

R-65

|   | DM # | Downlink Message                                                          | Message Supported by Facility (Y/N) |      |      |      |      |      |
|---|------|---------------------------------------------------------------------------|-------------------------------------|------|------|------|------|------|
|   |      |                                                                           | CZVR                                | CZEG | CZWG | CZYZ | CZUL | CZQM |
| C | 13   | AT (TIME) REQUEST CLIMB TO (ALT)                                          | N                                   | Y    | N    | N    | N    | N    |
|   | 14   | AT (TIME) REQUEST DESCENT TO (ALT)                                        | N                                   | Y    | N    | N    | N    | N    |
| C | 15   | REQUEST OFFSET (DISTANCE)(DIRECTION) OF ROUTE                             | Y                                   | Y    | N    | N    | Y    | N    |
|   | 16   | AT (POSITION) REQUEST OFFSET (SPECIFIED DISTANCE) (DIRECTION) OF ROUTE    | Y                                   | Y    | N    | N    | Y    | N    |
|   | 17   | AT (TIME) REQUEST OFFSET (SPECIFIED DISTANCE) (DIRECTION) OF ROUTE        | Y                                   | Y    | N    | N    | Y    | N    |
|   | 18   | REQUEST (SPEED)                                                           | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 19   | REQUEST (SPEED) TO (SPEED)                                                | N                                   | N    | N    | N    | N    | Y    |
|   | 20   | REQUEST VOICE CONTACT                                                     | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 21   | REQUEST VOICE CONTACT (FREQUENCY)                                         | Y                                   | Y    | Y    | Y    | Y    | N    |
|   | 22   | REQUEST DIRECT TO (POSITION)                                              | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 23   | REQUEST (PROCEDURE NAME)                                                  | N                                   | N    | N    | N    | N    | N    |
|   | 24   | REQUEST (ROUTE CLEARANCE)                                                 | N                                   | Y    | N    | N    | N    | N    |
|   | 25   | REQUEST CLEARANCE                                                         | N                                   | Y    | N    | N    | N    | N    |
|   | 26   | REQUEST WEATHER DEVIATION TO (POSITION) VIA (ROUTE CLEARANCE)             | N                                   | N    | N    | N    | N    | N    |
|   | 27   | REQUEST WEATHER DEVIATION UP TO (SPECIFIED DISTANCE) (DIRECTION) OF ROUTE | Y                                   | Y    | N    | N    | N    | N    |
| C | 28   | LEAVING (ALT)                                                             | Y                                   | Y    | Y    | Y    | Y    | Y    |
| C | 29   | CLIMBING TO (ALT)                                                         | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 30   | DESCENDING TO (ALT)                                                       | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 31   | PASSING (POSITION)                                                        | N                                   | N    | Y    | N    | N    | Y    |
|   | 32   | PRESENT ALTITUDE (ALT)                                                    | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 33   | PRESENT POSITION (POSITION)                                               | N                                   | N    | Y    | N    | N    | Y    |
|   | 34   | PRESENT SPEED (SPEED)                                                     | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 35   | PRESENT HEADING (DEGREES)                                                 | N                                   | N    | N    | N    | N    | N    |
|   | 36   | PRESENT GROUND TRACK (DEGREES)                                            | N                                   | N    | N    | N    | N    | N    |
|   | 37   | LEVEL (ALT)                                                               | Y                                   | Y    | Y    | Y    | Y    | Y    |
|   | 38   | ASSIGNED ALTITUDE (ALTITUDE)                                              | Y                                   | Y    | N    | Y    | N    | N    |
|   | 39   | ASSIGNED SPEED (SPEED)                                                    | Y                                   | Y    | N    | Y    | N    | N    |
|   | 40   | ASSIGNED ROUTE (ROUTE CLEARANCE)                                          | N                                   | N    | N    | N    | N    | N    |
|   | 41   | BACK ON ROUTE                                                             | Y                                   | Y    | N    | N    | N    | N    |
|   | 42   | NEXT WAYPOINT (POSITION)                                                  | Y                                   | Y    | Y    | N    | Y    | Y    |
|   | 43   | NEXT WAYPOINT ETA (TIME)                                                  | Y                                   | Y    | Y    | N    | Y    | Y    |
|   | 44   | ENSUING WAYPOINT (POSITION)                                               | N                                   | N    | Y    | N    | Y    | Y    |
|   | 45   | REPORTED WAYPOINT (POSITION)                                              | Y                                   | Y    | N    | N    | N    | N    |
|   | 46   | REPORTED WAYPOINT (TIME)                                                  | Y                                   | Y    | N    | N    | N    | N    |

RSI

North America

31-MAR-2022

Regional

SUP

R-66

NAM

INFO

C

|    |                                              |   |   |   |   |   |   |   |
|----|----------------------------------------------|---|---|---|---|---|---|---|
| 68 | FREE TEXT                                    | N | N | Y | N | N | Y | Y |
| 69 | REQUEST VMC DESCENT                          | N | N | N | N | N | N | N |
| 70 | REQUEST HEADING (DEGREES)                    | N | N | N | N | N | N | N |
| 71 | REQUEST GROUND TRACK (DEGREES)               | N | N | N | N | N | N | N |
| 72 | REACHING (ALT)                               | N | N | N | N | Y | N | Y |
| 73 | (VERSION NUMBER)                             | N | N | N | N | N | N | N |
| 74 | MAINTAIN OWN SEPARATION AND VMC              | N | N | N | N | N | N | N |
| 75 | AT PILOTS DISCRETION                         | N | N | N | N | N | N | N |
| 76 | REACHING BLOCK (ALT) TO (ALT)                | Y | Y | N | N | N | N | N |
| 77 | ASSIGNED BLOCK (ALT) TO (ALT)                | N | N | N | N | N | N | N |
| 78 | AT (TIME) (DISTANCE) (TO/FROM)<br>(POSITION) | Y | N | N | N | N | N | N |

31-MAR-  
2022  
NAM

R-70

North America  
Regional SUP  
INFO

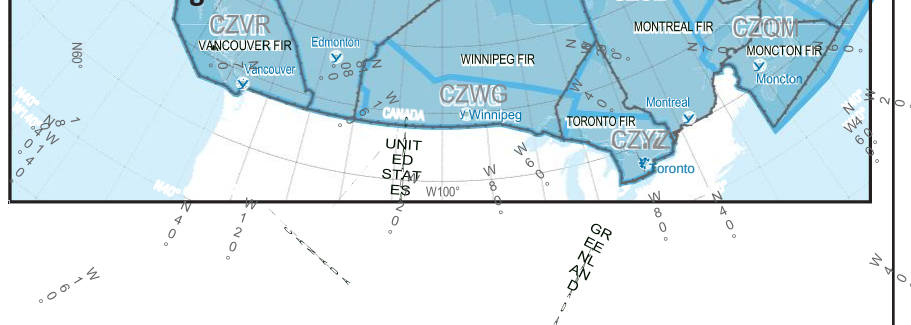
| DM<br># | Downlink Message                                        | Message Facility (Y/N) |          |          |          |          |          |          | Supported<br>by |
|---------|---------------------------------------------------------|------------------------|----------|----------|----------|----------|----------|----------|-----------------|
|         |                                                         | CZV<br>R               | CZE<br>G | CZW<br>G | CZY<br>Z | CZU<br>L | CZQ<br>M | CDQ<br>X |                 |
| 79      | ATIS IDENTIFIER (ATIS)                                  | N                      | N        | N        | N        | N        | N        | N        |                 |
| 80      | DEVIATING (DEVIATION<br>OFFSET) (DIRECTION)<br>OF ROUTE | Y                      | Y        | Y        | Y        | Y        | Y        | N        |                 |



## INFO

**SATCOM Shadow**

Data link services may be affected by an area of Inmarsat satellite communication (SATCOM) unreliability in the Edmonton FIR. This area, referred to as the SATCOM shadow, extends from the North Pole to approximately N70. Unreliability may be most pronounced at W120, while coverage improves to the east and west of W120. The exact extent and effect of the shadow depends on the satellite services contracted, atmospheric conditions, aircraft antenna placement, and direction of flight. Owing to their polar orbits, this SATCOM shadow will not likely affect Iridium SATCOM users. Regardless of the contract SATCOM service provider, aircraft observing an indication that SATCOM has been lost should expect that their ADS-C has been terminated. Ensuing position reports are to be provided via voice until the outage has been overcome and flight crews can re-establish ADS-C.

**CPDLC Coverage Areas and SATCOM Shadow**

15-SEP-2022

NAM

R-81

Regional SUP  
INFO5.2.2 U.S. Domestic En  
Route CPDLC

| Data Authority | Vertical Limits | Logon Address | Logon Time Before Entry   | CPDLC | ADS-C | Capability               |
|----------------|-----------------|---------------|---------------------------|-------|-------|--------------------------|
| Indianapolis   | -               | KUSA          | See Logon Procedure below | YES   | NO    | FANS 1/A with VDL Mode 2 |
| Kansas City    |                 |               |                           |       |       |                          |
| a Miami        |                 |               |                           |       |       |                          |
| Minneapolis    |                 |               |                           |       |       |                          |
| Oakland        |                 |               |                           |       |       |                          |
| Washington     |                 |               |                           |       |       |                          |

### Eligibility

- An aircraft can only begin U.S. Domestic En Route CPDLC trial participation after submitting the required documentation to L3HARRIS.
- To determine whether your aircraft is eligible, refer to your operator.
- Detailed application processes and tutorial material can be found on the L3HARRIS website: <https://www.l3harris.com/datacomm>

### Logon Procedure

- CPDLC “KUSA” is the single National Data Authority (NDA) in the U.S. Domestic Airspace. Do not logon using the ARTCC identifier (e.g., KZKC for Kansas City ARTCC).
- A logon to “KUSA” can occur up to 4HR prior to the filed departure time or prior to penetrating US airspace if arriving internationally and not using CPDLC service.

At airports with DCL service, logon should be made at least 30min prior to the proposed departure time to receive your IFR clearance.

At Non-DCL airport: Logon at the pilot's discretion; RECOMMENDED to logon on ground.

- Flight crews should wait at least 10min after landing before initiating a new CPDLC logon to ensure that FAA's system will have enough time to clear previous flight information.

## **CPDLC Messages**

- Each CPDLC Clearance or message sent by ATC to the ACFT requires a response.
- Respond in a timely manner, workload permitting, without undue delay.
- ATC can use CPDLC to issue common ATC clearances. Respond ACCEPT/WILCO or UNABLE/REJECT.
- ATC can request a REPORT from the aircraft. Respond using the pre-formatted REPORT page.
- Two pre-formatted “Due To” explanation messages may be added to a REJECT/UNABLE response to an ATC CPDLC clearance or to CPDLC REQUEST:
  - Due To Weather;
  - Due To Performance.
- Do NOT send FREE TEXT messages - exception with EMERGENCY messages.

## **Requests**

Do NOT send multiple requests at the same time in one message to ATC.

Do NOT send a second request of the same type (e.g., Altitude, Route, Voice Contact) when you have not received a response to a previous request.

The following downlink requests may be sent by pilots using CPDLC:

**Pilot Downlink Request**

REQUEST DIRECT TO [position]

REQUEST VOICE CONTACT

REQUEST [altitude]

REQUEST CLIMB TO [altitude]

REQUEST DESCENT TO [altitude]

**Emergency CPDLC Messages**

Voice remains primary for emergency communication.

FREE TEXT is permitted when sending an EMERGENCY REPORT. This is an exception to the general rule and anticipates situations where VHF voice radios may be unusable.

The flight crew may send the following EMERGENCY CPDLC messages to ATC:

**Emergency Downlink Messages**

PAN PAN

MAYDAY MAYDAY

[remainingfuel] OF FUEL REMAINING AND  
[remainingsouls] SOULS ON BOARD

CANCEL EMERGENCY

DIVERTING TO [position] VIA [route] [clearance]

OFFSETTING [distance] [offset] [direction] OF  
ROUTE

DESCENDING TO [altitude]

[freetext]

**5.2.3 Anchorage Arctic FIR/Oceanic FIR/ARTCC**

| Data Authority                                                            | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|---------------------------------------------------------------------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Anchorage Arctic FIR South of 73N (Over or South of WPTs PILUN and TAYTA) | -               | PAZA          | -                       | YES   | YES   | FANS 1/A   |
| Anchorage Continental FIR East of a line                                  |                 |               |                         |       |       |            |

|                                                                                           |   |      |   |     |     |             |
|-------------------------------------------------------------------------------------------|---|------|---|-----|-----|-------------|
| 57N152W to<br>58N167W to<br>63N174W                                                       |   |      |   |     |     |             |
| Anchorage<br>Continental FIR<br>West of a line<br>57N152W to<br>58N167W to<br>63N174W     | - | PAZN | - | YES | YES | FANS<br>1/A |
| Anchorage<br>Oceanic FIR                                                                  |   |      |   |     |     |             |
| Anchorage<br>Arctic FIR<br>above 73N LAT<br>(Over or North<br>of WPTs BIITE<br>and BARIP) |   |      |   |     |     |             |

- Aircraft entering Anchorage FIR airspace from the Magadan, Edmonton, Vancouver, Oakland or Fukuoka FIRs will be provided automatic FANS addressing forwarding.
- Aircraft departing Alaskan airports are requested to logon after departure, but before leaving FL180.
- The use of CPDLC does not remove requirements to monitor VHF/HF frequencies.
- Aircraft within VHF coverage may make position reports via CPDLC.
- West of 165W, all requests to ATC may be made via CPDLC.

15-SEP-  
2022  
NAM

North America  
Regional SUP  
INFO

R-83

- East of 165W, requests to ATC should be made via VHF if within VHF coverage.
- After logon, Anchorage ARTCC automation will provide automatic FANS address forwarding for flights entering the Magadan, Edmonton, Vancouver, Oakland and Fukuoka FIRs.
- Prior to entering the Anchorage Oceanic FIR, contact San Francisco Radio and:
  - Identify the flight as ADS-C and/or CPDLC connected;
  - Provide departure, destination and aircraft registration number; and
  - Request a SELCAL check.
- HF service in the Anchorage Arctic FIR is provided via Gander Radio. San Francisco Radio maintains an HF Long-Distance Operational Control (LDOC) station at Barrow, Alaska that may be of use when the solar conditions inhibit normal communications via Gander. HF service in the Anchorage Oceanic FIR is provided via San Francisco Radio.
- Expect to receive primary and secondary HF frequency assignments from San Francisco Radio for the entire route of flight when within the Anchorage Oceanic FIR.
- Maintain HF communications capability with appropriate en route Radio (San Francisco Radio or Gander Radio) at all times within the Anchorage Arctic or Oceanic FIRs.



31-MAR-2022

NAM

Regional SUP

INFO

5.2.4 Beacon Code

Requirements

R-85

5.2.4.1 Miami CTA/FIR

- a) There is no primary radar or weather returns available from the Grand Turk, Georgetown, and Nassau radar systems. Since radar separation is dependent upon the receipt of transponder returns, all aircraft within antenna coverage of either system are required to squawk transponder codes as assigned by ATC, or, if none assigned, squawk the appropriate stratum code.
- b) Aircraft departing and overflying the Santo Domingo and Port Au Prince FIRs can expect ATC assigned codes from those ATS providers. If a code is not assigned by either Santo Domingo or Port Au Prince, pilots should request a code. The assigned code should be squawked prior to entering the Miami CTA/FIR.





31-MAR-2022

NAM

R-90

Regional SUP

INFO

## 5.3 SATCOM Short Codes &amp; PSTN

## Numbers

**Disclaimer:**

Inmarsat short codes are provided by courtesy of Inmarsat Global Ltd. The revision of the short codes is on a "as received from Inmarsat" basis. The linkage of the short codes with valid ACC phone numbers is under the responsibility of Inmarsat Global Ltd. Lufthansa Systems FlightNav Inc. is not taking liability for the attribution of the short codes and the programming of the respective ACC phone numbers.

Public Switched Telephone Network (PSTN) numbers have been denicted from State sources (AIPs) where available

| Country                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ATS Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Inmarsat Short Code | PSTN Number     | Remarks |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|---------|
| Canada                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>When operating in Canada or in the Gander OCA, SATVOICE may be used for any communication service. SATVOICE is intended to enhance available communication for flight crews and controllers alike. While it is considered a form of direct controller-pilot communication (DCPC), VHF voice, HF and CPDLC remain the primary means of communication.</p> <p>The use of SATVOICE for this purpose requires on-board embedded equipment, installed and tested in accordance with appropriate certification and airworthiness standards. Pilots using SATVOICE in airspace where HF is required must still, on initial contact, do a SELCAL check on the assigned HF and continue to maintain a listening watch on the appropriate HF frequency. Safety-level priority has been assigned to ATS communications by satellite service providers, Inmarsat and Iridium only. When accepting an incoming call, the pilot shall visually confirm and verify that it is an ATS safety-level priority call. Calls using other priorities delivering ATC instructions must be disregarded and crews must contact the ATSU to confirm the validity of the message received. Aircraft equipped with SATVOICE equipment may call the appropriate ATSU using the following short codes or PSTN numbers.</p> <p>Short codes should always be used. However, PSTN numbers can be used, but only if absolutely necessary. Call routing automation in the voice switching system is only available when the short code is used. Calls will still get through with the PSTN number but will route to a designated position within the unit instead of the air traffic control officer responsible for the flight.</p> |                     |                 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Edmonton ACC (Note 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 431601              | +1 780 890 2775 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Gander Domestic FIR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 431602              | +1 709 651 5297 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Gander Oceanic FIR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 431603              | +1 709 651 5260 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Gander Radio (Note 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 431613              | +1 709 651 5298 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Moncton ACC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 431604              | +1 506 867 8745 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Montreal ACC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 431605              | +1 514 636 3606 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Toronto ACC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 431606              | +1 905 676 4509 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Vancouver ACC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 431607              | +1 604 507 7875 |         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Winnipeg ATC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 431608              | +1 204 837 9481 |         |
| <p><b>Note 1:</b></p> <p><b>Service Limitations North of 72N in Edmonton FIR</b></p> <p>Inmarsat satellite coverage has limitations in the north, so flights operating only with Inmarsat equipment may experience unreliability north of 72N and no service north of 80N. Iridium SATVOICE services are available north of 80N. Operators of aircraft that are equipped with both Inmarsat and Iridium modems should ensure that they switch to the Iridium system before operating north of 72N.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |                 |         |
| <p><b>Note 2:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |                 |         |

C

## INFO

| Country         | ATS Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Inmarsat Short Code | PSTN Number     | Remarks                                                            |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------|--------------------------------------------------------------------|
| USA<br>(Note 1) | New York ARTCC (New York East OCA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 436695              | +1 631 468 1397 | Only distress urgency for or                                       |
|                 | New York ARTCC (New York West OCA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 436696              | +1 631 468 1396 |                                                                    |
|                 | Oakland ARTCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 436697              | +1 510 745 3415 |                                                                    |
|                 | New York Radio (ARINC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 436623              | +1 631 244 2492 | ATC via Radio Facility (when unable to communicate on HF) (Note 2) |
|                 | San Francisco Radio (ARINC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 436625              | +1 925 371 3920 |                                                                    |
|                 | <p><b>Note 1:</b><br/>The FAA provides Inmarsat and Inmarsat SATVOICE services for air-to-ground and ground-to-air calls directly with Oakland, New York, and Anchorage ARTCCs and New York and San Francisco Radio. The FAA's SATVOICE services are supplemental to HF voice communication services.</p> <p><b>Note 2:</b><br/>When unable to communicate on HF, the pilot may conduct normal and routine communications SATVOICE via New York or San Francisco Radio or ATC. An operator is considered to be unable to communicate on HF during poor HF propagation or if he suffers an inflight HF radio failure. Consequently, that operator can use SATVOICE equipment and procedures to continue the flight to Anchorage, New York and Oakland OCAs, to obtain maintenance on the HF radios, would also be acceptable under these circumstances, and would meet the criteria for use of SATVOICE with New York and San Francisco Radio.</p> |                     |                 |                                                                    |

18-AUG-  
2022  
NAM

North America  
Regional SUP  
INFO

RSI

R-103

## 6 Appendix

### 6.1 VOLMET / ATIS

#### 6.1.1 VOLMET Stations (VHF) - NIL

There are no VOLMET stations on VHF in the NAM Region.

#### 6.1.2 VOLMET Stations (HF)

| Station Call-Sign | FREQ kHz                         | HR Service | of    | Sched ular | Contents                                                          | Stations Sequence | in |
|-------------------|----------------------------------|------------|-------|------------|-------------------------------------------------------------------|-------------------|----|
| GANDER RADIO      | 348<br>560<br>4100<br>5132<br>70 | H<br>24    | 20-25 | TAF        | Montreal (YUL),<br>Toronto,<br>Ottawa                             |                   |    |
|                   |                                  |            |       | METAR      | Gander,<br>Montreal (YUL),<br>Toronto,<br>Ottawa,<br>Goose Bay    |                   |    |
|                   |                                  |            | 25-30 | SIGMET     | (Note 1)                                                          |                   |    |
|                   |                                  |            |       | TAF        | Winnipeg,<br>Edmonton,<br>Calgary,<br>Churchill                   |                   |    |
|                   |                                  |            |       | METAR      | Kuujuuaq,<br>Winnipeg,<br>Churchill                               |                   |    |
|                   |                                  |            | 50-55 | TAF        | Gander, St. Johns,<br>Halifax                                     |                   |    |
|                   |                                  |            |       | METAR      | Gander, St. Johns,<br>Halifax,<br>Stephenville,<br>Montreal (YMX) |                   |    |
|                   |                                  |            | 55-00 | SIGMET     | (Note 1)                                                          |                   |    |
|                   |                                  |            |       | TAF        | Goose Bay,<br>Iqaluit,                                            |                   |    |
|                   |                                  |            |       |            |                                                                   |                   |    |

|                                                                                                                                                                                     |                                    |                                                |       |        |                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------|-------|--------|----------------------------------------------------------|
|                                                                                                                                                                                     |                                    |                                                |       |        | Sondrestrom                                              |
|                                                                                                                                                                                     |                                    |                                                |       | METAR  | Goose Bay, Iqaluit, Sondrestrom, Kuujuaq                 |
| <b>Note 1:</b> Includes SIGMET or notification of SIGMET affecting flights operating above FL100 in the Gander Oceanic and the Gander Domestic, Moncton, Montreal and Toronto FIRs. |                                    |                                                |       |        |                                                          |
| NEW YORK<br>RADIO                                                                                                                                                                   | 348<br>5660<br>4100<br>51132<br>70 | H<br>N<br>H<br>2<br>4<br>H<br>2<br>4<br>H<br>J | 00-05 | TAF    | Detroit, Cleveland, Cincinnati                           |
|                                                                                                                                                                                     |                                    |                                                |       | METAR  | Detroit, Cleveland, Cincinnati, Indianapolis, Pittsburgh |
|                                                                                                                                                                                     |                                    |                                                | 05-10 | SIGMET | Oceanic New York FIR                                     |
|                                                                                                                                                                                     |                                    |                                                |       | TAF    | Bangor, Windsor Locks, Charlotte                         |
|                                                                                                                                                                                     |                                    |                                                |       | METAR  | Bangor, Windsor Locks, Norfolk, Charlotte                |
|                                                                                                                                                                                     |                                    |                                                | 10-15 | TAF    | New York, Newark, Boston                                 |
|                                                                                                                                                                                     |                                    |                                                |       | METAR  | New York, Newark, Boston, Baltimore, Washington Dulles   |
|                                                                                                                                                                                     |                                    |                                                | 15-20 | SIGMET | Oceanic Miami/San Juan FIRs                              |
|                                                                                                                                                                                     |                                    |                                                |       | TAF    | Bermuda, Miami, Atlanta                                  |

| Station Call-Sign | FREQ kHz                                 | HR Service                                     | of        | Schedule | Contents                                                                    | Stations Sequence | in |
|-------------------|------------------------------------------|------------------------------------------------|-----------|----------|-----------------------------------------------------------------------------|-------------------|----|
| NEW YORK<br>RADIO | 348<br>556<br>660<br>4100<br>51132<br>70 | H<br>N<br>H<br>2<br>4<br>H<br>2<br>4<br>H<br>J | 15-<br>20 | METAR    | Bermuda,<br>Miami,<br>Nassau,<br>Orlando,<br>Atlanta                        |                   |    |
|                   |                                          |                                                |           | TAF      | Chicago,<br>Milwaukee,<br>Minneapolis                                       |                   |    |
|                   |                                          |                                                | 30-<br>35 | METAR    | Chicago,<br>Milwaukee,<br>Minneapolis,<br>Detroit,<br>Boston                |                   |    |
|                   |                                          |                                                |           | SIGMET   | Oceanic<br>New York FIR                                                     |                   |    |
|                   |                                          |                                                | 35-<br>40 | TAF      | Indianapolis,<br>St. Louis,<br>Pittsburgh                                   |                   |    |
|                   |                                          |                                                |           | METAR    | Indianapolis,<br>St. Louis,<br>Pittsburgh,<br>Atlantic City                 |                   |    |
|                   |                                          |                                                | 40-<br>45 | TAF      | Baltimore,<br>Philadelphia,<br>Washington<br>Dulles                         |                   |    |
|                   |                                          |                                                |           | METAR    | Baltimore,<br>Philadelphia,<br>Washington<br>Dulles, New<br>York,<br>Newark |                   |    |
|                   |                                          |                                                | 45-       | SIGMET   | Oceanic<br>Miami/San<br>Juan FIRs                                           |                   |    |
|                   |                                          |                                                |           | TAF      | Nassau,<br>Orlando                                                          |                   |    |

|  |  |  |    |       |                                                                                    |
|--|--|--|----|-------|------------------------------------------------------------------------------------|
|  |  |  | 50 | METAR | Bermuda,<br>Miami,<br>Nassau,<br>Orlando,<br>Atlanta,<br>Tampa, West<br>Palm Beach |
|--|--|--|----|-------|------------------------------------------------------------------------------------|



30-JUN-2016

NAM

R-110

Regional SUP

INFO

6.1.3 Aerodromes Covered by  
VOLMET Service

| ICAO | Airport Name                               | VOLMET Station | FREQ      |
|------|--------------------------------------------|----------------|-----------|
| CYEG | Edmonton Intl                              | Gander         |           |
| CYFB | Iqaluit                                    |                |           |
| CYHZ | Halifax Stanfield Intl                     |                |           |
| CYJI | Stephenville                               |                |           |
| CYMX | Montreal Mirabel Intl                      |                |           |
| CYOW | Ottawa MacDonald-Cartier Intl              |                |           |
| CYQX | Gander Intl                                |                |           |
| CYUL | Montreal Pierre Elliot Trudeau Intl        |                |           |
| CYVP | Kuujuuaq                                   |                |           |
| CYVR | Vancouver Intl                             | Honolulu       |           |
| CYWG | Winnipeg J A Richardson Intl               | Gander         |           |
| CYYC | Calgary Intl                               |                |           |
| CYYQ | Churchill                                  |                |           |
| CYYR | Goose Bay                                  |                |           |
| CYYT | St Johns Intl                              |                |           |
| CYYZ | Toronto Lester B Pearson Intl              |                |           |
| KACY | Atlantic City Intl                         | New York       | HF (Note) |
| KATL | Atlanta Hartsfield-Jackson Atlanta Intl    |                |           |
| KBDL | Windsor Locks Bradley Intl                 |                |           |
| KBGR | Bangor Intl                                |                |           |
| KBOS | Boston General Edward L Logan Intl         |                |           |
| KBWI | Baltimore/Washington Intl Thurgood Marshal |                |           |
| KCLE | Cleveland-Hopkins Intl                     |                |           |
| KCLT | Charlotte/Douglas Intl                     |                |           |

|      |                                           |          |  |
|------|-------------------------------------------|----------|--|
| KCVG | Covington Cincinnati/Northern KY Intl     |          |  |
| KDTW | Detroit Metropolitan Wayne County         |          |  |
| KEWR | Newark Liberty Intl                       |          |  |
| KIAD | Washington Dulles Intl                    |          |  |
| KIND | Indianapolis Intl                         |          |  |
| KJFK | New York John F Kennedy Intl              |          |  |
| KLAS | Las Vegas McCarran Intl                   | Honolulu |  |
| KLAX | Los Angeles Intl                          |          |  |
| KMCO | Orlando Intl                              |          |  |
| KMIA | Miami Intl                                |          |  |
| KMKE | Milwaukee General Mitchell Intl           | New York |  |
| KMSP | Minneapolis-St Paul Intl/Wold-Chamberlain |          |  |

## INFO

| ICAO | Airport Name                               | VOLMET Station | FREQ      |
|------|--------------------------------------------|----------------|-----------|
| KONT | Ontario Intl                               | Honolulu       | HF (Note) |
| KORD | Chicago O Hare Intl                        | New York       |           |
| KORF | Norfolk Intl                               |                |           |
| KPBI | West Palm Beach<br>Palm Beach Intl         |                |           |
| KPDX | Portland Intl                              | Honolulu       |           |
| KPHL | Philadelphia Intl                          | New York       |           |
| KPIT | Pittsburgh Intl                            |                |           |
| KSEA | Seattle-Tacoma Intl                        | Honolulu       |           |
| KSFO | San Francisco Intl                         |                |           |
| KSMF | Sacramento Intl                            |                |           |
| KSTL | St Louis Lambert-<br>St Louis Intl         | New York       |           |
| KTPA | Tampa Intl                                 |                |           |
| PACD | Cold Bay                                   | Honolulu       |           |
| PAED | Anchorage<br>Elmendorf AFB                 |                |           |
| PAFA | Fairbanks Intl                             |                |           |
| PAKN | King Salmon                                |                |           |
| PANC | Anchorage Ted<br>Stevens Anchorage<br>Intl |                |           |

**Note:**

For Gander &amp; New York HF VOLMET Service, refer to:

- North America Appendix 6.1.2 VOLMET Stations (HF)

For Honolulu HF VOLMET Service, refer to:

- Pacific Appendix 6.1.2 VOLMET Stations (HF)

Pacific Appendix  
6.1.2

23-JUN-2022

NAM

R-121

Regional SUP

INFO

## 6.1.4 ATIS

## Frequencies

| ICAO | Airport                               | D-ATIS | FREQ    | DEP/ARR | Language |
|------|---------------------------------------|--------|---------|---------|----------|
| CYAM | Sault St Marie                        |        | 133.050 |         | English  |
| CYBG | Bagotville                            |        | 124.200 |         | English  |
|      |                                       |        | 125.800 |         | French   |
| CYCD | Nanaimo                               |        | 128.425 |         | English  |
| CYEG | Edmonton Intl                         | YES    | 128.000 |         | English  |
| CYEV | Inuvik Mike Zubko                     |        | 128.500 |         | English  |
| CYFC | Fredericton Intl                      |        | 124.000 |         | English  |
|      |                                       |        | 127.550 |         | English  |
| CYHM | Hamilton                              | YES    | 128.100 |         | English  |
| CYHU | Montreal St-Hubert                    | YES    | 124.100 |         | French   |
|      |                                       |        | 124.900 |         | English  |
| CYHZ | Halifax Stanfield Intl                | YES    | 121.000 |         | English  |
| CYKF | Kitchener Waterloo                    |        | 125.100 |         | English  |
| CYLW | Kelowna                               | YES    | 127.500 |         | English  |
| CYMJ | Moose Jaw Air Vice Marshall CM McEwen |        | 131.300 |         | English  |
| CYMM | Fort McMurray                         |        | 128.500 |         | English  |
| CYMX | Montreal Mirabel Intl                 | YES    | 125.700 |         | English  |
|      |                                       |        | 126.100 |         | French   |
| CYOD | Cold Lake Group Captain R.W. McNair   |        | 118.250 |         | English  |
| CYOW | Ottawa MacDonald-Cartier Intl         | YES    | 121.150 |         | English  |

|          |                                        |     |             |  |         |
|----------|----------------------------------------|-----|-------------|--|---------|
|          |                                        |     | 132.<br>950 |  | French  |
| CYQ<br>B | Quebec Jean Lesage Intl                | YES | 128.<br>300 |  | French  |
|          |                                        |     | 134.<br>600 |  | English |
| CYQ<br>F | Red Deer Rgnl                          |     | 124.<br>000 |  | English |
| CYQ<br>G | Windsor                                |     | 134.<br>500 |  | English |
| CYQ<br>L | Lethbridge County                      |     | 124.<br>400 |  | English |
| CYQ<br>M | Moncton Greater<br>Romeo Leblanc Intl  | YES | 128.<br>650 |  | English |
| CYQ<br>O | Comox                                  |     | 118.<br>600 |  | English |
| CYQ<br>R | Regina Intl                            | YES | 127.<br>000 |  | English |
| CYQ<br>T | Thunder Bay                            | YES | 128.<br>800 |  | English |
| CYQ<br>U | Grande Prairie                         |     | 128.<br>600 |  | English |
| CYQ<br>X | Gander Intl                            | YES | 124.<br>800 |  | English |
| CYS<br>B | Sudbury                                |     | 127.<br>400 |  | English |
| CYT<br>H | Thompson                               |     | 127.<br>650 |  | English |
| CYT<br>R | Trenton                                |     | 135.<br>450 |  | English |
| CYT<br>S | Timmins / Victor M<br>Power            |     | 124.<br>950 |  | English |
| CYT<br>Z | Toronto B Bishop City                  |     | 133.<br>600 |  | English |
| CYU<br>L | Montreal Pierre Elliot<br>Trudeau Intl | YES | 127.<br>500 |  | French  |

## INFO

| ICAO     | Airport                              | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|--------------------------------------|--------|-------------|---------|----------|
|          |                                      |        | 133.<br>700 |         | English  |
| CYV<br>R | Vancouver Intl                       | YES    | 124.<br>600 |         | English  |
| CYW<br>G | Winnipeg J<br>Richardson Intl        | A YES  | 120.<br>200 |         | English  |
| CYW<br>K | Wabush                               |        | 128.<br>125 |         | English  |
| CYX<br>E | Saskatoon John G<br>Diefenbaker Intl | YES    | 128.<br>400 |         | English  |
| CYX<br>J | Fort St John                         |        | 128.<br>500 |         | English  |
| CYX<br>L | Sioux Lookout                        |        | 124.<br>750 |         | English  |
| CYX<br>S | Prince George                        |        | 128.<br>725 |         | English  |
| CYX<br>U | London                               |        | 127.<br>800 |         | English  |
| CYX<br>X | Abbotsford                           | YES    | 119.<br>800 |         | English  |
| CYX<br>Y | Whitewater Erik<br>Nielsen Intl      |        | 125.<br>250 |         | English  |
| CYY<br>B | North Bay                            |        | 124.<br>900 |         | English  |
| CYY<br>C | Calgary YYC Intl                     | YES    | 128.<br>225 |         | English  |
| CYY<br>E | Ft Nelson                            |        | 125.<br>650 |         | English  |
| CYY<br>J | Victoria Intl                        | YES    |             |         | English  |
| CYY<br>R | Goose Bay                            |        | 128.<br>100 |         | English  |
| CYY<br>T | St Johns Intl                        | YES    | 128.<br>000 |         | English  |
| CYY<br>Z | Toronto Lester B<br>Pearson Intl     | YES    | 120.<br>825 |         | English  |
|          |                                      |        | 133.<br>100 |         | English  |
| CYZ<br>F | Yellowknife                          |        | 128.<br>400 |         | English  |
| CYZ<br>V | Sept-Isles                           |        | 124.<br>800 |         | English  |
|          |                                      |        | 134.<br>900 |         | French   |

|          |                                     |     |             |     |         |
|----------|-------------------------------------|-----|-------------|-----|---------|
| CYZ<br>X | Greenwood                           |     | 128.<br>850 |     | English |
| KAB<br>E | Allentown Lenigh<br>Valley Intl     |     | 126.<br>975 |     | English |
| KABI     | Abilene Rgnl                        |     | 118.<br>250 |     | English |
| KAB<br>O | Albuquerque Intl<br>Sunport         | YES | 118.<br>000 |     | English |
| KAB<br>Y | Albany Southwest<br>Georgia Rgnl    |     | 133.<br>050 |     | English |
| KAC<br>K | Nantucket Mem                       |     | 127.<br>500 |     | English |
| KAC<br>T | Waco Rgnl                           |     | 123.<br>850 |     | English |
| KAC<br>Y | Atlantic City Intl                  |     | 108.<br>600 |     | English |
|          |                                     |     | 125.<br>725 |     | English |
| KAD<br>M | Ardmore Muni                        |     | 125.<br>600 |     | English |
| KAD<br>W | Camp Springs Joint<br>Base Andrews  |     | 133.<br>675 |     | English |
| KAF<br>W | Fort Worth Alliance                 |     | 126.<br>925 |     | English |
| KAG<br>S | Augusta Rgnl at Bush<br>Fld         |     | 132.<br>750 |     | English |
| KAL<br>B | Albany Intl                         | YES | 120.<br>450 |     | English |
| KAM<br>A | Amarillo Rick<br>Husband Intl       |     | 118.<br>850 |     | English |
| KAS<br>E | Aspen -Pitkin<br>County/Sardy Fld   |     | 120.<br>400 |     | English |
| KAI<br>L | Atlanta Hartsfield-<br>Jackson Intl | YES | 119.<br>650 | ARR | English |

23-JUN-  
2022  
NAM

R-130

North America  
Regional SUP  
INFO

RSI

| ICAO     | Airport                                        | D-ATIS | FREQ        | DEP/AR R | Language |
|----------|------------------------------------------------|--------|-------------|----------|----------|
|          |                                                |        | 125.<br>550 | DEP      | English  |
| KAI<br>W | Appleton Intl                                  |        | 127.<br>150 |          | English  |
| KAU<br>S | Austin Bergstrom Intl                          | YES    | 124.<br>400 |          | English  |
| KAV<br>L | Asheville Rgnl                                 |        | 120.<br>200 |          | English  |
| KAV<br>P | Wilkes-Barre/Scranton Intl                     |        | 111.<br>600 |          | English  |
| KAZ<br>O | Kalamazoo /Battle Creek Intl                   |        | 127.<br>250 |          | English  |
| KBD<br>L | Windsor Locks<br>Bradley Intl                  | YES    | 118.<br>150 |          | English  |
| KBE<br>D | Bedford Laurence G<br>Hanscom Fld              |        | 124.<br>600 |          | English  |
| KBFI     | Seattle Boeing<br>Fld/King County Intl         |        | 127.<br>750 |          | English  |
| KBFL     | Bakerfield Meadows<br>Fld                      |        | 118.<br>600 |          | English  |
| KBFM     | Mobile Intl                                    |        | 135.<br>575 |          | English  |
| KBGM     | Binghamton Greater<br>/Edwin A Link Fld        |        | 128.<br>150 |          | English  |
| KBGR     | Bangor Intl                                    |        | 127.<br>750 |          | English  |
| KBHM     | Birmingham<br>Shuttlesworth Intl               | -      | 119.<br>400 |          | English  |
| KBIL     | Billings Logan Intl                            |        | 126.<br>300 |          | English  |
| KBIS     | Bismarck Muni                                  |        | 119.<br>350 |          | English  |
| KBJC     | Denver Rocky<br>Mountain<br>Metropolitan       |        | 126.<br>250 |          | English  |
| KBKL     | Cleveland Burke<br>Lakefront                   |        | 125.<br>250 |          | English  |
| KBLI     | Bellingham Intl                                |        | 134.<br>450 |          | English  |
| KBLV     | Belleville Scott<br>AFB/Midamerica St<br>Louis |        | 125.<br>200 |          | English  |
|          |                                                |        | 128.<br>700 |          | English  |



|          |                                                                |     |             |     |         |
|----------|----------------------------------------------------------------|-----|-------------|-----|---------|
| KBM<br>I | Bloomington/Normal<br>Central IL Rgnl at<br>Bloomington-Normal |     | 135.<br>350 |     | English |
| KBN<br>A | Nashville Intl                                                 | YES | 135.<br>100 |     | English |
| KBOI     | Boise Air<br>Terminal/Gowen Fld                                | YES | 123.<br>900 |     | English |
| KBO<br>S | Boston General<br>Edward L Logan Intl                          | YES | 135.<br>000 |     | English |
| KBP<br>T | Beaumont/Port Arthur<br>Jack Brooks Rgnl                       |     | 126.<br>300 |     | English |
| KBR<br>O | Brownsville /South<br>Padre Island Intl                        |     | 128.<br>550 |     | English |
| KBT<br>R | Baton Rouge Metro,<br>Ryan Fld                                 |     | 125.<br>200 |     | English |
| KBT<br>V | Burlington Intl                                                |     | 123.<br>800 |     | English |
| KBU<br>F | Buffalo Niagara Intl                                           | YES | 135.<br>350 |     | English |
| KBU<br>R | Burbank Bob Hope                                               | YES | 134.<br>500 |     | English |
|          |                                                                |     | 135.<br>125 | ARR | English |
| KBW<br>I | Baltimore<br>/Washington Intl<br>Thurgood Marshal              | YES | 115.<br>100 |     | English |
|          |                                                                |     | 127.<br>800 |     | English |
| KBZ<br>N | Bozeman<br>Yellowstone Intl                                    |     | 135.<br>425 |     | English |
| KCA<br>E | Columbia Metro                                                 |     | 120.<br>150 |     | English |
| KCA<br>K | Akron -Canton Rgnl                                             |     | 121.<br>050 |     | English |

| ICAO     | Airport                                               | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|-------------------------------------------------------|--------|-------------|---------|----------|
| KCE<br>F | Springfield/Chicopee<br>Westover<br>ARB/Metro         |        | 127.<br>525 |         | English  |
| KCH<br>A | Chattanooga Lovell<br>Fld                             |        | 119.<br>850 |         | English  |
| KCH<br>O | Charlottesville -<br>Albemarle                        |        | 118.<br>425 |         | English  |
| KCH<br>S | Charleston AFB/Intl                                   |        | 124.<br>750 |         | English  |
| KCID     | Cedar Rapids The<br>Eastern Iowa                      |        | 124.<br>150 |         | English  |
| KCK<br>B | Clarksburg North<br>Central West Virginia             |        | 127.<br>825 |         | English  |
| KCL<br>E | Cleveland -Hopkins<br>Intl                            | YES    | 127.<br>850 | ARR     | English  |
|          |                                                       |        | 132.<br>375 | DEP     | English  |
| KCL<br>L | College Station<br>Easterwood Fld                     |        | 126.<br>850 |         | English  |
| KCL<br>T | Charlotte /Douglas<br>Intl                            | YES    | 121.<br>150 | ARR     | English  |
|          |                                                       |        | 132.<br>100 | DEP     | English  |
| KCM<br>H | Columbus John Glenn<br>Intl                           | YES    | 124.<br>600 |         | English  |
| KCM<br>I | Champaign/Urbana<br>University of<br>Illinois/Willard |        | 124.<br>850 |         | English  |
| KCO<br>S | Colorado Springs City<br>of Muni                      |        | 125.<br>000 |         | English  |
| KCO<br>U | Columbia Rgnl                                         |        | 128.<br>450 |         | English  |
| KCP<br>R | Casper /Natrona<br>County Intl                        |        | 126.<br>150 |         | English  |
| KCP<br>S | Canokla/St Louis St<br>Louis Downtown                 |        | 121.<br>450 |         | English  |
| KCR<br>P | Corpus Christi Intl                                   |        | 126.<br>800 |         | English  |
| KCR<br>W | Charleston West<br>Virginia Intl Yeager               |        | 127.<br>600 |         | English  |
| KCS<br>G | Columbus                                              |        | 127.<br>750 |         | English  |
| KCV<br>G | Covington<br>Cincinnati/Northern                      | YES    | 120.<br>250 |         | English  |

|          |                                      |     |             |     |         |
|----------|--------------------------------------|-----|-------------|-----|---------|
|          | KY Intl                              |     |             |     |         |
|          |                                      |     | 134.<br>375 | ARR | English |
|          |                                      |     | 135.<br>300 | DEP | English |
| KCW<br>A | Mosinee Central<br>Wisconsin         |     | 127.<br>450 |     | English |
| KCY<br>S | Cheyenne Rgnl/Jerry<br>Olson Fld     |     | 134.<br>425 |     | English |
| KDA<br>B | Daytona Beach Intl                   |     | 132.<br>875 |     | English |
| KDA<br>L | Dallas Love Fld                      | YES | 120.<br>150 |     | English |
| KDA<br>Y | Dayton James M Cox<br>Intl           |     | 125.<br>800 |     | English |
| KDB<br>O | Dubuque Rgnl                         |     | 127.<br>250 |     | English |
| KDC<br>A | Washington Ronald<br>Reagan Natl     | YES | 132.<br>650 |     | English |
| KDE<br>C | Decatur                              |     | 126.<br>350 |     | English |
| KDE<br>N | Denver Intl                          | YES | 125.<br>600 | ARR | English |
|          |                                      |     | 134.<br>025 | DEP | English |
| KDF<br>W | Dallas-Fort Worth<br>Intl            | YES | 123.<br>775 | ARR | English |
|          |                                      |     | 135.<br>925 | DEP | English |
| KDL<br>H | Duluth Intl                          |     | 124.<br>100 |     | English |
| KDS<br>M | Des Moines Intl                      |     | 119.<br>550 |     | English |
| KDI<br>W | Detroit Metropolitan<br>Wayne County | YES | 118.<br>125 | DEP | English |

23-JUN-  
2022  
NAM

R-141

North America  
Regional SUP  
INFO

RSI

| ICAO     | Airport                                    | D-ATIS | FREQ    | DEP/ARR | Language |
|----------|--------------------------------------------|--------|---------|---------|----------|
|          |                                            |        | 133.675 | ARR     | English  |
| KEA<br>U | Eau Claire Chippewa Valley Rgnl            |        | 126.025 |         | English  |
| KEF<br>D | Houston Ellington                          |        | 135.575 |         | English  |
| KEG<br>E | Eagle County Rgnl                          |        | 135.575 |         | English  |
| KEL<br>M | Elmira/Corning Rgnl                        |        | 125.475 |         | English  |
| KEL<br>P | El Paso Intl                               | YES    | 120.000 |         | English  |
| KERI     | Erie Intl/Tom Ridge Fld                    |        | 120.350 |         | English  |
| KEU<br>G | Eugene Mahlon Sweet Fld                    |        | 125.225 |         | English  |
| KEV<br>V | Evansville Rgnl                            |        | 120.200 |         | English  |
| KEW<br>R | Newark Liberty Intl                        | YES    | 115.700 | ARR     | English  |
|          |                                            |        | 134.825 | ARR     | English  |
| KEY<br>W | Key West Intl                              |        | 119.675 |         | English  |
| KFA<br>R | Fargo Hector Intl                          |        | 124.500 |         | English  |
| KFA<br>T | Fresno Yosemite Intl                       |        | 121.350 |         | English  |
| KFA<br>Y | Fayetteville Rgnl/Grannis Fld              |        | 121.250 |         | English  |
| KFL<br>G | Flagstaff Pulliam                          |        | 125.800 |         | English  |
| KFLL     | Fort Lauderdale /Hollywood Intl            | YES    | 135.000 |         | English  |
| KFM<br>N | Farmington Four Corners Rgnl               |        | 127.150 |         | English  |
| KFN<br>L | Ft Collins/Loveland Northern Colorado Rgnl |        | 135.075 |         | English  |
| KFN<br>T | Flint Bishop Intl                          |        | 133.150 |         | English  |
| KFO<br>E | Topeka Rgnl                                |        | 128.250 |         | English  |

|          |                                      |     |             |  |         |
|----------|--------------------------------------|-----|-------------|--|---------|
| KFR<br>G | Farmingdale Republic                 |     | 126.<br>650 |  | English |
| KFS<br>D | Sioux Falls Joe Foss<br>Fld          |     | 126.<br>600 |  | English |
| KFT<br>W | Fort Worth Meacham<br>Intl           |     | 120.<br>700 |  | English |
| KFW<br>A | Fort Wayne Intl                      |     | 121.<br>250 |  | English |
| KFX<br>E | Fort Lauderdale<br>Executive         |     | 119.<br>850 |  | English |
| KFY<br>V | Fayetteville Drake Fld               |     | 119.<br>575 |  | English |
| KGC<br>N | Grand Canyon Natl<br>Park            |     | 124.<br>300 |  | English |
| KGE<br>G | Spokane Intl                         |     | 124.<br>325 |  | English |
| KGF<br>K | Grand Forks Intl                     |     | 119.<br>400 |  | English |
| KGG<br>G | Longview East Texas<br>Rgnl          |     | 119.<br>650 |  | English |
| KGJ<br>T | Grand Junction Rgnl                  |     | 118.<br>550 |  | English |
| KGN<br>V | Gainesville Rgnl                     |     | 127.<br>150 |  | English |
| KGPI     | Kaibab Glacier Park<br>Intl          |     | 132.<br>625 |  | English |
| KGP<br>T | Gulfport -Biloxi Intl                |     | 119.<br>450 |  | English |
| KGR<br>B | Green Bay /Austin<br>Straubel Intl   |     | 124.<br>100 |  | English |
| KGR<br>K | Fort Hood/Killeen<br>Robert Gray AAF |     | 124.<br>900 |  | English |
| KGR<br>R | Grand Rapids Gerald<br>R Ford Intl   |     | 118.<br>725 |  | English |
| KGS<br>O | Greensboro Piedmont<br>Triad Intl    | YES | 128.<br>550 |  | English |

## INFO

| ICAO     | Airport                                                | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|--------------------------------------------------------|--------|-------------|---------|----------|
| KGS<br>P | Greer Greenville<br>Spartanburg Intl                   |        | 134.<br>250 |         | English  |
| KG<br>F  | Great Falls Intl                                       |        | 126.<br>600 |         | English  |
| KG<br>R  | Columbus/W<br>Point/Starkville Golden<br>Triangle Rgnl |        | 126.<br>375 |         | English  |
| KG<br>S  | Peru Grissom Arb                                       |        | 108.<br>450 |         | English  |
| KG<br>Y  | Goodyear Phoenix<br>Gary /Chicago Intl                 |        | 118.<br>350 |         | English  |
| KH<br>F  | Ogden Hill AFB                                         |        | 134.<br>925 |         | English  |
| KH<br>N  | Helena Rgnl                                            |        | 120.<br>400 |         | English  |
| KH<br>B  | Hobbs Lea County<br>Rgnl                               |        | 119.<br>750 |         | English  |
| KH<br>U  | Houston William P<br>Hobby                             | YES    | 124.<br>600 |         | English  |
| KH<br>N  | White Plains<br>Westchester County                     | YES    | 116.<br>600 |         | English  |
|          |                                                        |        | 133.<br>800 |         | English  |
| KH<br>V  | Huntsville Intl-Carl T<br>Jones Fld                    |        | 121.<br>250 |         | English  |
| KH<br>D  | Island Hilton Head                                     |        | 121.<br>400 |         | English  |
| KI<br>AD | Washington Dulles<br>Intl                              | YES    | 134.<br>850 |         | English  |
| KI<br>AG | Niagara Falls Intl                                     |        | 120.<br>800 |         | English  |
| KI<br>AH | Houston George<br>Bush Intercont /                     | YES    | 124.<br>050 |         | English  |
| KI<br>CT | Wichita Dwight D<br>Eisenhower Natl                    |        | 125.<br>150 |         | English  |
| KI<br>DA | Idaho Falls Rgnl                                       |        | 135.<br>325 |         | English  |
| KI<br>LM | Wilmington Intl                                        |        | 124.<br>975 |         | English  |
| KI<br>LN | Wilmington Air Park                                    |        | 124.<br>925 |         | English  |
| KI<br>ND | Indianapolis Intl                                      | YES    | 134.        |         | English  |

|           |                                     |     |             |     |         |
|-----------|-------------------------------------|-----|-------------|-----|---------|
|           |                                     |     | 250         |     |         |
| KISP      | New York Long Island<br>Mac Arthur  |     | 120.<br>725 |     | English |
| KITH      | Ithaca Tompkins Intl                |     | 125.<br>175 |     | English |
| KIWA<br>A | Phoenix -Mesa<br>Gateway            |     | 133.<br>500 |     | English |
| KJAC      | Jackson Hole                        | YES | 120.<br>625 |     | English |
| KJAN      | Jackson -Medgar<br>Wiley Evers Intl |     | 121.<br>050 |     | English |
| KJAX      | Jacksonville Intl                   | YES | 125.<br>850 |     | English |
| KJFK      | New York John F<br>Kennedy Intl     | YES | 115.<br>400 | ARR | English |
|           |                                     |     | 117.<br>700 | ARR | English |
|           |                                     |     | 128.<br>725 |     | English |
| KJLN      | Joplin Rgnl                         |     | 120.<br>850 |     | English |
| KJQF      | Concord -Padgett<br>Rgnl            |     | 121.<br>150 | ARR | English |
|           |                                     |     | 133.<br>675 |     | English |
| KLAN      | Lansing Capital<br>Region Intl      |     | 119.<br>750 |     | English |
| KLAS      | Las Vegas Harry Reid<br>Intl        | YES | 132.<br>400 |     | English |
| KLAX      | Los Angeles Intl                    | YES | 133.<br>800 | ARR | English |
|           |                                     |     | 135.<br>650 | DEP | English |
| KLBB      | Lubbock Preston<br>Smith Intl       |     | 125.<br>300 |     | English |

23-JUN-  
2022  
NAM

R-150

North America  
Regional SUP  
INFO

RSI

| ICAO     | Airport                                                   | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|-----------------------------------------------------------|--------|-------------|---------|----------|
| KLC<br>H | Lake Charles Rgnl                                         |        | 118.<br>750 |         | English  |
| KLC<br>K | Columbus<br>Rickenbacker Intl                             |        | 132.<br>750 |         | English  |
| KLE<br>X | Lexington Blue Grass                                      |        | 126.<br>300 |         | English  |
| KLFI     | Lafayette Rgnl/Paul<br>Fournet Fld                        |        | 134.<br>050 |         | English  |
| KLGA     | New York LaGuardia                                        | YES    | 125.<br>950 | ARR     | English  |
|          |                                                           |        | 127.<br>050 | DEP     | English  |
| KLGB     | Long Beach<br>(Daugherty Fld)                             |        | 127.<br>750 |         | English  |
| KLIT     | Little Rock Bill and<br>Hillary Clinton<br>Natl/Adams Fld | YES    | 125.<br>650 |         | English  |
| KLMT     | Klamath Falls Crater<br>Lake-Klamath Rgnl                 |        | 121.<br>900 |         | English  |
| KLNK     | Lincoln                                                   |        | 118.<br>050 |         | English  |
| KLRD     | Laredo Intl                                               |        | 125.<br>775 |         | English  |
| KLRF     | Jacksonville Little<br>Rock AFB                           |        | 119.<br>175 |         | English  |
| KLSE     | La Crosse Rgnl                                            |        | 124.<br>950 |         | English  |
| KLTS     | Altus AFB                                                 |        | 109.<br>800 |         | English  |
| KMAF     | Midland Intl Air and<br>Space Port                        |        | 126.<br>800 |         | English  |
| KMBS     | Saginaw MBS Intl                                          |        | 125.<br>925 |         | English  |
| KMCF     | Tampa Macdill AFB                                         |        | 133.<br>825 |         | English  |
| KMCI     | Kansas City Intl                                          | YES    | 128.<br>375 |         | English  |
| KMCN     | Macon Middle<br>Georgia Rgnl                              |        | 120.<br>775 |         | English  |
| KMCO     | Orlando Intl                                              | YES    | 120.<br>525 | DEP     | English  |
|          |                                                           |        | 121.<br>250 | ARR     | English  |



|          |                                              |     |             |     |         |
|----------|----------------------------------------------|-----|-------------|-----|---------|
| KMD<br>T | Harrisburg Intl                              |     | 118.<br>800 |     | English |
| KMD<br>W | Chicago Midway Intl                          | YES | 132.<br>750 |     | English |
| KME<br>M | Memphis Intl                                 | YES | 127.<br>750 |     | English |
| KMF<br>R | Medford Rogue<br>Valley Intl-                |     | 127.<br>250 |     | English |
| KMG<br>M | Montgomery<br>Rgnl/Dannelly Fld              |     | 120.<br>675 |     | English |
| KMH<br>T | Manchester Boston<br>Rgnl                    |     | 119.<br>550 |     | English |
| KMI<br>A | Miami Intl                                   | YES | 119.<br>150 | ARR | English |
|          |                                              |     | 133.<br>675 | DEP | English |
| KMK<br>C | Kansas City<br>Charles Wheeler<br>Downtown B |     | 120.<br>750 |     | English |
| KMK<br>E | Milwaukee General<br>Mitchell Intl           | YES | 126.<br>400 |     | English |
| KML<br>B | Melbourne Orlando<br>Intl                    |     | 132.<br>550 |     | English |
| KML<br>I | Moline Quad Cities<br>Intl                   |     | 121.<br>200 |     | English |
| KMO<br>B | Mobile Rgnl                                  |     | 135.<br>575 |     | English |
| KMR<br>Y | Monterey Rgnl                                |     | 119.<br>250 |     | English |
| KMS<br>N | Madison Dane County<br>Rgnl/Truax Fld        |     | 124.<br>650 |     | English |
| KMS<br>O | Missoula Montana                             |     | 126.<br>650 |     | English |

## INFO

| ICAO     | Airport                                           | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|---------------------------------------------------|--------|-------------|---------|----------|
| KMS<br>P | Minneapolis -St Paul<br>Intl/Wold-<br>Chamberlain | YES    | 120.<br>800 | DEP     | English  |
|          |                                                   |        | 135.<br>350 | ARR     | English  |
| KMS<br>Y | New Orleans Louis<br>Armstrong Intl               | YES    | 127.<br>550 |         | English  |
| KM<br>WH | Moses Lake Grant<br>County Intl                   |        | 119.<br>050 |         | English  |
| KMY<br>R | Myrtle Beach Intl                                 |        | 123.<br>925 |         | English  |
| KNY<br>L | Yuma MCAS/ Intl                                   |        | 118.<br>800 |         | English  |
| KOA<br>K | Oakland<br>Metropolitan Intl                      | YES    | 133.<br>775 |         | English  |
| KOK<br>C | Oklahoma City Will<br>Rogers World                | YES    | 125.<br>850 |         | English  |
| KOM<br>A | Omaha Eppley                                      | YES    | 120.<br>400 |         | English  |
| KON<br>T | Ontario Intl                                      | YES    | 124.<br>250 |         | English  |
| KOP<br>F | Miami -Opa Locka<br>Executive                     |        | 125.<br>900 |         | English  |
| KOR<br>D | Chicago O Hare Intl                               | YES    | 135.<br>400 |         | English  |
| KOR<br>F | Norfolk Intl                                      |        | 127.<br>150 |         | English  |
| KOR<br>H | Worcester Rgnl                                    |        | 126.<br>550 |         | English  |
| KOS<br>H | Oshkosh Wittman<br>Rgnl                           |        | 125.<br>900 |         | English  |
| KPA<br>E | Everett Snohomish<br>County Paine Fld             |        | 128.<br>650 |         | English  |
| KPBI     | West Palm Beach<br>Palm Beach Intl                | YES    | 123.<br>750 |         | English  |
| KPD<br>X | Portland Intl                                     | YES    | 128.<br>350 |         | English  |
| KPH<br>F | Newport News<br>/Williamsburg Intl                |        | 128.<br>650 |         | English  |
| KPH<br>L | Philadelphia Intl                                 | YES    | 133.<br>400 | ARR     | English  |
|          |                                                   |        | 135.<br>925 | DEP     | English  |
| KPH      | Phoenix Sky Harbor                                | YES    | 127.        |         | English  |

|          |                                                          |     |             |     |         |
|----------|----------------------------------------------------------|-----|-------------|-----|---------|
| X        | Intl                                                     |     | 575         |     |         |
| KPIA     | Peoria General<br>Downing - Intl                         |     | 126.<br>100 |     | English |
| KPIE     | St Petersburg-<br>Clearwater St Pete-<br>Clearwater Intl |     | 134.<br>500 |     | English |
| KPIH     | Pocatello Rgnl                                           |     | 135.<br>625 |     | English |
| KPII     | Pittsburgh Intl                                          | YES | 127.<br>250 | ARR | English |
|          |                                                          |     | 135.<br>900 | DEP | English |
| KPM<br>D | Palmdale USAF Plant<br>42                                |     | 118.<br>275 |     | English |
| KPN<br>S | Pensacola Intl                                           |     | 121.<br>250 |     | English |
| KPO<br>B | Fayetteville Pope AAF                                    | YES | 132.<br>300 |     | English |
| KPR<br>C | Prescott Rgnl - Ernest<br>A Love Fld                     |     | 127.<br>200 |     | English |
| KPS<br>C | Pasco Tri-Cities                                         |     | 125.<br>650 |     | English |
| KPS<br>M | Portsmouth Intl at<br>Pease                              |     | 132.<br>050 |     | English |
| KPS<br>P | Palm Springs Intl                                        |     | 124.<br>650 |     | English |
| KPT<br>K | Pontiac Oakland<br>County Intl                           |     | 125.<br>025 |     | English |
| KPU<br>B | Pueblo Mem                                               |     | 125.<br>250 |     | English |
| KPV<br>D | Providence Rhode<br>Island TF Green Intl                 | YES | 124.<br>200 |     | English |
| KPV<br>U | Provo Muni                                               |     | 135.<br>175 |     | English |

23-JUN-  
2022  
NAM

R-170

North America  
Regional SUP  
INFO

RSI

| ICAO     | Airport                                      | D-ATIS | FREQ        | DEP/ARR | Language |
|----------|----------------------------------------------|--------|-------------|---------|----------|
| KPW<br>M | Portland Intl Jetport                        |        | 119.<br>050 |         | English  |
| KRD<br>D | Redding Muni                                 |        | 124.<br>100 |         | English  |
| KRD<br>M | Redmond Roberts Fld                          |        | 119.<br>025 |         | English  |
| KRD<br>R | Grand Forks AFB                              | YES    |             |         | English  |
| KRD<br>U | Raleigh/Durham<br>Raleigh-Durham Intl        | YES    | 123.<br>800 |         | English  |
| KRF<br>D | Chicago/Rockford<br>Intl                     |        | 127.<br>600 |         | English  |
| KRIC     | Richmond Intl                                |        | 119.<br>150 |         | English  |
| KRIV     | Riverside March Arb                          |        | 134.<br>750 |         | English  |
| KRM<br>E | Rome Griffiss Intl                           |        | 118.<br>700 |         | English  |
| KRN<br>O | Reno / Tahoe Intl                            | YES    | 135.<br>800 |         | English  |
| KRN<br>T | Renton Muni                                  |        | 126.<br>950 |         | English  |
| KRO<br>A | Roanoke /Blacksburg<br>Rgnl /Woodrum Fld/    |        | 132.<br>375 |         | English  |
| KRO<br>C | Rochester Frederick<br>Douglass/Greater Intl |        | 124.<br>825 |         | English  |
| KRO<br>W | Roswell Air Center                           |        | 128.<br>450 |         | English  |
| KRS<br>T | Rochester Intl                               |        | 120.<br>500 |         | English  |
| KRS<br>W | Fort Myers<br>Southwest Florida<br>Intl      | YES    | 124.<br>650 |         | English  |
| KSA<br>F | Santa Fe Muni                                |        | 128.<br>550 |         | English  |
| KSA<br>N | San Diego Intl                               | YES    | 134.<br>800 |         | English  |
| KSA<br>T | San Antonio Intl                             | YES    | 118.<br>900 |         | English  |
| KSA<br>V | Savannah /Hilton<br>Head Intl                |        | 123.<br>750 |         | English  |
| KSB<br>A | Santa Barbara Muni                           |        | 132.<br>650 |         | English  |

|          |                                  |     |             |  |         |
|----------|----------------------------------|-----|-------------|--|---------|
| KSB<br>D | San Bernardino Intl              |     | 124.<br>175 |  | English |
| KSB<br>N | South Bend Intl                  |     | 118.<br>150 |  | English |
| KSC<br>K | Stockton Metro                   |     | 118.<br>250 |  | English |
| KSD<br>F | Louisville<br>Muhammad Ali Int   | YES | 118.<br>725 |  | English |
| KSD<br>M | San Diego Brown Fld<br>Muni      |     | 132.<br>350 |  | English |
| KSE<br>A | Seattle - Tacoma Intl            | YES | 118.<br>000 |  | English |
| KSF<br>B | Orlando Sanford Intl             |     | 125.<br>975 |  | English |
| KSF<br>O | San Francisco Intl               | YES | 113.<br>700 |  | English |
|          |                                  |     | 115.<br>800 |  | English |
|          |                                  |     | 118.<br>850 |  | English |
| KSG<br>F | Springfield Branson<br>National  |     | 135.<br>125 |  | English |
| KSH<br>V | Shreveport Rgnl                  |     | 128.<br>450 |  | English |
| KSJ<br>C | San Jose Norman Y<br>Mineta Intl | YES | 126.<br>950 |  | English |
| KSK<br>F | San Antonio Kelly Fld            |     | 120.<br>450 |  | English |
| KSL<br>C | Salt Lake City Intl              | YES | 124.<br>750 |  | English |
|          |                                  |     | 125.<br>625 |  | English |
| KSL<br>N | Salina Rgnl                      |     | 120.<br>150 |  | English |

## INFO

| ICAO  | Airport                                       | D-ATIS | FREQ    | DEP/ARR | Language |
|-------|-----------------------------------------------|--------|---------|---------|----------|
| KSMF  | Sacramento Intl                               | YES    | 126.750 |         | English  |
| KSMX  | Santa Maria Pub/Capt G Allan Hancock Fld      |        | 121.150 |         | English  |
| KSNWA | Santa Ana John Wayne Airport-Orange County    | YES    | 126.000 |         | English  |
| KSPI  | Springfield Abraham Lincoln Capital           |        | 127.650 |         | English  |
| KSPS  | Wichita Falls Sheppard AFB/ Muni              |        | 132.050 |         | English  |
| KSRQ  | Sarasota/Bradenton Intl                       |        | 124.375 |         | English  |
| KSTC  | St Cloud Rgnl                                 |        | 119.375 |         | English  |
| KSTL  | St Louis Lambert Intl                         | YES    | 125.025 |         | English  |
| KSUW  | St Louis Spirit Of                            |        | 134.800 |         | English  |
| KSUW  | Fairfield Travis AFB                          | YES    | 135.550 |         | English  |
| KSUW  | Sioux City Sioux Gateway/Brig Gen Bud Day Fld |        | 119.450 |         | English  |
| KSWF  | New York Stewart Intl                         |        | 124.575 |         | English  |
| KSYR  | Syracuse Hancock Intl                         |        | 124.225 |         | English  |
| KTEB  | Teterboro                                     | YES    | 114.200 |         | English  |
|       |                                               |        | 132.850 |         | English  |
| KTLH  | Tallahassee Intl                              |        | 119.450 |         | English  |
| KTOLE | Toledo Eugene F Kranz Express                 |        | 118.750 |         | English  |
| KTPA  | Tampa Intl                                    | YES    | 126.450 | ARR     | English  |
|       |                                               |        | 128.475 | DEP     | English  |
| KTRI  | Bristol/Johnson/Kingsport Tri-Cities          |        | 118.250 |         | English  |
| KTLA  | Tulsa Intl                                    | YES    | 124.900 |         | English  |

|          |                                                                             |     |             |  |         |
|----------|-----------------------------------------------------------------------------|-----|-------------|--|---------|
| KTU<br>S | Tucson Intl                                                                 |     | 123.<br>800 |  | English |
| KIV<br>C | Traverse City Cherry<br>Capital                                             |     | 119.<br>175 |  | English |
| KTY<br>R | Tyler Pounds Rgnl                                                           |     | 126.<br>250 |  | English |
| KTY<br>S | Knoxville Mc Ghee<br>Tyson                                                  |     | 128.<br>350 |  | English |
| KUN<br>V | State College<br>University Park                                            | YES | 127.<br>650 |  | English |
| KVC<br>V | Victorville Southern<br>California Logistics                                |     | 135.<br>475 |  | English |
| KVN<br>Y | Van Nuys                                                                    |     | 127.<br>550 |  | English |
| KVP<br>S | Valparaiso/Destin-Ft<br>Walton Beach Eglin<br>AFB/Destin-Ft Walton<br>Beach |     | 134.<br>625 |  | English |
| KVQ<br>Q | Jacksonville Cecil                                                          |     | 125.<br>275 |  | English |
| KWR<br>B | Warner Robins<br>Robins AFB                                                 |     | 119.<br>475 |  | English |
| KXN<br>A | Fayetteville/Springd<br>ale/Rogers<br>Northwest<br>Arkansas Natl            |     | 119.<br>425 |  | English |
| KYK<br>M | Yakima Air<br>Terminal/McAllister<br>Fld                                    |     | 125.<br>250 |  | English |
| MBP<br>V | Providenciales Intl                                                         |     | 132.<br>450 |  | English |
| PABI     | Delta Junction Ft<br>Greely Allen AAF                                       |     | 132.<br>075 |  | English |
| PAE<br>D | Anchorage Elmendorf<br>AFB                                                  |     | 124.<br>300 |  | English |

23-JUN-  
2022  
NAM

R-190

North America  
Regional SUP  
INFO

| ICAO | Airport                | D-ATIS  | FREQ    | DEP/ARR | Language |
|------|------------------------|---------|---------|---------|----------|
| PAEI | Fairbanks Eielson AFB  |         | 119.900 |         | English  |
| PAEN | Kenai Muni             |         | 133.350 |         | English  |
| PAFA | Fairbanks Intl         |         | 124.400 |         | English  |
| PAJN | Juneau Intl            |         | 135.200 |         | English  |
| PAKN | King Salmon            |         | 128.800 |         | English  |
| PANC | Anchorage Stevens Intl | led YES | 135.500 |         | English  |





~~NAM~~

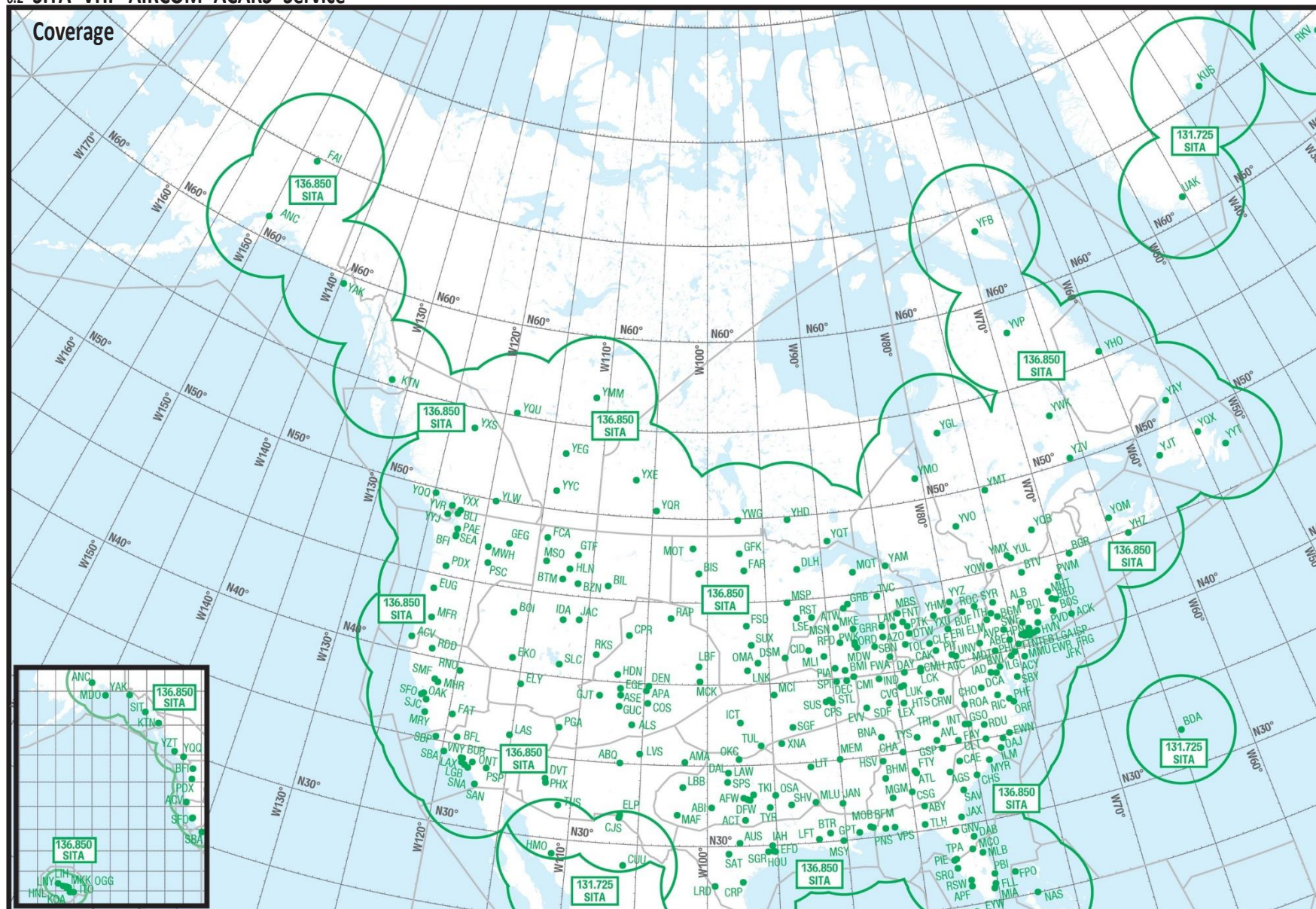
North America

| Regional | SUP |
|----------|-----|
| INFO     |     |

RSI

## Regional SUP INFO

## 6.2 SITA VHF AIRCOM ACARS Service





18-AUG-2022

NAM

R-230

Regional SUP

INFO

## 6.3 FISE / FSS Frequencies

6.3.1 List of Canadian FISE  
Frequencies6.3.1.1 Edmonton FIC FISE RCOs  
North of 60°NCall-sign: EDMONTON  
RADIO

| RCO                        | FISE<br>FREQ        | Broadcast<br>FREQ |
|----------------------------|---------------------|-------------------|
| Baker Lake                 | 122.3<br>75<br>5680 | 126.700           |
| Cambridge Bay              | 123.2<br>50         | 126.700           |
| Coral Harbour              | 123.2<br>75         | 126.700           |
| Ekati                      | 123.2<br>75         | 126.700           |
| Fort Good Hope             | 123.5<br>50         | 126.700           |
| Fort Simpson               | 123.4<br>75         | 126.700           |
| Fort Smith                 | 123.5<br>50         |                   |
| Hall Beach                 | 123.2<br>75         | 126.700           |
| Hay River                  | 123.2<br>75         | 126.700           |
| Inuvik                     | 123.3<br>75<br>5680 | 126.700           |
| Kugluktuk,<br>(Coppermine) | 123.1<br>50         | 126.700           |
| Norman Wells               | 123.2<br>75         | 126.700           |
| Rankin Inlet               | 123.5<br>50         | 126.700           |
| Resolute Bay               | 126.7<br>00<br>5680 |                   |
| Sachs Harbour              | 123.5<br>50         | 126.700           |
| Taloyoak                   | 123.5<br>50         | 126.700           |

|                        |                     |         |
|------------------------|---------------------|---------|
| Ulukhaktok<br>(Holman) | 123.4<br>75         | 126.700 |
| Yellowknife            | 123.3<br>75<br>5680 | 126.700 |

### Use of Frequency 5680 kHz

This frequency provides long-range air-ground communications coverage in the remote areas of Canada for the provision of Flight Information Service En-Route (FISE) beyond the range of Very High Frequency (VHF) communications. Aircraft must use Single Sidebands (SSBs) when communicating on 5680 kHz.

#### 6.3.1.2 Edmonton FIC FISE RCOs South of 60°N

Call-sign: EDMONTON RADIO

| RCO             | FISE<br>FREQ | Broadcast<br>FREQ |
|-----------------|--------------|-------------------|
| Banff           | 123.5<br>50  | 126.700           |
| Berens River    | 123.4<br>75  | 126.700           |
| Brandon         | 123.2<br>75  | 126.700           |
| Buffalo Narrows | 123.2<br>75  | 126.700           |
| Churchill       | 123.2<br>75  | 126.700           |
| Dauphin         | 123.3<br>75  | 126.700           |
| Edmonton        | 122.3<br>75  | 126.700           |

## INFO

| RCO              | FISE<br>FREQ | Broadcast<br>FREQ |
|------------------|--------------|-------------------|
| Flin Flon        | 123.2<br>75  | 126.700           |
| Fort Chipewyan   | 123.4<br>75  | 126.700           |
| Fort McMurray    | 123.5<br>50  | 126.700           |
| Fort Nelson      | 123.5<br>50  | 126.700           |
| Fort St John     | 123.5<br>50  | 126.700           |
| Gillam           | 123.3<br>75  | 126.700           |
| Grande Prairie   | 123.4<br>75  | 126.700           |
| High Level       | 123.3<br>75  | 126.700           |
| Island Lake      | 122.3<br>75  | 126.700           |
| Jasper-Hinton    | 123.5<br>50  | 126.700           |
| Kindersley       | 123.4<br>75  | 126.700           |
| Lac La Biche     | 123.4<br>75  | 126.700           |
| La Ronge         | 123.5<br>50  | 126.700           |
| Lethbridge       | 123.4<br>75  | 126.700           |
| Lloydminster     | 123.5<br>50  | 126.700           |
| Lynn Lake        | 123.4<br>75  | 126.700           |
| Medicine Hat     | 123.3<br>75  | 126.700           |
| North Battleford | 123.3<br>75  | 126.700           |
| Norway House     | 123.3<br>75  | 126.700           |
| Peace River      | 123.2<br>75  | 126.700           |
| Prince Albert    | 123.4<br>75  | 126.700           |
| Red Deer         | 123.4<br>75  | 126.700           |
| Regina           | 123.5        | 126.700           |

|               |             |         |
|---------------|-------------|---------|
|               | 50          |         |
| Saskatoon     | 122.3<br>75 | 126.700 |
| Slave Lake    | 123.3<br>75 | 126.700 |
| Springbank    | 123.3<br>75 | 126.700 |
| Stony Rapids  | 122.3<br>75 | 126.700 |
| Swift Current | 123.2<br>75 | 126.700 |
| The Pas       | 123.5<br>50 | 126.700 |
| Thompson      | 123.5<br>50 | 126.700 |
| Whitecourt    | 123.2<br>75 | 126.700 |
| Winnipeg      | 123.2<br>50 | 126.700 |
| Yorkton       | 123.4<br>75 | 126.700 |

| <b>DRCO</b>    | <b>FISE<br/>FREQ</b> | <b>Broadcast<br/>FREQ</b> |
|----------------|----------------------|---------------------------|
| Key Lake       | 123.3<br>75          | 126.700                   |
| Tadoule Lake   | 126.7<br>00          |                           |
| Wollaston Lake | 123.5<br>50          |                           |

#### 6.3.1.3 London FIC FISE RCOs Atlantic Region

Call-sign: LONDON RADIO

18-AUG-  
2022  
NAM

R-250

North America  
Regional SUP  
INFO

| RCO             | FISE<br>FREQ        | Broadcast<br>FREQ |
|-----------------|---------------------|-------------------|
| Allen s Island  | 123.3<br>75         | 126.700           |
| Charlottetown   | 123.5<br>50         | 126.700           |
| Churchill Falls | 123.2<br>50         | 126.700           |
| Deer Lake       | 123.3<br>75         | 126.700           |
| Gander          | 123.4<br>75         | 126.700           |
| Goose Bay       | 123.4<br>75         | 126.700           |
| Halifax         | 123.2<br>75         | 126.700           |
| Hopedale        | 123.6<br>50         | 126.700           |
| Moncton         | 122.5<br>00         | 126.700           |
| Nain            | 123.6<br>50         |                   |
| Saint John      | 123.4<br>75         | 126.700           |
| St. Anthony     | 123.2<br>75         | 126.700           |
| St. John s      | 5680<br>123.2<br>75 | 126.700           |
| Stephenville    | 123.4<br>75         | 126.700           |
| Sydney          | 123.4<br>75         | 126.700           |
| Yarmouth        | 123.5<br>50         |                   |

| DRCO            | FISE<br>FREQ | Broadcast<br>FREQ |
|-----------------|--------------|-------------------|
| Port Hawkesbury | 123.3<br>75  | 126.700           |

#### Use of Frequency 5680 kHz

This frequency provides long-range air-ground communications coverage in the remote areas of Canada for the provision of Flight Information Service En-Route (FISE)



beyond the range of Very High Frequency (VHF) communications. Aircraft must use Single Sidebands (SSBs) when communicating on 5680 kHz.

6.3.1.4 **London FIC FISE RCOs Ontario**

Call-sign: LONDON RADIO

| <b>RCO</b>              | <b>FISE<br/>FREQ</b> | <b>Broadcast<br/>FREQ</b> |
|-------------------------|----------------------|---------------------------|
| Buttonville             | 123.1<br>50          | 126.700                   |
| Campbellford            | 123.3<br>75          | 126.700                   |
| Earlton                 | 123.3<br>75          |                           |
| Foymount                | 122.3<br>75          | 126.700                   |
| Geraldton               | 123.4<br>75          | 126.700                   |
| Gore Bay-<br>Manitoulin | 126.7<br>00          |                           |
| Kapuskasing             | 123.2<br>75          | 126.700                   |
| Kingston                | 123.5<br>50          | 126.700                   |
| London                  | 123.5<br>50          | 126.700                   |
| Moosonee                | 123.4<br>75          | 126.700                   |
| Muskoka                 | 123.4<br>75          | 126.700                   |
| North Bay               | 123.5<br>50          | 126.700                   |
| Palmerston              | 122.3<br>75          | 126.700                   |

## INFO

| RCO            | FISE<br>FREQ | Broadcast<br>FREQ |
|----------------|--------------|-------------------|
| St. Catharines | 126.7<br>00  |                   |
| Sarnia         | 123.4<br>75  |                   |
| Sault          | 123.4<br>75  | 126.700           |
| Sudbury        | 123.4<br>75  | 126.700           |
| Timmins        | 123.5<br>50  | 126.700           |
| Toronto        | 123.2<br>75  |                   |
| Wawa           | 122.3<br>75  | 126.700           |
| Warton         | 123.3<br>75  | 126.700           |
| Windsor        | 123.3<br>75  | 126.700           |

| DRCO         | FISE<br>FREQ | Broadcast<br>FREQ |
|--------------|--------------|-------------------|
| Ameson       | 126.7<br>00  |                   |
| Attawapiskat | 126.7<br>00  |                   |

## 6.3.1.5 Kamloops FIC FISE RCOs

Call-sign: PACIFIC RADIO

| RCO                              | FISE<br>FREQ | Broadcast<br>FREQ |
|----------------------------------|--------------|-------------------|
| Abbotsford                       | 122.5<br>00  | 126.700           |
| Bella Bella<br>(Campbell Island) | 123.4<br>75  | 126.700           |
| Bella Coola                      | 126.7<br>00  |                   |
| Burns Lake                       | 123.3<br>75  | 126.700           |
| Campbell River                   | 123.5<br>50  | 126.700           |
| Castlegar                        | 125.8<br>50  |                   |
| Cranbrook                        | 123.2<br>75  | 126.700           |

|             |             |         |
|-------------|-------------|---------|
| Creston     | 125.8<br>50 | 126.700 |
| Ethelda Bay | 123.5<br>50 | 126.700 |
| Fernie      | 123.3<br>75 |         |
| Golden      | 122.3<br>75 | 126.700 |
| Grand Forks | 125.8<br>50 | 126.700 |
| Hope        | 125.8<br>50 | 126.700 |
| Invermere   | 123.4<br>75 | 126.700 |
| Kamloops    | 123.3<br>75 | 126.700 |
| Kelowna     | 122.5<br>00 | 126.700 |
| Lytton      | 123.5<br>50 | 126.700 |
| Mackenzie   | 123.4<br>75 | 126.700 |
| McBride     | 123.5<br>50 | 126.700 |
| Nanaimo     | 126.0<br>00 |         |
| Nelson      | 123.4<br>75 | 126.700 |
| Oliver      | 125.8<br>50 | 126.700 |
| Pemberton   | 122.3<br>75 | 126.700 |

18-AUG-  
2022  
NAM

R-270

North America  
Regional SUP  
INFO

| RCO              | FISE<br>FREQ | Broadcast<br>FREQ |
|------------------|--------------|-------------------|
| Port Hardy       | 123.3<br>75  | 126.700           |
| Prince George    | 123.5<br>50  | 126.700           |
| Prince Rupert    | 123.2<br>75  | 126.700           |
| Princeton        | 125.8<br>50  | 126.700           |
| Puntzi Mountain  | 126.7<br>00  |                   |
| Revelstoke       | 122.3<br>75  | 126.700           |
| Salmon Arm       | 122.3<br>75  | 126.700           |
| Smithers         | 123.3<br>75  |                   |
| Terrace          | 123.3<br>75  | 126.700           |
| Tofino           | 125.8<br>50  | 126.700           |
| Vancouver        | 123.1<br>50  |                   |
| Victoria Harbour | 125.8<br>50  |                   |
| Victoria         | 122.3<br>75  | 126.700           |
| Williams Lake    | 123.2<br>75  | 126.700           |

| DRCO           | FISE<br>FREQ | Broadcast<br>FREQ |
|----------------|--------------|-------------------|
| Bob Quinn Lake | 126.7<br>00  |                   |

#### 6.3.1.6 Quebec FIC FISE RCOs

Call-sign: QUEBEC RADIO

| RCO         | FISE<br>FREQ | Broadcast<br>FREQ |
|-------------|--------------|-------------------|
| Bathurst    | 123.4<br>75  | 126.700           |
| Brisay      | 123.2<br>75  | 126.700           |
| Cape Dorset | 123.3        | 126.700           |

|                      |                     |         |
|----------------------|---------------------|---------|
|                      | 75                  |         |
| Chibougamau          | 123.3<br>75         | 126.700 |
| Dewar Lakes          | 123.5<br>50         | 126.700 |
| Gaspe                | 123.4<br>75         | 126.700 |
| Gatineau             | 123.3<br>75         |         |
| Iles-de-la-Madeleine | 123.5<br>50         | 126.700 |
| Inukjuak             | 123.5<br>50         | 126.700 |
| Iqaluit              | 123.2<br>75         | 126.700 |
| Kuuujuaq             | 5680<br>123.2<br>75 | 126.700 |
| Kuujuarapik          | 5680<br>123.4<br>75 | 126.700 |
| La Grande            | 5680<br>123.3<br>75 | 126.700 |
| La Tuque             | 123.4<br>75         | 126.700 |
| Mont-Joli            | 123.3<br>75         | 126.700 |
| Mont-Laurier         | 123.4<br>75         |         |
| Mont-Megantic        | 123.2<br>50         | 126.700 |

## INFO

| RCO           | FISE<br>FREQ | Broadcast<br>FREQ |
|---------------|--------------|-------------------|
| Montreal      | 123.5<br>50  | 126.700           |
| Natashquan    | 123.8<br>50  | 126.700           |
| Nemiscau      | 123.2<br>75  | 126.700           |
| Ottawa        | 123.1<br>50  | 126.700           |
| Pond Inlet    | 123.2<br>75  | 126.700           |
| Puvirnituq    | 123.2<br>75  | 126.700           |
| Quebec        | 123.2<br>75  | 126.700           |
| Roberval      | 123.5<br>50  | 126.700           |
| Rouyn         | 123.4<br>75  | 126.700           |
| St-Augustin   | 119.5<br>75  | 126.700           |
| Schefferville | 123.4<br>75  | 126.700           |
| Sept-Iles     | 123.2<br>75  | 126.700           |
| Val-d'Or      | 122.3<br>75  | 126.700           |
| Wabush        | 123.3<br>75  | 126.700           |

| DRCO                       | FISE<br>FREQ | Broadcast<br>FREQ |
|----------------------------|--------------|-------------------|
| Bonaventure                | 123.5<br>50  |                   |
| Grand Falls/St.<br>Leonard | 126.7<br>00  |                   |
| Kangirsuq<br>(Wakeham Bay) | 123.4<br>75  | 126.700           |
| Kangirsuk                  | 126.7<br>00  |                   |
| La Grande-4                | 123.5<br>50  | 126.700           |
| Matagami                   | 123.5<br>50  | 126.700           |

|         |             |  |
|---------|-------------|--|
| Salluit | 126.7<br>00 |  |
|---------|-------------|--|

### Use of Frequency 5680 kHz

This frequency provides long-range air-ground communications coverage in the remote areas of Canada for the provision of Flight Information Service En-Route (FISE) beyond the range of Very High Frequency (VHF) communications. Aircraft must use Single Sidebands (SSBs) when communicating on 5680 kHz.

#### 6.3.1.7 Whitehorse FIC FISE RCOs

Call-sign: WHITEHORSE RADIO

| RCO             | FISE<br>FREQ | Broadcast<br>FREQ |
|-----------------|--------------|-------------------|
| Atlin           | 123.5<br>50  | 126.700           |
| Beaver Creek    | 123.4<br>75  | 126.700           |
| Dawson          | 123.5<br>50  | 126.700           |
| Dease Lake      | 123.4<br>75  | 126.700           |
| Faro            | 123.5<br>50  | 126.700           |
| Fort Ware       | 123.3<br>75  | 126.700           |
| Haines Junction | 123.3<br>75  | 126.700           |
| Mayo            | 122.3<br>75  | 126.700           |
| Watson Lake     | 123.3<br>75  | 126.700           |

18-AUG-  
2022  
NAM

R-290

North America  
Regional SUP  
INFO

| RCO        | FISE<br>FREQ           | Broadcast<br>FREQ |
|------------|------------------------|-------------------|
| Whitehorse | <del>123.2</del><br>75 | 126.700           |

| DRCO     | FISE<br>FREQ           | Broadcast<br>FREQ |
|----------|------------------------|-------------------|
| Old Crow | <del>123.4</del><br>75 | 126.700           |

#### 6.3.1.8 Winnipeg FIC FISE RCOs

Call-sign: WINNIPEG RADIO

| RCO               | FISE<br>FREQ           | Broadcast<br>FREQ |
|-------------------|------------------------|-------------------|
| Atikokan          | <del>123.2</del><br>75 | 126.700           |
| Berens River      | <del>123.4</del><br>75 | 126.700           |
| Big Trout Lake    | <del>123.5</del><br>50 | 126.700           |
| Brandon           | <del>123.2</del><br>75 | 126.700           |
| Churchill         | <del>123.2</del><br>75 | 126.700           |
| Dauphin           | <del>123.3</del><br>75 | 126.700           |
| Flin Flon         | <del>123.2</del><br>75 | 126.700           |
| Fort Frances Muni | <del>123.5</del><br>50 | 126.700           |
| Gillam            | <del>123.3</del><br>75 | 126.700           |
| Horn              | <del>123.5</del><br>50 |                   |
| Island Lake       | <del>122.3</del><br>75 | 126.700           |
| Kenora            | <del>123.3</del><br>75 | 126.700           |
| Lynn Lake         | <del>123.4</del><br>75 | 126.700           |
| Norway House      | <del>123.3</del><br>75 | 126.700           |
| Peawanuck         | <del>123.2</del><br>75 | 126.700           |
| Pickle Lake       | <del>123.4</del>       | 126.700           |



|               |         |         |
|---------------|---------|---------|
|               | 75      |         |
| Red Lake      | 123.550 | 126.700 |
| Sioux Lookout | 126.000 | 126.700 |
| The Pas       | 123.550 | 126.700 |
| Thompson      | 123.550 | 126.700 |
| Thunder Bay   | 122.375 | 126.700 |
| Winnipeg      | 123.250 | 126.700 |

| DRCO            | FISE FREQ | Broadcast FREQ |
|-----------------|-----------|----------------|
| Lansdowne House | 123.375   | 126.700        |
| Tadoule Lake    | 126.700   |                |

### Use of Frequency 5680 kHz

This frequency provides long-range air-ground communications coverage in the remote areas of Canada for the provision of Flight Information Service En-Route (FISE) beyond the range of Very High Frequency (VHF) communications. Aircraft must use Single Sidebands (SSBs) when communicating on 5680 kHz.



18-AUG-2022

NAM

Regional SUP

INFO

## 6.3.2 List of US FSS

## Frequencies

R-310

VHF frequencies available at Flight Service Stations and at their Remote Communication Outlets (RCO's) are listed below. Frequencies in **bold type** are available all altitudes but recommended for use FL180 and above.

'T' indicates transmit only and 'R' indicates receive only. RCO's available at NAVAID's are listed after the NAVAID name. RCO's not at NAVAID's are listed by name.

## 6.3.2.1 Alaska

## 6.3.2.1.1 Kenai FSS

| Kenai (ENA) Flight Service Station Parent Type:<br>Hours of Operation: Continuous (24 x 7) |                                    |
|--------------------------------------------------------------------------------------------|------------------------------------|
| RCO Name/Location                                                                          | Frequency/s                        |
| Kenai FSS                                                                                  | 121.500, 122.650, 121.300          |
| AKhiok                                                                                     | 122.600                            |
| Anchorage                                                                                  | 121.500, 122.200, 122.300, 122.550 |
| Aniak                                                                                      | 121.500, 122.450                   |
| Anvik                                                                                      | 122.400                            |
| Bethel                                                                                     | 121.500, 122.200                   |
| Cantwell                                                                                   | 122.500                            |
| Cape Newenham                                                                              | 122.300                            |
| Cape Romanzof                                                                              | 122.100                            |
| Emmonak                                                                                    | 122.550                            |
| Farewell                                                                                   | 122.100, 121.500 (OTS UFN)         |
| Girdwood                                                                                   | 122.150                            |
| Gulkana                                                                                    | 121.500, 122.200                   |
| Hooper Bay                                                                                 | 122.400                            |
| King Salmon                                                                                | 121.500, 122.200, 121.900          |
| Kipnuk                                                                                     | 122.600                            |
| Kodiak                                                                                     | 119.800                            |
| Lake Clark Pass West                                                                       | 121.200                            |
| Lake Clark Pass East                                                                       | 121.100                            |
| Mekoryuk                                                                                   | 122.000                            |
| Nikishka                                                                                   | 122.000                            |
| Old Harbor                                                                                 | 122.500                            |
| Paxson                                                                                     | 122.300                            |
| Pillar Mountain                                                                            | 122.100                            |
| Platinum                                                                                   | 122.500                            |
| Port Heiden                                                                                | 122.200                            |

|                   |         |
|-------------------|---------|
| Pribilof          | 122.500 |
| Quinnagak         | 122.100 |
| Saint Marys       | 122.350 |
| Saint Paul Island | 122.450 |
| Seward            | 122.600 |

## INFO

|              |                  |
|--------------|------------------|
| Soldotna     | 122.350          |
| Sparrevohn   | 122.500          |
| Stuck        | 122.100          |
| Summit       | 122.600, 121.500 |
| Tanneta Pass | 122.400          |
| Tatalina     | 122.300          |
| Togiak       | 122.250          |
| Woody Island | 121.500, 122.200 |

## 6.3.2.1.2 Cold Bay FSS

| Cold Bay (CDB) Flight Service Station<br>Type: Satellite<br>Parent Facility: Kenai FSS<br>Hours of Operation: 0800-1745 local |                           |
|-------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                                             | Frequency/s               |
| Cold Bay                                                                                                                      | 121.500, 122.200, 123.600 |
| King Cove                                                                                                                     | 122.250                   |
| Nelson Lagoon                                                                                                                 | 122.400                   |
| Sand Point                                                                                                                    | 122.300                   |
| Unalaska                                                                                                                      | 122.600                   |
| Frequencies monitored/operated by parent FSS when closed.                                                                     |                           |

## 6.3.2.1.3 Dillingham FSS

| Dillingham (DLG) Flight Service Station<br>Type: Satellite<br>Parent Facility: Kenai FSS<br>Hours of Operation:<br>15 SEP to 15 MAY: 0745-2145 local<br>16 MAY to 14 SEP: 0745-2345 local |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                                                                                                         | Frequency/s               |
| Dillingham FSS                                                                                                                                                                            | 121.500, 122.300, 123.600 |
| Kemuk Mountain                                                                                                                                                                            | 122.550                   |
| Frequencies monitored/operated by parent FSS when closed.                                                                                                                                 |                           |

## 6.3.2.1.4 Kenai FSS Satellite w/o RCO

| Kenai Flight Service Station Satellite FSSs That Do Not Have RCOs |                                     |                           |
|-------------------------------------------------------------------|-------------------------------------|---------------------------|
| Name/Location                                                     | Hours Of Operation                  | Frequency/s               |
| Homer FSS                                                         | 0600-2130 local                     | 121.500, 122.200, 123.600 |
| Iliamna FSS (seasonal)                                            | 15 MAY to 15 OCT<br>0545-2145 local | 121.500, 122.200, 123.600 |

|                           |                                                                                 |                                         |
|---------------------------|---------------------------------------------------------------------------------|-----------------------------------------|
| McGrath FSS<br>(seasonal) | 01 MAY to 30 SEP<br>0900-1845 local                                             | 121.500,<br>122.200, 122.650<br>123.600 |
| Palmer FSS                | MON-FRI 0800-<br>1800 local; SAT<br>0600-2130 local;<br>SUN, 0900-1700<br>local | 122.400, 123.600                        |

18-AUG-  
2022  
NAM

R-330

Regional SUP  
INFO

| Kenai Flight Service Station Satellite FSSs That Do Not Have RCOs             |                                                                            |                  |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------|------------------|
| Name/Location                                                                 | Hours Of Operation                                                         | Frequency/s      |
| Talkeetna FSS                                                                 | 16 SEP to 15 APR<br>0800-1745 local<br>16 APR to 15 SEP<br>0800-2000 local | 122.200, 123.600 |
| When satellite FSS is closed frequencies are monitored/operated by Kenai FSS. |                                                                            |                  |

#### 6.3.2.1.5 Fairbanks FSS

| Fairbanks . (FAI) Flight<br>Service Station Type:<br>Parent<br>Hours of Operation: Continuous (24 x 7) |                                     |
|--------------------------------------------------------------------------------------------------------|-------------------------------------|
| RCO Name/Location                                                                                      | Frequency/s                         |
| Fairbanks FSS                                                                                          | 121.500, 122.200, 122.45<br>122.600 |
| Anaktuvuk Pass                                                                                         | 122.150                             |
| Atigun                                                                                                 | 122.600                             |
| Bettles                                                                                                | 121.500, 122.200                    |
| Big Delta                                                                                              | 121.500, 122.200                    |
| Black Rapids                                                                                           | 122.400                             |
| Coldfoot                                                                                               | 122.000                             |
| Fish                                                                                                   | 122.100                             |
| Fort Yukon                                                                                             | 122.050                             |
| Frozen Calf                                                                                            | 121.100                             |
| Galena                                                                                                 | 121.500, 122.200                    |
| Healy                                                                                                  | 122.400                             |
| Huslia                                                                                                 | 122.400                             |
| Indian Mountain                                                                                        | 122.600                             |
| Kaaruk                                                                                                 | 122.400                             |
| McKinley RCO                                                                                           | 122.100                             |
| Minchumina                                                                                             | 122.200                             |
| Murphy Dome                                                                                            | 122.300                             |
| Nenana                                                                                                 | 121.500, 122.500                    |
| Point Lay                                                                                              | 122.400                             |
| Ruby                                                                                                   | 122.250                             |
| Tanana                                                                                                 | 121.500, 122.650                    |
| Wainwright                                                                                             | 122.500                             |
| White Hills                                                                                            | 122.100                             |
| Yukon River Bridge                                                                                     | 122.150                             |

## INFO

6.3.2.1.6 **Deadhorse FSS**

| Deadhorse (SCC) Flight Service Station<br>Type: Satellite<br>Parent Station<br>Fairbanks FSS<br>Operation: local<br>Facility:<br>Hours of<br>0600-2130 |                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                                                                      | Frequency/s               |
| Deadhorse FSS                                                                                                                                          | 121.500, 122.200, 123.600 |
| Barter Island                                                                                                                                          | 122.000                   |
| Nuiqsut                                                                                                                                                | 122.500                   |
| Frequencies monitored/operated by parent FSS when closed.                                                                                              |                           |

6.3.2.1.7 **Kotzebue FSS**

| Kotzebue (D1Z) Flight Service Station<br>Type: Satellite<br>Parent Station<br>Fairbanks FSS<br>Operation: local<br>Facility:<br>Hours of<br>0700-2400 |                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| RCO Name/Location                                                                                                                                     | Frequency/s                        |
| Kotzebue FSS                                                                                                                                          | 121.500, 120.300, 122.200, 123.600 |
| Ambler                                                                                                                                                | 122.000                            |
| Buckland                                                                                                                                              | 122.300                            |
| Cape Lisburne                                                                                                                                         | 122.300                            |
| Deering                                                                                                                                               | 122.250                            |
| Kivalina                                                                                                                                              | 122.650                            |
| Noatak                                                                                                                                                | 122.400                            |
| Point Hope                                                                                                                                            | 122.250                            |
| Selawik                                                                                                                                               | 122.500                            |
| Frequencies monitored/operated by parent FSS when closed.                                                                                             |                                    |

6.3.2.1.8 **Nome FSS**

| Nome (OME) Flight Service Station<br>Type: Satellite<br>Parent Station<br>Fairbanks FSS<br>Operation: local<br>Facility:<br>Hours of<br>0715-2245 |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| RCO Name/Location                                                                                                                                 | Frequency/s                       |
| Nome FSS                                                                                                                                          | 121.500, 122.200, 122.45, 123.600 |
| Brevig Mission                                                                                                                                    | 135.600                           |



|                  |         |                       |
|------------------|---------|-----------------------|
| Gambell          | 122.000 |                       |
| Golovin          | 122.050 |                       |
| Granite Mountain | 122.100 | Out of service<br>UFN |
| Koyuk            | 122.350 |                       |
| Newton Peak      | 122.500 |                       |
| Savoonga         | 122.300 |                       |
| Shishmaref       | 122.400 |                       |
| Tin City         | 122.600 |                       |

18-AUG-  
2022  
NAM

R-350

North America  
Regional SUP  
INFO

| Nome (OME) Flight Service<br>Station Station Type:<br>Satellite<br>Parent Facility:<br>Fairbanks FSS Hours of<br>Operation: 0715-2245<br>local |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| RCO Name/Location                                                                                                                              | Frequency/s      |
| Unalakleet                                                                                                                                     | 121.500, 122.300 |
| Frequencies monitored/operated by parent FSS when closed.                                                                                      |                  |

#### 6.3.2.1.9 Northway FSS

| Northway (ORT) Flight Service<br>Station (Seasonal) Station Type:<br>Satellite<br>Parent Facility: Fairbanks FSS<br>Hours of Operation: 01 MAY to 30 SEP: 0915-1845<br>local |                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| RCO Name/Location                                                                                                                                                            | Frequency/s                           |
| Northway FSS                                                                                                                                                                 | 121.500, 122.200,<br>122.650, 123.600 |
| Eagle                                                                                                                                                                        | 122.300                               |
| Knob Ridge                                                                                                                                                                   | 122.600                               |
| Mentasta                                                                                                                                                                     | 121.400                               |
| Mt. Fairplay                                                                                                                                                                 | 121.300                               |
| Tok                                                                                                                                                                          | 122.400                               |
| Frequencies monitored/operated by parent FSS when closed.                                                                                                                    |                                       |

#### 6.3.2.1.10 Fairbanks FSS Satellite w/o RCO

| Fairbanks Flight Service Station Satellite FSSs That Do Not Have RCOs             |                    |                                             |
|-----------------------------------------------------------------------------------|--------------------|---------------------------------------------|
| Name/Location                                                                     | Hours Of Operation | Frequency/s                                 |
| Barrow FSS                                                                        | 0600-2200 local    | 121.500,<br>122.200,<br>122.600,<br>123.600 |
| When satellite FSS is closed frequencies are monitored/operated by Fairbanks FSS. |                    |                                             |

#### 6.3.2.1.11 Juneau FSS

| Juneau (JNU) Flight Service<br>Station Station Type:<br>Parent<br>Hours of Operation: Continuous (24 x 7) |                           |
|-----------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                         | Frequency/s               |
| Juneau FSS                                                                                                | 121.500, 118.700, 122.200 |
| Aisek                                                                                                     | 121.400                   |

|                 |                           |
|-----------------|---------------------------|
| Cape Spencer    | 122.600                   |
| Cordova         | 121.500, 122.200, 123.600 |
| Duncan Canal    | 122.100                   |
| Gustavus        | 121.500, 122.650          |
| Haines          | 121.500, 122.600          |
| Hoonah          | 122.350                   |
| Johnstown Point | 122.100                   |
| Juneau Downtown | 122.150                   |

| Juneau (JNU) Flight Service Station<br>Parent Station Type:<br>Hours of Operation: Continuous (24 x 7) |                           |
|--------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                      | Frequency/s               |
| Lena Point                                                                                             | 122.250                   |
| Middleton Island                                                                                       | 121.500, 122.050          |
| Mount Eyak                                                                                             | 122.500                   |
| Mount Fanshaw                                                                                          | 121.000                   |
| Naked Island                                                                                           | 133.150                   |
| Potato Point                                                                                           | 122.400                   |
| Robert Baron                                                                                           | 121.100                   |
| Skagway                                                                                                | 122.400                   |
| Thompson Pass                                                                                          | 122.550                   |
| Valdez                                                                                                 | 121.500, 122.200          |
| Williams Mountain                                                                                      | 122.550                   |
| Yakataga                                                                                               | 122.500                   |
| Yakutat                                                                                                | 121.500, 122.700, 123.600 |

## 6.3.2.1.12 Ketchikan FSS

| Ketchikan. (KTN) Flight Service Station<br>Parent Station Type:<br>Facility: Juneau FSS Hours of Operation: 0615-2115 local |                           |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                                           | Frequency/s               |
| Ketchikan FSS                                                                                                               | 121.500, 122.200, 123.600 |
| Annette Island                                                                                                              | 122.400                   |
| Boca De Quandro                                                                                                             | 119.300                   |
| High Mountain                                                                                                               | 121.500, 121.200          |
| Klawok                                                                                                                      | 122.250                   |
| Ratz Mountain                                                                                                               | 122.150                   |
| Sunny Hay Mountain                                                                                                          | 120.900                   |
| Frequencies monitored/operated by parent FSS when closed.                                                                   |                           |

## 6.3.2.1.13 Sitka FSS

| Sitka (SIT) Flight Service Station<br>Parent Station Type:<br>Facility: Juneau FSS Hours of Operation: 0600-2145 local |                           |
|------------------------------------------------------------------------------------------------------------------------|---------------------------|
| RCO Name/Location                                                                                                      | Frequency/s               |
| Sitka FSS                                                                                                              | 121.500, 122.200, 123.600 |
| Angoon                                                                                                                 | 122.400                   |

|                 |         |
|-----------------|---------|
| Biörka Island   | 122.300 |
| Finger Mountain | 120.400 |
| Gunnuk Mountain | 122.175 |

18-AUG-  
2022  
NAM

R-370

Regional SUP  
INFO

| RCO Name/Location                                         |  | Frequency/s                    |
|-----------------------------------------------------------|--|--------------------------------|
| Kake                                                      |  | 122.175, 122.650               |
| Kruzof                                                    |  | 122.050                        |
| Kuiu                                                      |  | 121.300, Out of service<br>UFN |
| Level Island                                              |  | 122.300                        |
| Petersburg                                                |  | 122.350                        |
| Wrangell                                                  |  | 122.450                        |
| Frequencies monitored/operated by parent FSS when closed. |  |                                |



18-AUG-2022  
NAM

|                     |                     |
|---------------------|---------------------|
| Tucumcari<br>VORTAC | 113.61<br>122.350   |
| Zuni RCO            | 121.500,<br>122.050 |

6.3.2.3 **Altoona Radio**

|                                  |                                                     |
|----------------------------------|-----------------------------------------------------|
| <b>Albuquerque Radio</b>         |                                                     |
| Allegheeny RCO                   | 122.200, 122.400                                    |
| Allegheeny VOR/DME               | 110.0T, 122.100R                                    |
| Alamogordo<br>RCO                | 122.150,<br>122.200, 122.100R,<br>122.200, 122.650, |
| Albuquerque<br>RCO               | 122.1500,<br>122.550                                |
| Alford RCO                       | 122.300                                             |
| Anton Chico<br>VORTAC            | 111.6T, 122.100R                                    |
| Clarks VOR/DME                   | 112.6T, 122.100R                                    |
| Carlsbad<br>RCO                  | 122.650                                             |
| Chambers RCO                     | 122.200                                             |
| El Paso City VORTAC              | 115.8T, 122.100R                                    |
| VORTAC                           | 122.100R                                            |
| Clines<br>Corners<br>RCO         | 122.300                                             |
| Clovis RCO                       | 122.500                                             |
| Corona<br>VORTAC                 | 115.5T,<br>122.100R                                 |
| Deming RCO                       | 122.200                                             |
| El Paso RCO                      | 122.400,<br>122.550                                 |
| Farmington<br>RCO                | 121.500,<br>122.400                                 |
| Gallup RCO                       | 122.600                                             |
| Gallup<br>VORTAC                 | 115.1T,<br>122.100R                                 |
| Guadalupe<br>Pass RCO            | 121.500,<br>122.350                                 |
| Hobbs RCO                        | 122.200                                             |
| Las Vegas<br>RCO                 | 122.600                                             |
| Roswell<br>RCO                   | 122.450                                             |
| Ruidoso RCO                      | 122.250                                             |
| Santa Fe<br>RCO                  | 122.200                                             |
| Silver City<br>VORTAC            | 110.8T,<br>122.100R                                 |
| Socorro<br>VORTAC                | 116.8T,<br>122.100R                                 |
| Taos RCO                         | 122.250                                             |
| Taos<br>VORTAC                   | 117.6T,<br>122.100R                                 |
| Truth or<br>Consequenc<br>es RCO | 122.200                                             |
| Truth or<br>Consequenc<br>es RCO | 121.500                                             |



## North America

## Regional SUP INFO R-390

|                    |                                 |
|--------------------|---------------------------------|
| Erie VORTAC        | 109.41<br>122.100R              |
| Franklin VOR       | 109.61<br>122.100R              |
| Indian Head VORTAC | 108.21<br>122.100R              |
| Johnstown VORTAC   | 113.01<br>122.100R,<br>122.650  |
| Keating VORTAC     | 116.01<br>122.100R              |
| Montour VORTAC     | 112.01<br>122.100R              |
| Philpsburg RCO     | 121.500,<br>122.500,<br>122.600 |
| Philpsburg VORTAC  | 115.51<br>122.100R              |
| Revioc VOR/DME     | 110.61<br>122.100R              |
| Slate Run VORTAC   | 113.91<br>122.100R              |
| St Marys RCO       | 121.300                         |
| St Thomas VORTAC   | 115.01<br>122.100R              |
| Tidioute VORTAC    | 117.61<br>122.100R              |

## 6.3.2.4 Anderson Radio

|           |         |
|-----------|---------|
| Aiken RCO | 122.450 |
| Allendale | 116.71, |

|                        |                                 |
|------------------------|---------------------------------|
| VOR                    | 122.100R                        |
| Anderson RCO           | 121.500,<br>122.200,<br>123.600 |
| Charlestown RCO        | 122.200,<br>122.500             |
| Charlestown VORTAC     | 113.51<br>122.100R              |
| Chesterfield VOR/DME   | 108.21<br>122.050R              |
| Colliers VORTAC        | 113.91<br>122.050R              |
| Columbia VORTAC        | 114.71<br>122.100R,<br>122.650  |
| Florence RCO           | 121.500,<br>122.600             |
| Florence VORTAC        | 115.21<br>122.100R              |
| Foothills VORTAC       | 113.41<br>122.100R              |
| Grand Strand RCO       | 123.600                         |
| Grand Strand VORTAC    | 117.61<br>122.100R              |
| Greenwood VORTAC       | 115.51<br>122.100R,<br>122.625  |
| Greer RCO              | 121.500,<br>122.200,<br>122.650 |
| Hilton Head Island RCO | 122.550                         |
| Spartanburg RCO        | 122.100R                        |
| vance VORTAC           | 110.41<br>122.100R              |

## 6.3.2.5 Anniston Radio

|                |                                 |
|----------------|---------------------------------|
| Anniston RCO   | 121.500,<br>122.200,<br>123.600 |
| Birmingham RCO | 122.200,<br>123.650             |

## Regional SUP INFO

R-400

NAM

|                    |                              |
|--------------------|------------------------------|
| Brookley VORTAC    | 112.8T, 122.100R             |
| Crimson VORTAC     | 117.8T, 122.100R             |
| Decatur RCO        | 122.600                      |
| Dothan RCO         | 121.500, 122.200,<br>122.500 |
| Eufaula VORTAC     | 109.2T, 122.100R             |
| Gadsden VOR/DME    | 112.3T, 122.100R             |
| Hamilton VORTAC    | 110.4T, 122.300              |
| Huntsville RCO     | 122.200                      |
| Mobile RCO         | 121.500, 122.200,<br>123.650 |
| Monroeville VORTAC | 116.8T, 122.100R             |
| Montgomery RCO     | 121.500, 122.200,<br>122.550 |
| Montgomery VORTAC  | 112.1T, 122.100R             |
| Muscle Shoals RCO  | 121.500, 122.200,<br>122.400 |
| Selma RCO          | 122.400                      |
| Talladega VOR/DME  | 108.8T, 122.050R             |
| Tuscaloosa RCO     | 122.200                      |
| Tuskegee VOR/DME   | 117.3T, 122.100R             |
| Vulcan VORTAC      | 114.4T, 122.100R             |
| Wiregrass VORTAC   | 111.6T, 122.100R             |

|                        |                     |
|------------------------|---------------------|
| Manchester<br>VOR/DME  | 114.4T,<br>122.100R |
| Millinocket<br>RCO     | 123.600             |
| Millinocket<br>VOR/DME | 117.9T,<br>122.100R |
| Princeton<br>VOR/DME   | 114.3T,<br>122.100R |
| Waterboro<br>RCO       | 122.250             |
| Whiterfield<br>RCO     | 122.400             |

## 6.3.2.7 Boise Radio

|                        |                     |
|------------------------|---------------------|
| Ashton RCO             | 123.625             |
| Bliss RCO              | 122.400             |
| Boise RCO              | 122.200,<br>122.600 |
| Cascade<br>RCO         | 122.350             |
| Coeur d'Alene RCO      | 122.050             |
| Conners RCO            | 121.500,<br>122.050 |
| Hailey RCO             | 122.400             |
| Idaho Falls<br>RCO     | 122.550             |
| Lewiston<br>RCO        | 122.350             |
| Malad City<br>RCO      | 122.650             |
| Mountain<br>Home RCO   | 122.600             |
| Mullan Pass<br>VOR/DME | 117.8T,<br>122.150  |
| Pocatello<br>RCO       | 122.350             |
| Rome RCO               | 122.650             |
| Salmon RCO             | 121.500,<br>122.550 |
| Saw Butte<br>RCO       | 122.450             |
| Stanley RCO            | 122.600             |
| Twin Falls<br>RCO      | 122.250             |

## 6.3.2.6 Bangor Radio

|                  |                                       |
|------------------|---------------------------------------|
| Augusta VOR/DME  | 111.4T, 122.100R,<br>122.200, 122.600 |
| Bangor RCO       | 121.500, 122.200                      |
| Belfast RCO      | 121.975                               |
| Berlin RCO       | 122.350                               |
| Bucks Harbor RCO | 122.500                               |
| Caribou RCO      | 122.300                               |
| Claremont RCO    | 122.400                               |
| Concord RCO      | 122.200, 122.300                      |
| Fryeburg RCO     | 122.550                               |
| Greenville RCO   | 122.600                               |

## 6.3.2.8 Bridgeport Radio

|                                |                                           |
|--------------------------------|-------------------------------------------|
| Boston RCO                     | 122.400                                   |
| Boston<br>VOR/DME              | 112.71<br>122.100R                        |
| Bridgeport<br>VOR/DME          | 108.81<br>121.500<br>122.100R,<br>122.200 |
| Chester<br>RCO                 | 122.250                                   |
| Fitchburg<br>RCO               | 118.025                                   |
| Gardner<br>VOR/DME             | 110.61<br>122.100R                        |
| Groton<br>VOR/DME              | 110.91<br>122.100R                        |
| Hyannis<br>RCO                 | 126.425                                   |
| Lawrence<br>VOR/DME            | 112.51<br>122.100R                        |
| Madison<br>VOR/DME             | 110.41<br>122.100R                        |
| Mansfield<br>RCO               | 121.725                                   |
| Marthas<br>Vineyard<br>VOR/DME | 114.51<br>122.100R                        |

18-AUG-2022  
NAM

|                      |                                             |
|----------------------|---------------------------------------------|
| Utica<br>VORTAC      | 111.21<br>122.100R,<br>122.200,<br>122.650' |
| Wellsville<br>VORTAC | 111.41<br>122.100R                          |

6.3.2.10 **Burlington Radio**

|                      |                    |
|----------------------|--------------------|
| Nantucket<br>VOR/DME | 116.21<br>122.100R |
| New Haven<br>VOR/DME | 109.81<br>122.100R |
| Norwich<br>VOR/DME   | 110.01<br>122.100R |
| Providence<br>VORTAC | 111.51<br>122.600  |
| Punah<br>VOR/DME     | 117.41<br>122.100R |
| Quonset<br>State RCO | 122.200, 122.600   |
| Windsor<br>Locks RCO | 122.500<br>122.300 |
| Worcester<br>RCO     | 114.21<br>122.200  |
| Worcester<br>VORTAC  | 116.9T, 122.100R   |

6.3.2.9 **Buffalo Radio**

|                      |                                              |
|----------------------|----------------------------------------------|
| Binghamton<br>VORTAC | 112.21<br>122.100R                           |
| Buffalo RCO          | 121.500<br>122.100R,<br>122.200,<br>122.600' |
| Dunkirk<br>VORTAC    | 116.21<br>122.100R                           |
| Elmira RCO           | 121.500<br>122.100R,<br>122.200,<br>122.400' |
| Geneseo<br>VOR/DME   | 108.21<br>122.100R                           |
| Georgetown<br>VORTAC | 117.81<br>122.100R                           |
| Hancock<br>VOR/DME   | 116.81<br>122.100R                           |
| Ithaca<br>VOR/DME    | 111.81<br>122.100R                           |
| Jamestown<br>VOR/DME | 114.71<br>122.100R                           |
| Rochester<br>RCO     | 122.600                                      |
| Rockdale<br>VOR/DME  | 112.61<br>122.100R                           |
| Utica<br>VOR/DME     | 117.41<br>122.100R,<br>122.200,<br>122.650'  |

## North America

## Regional SUP INFO R-410

|                         |                            |
|-------------------------|----------------------------|
| Rutland RCO             | 122.300                    |
| Saranac Lake<br>VOR/DME | 109.21<br>122.100R         |
| Springfield<br>RCO      | 122.500                    |
| Watertown<br>RCO        | 122.200,<br><b>122.300</b> |
| Watertown<br>VORTAC     | 109.81<br>122.100R         |

6.3.2.11 **Casper Radio**

|                                    |                               |
|------------------------------------|-------------------------------|
| Antelope<br>Gap RCO                | 122.200                       |
| Big Piney<br>VOR/DME               | 116.51<br>121.500,<br>122.300 |
| Boysen<br>Reservoir<br>VOR/DM<br>E | 117.81<br>122.300             |
| Casper RCO                         | 121.500,<br>122.400           |
| Cherokee<br>RCO                    | 122.400                       |

|                        |                     |
|------------------------|---------------------|
| Cheyenne<br>RCO        | 122.300             |
| Gody RCO               | 122.300             |
| Converse<br>RCO        | 121.975             |
| Crazy Woman<br>VOR/DME | 117.31<br>122.025   |
| Dunoir RCO             | 122.600             |
| Fort Bridger<br>RCO    | 121.500,<br>122.300 |
| Gillette RCO           | 122.300             |
| Jackson<br>RCO         | 122.050             |
| Laramie<br>VOR/DME     | 117.61<br>122.600   |
| Medicine<br>Bow RCO    | 122.500             |
| Newcastle<br>RCO       | 122.500             |
| Rawlins<br>RCO         | 122.200             |
| Riverton<br>RCO        | 122.200             |
| Rock Springs<br>RCO    | 121.500,<br>122.600 |
| Sheridan<br>RCO        | 121.500,<br>122.500 |
| Worland<br>RCO         | 121.500,<br>122.400 |

6.3.2.12 **Cedar City Radio**

|                       |                                 |
|-----------------------|---------------------------------|
| Abajo Peak<br>RCO     | 122.550                         |
| Bonneville<br>VORTAC  | 112.31<br>122.100R              |
| Bryce<br>Canyon RCO   | 121.500,<br>122.200             |
| Bullfrog<br>Basin RCO | <b>122.400</b>                  |
| Carbon<br>VOR/DME     | 115.51<br>122.200               |
| Cedar City<br>RCO     | 121.500,<br>122.200,<br>122.600 |
| Delle RCO             | <b>122.500</b>                  |
| Delta<br>VORTAC       | 116.11<br>122.550               |
| Fairfield             | 122.250                         |

|     |  |
|-----|--|
| RCO |  |
|-----|--|

## Regional SUP INFO

|                    |                                |                    |                                                       |
|--------------------|--------------------------------|--------------------|-------------------------------------------------------|
|                    | R-420                          |                    | 122.200                                               |
| Francis Peak RCO   | 122.200                        | Zanesville RCO     | <del>121.500,</del><br><del>122.200,</del><br>122.500 |
| Halls Crossing RCO | 122.400                        | Zanesville VOR/DME | 111.41<br>122.100R                                    |
| Hanksville VORTAC  | <del>115.91,</del><br>122.650  |                    |                                                       |
| Lucin VORTAC       | <del>113.61,</del><br>122.100R |                    |                                                       |
| Milford VORTAC     | <del>112.11,</del><br>122.100R |                    |                                                       |
| Moab RCO           | 122.300                        |                    |                                                       |
| Myton VOR/DME      | <del>112.71,</del><br>122.100R |                    |                                                       |
| Ogden RCO          | 122.450                        |                    |                                                       |
| Richfield RCO      | <b>122.500</b>                 |                    |                                                       |
| Salt Lake City RCO | 122.400                        |                    |                                                       |
| St. George RCO     | 122.500                        |                    |                                                       |
| Vernal RCO         | 122.350                        |                    |                                                       |

6.3.2.14 **Columbia Radio**6.3.2.13 **Cleveland Radio**

|                    |                                                              |
|--------------------|--------------------------------------------------------------|
| Bellaire VOR/DME   | <del>117.11,</del><br>122.100R                               |
| Chardon VOR/DME    | <del>112.71,</del><br>122.100R                               |
| Cleveland RCO      | <del>122.200,</del><br><del>122.200,</del><br><b>122.350</b> |
| Dryer VOR/DME      | <del>113.61,</del><br>122.100R                               |
| Findlay RCO        | <del>122.200,</del><br>122.650                               |
| Flag City VORTAC   | 108.21<br>122.100R                                           |
| Jefferson VOR/DME  | <del>115.21,</del><br>122.100R                               |
| Manstfield RCO     | 122.600                                                      |
| Manstfield VORTAC  | 108.81<br>122.100R                                           |
| Sandusky VOR/DME   | 109.21<br>122.100R                                           |
| Waterville VOR/DME | 113.11<br>122.100R                                           |
| Youngstown VORTAC  | 109.01<br>122.100R,                                          |

## NAM

|                       |                    |
|-----------------------|--------------------|
| Joplin RCO            | 122.600            |
| Kansas City<br>VORTAC | 113.31<br>122.100R |
| Kirksville<br>RCO     | 122.200            |
| Kirksville<br>VORTAC  | 114.61<br>122.100R |
| Lebanon<br>RCO        | 122.500            |
| Macon<br>VOR/DME      | 112.91<br>122.100R |
| Maples<br>VORTAC      | 113.41<br>122.100R |
| Neosho<br>VOR/DME     | 117.31<br>122.100R |
| Point                 | 122.025            |

|                       |                                           |
|-----------------------|-------------------------------------------|
| Butler<br>VORTAC      | 115.91<br>122.100R                        |
| Chillicothe<br>RCO    | 122.250                                   |
| Clinton RCO           | 121.500,<br>122.400                       |
| Columbia<br>VOR/DME   | 110.21<br>121.500,<br>122.200,<br>122.650 |
| Dogwood<br>VORTAC     | 109.41<br>122.100R                        |
| Downtown<br>RCO       | 122.600                                   |
| Hallsville<br>VORTAC  | 114.21<br>122.100R                        |
| Jefferson<br>City RCO | 122.250                                   |
| Johnson<br>County RCO | 122.150                                   |

|                       |                                |
|-----------------------|--------------------------------|
| Lookout<br>RCO        |                                |
| Springfield<br>RCO    | 122.550                        |
| Springfield<br>VORTAC | 116.91<br>122.100R             |
| St. Joseph<br>VORTAC  | 115.51<br>122.100R,<br>122.300 |
| Sunshine<br>RCO       | 122.150                        |
| Vichy RCO             | 121.500,<br>122.350            |
| Vichy<br>VOR/DME      | 117.71<br>122.100R             |
| West Plains<br>RCO    | 122.150                        |

## 6.3.2.15 Columbus Radio

|                      |                              |
|----------------------|------------------------------|
| Ainsworth VOR/DME    | 112.7T, 121.500,<br>122.400  |
| Alliance RCO         | 122.300                      |
| Beatrice RCO         | 122.500                      |
| Central Nebraska RCO | 122.450                      |
| Chadron RCO          | 122.500                      |
| Columbus RCO         | 121.500, 122.200,<br>122.400 |
| Hastings VOR/DME     | 108.8T, 122.100R             |
| Hayes Center VORTAC  | 117.7T, 122.100R             |
| Kearney VOR          | 111.2T, 122.550              |
| Lee Bird RCO         | 121.500, 122.500             |
| Lincoln VORTAC       | 116.1T, 122.650              |
| Mc Cook FAN MARKER   | 122.600T                     |
| Mc Cook VOR/DME      | 115.3T, 122.600              |
| Norfolk RCO          | 122.150                      |
| O'Neill RCO          | 122.450                      |
| Omaha RCO            | 122.350                      |
| Pawnee City VORTAC   | 112.4T, 122.100R             |
| Scottsbluff RCO      | 122.600                      |
| Scottsbluff VORTAC   | 112.6T, 122.100R             |
| Sidney VORTAC        | 115.9T, 122.100R,<br>122.450 |



18-AUG-2022

NAM

|                      |                    |
|----------------------|--------------------|
| Theford<br>VOR/DME   | 108.61<br>122.400  |
| Toadstool<br>VOR/DME | 113.41<br>122.100R |
| Wolbach<br>VORTAC    | 114.81<br>122.100R |

6.3.2.16 **Dayton Radio**

|                       |                     |
|-----------------------|---------------------|
| Allen County<br>VOR   | 108.41<br>122.100R  |
| Appleton<br>VORTAC    | 116.71<br>122.100R  |
| Athens/Alba<br>ny RCO | 122.250             |
| Cincinnati<br>RCO     | 122.400             |
| Columbus<br>RCO       | 122.200,<br>122.300 |
| Dayton RCO            | 122.200,<br>122.550 |
| Dayton<br>VOR/DME     | 114.51<br>122.100R  |
| Gallipolis<br>RCO     | 121.650             |
| Hillsboro<br>RCO      | 121.500,<br>122.200 |
| Rosewood<br>VORTAC    | 117.51<br>122.100R  |
| Yellow Bud<br>VOR     | 112.51<br>122.100R  |

6.3.2.17 **De Ridder Radio**

|                          |                     |
|--------------------------|---------------------|
| Alexandria<br>RCO        | 121.500,<br>122.550 |
| De Ridder<br>RCO         | 122.200             |
| Eugene<br>Island RCO     | 122.250             |
| Fighting Tiger<br>VORTAC | 116.51<br>122.200   |
| Larayette<br>RCO         | 121.500,<br>122.350 |
| Lake Charles<br>RCO      | 121.500,<br>122.300 |
| Leeville<br>VORTAC       | 113.51<br>122.100R  |

|                           |                     |
|---------------------------|---------------------|
| Many RCO                  | 121.500,<br>122.150 |
| Monroe RCO                | 122.250             |
| New Orleans<br>RCO        | 122.600             |
| Patterson<br>RCO          | 122.500             |
| Rustin RCO                | 122.350             |
| Shreveport<br>RCO         | 122.600             |
| South<br>Timbalier<br>RCO | 122.600             |
| Tibby<br>VORTAC           | 112.01<br>122.100R  |
| Vermillion<br>RCO         | 122.600             |

6.3.2.18 **Denver Radio**

## North America

## Regional SUP INFO R-430

|                           |                           |
|---------------------------|---------------------------|
| Blue Mesa RCO             | 122.550                   |
| Cortez RCO                | 122.300                   |
| Denver RCO                | 123.650                   |
| Denver RCO                | 121.500, 122.200, 122.350 |
| Dove Creek VORTAC         | 114.61, 122.500           |
| Durango VOR/DME           | 108.21, 122.350           |
| Eagle RCO                 | 122.200                   |
| Fort Collins/Loveland RCO | 122.400                   |
| Gill VOR/DME              | 114.21, 122.650           |
| Glenwood Springs RCO      | 122.200                   |
| Grand Junction RCO        | 122.600                   |

|                      |                          |
|----------------------|--------------------------|
| Akron RCO            | 120.675                  |
| Alamosa VORTAC       | 113.91, 121.500, 122.150 |
| Badger Mountain RCO  | 122.200                  |
| Black Forest VOR/DME | 112.51, 122.250          |

|                        |         |
|------------------------|---------|
| Grand Mesa RCO         | 122.200 |
| Hayden RCO             | 122.250 |
| Kremmling RCO          | 122.300 |
| La Junta RCO           | 122.600 |
| Limon RCO              | 122.475 |
| Meeker RCO             | 122.150 |
| Montrose RCO           | 122.650 |
| Pueblo RCO             | 122.200 |
| Rangely RCO            | 122.650 |
| Red Table Mountain RCO | 122.400 |
| Rifle RCO              | 122.500 |
| Steamboat Springs RCO  | 122.200 |
| Telluride RCO          | 122.150 |
| Trinidad RCO           | 122.200 |

## 6.3.2.19 Elkins Radio

|                     |                                                      |
|---------------------|------------------------------------------------------|
| Beckley VORTAC      | 117.7T, 122.100R                                     |
| Bluefield RCO       | 122.200, 122.650                                     |
| Bluefield VORTAC    | 110.0T, 122.100R                                     |
| Charleston RCO      | 122.200, <b>122.550</b>                              |
| Charleston VORTAC   | 117.4T, 122.100R                                     |
| Clarksburg VOR/DME  | 112.6T, 122.100R                                     |
| Cumberland RCO      | 122.350                                              |
| Elkins VORTAC       | 114.2T, 121.500, 122.100R, 122.200, 122.450, 123.600 |
| Grantsville VOR/DME | 112.3T, 122.100R                                     |
| Henderson VORTAC    | 115.9T, 122.100R                                     |
| Huntington RCO      | 122.200, <b>122.600</b>                              |

## Regional SUP INFO

|                     |                                |
|---------------------|--------------------------------|
| IVV Knob RCO        | 124.300                        |
| Kessel VOR/DME      | 110.81<br>122.100R             |
| Martinsburg RCO     | 122.450                        |
| Morgantown VORTAC   | 111.61<br>122.100R,<br>122.600 |
| Parkersburg VORTAC  | 108.61<br>122.100R,<br>122.400 |
| Amelia RCO          | 122.500                        |
| Amarillo RCO        | 117.51                         |
| Rainelle RCO        | 118.61                         |
| Brady Bridge RCO    | 122.500                        |
| Winterset RCO       | 121.500                        |
| Worthington VOR/DME | 118.550<br>122.100R            |
| Worthington RCO     | 121.500, 122.450               |
| Dalhart RCO         | 121.500, 122.200               |

## 6.3.2.20 Fort Dodge Radio

|                   |                                 |
|-------------------|---------------------------------|
| Burlington RCO    | 121.500,<br>122.65              |
| Cedar Rapids RCO  | 122.550                         |
| Charles City RCO  | 122.400                         |
| Davenport RCO     | 122.500                         |
| Denison RCO       | 122.250                         |
| Des Moines VORTAC | 117.51<br>122.650               |
| Dubuque VORTAC    | 115.81<br>122.050               |
| Fort Dodge RCO    | 121.500,<br>122.200,<br>122.300 |
| Grinnell RCO      | 122.350                         |
| Iowa City VORTAC  | 116.21<br>122.100R,<br>122.250  |
| Keokuk Muni RCO   | 122.125                         |
| Lamoni VORTAC     | 116.71<br>122.100R              |
| Mason City VORTAC | 114.91<br>122.600               |
| Newton VOR/DME    | 112.51<br>122.100R              |
| Omaha VORTAC      | 116.31<br>122.100R              |

|                       |                                |
|-----------------------|--------------------------------|
| R-440 Ottumwa VOR/DME | 111.61<br>122.400              |
| Sioux City VORTAC     | 116.51<br>122.100R,<br>122.450 |
| Spencer RCO           | 122.150                        |
| Waterloo RCO          | 122.050                        |
| Waukon VORTAC         | 116.61<br>122.100R             |

## 6.3.2.21 Fort Worth Radio

## NAM

|                     |                     |
|---------------------|---------------------|
| Dallas RCO          | 122.300             |
| Fort Worth RCO      | 121.500,<br>122.600 |
| Gregg County VORTAC | 112.31<br>122.200   |
| Hutchinson RCO      | 122.050             |
| Jacksboro RCO       | 121.500,<br>122.400 |
| Lubbock RCO         | 122.550             |
| Mineral Wells RCO   | 122.200             |
| Paris RCO           | 122.250             |
| Plainview VOR/DME   | 112.91<br>122.550   |
| Sherman/Denison RCO | 122.300             |
| Snyder RCO          | 122.450             |
| Tyler RCO           | 122.300             |
| Waco RCO            | 122.150             |
| Wichita Falls RCO   | 122.650             |

## 6.3.2.22 Gainesville Radio

|               |                                            |
|---------------|--------------------------------------------|
| Craig VORTAC  | 114.51<br>122.100R,<br>122.200,<br>122.450 |
| Crestview RCO | 122.200,<br>122.450                        |

|                   |                                                                   |
|-------------------|-------------------------------------------------------------------|
| Cross City VORTAC | 112.01<br>122.100R                                                |
| Gators VORTAC     | 116.71<br>121.500,<br>122.200,<br>122.475,<br>122.500,<br>122.600 |
| Greenville VORTAC | 109.01<br>122.100R                                                |
| Lake City RCO     | 122.600                                                           |
| Marianna VORTAC   | 114.01<br>122.100R                                                |
| Ocala VORTAC      | 113.71<br>122.100R                                                |
| Palatka RCO       | 122.250                                                           |
| Panama City RCO   | 122.600                                                           |
| Pensacola RCO     | 122.200,<br>122.600                                               |
| Perry RCO         | 122.450                                                           |
| Saultley VOR      | 108.81<br>122.100R                                                |
| Seminole RCO      | 121.500,<br>122.200,<br>122.400                                   |
| Seminole VORTAC   | 117.51<br>122.100R                                                |
| St. Augustine RCO | 122.300                                                           |
| Taylor VORTAC     | 112.91<br>122.100R                                                |

## 6.3.2.23 Grand Forks Radio

|                     |                     |
|---------------------|---------------------|
| Bismarck VOR/DME    | 116.51<br>122.200   |
| Bowman RCO          | 122.400             |
| Devils Lake VOR/DME | 111.01<br>122.300   |
| Dickinson RCO       | 121.500,<br>122.200 |

18-AUG-2022  
NAM

|                 |                                 |
|-----------------|---------------------------------|
| Fargo RCO       | 122.425                         |
| Grand Forks RCO | 121.500,<br>122.200,<br>122.600 |
| Hazen RCO       | 122.450                         |
| Jameson RCO     | 122.200                         |
| Minot RCO       | 122.600                         |
| VORTAC          | 117.11                          |
| Rolla RCO       | 122.200, 122.600R               |
| Williston RCO   | 122.200, 122.600                |
| Williston RCO   | 123.600                         |
| Williston RCO   | 110.0T, 122.100R                |

6.3.2.24 **Great Falls Radio**

|                     |                               |
|---------------------|-------------------------------|
| Billings RCO        | 122.550                       |
| Bozeman RCO         | 121.500,<br>122.500           |
| Butte RCO           | 122.200,<br>122.400           |
| Coppertown RCO      | 122.650                       |
| Cut Bank VORTAC     | 114.41<br>121.500,<br>122.200 |
| Dillon RCO          | 122.150                       |
| Drummond RCO        | 122.250                       |
| Glasgow RCO         | 121.500,<br>122.250           |
| Great Falls RCO     | 122.600                       |
| Harlowton RCO       | 122.400                       |
| Havre RCO           | 123.650                       |
| Helena RCO          | 122.550                       |
| Judith Mountain RCO | 122.200                       |
| Lakeside RCO        | 122.500                       |
| Lewiston RCO        | 122.350                       |
| Livingston RCO      | 122.200                       |
| Miles City RCO      | 122.200                       |

|                 |         |
|-----------------|---------|
| Miller Peak RCO | 122.450 |
| Sidney RCO      | 123.650 |
| Lower Hill RCO  | 122.300 |
| Wolf Point RCO  | 122.450 |
| Yellowstone RCO | 119.400 |

6.3.2.25 **Green Bay Radio**

## North America

## Regional SUP INFO R-450

|                       |                                 |
|-----------------------|---------------------------------|
| Fond du Lac RCO       | 122.500                         |
| Green Bay RCO         | 121.500,<br>122.200,<br>122.550 |
| Hancock RCO           | 121.500,<br>122.525,<br>123.650 |
| Hayward VOR/DME       | 113.41<br>122.100R              |
| Iron Mountain VOR/DME | 111.21<br>122.100R              |
| Ironwood VORTAC       | 108.81<br>122.300               |
| Janesville VOR/DME    | 114.31<br>122.100R              |
| Kenosha VOR/DME       | 109.21<br>123.600R              |
| La Crosse RCO         | 121.500,<br>122.200,<br>122.350 |
| Lone Rock VOR/DME     | 112.81<br>122.350               |
| Mackinac Island RCO   | 122.350                         |
| Madison VORTAC        | 108.61<br>122.600               |
| Manitowoc VOR/DME     | 111.01<br>122.100R              |
| Marshfield RCO        | 122.550                         |
| Menominee VOR/DME     | 109.61<br>122.100R              |
| Milwaukee RCO         | 122.400,<br>122.650             |

|                         |                                |
|-------------------------|--------------------------------|
| Mosinee RCO             | 122.525                        |
| Newberry RCO            | 122.400                        |
| Oshkosh VORTAC          | 111.81<br>122.100R,<br>122.250 |
| Platteville RCO         | 122.500                        |
| Prairie du Chien RCO    | 122.250                        |
| Red Wing RCO            | 122.600                        |
| Rhineland VORTAC        | 109.21<br>122.100R             |
| Rice Lake RCO           | 122.300                        |
| Sault Ste Marie VOR/DME | 112.21<br>122.100R             |
| Sawyer RCO              | 123.600                        |
| Schoolcraft County RCO  | 122.250                        |
| Siren VOR/DME           | 109.41<br>122.100R             |
| Stevens Point VORTAC    | 110.61<br>122.100R             |
| Timmerman VOR/DME       | 112.51<br>123.600R             |
| Wausau RCO              | 121.500,<br>122.400            |
| West Bend VOR           | 109.81<br>122.100R             |
| Wisconsin Rapids RCO    | 122.450                        |
| Woodruff RCO            | 122.600                        |

## 6.3.2.26 Greenwood Radio

|              |                    |
|--------------|--------------------|
| Bigbee RCO   | 123.650            |
| Eaton VORTAC | 110.61<br>122.100R |

|                      |                                     |
|----------------------|-------------------------------------|
| Greenville VOR/DME   | 110.2T, 122.100R                    |
| Greenwood RCO        | 121.500, 122.200, 122.550           |
| Gulfport VORTAC      | 109.0T, 122.100R                    |
| Holly Springs VORTAC | 112.4T, 122.100R, 122.300           |
| Jackson RCO          | 121.500, 122.200, 122.650           |
| Kewanee VORTAC       | 113.8T, 122.100R                    |
| Laurel RCO           | 122.300                             |
| Mc Comb RCO          | 121.500, 122.100R, 122.200, 122.400 |
| Meridian RCO         | 121.500, 122.200, 122.600           |
| Meridian VORTAC      | 117.0T, 122.100R                    |
| Natchez VOR/DME      | 110.0T, 122.100R                    |
| Picayune VOR/DME     | 112.2T, 122.100R                    |
| Sidon VORTAC         | 114.7T, 122.100R                    |
| Tupelo RCO           | 122.500                             |

**6.3.2.27 Hawthorne Radio**

|                   |                           |
|-------------------|---------------------------|
| Burbank RCO       | 122.350                   |
| Fillmore VORTAC   | 112.5T, 122.100R          |
| Guadalupe VOR     | 111.0T, 122.100R          |
| Hawthorne RCO     | 122.200, 122.500          |
| Paso Robles RCO   | 121.500, 122.400          |
| San Marcus VORTAC | 114.9T, 122.100R, 122.300 |
| Seligman EFAS1    | 135.900                   |
| Tonopah EFAS1     | 135.900                   |

**6.3.2.28 Huron Radio**

|                  |                           |
|------------------|---------------------------|
| Aberdeen VOR/DME | 113.0T, 122.100R, 122.400 |
| Brookings RCO    | 122.650                   |
| Buffalo VOR/DME  | 109.4T, 122.150           |
| Dunree VORTAC    | 116.8T, 122.600           |

|                   |                  |
|-------------------|------------------|
| Rapid City RCO    | 122.650          |
| Rapid City VORTAC | 112.3T, 122.100R |
| Sioux Falls RCO   | 122.200          |
| Spearfish RCO     | 122.550          |
| Watertown RCO     | 122.500          |
| Winner VOR        | 112.8T, 122.100R |
| Yankton RCO       | 122.550          |

**6.3.2.29 Jackson Radio**

|                     |                                    |
|---------------------|------------------------------------|
| Clarksville VOR/DME | 110.6T, 122.100R                   |
| Dyersburg RCO       | 121.500, 122.200, 122.450          |
| Graham RCO          | 122.250                            |
| Graham VORTAC       | 111.6T, 122.100R                   |
| Jacks Creek VOR/DME | 109.4T, 122.100R                   |
| Jackson RCO         | 121.500, 122.200, 122.650, 127.150 |
| Memphis RCO         | 121.500, 122.200, 123.650          |
| Memphis VORTAC      | 117.5T, 122.100R                   |

**6.3.2.30 Jonesboro Radio**

|                               |                                    |
|-------------------------------|------------------------------------|
| Batesville RCO                | 122.250                            |
| El Dorado RCO                 | 121.500, 122.650                   |
| Fayetteville RCO              | 122.300                            |
| Fayetteville/Sp ringdale/ RCO | 122.550                            |
| Flippin RCO                   | 122.350                            |
| Fort Smith VORTAC             | 110.4T, 122.200                    |
| Harrison RCO                  | 121.500, 122.450                   |
| Hot Springs VOR/DME           | 110.0T, 122.100R                   |
| Jonesboro RCO                 | 121.500, 122.200, 122.300, 123.600 |

|             |          |
|-------------|----------|
| Little Rock | 122.550  |
| RCO         |          |
| Monticello  | 111.61   |
| VOR/DME     | 122.100R |
| Pine Bluff  | 121.500, |
| RCO         | 122.600  |
| Social Hill | 122.075  |

|              |          |
|--------------|----------|
| RCO          |          |
| Texarkana    | 121.500, |
| RCO          | 122.450  |
| Walnut Ridge | 114.51   |
| VORTAC       | 122.200  |

6.3.2.31 **Kankakee Radio**

|             |           |
|-------------|-----------|
| Bloomington | 108.21    |
| VOR/DME     | 123.600R  |
| Bradford    | 114.71    |
| VORTAC      | 121.500   |
|             | 122.050R, |
|             | 123.600   |



18-AUG-2022

R-470

Regional SUP  
INFO

NAM

|                        |                               |
|------------------------|-------------------------------|
| Chicago Heights VORTAC | 114.21<br>122.100R            |
| Chicago Meigs RCO      | 122.150                       |
| Dupage RCO             | 122.300                       |
| Dupage VOR/DME         | 108.41<br>122.100R            |
| Galesburg VOR/DME      | 109.81<br>122.100R            |
| Joliet RCO             | 122.500                       |
| Joliet VORTAC          | 112.31<br>122.100R            |
| Kankakee VOR/DME       | 111.61<br>121.500<br>122.200' |
| Macomb RCO             | 122.150                       |
| Moline RCO             | 122.600                       |
| Peoria RCO             | 122.350                       |
| Peotone VORTAC         | 113.21<br>122.050R            |
| Polo VOR/DME           | 111.21<br>122.100R            |
| Pontiac VOR/DME        | 109.61<br>122.100R            |
| Rockford RCO           | 122.650                       |
| Rockford VOR/DME       | 110.81<br>122.100R            |
| Waukegan RCO           | 122.550                       |

6.3.2.32 **Lansing Radio**

|                     |                               |
|---------------------|-------------------------------|
| Alpena VORTAC       | 108.81<br>121.500<br>122.100R |
| Bad Axe RCO         | 122.650                       |
| Battle Creek VORTAC | 109.41<br>122.200             |
| Barrien Springs RCO | 121.625                       |
| Carleton VORTAC     | 115.71<br>122.100R            |

|                     |                               |
|---------------------|-------------------------------|
| Pellston RCO        | 121.500<br>122.200<br>123.600 |
| Pellston VORTAC     | 111.81<br>122.300             |
| Pontiac VORTAC      | 111.01<br>122.150R            |
| Pullman VOR/DME     | 112.11<br>122.100R            |
| Saginaw RCO         | 121.500<br>122.200<br>122.400 |
| Salem VORTAC        | 114.31<br>122.100R            |
| Traverse City RCO   | 122.200<br>122.650            |
| West Branch RCO     | 122.350                       |
| White Cloud VOR/DME | 117.61<br>122.100R            |

6.3.2.33 **Leesburg Radio**

|                           |                           |
|---------------------------|---------------------------|
| Armel VOR/DME             | 113.5T, 122.100R          |
| Baltimore VORTAC          | 115.1T, 122.100R, 122.200 |
| Brooke VORTAC             | 114.5T, 122.100R          |
| Buck s Elbow Mountain RCO | 122.200, 122.650          |
| Cape Charles VORTAC       | 112.2T, 122.100R          |
| Casanova VORTAC           | 116.3T, 122.100R          |
| Charlottesville RCO       | 121.500, 122.200, 122.650 |
| Danville RCO              | 122.200                   |
| Falls Church RCO          | 122.200, 122.600          |
| Flat Rock VORTAC          | 113.3T, 122.100R          |
| Franklin VORTAC           | 110.6T, 122.100R          |
| Frederick VORTAC          | 109.0T, 122.100R          |
| Glade Spring VOR/DME      | 110.2T, 122.100R          |
| Gordonsville VORTAC       | 115.6T, 121.500, 122.100R |
| Hagerstown VOR            | 109.8T, 122.100R          |
| Harcum VORTAC             | 108.8T, 122.100R          |
| Hopewell VORTAC           | 112.0T, 122.100R          |
| Lawrenceville VORTAC      | 112.9T, 122.100R          |
| Leesburg RCO              | 121.500, 122.200, 122.600 |
| Linden VORTAC             | 114.3T, 122.100R          |
| Lynchburg VORTAC          | 109.2T, 122.100R          |
| Martinsburg VORTAC        | 113.1T, 122.100R          |

|                          |                            |
|--------------------------|----------------------------|
| Detroit RCO              | 122.200,<br><b>122.550</b> |
| Flint<br>VORTAC          | 116.91<br>122.300          |
| Gaylord RCO              | 122.550                    |
| Grand<br>Rapids RCO      | 122.250                    |
| Jackson<br>RCO           | 122.200                    |
| Kalamazoo<br>VOR/DME     | 109.01<br>122.100R         |
| Keeler<br>VOR/DME        | 116.61<br>122.100R         |
| Lansing<br>RCO           | 122.200                    |
| Litchfield<br>VOR/DME    | 111.21<br>122.100R         |
| Ludington<br>RCO         | 122.450                    |
| Manistee<br>VOR/DME      | 111.41<br>122.100R         |
| Mount<br>Pleasant<br>RCO | 122.600                    |
| Muskegon<br>RCO          | 122.500                    |
| Peck<br>VORTAC           | 114.01<br>122.100R         |

## Regional SUP INFO

|                                 |                                            |
|---------------------------------|--------------------------------------------|
| Norfolk<br>VORTAC               | 116.91<br>122.100R                         |
| Nottingham<br>VORTAC            | 113.71<br>122.100R                         |
| Patuxent<br>VORTAC              | 117.61<br>122.100R                         |
| Pulaski RCO                     | 122.300                                    |
| Pulaski<br>VORTAC               | 116.81<br>122.100R                         |
| Richmond<br>VORTAC              | 114.11<br>122.100R,<br>122.200,<br>122.400 |
| Roanoke<br>RGNL/Woodru<br>m RCO | 122.100R,<br>122.200,<br>122.600           |
| Salisbury<br>RCO                | 121.500,<br>122.200,<br>122.300            |
| Salisbury<br>VORTAC             | 111.21<br>122.100R                         |
| Snow Hill<br>VORTAC             | 112.41<br>122.100R,<br>122.600             |
| South Boston<br>VORTAC          | 110.41<br>122.100R                         |
| Westminster<br>VORTAC           | 117.91<br>122.100R                         |

6.3.2.34 **Louisville Radio**

|                      |                                 |
|----------------------|---------------------------------|
| Bowling<br>Green RCO | 121.500,<br>122.200,<br>122.400 |
| Central City<br>RCO  | 122.100R                        |
| Cincinnati<br>VORTAC | 117.31<br>122.100R              |
| Falmouth<br>VOR/DME  | 117.01<br>122.100R              |
| Frankfort<br>VOR     | 109.41<br>122.100R              |
| Hazard<br>VOR/DME    | 111.21<br>122.100R              |
| Lexington<br>VORTAC  | 112.61<br>122.100R              |
| London RCO           | 121.500,<br>122.200,<br>122.650 |
| London<br>VORTAC     | 116.11<br>122.100R              |

|                         |                                              |
|-------------------------|----------------------------------------------|
| R-480 Louisville<br>RCO | 119.500,<br>121.500R,<br>122.200,<br>122.450 |
| Madison<br>RCO          | 122.300                                      |
| New Hope<br>VOR/DME     | 110.81<br>122.100R                           |
| Newcombe<br>VORTAC      | 110.41<br>122.100R                           |
| Owensboro<br>VOR/DME    | 108.61<br>122.100R                           |
| Paducah<br>RCO          | 122.200,<br>122.500                          |
| Pikeville<br>RCO        | 122.050                                      |
| Somerset<br>RCO         | 122.550                                      |
| York<br>VORTAC          | 112.81<br>122.100R                           |

6.3.2.35 **Macon Radio**

NAM

|                  |                                           |
|------------------|-------------------------------------------|
| Alma VORTAC      | 115.11<br>122.100R                        |
| Athens VOR       | 109.61<br>122.100R                        |
| Atlanta RCO      | 122.200,<br>122.600                       |
| Atlanta VORTAC   | 116.91<br>122.100R                        |
| Brunswick VORTAC | 109.81<br>121.500<br>122.100R,<br>122.200 |
| Choo Choo VORTAC | 115.81<br>121.500<br>122.100R             |
| Columbus VORTAC  | 117.11<br>122.100R,<br>122.650            |
| Daniel RCO       | 122.300                                   |
| Dublin VORTAC    | 113.11<br>122.100R,<br>122.600            |
| Gainesville RCO  | 122.550                                   |
| Harris VORTAC    | 109.81<br>122.350                         |
| Lagrange VORTAC  | 115.61<br>122.100R                        |

|            |                     |
|------------|---------------------|
| Albany RCO | 122.600             |
| Alma RCO   | 121.500,<br>123.600 |

|                   |                                                       |
|-------------------|-------------------------------------------------------|
| Macon VORTAC      | 114.21<br>121.500<br>122.100R,<br>122.200,<br>122.400 |
| Peachtree VOR/DME | 116.61<br>122.100R                                    |
| Rome VORTAC       | 115.41<br>122.300                                     |
| Savannah RCO      | 121.500,<br>123.650                                   |
| Savannah VORTAC   | 116.01<br>122.100R                                    |
| Statesboro RCO    | 122.600                                               |
| Thomasville RCO   | 122.550                                               |
| Tift Myers VOR    | 112.51<br>122.350                                     |
| Valdosta VOR/DME  | 114.81<br>121.500<br>122.100R,<br>122.200             |
| Vienna VORTAC     | 116.51<br>122.100R                                    |
| Waycross VORTAC   | 110.21<br>122.100R                                    |

#### 6.3.2.36 Mc Alester Radio

|                      |                  |
|----------------------|------------------|
| Ada RCO              | 122.450          |
| Ardmore RCO          | 121.500, 122.550 |
| Bartlesville VOR/DME | 117.9T, 123.600  |
| Gage RCO             | 122.550          |
| Hobart RCO           | 122.200          |
| Mc Alester RCO       | 121.500, 122.650 |
| Muskogee RCO         | 122.500          |
| Norman RCO           | 122.150          |
| Ponca City RCO       | 122.250          |
| Rich Mountain RCO    | 121.500, 122.600 |
| Sayre VORTAC         | 115.2T, 122.100R |

18-AUG-2022

NAM

|                    |                            |
|--------------------|----------------------------|
| Stillwater RCO     | 122.300                    |
| Stillwater VOR/DME | 108.41<br>122.100R         |
| Tulsa RCO          | 122.200,<br><b>123.650</b> |
| Wiley Post RCO     | 122.400,<br><b>122.650</b> |
| Woodring RCO       | 122.600                    |

6.3.2.37 **Mc Minnville Radio**

|                         |                            |
|-------------------------|----------------------------|
| Astoria RCO             | 122.300                    |
| Augsburger Mountain RCO | 122.300                    |
| Beaver Mountain RCO     | 121.500,<br><b>122.400</b> |
| Burns RCO               | 121.500,<br>122.500        |
| Cape Blanco RCO         | 122.400                    |
| Enterprise RCO          | 122.500                    |
| Eugene RCO              | 121.500,<br><b>122.300</b> |
| Kimberly RCO            | 122.600                    |
| Klamath Falls RCO       | 121.500,<br>122.600        |
| Lakeview VORTAC         | 112.01<br>122.300          |
| Mc Minnville RCO        | 122.450                    |
| Medford RCO             | 121.500,<br>122.650        |
| Newberg RCO             | 122.450                    |
| Newport RCO             | 122.500                    |
| North Bend RCO          | 121.500,<br>122.400        |
| Ontario RCO             | 122.300                    |
| Pendleton RCO           | 122.200                    |
| Portland                | 122.600                    |

|                   |                     |
|-------------------|---------------------|
| RCO               |                     |
| Redmond RCO       | 121.500,<br>122.500 |
| Roseburg VOR/DME  | 108.21<br>122.550   |
| Salem RCO         | 122.600             |
| Sexton Summit RCO | 122.500             |
| Sunriver RCO      | 122.300             |
| Wallula RCO       | 121.500,<br>122.600 |

6.3.2.38 **Miami Radio**

## North America

## Regional SUP INFO R-490

|                   |                                |
|-------------------|--------------------------------|
| Grand Turk RCO    | 118.400                        |
| Key West VORTAC   | 113.51<br>122.100R,<br>122.200 |
| La Belle VORTAC   | 110.41<br>122.100R             |
| Marathon RCO      | 122.600                        |
| Naples RCO        | 123.600                        |
| Nassau RCO        | 118.400                        |
| Panokee RCO       | 122.350                        |
| Panokee VOR/DME   | 115.41<br>122.100R             |
| Palm Beach VORTAC | 115.71<br>122.100R,<br>122.400 |
| Virginia Key RCO  | 122.100R                       |

6.3.2.39 **Milville Radio**

|                   |         |
|-------------------|---------|
| Atlantic City RCO | 122.550 |
| Broadway RCO      | 122.350 |

|                  |                     |
|------------------|---------------------|
| Bimini VORTAC    | 116.71<br>122.100R  |
| Dade Collier RCO | 122.300             |
| Davie RCO        | 126.700             |
| Dolphin RCO      | 122.100R            |
| Fort Myers RCO   | 122.200,<br>122.650 |
| Fort Pierce RCO  | 122.550             |
| Freeport RCO     | 126.900             |

|                     |                                             |
|---------------------|---------------------------------------------|
| Cedar Lake VORTAC   | 115.21<br>122.100R                          |
| Colts Neck RCO      | 122.300                                     |
| Covle VORTAC        | 113.41<br>122.100R                          |
| Dupont VORTAC       | 114.01<br>122.100R                          |
| Milville RCO        | 121.500<br>122.100R,<br>123.650,<br>122.650 |
| Robbinsville VORTAC | 113.81<br>122.100R,<br>122.450              |
| Sea Isle VORTAC     | 114.81<br>122.100R                          |
| Smyrna VORTAC       | 111.41<br>122.100R                          |
| Solberg VOR/DME     | 112.91<br>122.100R                          |
| Sparta RCO          | 122.500                                     |
| Stillwater VOR/DME  | 109.61<br>122.100R                          |
| Teterboro RCO       | 122.200,<br>122.650                         |
| Waterloo VOR/DME    | 112.61<br>122.100R                          |
| Woodstown VORTAC    | 112.81<br>122.100R                          |

6.3.2.40 **Montgomery County Radio**

|                     |                              |
|---------------------|------------------------------|
| Beaumont RCO        | 122.200                      |
| Center RCO          | 122.600                      |
| College Station RCO | 121.500, 122.200,<br>122.650 |
| East Breaks RCO     | 122.500                      |
| Galveston RCO       | 122.200, 122.150             |
| High Island RCO     | 122.350                      |
| Hobby RCO           | 122.350                      |

## Regional SUP INFO

R-500

NAM

|                       |                  |
|-----------------------|------------------|
| Houston RCO           | 122.400          |
| Huntsville RCO        | 122.300          |
| Jasper RCO            | 122.500          |
| Lufkin RCO            | 121.500, 122.200 |
| Montgomery County RCO | 122.200          |
| Palacios RCO          | 122.250          |
| Victoria RCO          | 122.200          |

|                   |                  |
|-------------------|------------------|
| Mountain View RCO | 122.500          |
| Oakland RCO       | 121.500, 122.500 |
| Point Arena RCO   | 122.600          |
| Salinas RCO       | 121.500, 122.600 |
| Ukiah RCO         | 122.350          |

## 6.3.2.41 Nashville Radio

|                         |                            |
|-------------------------|----------------------------|
| Bristol RCO             | 122.200                    |
| Chattanooga RCO         | 122.200, 123.650           |
| Crossville RCO          | 121.500, 122.500           |
| Hinch Mountain VORTAC   | 117.61, 122.100R           |
| Holston Mountain VORTAC | 114.61, 122.100R           |
| Livingston VORTAC       | 108.41, 122.100R           |
| McGhee Tyson RCO        | 122.200, 122.300           |
| Nashville RCO           | 122.100R, 122.200, 122.550 |
| Shelbyville FAN MARKE R | 122.100R                   |
| Shelbyville VOR/DME     | 109.01, 122.100R           |
| Volunteer VORTAC        | 116.41, 122.100R           |

## 6.3.2.42 New York Radio

|                    |                           |
|--------------------|---------------------------|
| Hampton VORTAC     | 113.91, 122.100R, 122.600 |
| Huguenot VOR/DME   | 116.11, 122.100R          |
| Kennedy VOR/DME    | 115.91, 122.100R          |
| Kingston VOR/DME   | 117.61, 122.100R          |
| La Guardia VOR/DME | 113.11, 122.100R          |
| New York RCO       | 121.500, 122.200, 122.600 |
| Poughkeepsie RCO   | 121.500, 122.200, 122.400 |

## 6.3.2.43 Oakland Radio

## 6.3.2.44 Prescott Radio

|                      |                  |
|----------------------|------------------|
| Ajo RCO              | 122.650          |
| Bagdad RCO           | 122.500          |
| Bisbee RCO           | 122.400          |
| Black Metal Peak RCO | 122.550          |
| Buckeye VORTAC       | 110.61, 122.100R |
| Douglas RCO          | 121.500, 122.600 |
| Flagstaff VOR/DME    | 113.91, 123.650R |
| Gila Bend VORTAC     | 116.61, 122.100R |
| Globe RCO            | 122.300          |
| Grand Canyon RCO     | 123.650          |
| Kayenta RCO          | 122.450          |
| Kingman VOR/DME      | 108.81, 122.100R |
| Mingus Mountain RCO  | 122.300          |
| Mount Lemmon         | 122.400          |

|                     |         |
|---------------------|---------|
| Arcata RCO          | 122.600 |
| Crescent City RCO   | 122.300 |
| Eureka RCO          | 122.350 |
| Garperville RCO     | 122.300 |
| Mount Tamalpais RCO | 122.350 |

|                      |                  |
|----------------------|------------------|
| RCO                  |                  |
| Needles VORTAC       | 115.21, 122.100R |
| Nogales VOR/DME      | 108.21, 122.400  |
| Page RCO             | 122.600          |
| Peach Springs VORTAC | 112.01, 122.250  |
| Phoenix RCO          | 122.200, 122.600 |
| Prescott RCO         | 121.500          |
| Safford RCO          | 122.300          |
| St Johns VORTAC      | 112.31, 122.100R |
| Stanfield VORTAC     | 114.81, 122.100R |
| Tuba City VORTAC     | 113.51, 122.050R |
| Tucson RCO           | 122.200          |
| Winslow RCO          | 122.600          |
| Yuma RCO             | 122.200          |

## 6.3.2.45 Princeton Radio

|                  |                  |
|------------------|------------------|
| Albert Lea RCO   | 122.050          |
| Alexandria RCO   | 121.500, 122.600 |
| Anoka County RCO | 122.550          |
| Austin RCO       | 122.500          |
| Baudette VOR/DME | 111.6T, 122.400  |



18-AUG-2022

NAM

|                         |                     |
|-------------------------|---------------------|
| Bemidji RCO             | 123.600             |
| Brainerd RCO            | 123.650             |
| Crane Lake RCO          | 122.200             |
| Darwin VORTAC           | 109.01<br>122.100R  |
| Detroit Lakes RCO       | 122.500             |
| Duluth VORTAC           | 112.61<br>122.350   |
| Ely VOR/DME             | 109.61<br>122.100R  |
| Eveleth RCO             | 122.450             |
| Fairmont VOR/DME        | 110.21<br>123.600R  |
| Farmington VORTAC       | 115.71<br>122.100R  |
| Fergus Falls RCO        | 122.350             |
| Grand Marais RCO        | 122.300             |
| Grand Rapids RCO        | 122.050             |
| Hibbing RCO             | 121.500,<br>122.600 |
| Humboldt VORTAC         | 112.41<br>122.100R  |
| International Falls RCO | 123.600             |
| Madison RCO             | 122.300             |
| Mankato VOR/DME         | 110.81<br>122.100R  |
| Marshall RCO            | 122.350             |
| Minneapolis RCO         | 122.300             |
| Montevideo RCO          | 122.450             |
| Mora RCO                | 122.400             |
| Morris VOR/DME          | 109.61<br>122.250   |
| Nodine VORTAC           | 117.91<br>122.100R  |
| Owatonna RCO            | 122.250             |
| Park Rapids VOR/DME     | 110.61<br>122.100R  |
| Princeton               | 121.500,            |

|                           |                                 |
|---------------------------|---------------------------------|
| RCO                       | 122.200                         |
| Redwood Falls RCO         | 121.500,<br>122.400             |
| Rochester RCO             | 122.450                         |
| Roseau RCO                | 122.250                         |
| St Cloud RCO              | 122.500                         |
| Thief River Falls VOR/DME | 108.41<br>122.100R,<br>123.600R |
| Warroad RCO               | 122.550                         |
| Willmar RCO               | 122.150                         |
| Winona RCO                | 122.150                         |
| Worthington VOR/DME       | 110.91<br>122.100R,<br>123.600R |

6.3.2.46 **Raleigh Radio**

## North America

## Regional SUP INFO

|                           |                                            |
|---------------------------|--------------------------------------------|
| Charlotte<br>VOR/DME      | 115.01<br>122.400                          |
| Corfield<br>VORTAC        | 114.61<br>122.100R                         |
| Elizabeth City<br>VOR/DME | 112.51<br>122.050R,<br>122.200             |
| Fayetteville<br>VOR/DME   | 108.81<br>122.100R                         |
| Greensboro<br>VORTAC      | 116.21<br>122.100R,<br>122.200,<br>123.650 |
| Hatteras<br>RCO           | 122.300                                    |
| Hickory RCO               | 122.200,<br>122.600                        |
| Kinston<br>VORTAC         | 109.61<br>122.150R                         |
| Liberty<br>VOR/DME        | 112.81<br>122.100R                         |
| Liberty<br>VORTAC         | 113.01<br>122.100R                         |
| New Bern<br>RCO           | 122.100R                                   |

|                                 |                    |
|---------------------------------|--------------------|
| Barretts<br>Mountain<br>VOR/DME | 110.81<br>122.100R |
|---------------------------------|--------------------|

|                                 |                                             |
|---------------------------------|---------------------------------------------|
| New Bern<br>VOR/DME             | 113.51<br>122.200,<br>122.400               |
| Pitt-<br>Greenville<br>RCO      | 122.350                                     |
| Raleigh RCO                     | 121.500,<br>122.200,<br>122.450,<br>122.650 |
| Rocky Mount<br>RCO              | 122.200                                     |
| Rocky Mount<br>RCO              | 122.300                                     |
| Sandhills<br>VORTAC             | 111.81<br>122.100R                          |
| Snowbird<br>VORTAC              | 108.81<br>122.100R                          |
| Sugarloaf<br>Mountain<br>VORTAC | 112.21<br>122.100R,<br>122.200,<br>122.300  |
| Tar River<br>VORTAC             | 117.81<br>122.100R                          |
| Wilkesboro<br>RCO               | 122.400                                     |
| Wilmington<br>RCO               | 122.550                                     |
| Wilmington<br>VORTAC            | 117.01<br>122.100R                          |

## 6.3.2.47 Rancho Murieta Radio

|                      |                              |
|----------------------|------------------------------|
| Angels Camp RCO      | 122.300                      |
| Antelope Mtn RCO     | 122.400                      |
| Bakersfield RCO      | 122.450                      |
| Chico VOR/DME        | 109.8T, 122.100R             |
| El Nido VOR/DME      | 114.2T, 122.100R             |
| Fall River Mills RCO | 122.400                      |
| Fellows VORTAC       | 117.5T, 122.100R             |
| Fort Jones VOR/DME   | 109.6T, 122.100R             |
| Fresno RCO           | 122.550                      |
| Gorman VORTAC        | 116.1T, 122.100R             |
| Hangtown VOR/DME     | 115.5T, 122.100R             |
| Marysville VOR/DME   | 110.8T, 122.100R,<br>122.600 |

## Regional SUP INFO

|                       |                     |
|-----------------------|---------------------|
| Maxwell<br>VORTAC     | 110.01<br>122.100R  |
| Modesto<br>VOR/DME    | 114.61<br>122.100R  |
| Panoche<br>VORTAC     | 112.61<br>122.100R  |
| Quincy RCO            | 122.400             |
| Rancho<br>Murieta RCO | 121.500,<br>122.200 |
| Red Bluff<br>RCO      | 121.500,<br>122.400 |
| Redding<br>VOR/DME    | 108.41<br>122.100R  |
| Sacramento<br>RCO     | 122.050             |
| Stockton<br>RCO       | 122.650             |
| Tule<br>VOR/DME       | 109.21<br>122.100R  |
| Visalia<br>VOR/DME    | 109.41<br>122.100R  |
| Weaverville<br>RCO    | 122.400             |

6.3.2.48 **Reno Radio**

|                          |                     |
|--------------------------|---------------------|
| Beatty<br>VORTAC         | 114.71<br>122.100R  |
| Coaldale<br>VORTAC       | 117.71<br>122.100R  |
| Currant RCO              | 122.300             |
| Eiko RCO                 | 122.600             |
| Ely RCO                  | 121.500,<br>122.200 |
| Eureka RCO               | 122.300             |
| Hazen<br>VORTAC          | 114.11<br>122.100R  |
| Jackpot RCO              | 122.500             |
| Las Vegas<br>RCO         | 122.400             |
| Lovelock<br>RCO          | 122.400             |
| Mina<br>VORTAC           | 115.11<br>122.100R  |
| Mormon<br>Mesa<br>VORTAC | 114.31<br>122.100R  |
| Mount Lewis<br>RCO       | 122.650             |
| Mount Potosi             | 122.350             |

|                         |                     |
|-------------------------|---------------------|
| R-520 RCO               |                     |
| Reno RCO                | 122.200,<br>122.500 |
| Sod House<br>VORTAC     | 114.31<br>122.600   |
| Squaw Valley<br>VOR/DME | 113.21<br>122.250   |
| Tonopah<br>RCO          | 122.600             |
| Wells VOR               | 114.21<br>122.100R  |
| Wilson Creek<br>VORTAC  | 116.31<br>122.100R  |
| Winnemucca<br>RCO       | 121.500,<br>122.300 |

6.3.2.49 **Riverside Radio**

NAM

|                     |                  |
|---------------------|------------------|
| Furnace Creek RCO   | 122.200          |
| Gotts VORTAC        | 114.41, 122.05R  |
| Hector VORTAC       | 112.71, 122.100R |
| Homeland VOR        | 113.41, 122.100R |
| Lancaster RCO       | 122.200          |
| Mammoth RCO         | 122.150          |
| Needles RCO         | 121.500, 122.200 |
| Palm Springs VORTAC | 115.51, 122.100R |

|                |                  |
|----------------|------------------|
| Barstow RCO    | 122.300          |
| Bishop VOR/DME | 109.61, 122.600  |
| Blythe RCO     | 121.500, 122.400 |
| Daggett RCO    | 121.500, 122.200 |

|                         |                  |
|-------------------------|------------------|
| Parker VORTAC           | 117.91, 122.100R |
| Pomona RCO              | 123.650          |
| Rand Mountain RCO       | 122.400          |
| Riverside RCO           | 122.050, 122.200 |
| Santa Ana RCO           | 122.450          |
| Thermal RCO             | 122.300          |
| Twentynine Palms VORTAC | 114.21, 122.100R |

#### 6.3.2.50 Saint Louis Radio

|                        |                                    |
|------------------------|------------------------------------|
| Adders RCO             | 122.100R                           |
| Bible Grove VORTAC     | 109.0T, 122.050R                   |
| Cape Girardeau VOR/DME | 112.9T, 121.500, 122.100R, 122.400 |
| Centralia VORTAC       | 115.0T, 122.100R                   |
| Champaign VORTAC       | 110.0T, 122.100R                   |
| Champaign/Urbana RCO   | 122.450                            |
| Danville VORTAC        | 111.0T, 122.100R                   |
| Decatur RCO            | 122.300                            |
| Farmington VORTAC      | 115.7T, 122.100R, 122.300          |
| Malden VORTAC          | 111.2T, 122.100R                   |
| Marion VOR/DME         | 110.4T, 122.100R                   |
| Mattoon VOR/DME        | 109.4T, 123.600R                   |
| Mount Vernon VOR/DME   | 113.8T, 122.050R                   |
| Quincy RCO             | 121.500, 122.500                   |
| Quincy VORTAC          | 113.6T, 122.100R                   |
| Roberts VOR/DME        | 116.8T, 122.100R                   |
| Samsville VOR/DME      | 116.6T, 122.100R                   |
| Spinner VORTAC         | 112.7T, 122.250                    |
| Spirit of St Louis RCO | 122.200, 124.750                   |
| St Louis RCO           | 121.500, 122.450, 122.600          |
| St Louis Regional RCO  | 122.050                            |

18-AUG-2022

R-530

Regional SUP  
INFO

NAM

|                    |                    |
|--------------------|--------------------|
| Vandalia<br>VORTAC | 114.31<br>122.100R |
|--------------------|--------------------|

## 6.3.2.51 Saint Petersburg Radio

|                           |                                                                    |
|---------------------------|--------------------------------------------------------------------|
| Brooksville<br>RCO        | 122.300                                                            |
| Fort Drum<br>RCO          | 122.200                                                            |
| Lakeland<br>VORTAC        | 116.01<br>122.100R                                                 |
| Melbourne<br>RCO          | 121.500,<br>122.600                                                |
| Melbourne<br>VOR/DME      | 110.01<br>122.100R                                                 |
| Orlando RCO               | 122.200,<br>122.650,<br>123.650                                    |
| Orlando<br>VORTAC         | 112.21<br>122.100R                                                 |
| Ormond<br>Beach<br>VORTAC | 112.61<br>122.100R,<br>122.400                                     |
| Punta Gorda<br>RCO        | 122.025                                                            |
| Sarasota<br>VORTAC        | 117.01<br>122.100R                                                 |
| Sebring RCO               | 122.250                                                            |
| St Petersburg<br>VORTAC   | 116.41<br>121.500,<br>122.100R,<br>122.200,<br>122.450,<br>123.600 |
| Titusville<br>RCO         | 123.600                                                            |
| Treasure<br>VORTAC        | 117.31<br>122.100R                                                 |
| Vero Beach<br>RCO         | 121.500,<br>122.200,<br>122.500                                    |

## 6.3.2.52 San Angelo Radio

|                     |                  |
|---------------------|------------------|
| Alice RCO           | 122.600          |
| Austin RCO          | 122.550          |
| Big Spring RCO      | 122.400          |
| Brownsville RCO     | 122.300          |
| Center Point VORTAC | 117.5T, 122.100R |
| Corpus Christi RCO  | 122.650          |
| Cotulla RCO         | 122.200          |
| Del Rio RCO         | 122.300          |

|                        |                     |
|------------------------|---------------------|
| San Angelo<br>RCO      | 122.250             |
| San Antonio<br>RCO     | 122.200,<br>122.300 |
| Stonewall<br>VORTAC    | 113.81<br>122.100R  |
| Temple<br>VOR/DME      | 110.41<br>122.100R  |
| Three Rivers<br>VORTAC | 111.41<br>122.100R  |
| Uvalde RCO             | 123.650             |
| Wink RCO               | 122.050             |

## 6.3.2.53 San Diego Radio

|                     |                     |
|---------------------|---------------------|
| Bard<br>VORTAC      | 116.81,<br>122.1R   |
| Imperial<br>RCO     | 122.500             |
| Imperial<br>VORTAC  | 115.91,<br>122.1R   |
| Julian<br>VORTAC    | 114.01<br>123.650   |
| Montgomery<br>RCO   | 122.200,<br>122.400 |
| Oceanside<br>VORTAC | 115.31<br>122.1R    |
| Yuma RCO            | 122.600             |

## 6.3.2.54 San Juan Radio

|                      |                                             |
|----------------------|---------------------------------------------|
| Borinquen<br>VORTAC  | 113.51<br>122.100R                          |
| Mayaguez<br>VOR/DME  | 110.61<br>122.100R                          |
| San Juan<br>RCO      | 121.500,<br>122.200,<br>123.650,<br>126.700 |
| St Croix<br>VOR/DME  | 108.21<br>122.100R                          |
| St Thomas<br>VOR/DME | 108.61<br>123.600R                          |

## 6.3.2.55 Seattle Radio

|                           |                     |
|---------------------------|---------------------|
| Badger<br>Mountain<br>RCO | 121.500,<br>122.300 |
|---------------------------|---------------------|

|                                |                                  |
|--------------------------------|----------------------------------|
| Bellingham<br>RCO              | 121.500,<br>122.150'             |
| Buckhorn<br>MTN RCO            | 122.200                          |
| Ellensburg<br>RCO              | 121.500,<br>122.200'             |
| Ephrata<br>RCO                 | 121.500,<br>122.200'             |
| Hoguiam<br>RCO                 | 122.200                          |
| Jump-Off-<br>Joe RCO           | 122.400                          |
| Moses Lake<br>VOR/DME          | 115.01,<br>122.400               |
| Mount<br>Constitution<br>RCO   | 122.300                          |
| Ocean<br>Shores RCO            | 121.500,<br>122.400'             |
| Paine RCO                      | 121.500,<br>122.550'             |
| Port Angeles<br>RCO            | 122.600                          |
| Pullman<br>VOR/DME             | 109.01,<br>122.600               |
| Seattle RCO                    | 122.500,<br>123.650'             |
| Southwest<br>Washington<br>RCO | 121.500,<br>122.250,<br>122.550' |

## Regional SUP INFO

R-540<sub>6.3.2.57</sub>

## Wichita Radio

|                    |                                            |
|--------------------|--------------------------------------------|
| Spokane<br>RCO     | 122.200,<br><del>122.550,</del><br>122.650 |
| Tatoosh<br>VORTAC  | 112.21<br>122.250                          |
| The Dalles<br>RCO  | 121.500,<br>122.650                        |
| Vancouver<br>RCO   | 122.350                                    |
| Walla Walla<br>RCO | 122.300                                    |
| Wenatchee<br>RCO   | 122.600                                    |
| Yakima RCO         | 122.500                                    |

## 6.3.2.56 Terre Haute Radio

|                       |                                            |
|-----------------------|--------------------------------------------|
| Crownpoint<br>RCO     | 123.650                                    |
| Evansville<br>RCO     | 122.650                                    |
| Fort Wayne<br>RCO     | 122.200,<br>122.450                        |
| Goshen<br>VORTAC      | 113.71<br>122.100R                         |
| Hoosier<br>VORTAC     | 110.21<br>122.100R                         |
| Indianapolis<br>RCO   | 122.550                                    |
| Knox<br>VOR/DME       | 115.61<br>122.100R                         |
| Kokomo<br>VORTAC      | 113.51<br>122.100R                         |
| Lafayette<br>RCO      | 121.500,<br><del>122.200,</del><br>122.350 |
| Muncie<br>VOR/DME     | 114.41<br>122.100R                         |
| Osgood RCO            | 122.250                                    |
| Richmond<br>VORTAC    | 110.61<br>122.100R                         |
| Shelbyville<br>VORTAC | 112.01<br>122.100R                         |
| South Bend<br>RCO     | 121.500,<br>122.600                        |
| Terre Haute<br>RCO    | <del>122.200,</del><br>122.650             |
| Washington<br>RCO     | 122.200                                    |

NAM

|                |                            |
|----------------|----------------------------|
| Mc Pherson RCO | 122.150                    |
| Oswego VORTAC  | 117.61<br>122.100R         |
| Parsons RCO    | 122.075                    |
| Pittsburg RCO  | 122.150                    |
| Russell RCO    | 122.600                    |
| Salina RCO     | 122.400                    |
| Strother RCO   | 122.500                    |
| Topeka RCO     | 122.450                    |
| Ulysses RCO    | 122.300                    |
| Wichita RCO    | 122.200,<br><b>122.650</b> |

6.3.2.58 **Williamsport Radio**

|                  |                     |
|------------------|---------------------|
| Allentown VORTAC | 117.51<br>122.100R  |
| Harrisburg RCO   | 122.200,<br>122.400 |

|                        |                                 |
|------------------------|---------------------------------|
| Harrisburg VORTAC      | 112.51<br>122.100R              |
| Lancaster VORTAC       | 117.31<br>122.100R              |
| Modena VORTAC          | 113.21<br>122.100R              |
| North Philadelphia RCO | 122.200,<br>122.600             |
| Pottstown VORTAC       | 116.51<br>122.100R              |
| Ravine VORTAC          | 114.61<br>122.100R              |
| Selinsgrove VORTAC     | 110.41<br>122.100R              |
| Stony Brook VOR/DME    | 108.61<br>122.100R              |
| Wilkes-Barre RCO       | 122.200,<br>122.600             |
| Williamsport RCO       | 121.500,<br>122.200,<br>122.650 |
| Williamsport VOR/DME   | 114.41<br>122.100R              |
| Yardley VOR/DME        | 108.21<br>122.100R              |

|                 |                               |
|-----------------|-------------------------------|
| Anthony VORTAC  | 112.91<br>122.100R            |
| Chanute RCO     | 122.350                       |
| Dodge City RCO  | 122.350                       |
| Emporia RCO     | 122.300                       |
| Garden City RCO | 122.450                       |
| Goodland VORTAC | 115.11<br>121.500,<br>122.400 |
| Great Bend RCO  | 122.500                       |
| Hays RCO        | 122.300                       |
| Hill City RCO   | <b>122.650</b>                |
| Liberal RCO     | 122.400                       |
| Manhattan RCO   | <b>122.650</b>                |
| Mankato VORTAC  | 109.81<br>122.100R            |



18-AUG-2022

NAM

R-550

North America  
Regional SUP  
INFO

RSI

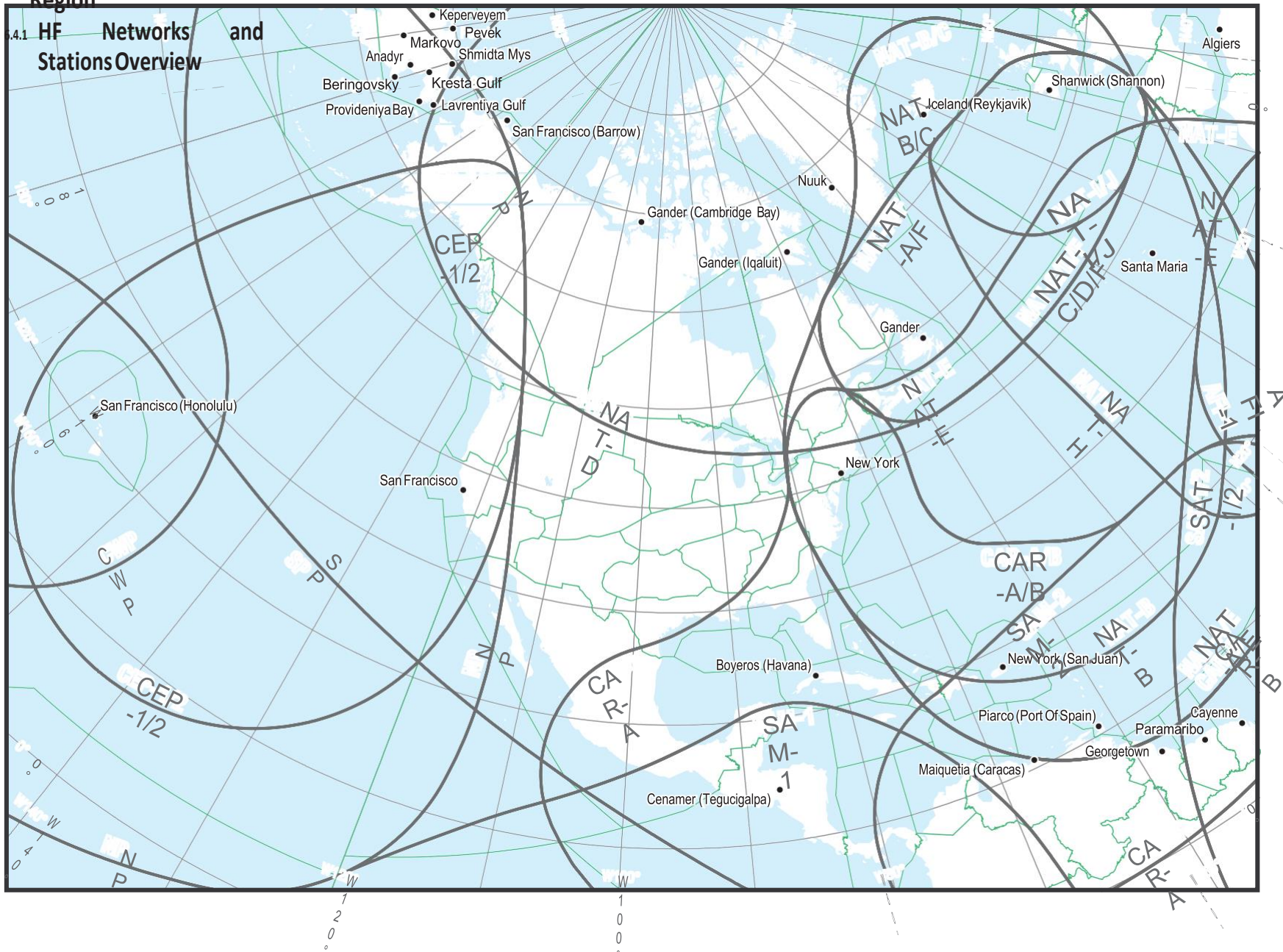
RSI

North America  
Regional SUP INFO

## 6.4 HF Frequencies - NAM

### Region

### HF Networks and Stations Overview



North America

North America

Regional SUP  
INFO

RSI

RSI

Regional SUP  
INFO18-AUG-  
2022

R-560

NA  
M6.4.2 HF  
Frequency  
List

| Call Sign     |       | FREQ kHz | OPS<br>HR | SELCAL | HF Network | PRY/SE<br>C | Remarks |
|---------------|-------|----------|-----------|--------|------------|-------------|---------|
| NEW YORK      | RADIO | 3494     |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 6640     |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 8933     |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 11342    |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 13348    |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 17925    |           | YES    |            |             | LDOC    |
| NEW YORK      | RADIO | 21964    |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 3494     |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 6640     |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 8933     |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 11342    |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 13348    |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 17925    |           | YES    |            |             | LDOC    |
| SAN FRANCISCO | RADIO | 21964    |           | YES    |            |             | LDOC    |



A320/A321

OPERATIONS MANUAL PART C

## SUPPLEMENT 2

NORTH AMERICA

Intentionally left blank



A320/A321

OPERATIONS MANUAL PART C

## SUPPLEMENT 3

SOUTH AMERICA

### GENERAL

**Applicable to: ALL**

The following supplement is present due to request from the Competent Authority. For operational information, please *Refer to: Jeppesen FD Pro X – Pubs.*

16-NOV-  
2017  
SAM

1

**Table of Contents**

South America  
Regional SUP  
INFO

**1 SAM Region**

**Overview 2 RAR**

|      |                                                                     |      |
|------|---------------------------------------------------------------------|------|
| 2.1  | Flight Information Region (FIR) (NIL)                               | R-21 |
| 2.2  | Advisory Routes, Areas, Service (NIL)                               | R-21 |
| 2.3  | Controlled Airspace and ATC (NIL)                                   | R-21 |
| 2.4  | Alerting, Search and Rescue (NIL)                                   | R-21 |
| 2.5  | Airspace Restrictions (NIL)                                         | R-21 |
| 2.6  | General Flight Rules<br>Instruments, Equipment and Flight Documents | R-21 |
|      | 2.6.1 Aeroplane Documents                                           |      |
|      | 2.6.1.1 Operation of Aircraft not Approved for RVSM                 | R-21 |
| 2.7  | Visual Flight Rules (VFR) (NIL)                                     | R-21 |
| 2.8  | Instrument Flight Rules (IFR)                                       | R-21 |
| 2.9  | Units of Measurement (NIL)                                          | R-21 |
| 2.10 | Altimeter Setting (NIL)                                             | R-21 |
| 2.11 | Altitude Regulations (NIL)                                          | R-21 |

|          |                                                                               |        |
|----------|-------------------------------------------------------------------------------|--------|
| 2.12     | Separation Rules                                                              | 2.12.1 |
|          | Lateral Separation                                                            | R-21   |
| 2.12.2   | Longitudinal Separation                                                       | R-22   |
| 2.12.3   | Vertical Separation                                                           | R-22   |
|          | 2.12.4 EUR/SAM Corridor                                                       | R-25   |
| 2.12.4.1 | Area of Application                                                           | R-25   |
|          | 2.12.4.2 Operations Within the<br>EUR/SAM Corridor<br>RVSM/RNP 10<br>Airspace | R-25   |

Regional

SUP

SAM

INFO

|            |                           |                                                              |        |  |
|------------|---------------------------|--------------------------------------------------------------|--------|--|
|            |                           | Lateral Separation                                           | R-26   |  |
| 2.12.4.3   |                           | Longitudinal Separation                                      | R-     |  |
| 2.12.4.4   |                           | 26 Strategic Lateral Offset                                  |        |  |
| 2.12.4.5   |                           | Procedures (SLOP)                                            | R-     |  |
| 2.12.4.6   |                           | 26 Flight Planning                                           |        |  |
|            |                           | Requirements                                                 | R-     |  |
|            |                           | 27                                                           |        |  |
| 2.12.4.7   |                           | Flight Level Allocation<br>Scheme (FLAS) EUR/SAM<br>Corridor | R-28   |  |
| 2.12.4.8   |                           | EUR/SAM Corridor Contingency Plan                            | R-     |  |
|            |                           | 28                                                           |        |  |
| 2.12.4.8.1 |                           | Beginning of Contingency Situation                           | R-     |  |
|            |                           | 28                                                           |        |  |
| 2.12.4.8.2 |                           | General Procedures<br>During Contingency<br>Situation        | R-28   |  |
| 2.12.4.8.3 |                           | Contingency ATS<br>Routes of the EUR/SAM<br>Corridor         | R-30   |  |
| 2.12.4.8.4 |                           | Contingency Longitudinal Minima                              | R-     |  |
|            |                           | 30                                                           |        |  |
| 2.12.4.8.5 |                           | End of Contingency Procedures                                | R-30   |  |
| 2.13       | Flight Plan and Clearance |                                                              | 2.13.1 |  |
|            | Mach Number               | R-40                                                         |        |  |
| 2.14       | Communication (NIL)       |                                                              | R-40   |  |
| 2.15       | Flight Permission (NIL)   |                                                              | R-40   |  |
| 2.16       | Miscellaneous (NIL)       |                                                              | R-40   |  |

|      |                                           |      |
|------|-------------------------------------------|------|
| 2.17 | Emergency (NIL)                           | R-40 |
| 2.18 | Interception Principles and Signals (NIL) | R-40 |
| 2.19 | Unlawful Interference (NIL)               | R-40 |

### **3 MET (NIL)**

### **4 NAV**

|     |                                                 |      |
|-----|-------------------------------------------------|------|
| 4.1 | Atlantic Ocean Random Routing RNAV Area (AORRA) | R-43 |
| 4.2 | Degradation or Failure of the RNAV System       | R-81 |



25-NOV-  
2021  
SAM

|     |
|-----|
| III |
|-----|

5  
CO  
M

South America  
Regional SUP  
INFO

|                         |              |           |       |
|-------------------------|--------------|-----------|-------|
| 5.1 Clearance           |              |           | R-83  |
| 5.2 Position Reports    |              |           | R-83  |
| 5.3 Cruise Climb        |              |           | R-83  |
| 5.4 Data Services       | Link 5.4.1   | Argentina | R-84  |
|                         | 5.4.2        | Brazil    | R-84  |
|                         | 5.4.3        | Chile     | R-100 |
| 5.5 SATCOM Codes & PSTN | ShortNumbers |           | R-101 |

## 6 Appendix

|                   |       |                   |               |
|-------------------|-------|-------------------|---------------|
| 6.1 VOLMET / ATIS | 6.1.1 | VOLMET (VHF)      | StationsR-103 |
|                   | 6.1.2 | VOLMET (HF) - NIL | StationsR-103 |
|                   | 6.1.3 | D-VOLMET          | StationsR-104 |
|                   | 6.1.4 | ATIS Frequencies  | R-122         |

6.2 SITA VHF AIRCOM ACARS Service Coverage

R-130

|     |                                  |       |                                      |       |
|-----|----------------------------------|-------|--------------------------------------|-------|
| 6.3 | HF<br>Frequencies<br>-<br>Region | 6.3.1 | HF Networks and Stations<br>Overview | R-140 |
|     | SAM                              | 6.3.2 | HF Frequency List                    | R-150 |



07-MAR-  
2019  
SAM

South America  
Regional SUP  
INFO

RSI

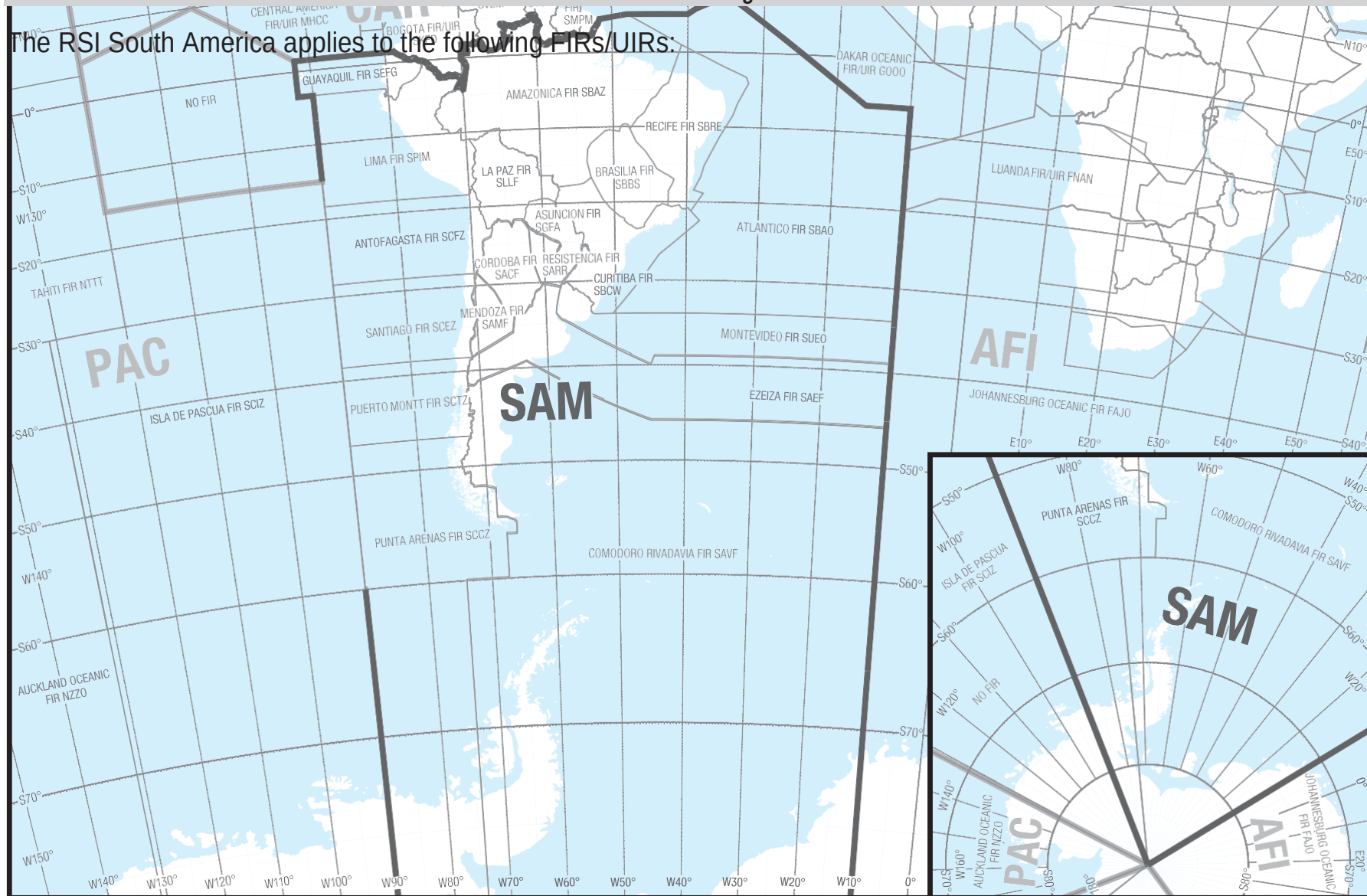
South America  
Regional SUP INFO

RSI

R-10

### 1 SAM Region Overview

The RSI South America applies to the following FIRs/UIRs:





16-NOV-  
2017  
SAM

South America  
Regional SUP  
INFO

RSI

R-21

## 2 RAR

- 2.1 **Flight Information Region (FIR) (NIL)**
- 2.2 **Advisory Routes, Areas, Service (NIL)**
- 2.3 **Controlled Airspace and ATC (NIL)**
- 2.4 **Alerting, Search and Rescue (NIL)**
- 2.5 **Airspace Restrictions (NIL)**
- 2.6 **General Flight Rules**

### 2.6.1 Aeroplane Instruments, Equipment and Flight Documents

#### 2.6.1.1 Operation of Aircraft not Approved for RVSM

Except for areas where transition areas have been established, aircraft not approved for RVSM operations shall not be allowed to operate in CAR/SAM RVSM airspace and EUR/SAM RVSM airspace.

Exceptionally, aircraft that have not received RVSM State approval may be cleared to operate in airspace where RVSM may be applied in accordance with policy and procedures established by the State provided that 600m (2000ft) vertical separation is applied.

**Note:** Transitions to and from RVSM levels will normally take place in the first FIR in CAR/SAM RVSM airspace and EUR/SAM RVSM airspace.

#### 2.7 **Visual Flight Rules (VFR) (NIL)**

#### 2.8 **Instrument Flight Rules (IFR)**

Flights shall be conducted in accordance with instrument flight rules when operated more than 37km (20NM) seaward from the shoreline, for a duration of more than one hour, except that compliance with IFR minimum levels is not required during the day in visual meteorological conditions.

All IFR flights shall comply with the procedures for air traffic advisory service when operating in Class F airspace.

#### 2.9 **Units of Measurement (NIL)**

#### 2.10 **Altimeter Setting (NIL)**

#### 2.11 **Altitude Regulations (NIL)**

#### 2.12 **Separation Rules**

### **2.12.1 Lateral Separation**

- ACFT operating over the Atlantic Ocean (except Sal Oceanic, Dakar Oceanic, Atlantico and Recife FIRs): 120NM
- ACFT operating within the Sal Oceanic, Dakar Oceanic, Atlantico and Recife FIRs: 100NM
- ACFT approved to RNP 10 or better on designated controlled oceanic routes or areas within the Canaries FIR (southern sector), Sal Oceanic, Dakar Oceanic, Atlantico and Recife FIRs: 50NM

ACFT transiting into airspace with a larger lateral minimum than the airspace being exited, lateral separation will continue to exist provided that:

- the smaller separation minimum exists;
- flight paths diverge by 15 degrees or more until the larger minimum is established; and
- it is possible to ensure, by means approved by the appropriate ATS authority, that the ACFT have the navigation capability necessary to ensure accurate track guidance.

**2.12.2 Longitudinal Separation**

Minimum longitudinal separation between ACFT operating over the Atlantic Ocean shall be 30 MIN. except:

- 15 MIN between ACFT operating
  - on the specified routes in the Lima and Santiago FIRs and adjacent control areas of the Pacific Region; or
  - at or above FL250 within the Dakar Oceanic, Sal Oceanic, Atlantico and Recife FIRs, provided that the Mach Number Technique (MNT) is applied and, whether in level, climbing or descending flight, the ACFT have reported over the same entry point to the ATS routes or a common entry point into oceanic-controlled airspace and follow the same track or continuously diverging tracks.
- 50NM derived by RNAV between ACFT meeting RNP 10 requirements for flights on designated controlled oceanic routes or areas within the Canarias FIR (southern sector), Sal Oceanic, Dakar Oceanic, Atlantico and Recife FIRs.

**2.12.3 Vertical Separation**

The RVSM of 1000ft (300m) shall be applicable in that volume of airspace between FL290 and FL410 inclusive in the following FIRs:

Antofagasta, Amazonica, Asuncion, Atlantico, Barranquilla, Brasilia, Bogota, Comodoro Rivadavia to the west of the meridian 054W, Cordoba, Curitiba, Ezeiza, Georgetown, Guayaquil, La Paz, Lima, Maiquetia, Mendoza, Montevideo, Panama, Paramaribo, Puerto Montt, Punta Arenas, Recife, Resistencia, Cayenne and Santiago.

RVSM shall also be applicable in either all, or part of, the following FIRs: Canarias (Southern Sector), Dakar Oceanic, Sal Oceanic, Recife and Atlantico (EUR/SAM corridor portion).



09-FEB-2017

South America

RSI

~~SAM~~

Regional

SUP

## 2.12.4 EUR/S

INFO

### AM Corridor

#### 2.12.4.1 Area of Application

R-25

- a) The EUR/SAM corridor is the airspace over the South Atlantic area which lies within FIRs of Atlantico, Canarias, Dakar Oceanic, Recife and Sal Oceanic.
- b) RVSM and RNP 10 shall be applicable in that volume of airspace between FL 290 and FL 410 in the following airspace:
- c) From 25°00'N/015°30'W; 17°20'N/020°00'W; 15°00'N/020°00'W; 12°58'N/021°22'W; 08°31'S/034°21'W; 08°08.2'S/ 034°56'W (Recife VOR) then follow the Northern continental limits of Brazil until the point 01°21'S/043°08'W; 07°40'N/035°00'W; 13°30'N/037°30'W; 17°00'N/037°30'W; 24°00'N/025°00'W; 30°00'N/025°00'W; 30°00'N/ 020°00'W; 31°39'N/017°25'W; from this point following the Canarias/Lisbon boundary to 31°30'14"N/017°01'44"W; 27°00'N/020°00'W; 25°00'N/020°00'W; 25°00'N/015°30'W.

#### 2.12.4.2 Operations Within the EUR/SAM Corridor RVSM/RNP 10 Airspace

- a) With the exception of State aircraft, no aircraft shall flight plan to operate in the airspace at the EUR/SAM corridor unless it is both RVSM and RNP 10 certified to operate in this airspace by the State of Registry or the State of operator, as the case may be, except in the following circumstances:
  - 1) The aircraft is being initially delivered to the State of Registry or the State of the operator;
  - 2) The aircraft is RVSM and RNP 10 certified but experienced navigation system degradation and is being flown back to base or to a maintenance facility for repairs;
  - 3) The aircraft is engaged on a humanitarian or mercy flight;

**Note:** The procedures below do not apply to the airspace at North of Parallel 27° North in the Canarias FIR where no

exceptions are allowed.

- b) Special coordination procedures for non-RNP 10 aircraft:
- aircraft under a) 1) and a) 2) shall not flight plan to operate between 2100 and 0900.
  - aircraft operators of non-RVSM and/or non-RNP 10 aircraft shall obtain a special authorization from the first ACC concerned, i.e. Atlantico, Canarias, Dakar or Sal ACC. Authorization must be requested not more than 12 HR and less than 4HR before the intended time of departure.
  - In addition the operator shall notify by phone all other ACCs concerned of the following elements: (see item d) for contacts)
    - aircraft identification;
    - Type of aircraft;
    - Departure aerodrome and ETD;
    - Route;
    - Position and estimated time over the entry and exit points of each FIR concerned;
    - Requested flight level;
    - Destination aerodrome and ETA.
  - The operator shall insert "RMK/NONRNP10" in Item 18 of the ICAO Flight Plan;
  - Minimum lateral separation to be applied to aircraft operating under these provisions are 100NM.
- c) These provisions are intended to address the special cases listed and shall not be taken as a means to circumvent the normal RNP 10 requirements and processes.

| ACC Contacts  |                                                                              |
|---------------|------------------------------------------------------------------------------|
| Atlantico ACC | +5581 2129 8330/2129 8336 (channel reserved for SATCOM) /3343 6215/3343 6215 |
| Canarias ACC  | +34 928 577 060 / 928 577 064                                                |
| Dakar ACC     | +221 869 2305 / 869 2307                                                     |
| Sal ACC       | +238 241 1970                                                                |

#### 2.12.4.3 Lateral Separation

The minimum lateral separation that shall be applied between RNAV-equipped aircraft approved to RNP 10 or better shall be 50NM.

#### 2.12.4.4 Longitudinal Separation

Minimum longitudinal separation between ACFT will be 10 MIN, when the Mach Number Technique (MNT) is applied, or 80NM RNAV.

#### 2.12.4.5 Strategic Lateral Offset Procedures (SLOP)

SLOP is applied in the following FIRs:

- Canarias UIR
- Dakar Oceanic UIR
- Sal Oceanic UIR
- Atlantico FIR

In relation to a route or track, there are three positions that an aircraft may fly:

- a) Centerline
- b) 1NM RIGHT
- c) 2NM RIGHT

Do not exceed 2NM right of centerline.

The following flight planning requirements will apply to operators of RVSM approved civil aircraft intending to conduct flights within the EUR/SAM Corridor RVSM airspace:

- a) Operators of RVSM approved civil aircraft shall indicate the approval status by inserting the letter W in Item 10 of the ICAO flight plan form, regardless of the requested flight level.
- b) Operators of RVSM approved civil aircraft intending to operate within the EUR/SAM Corridor RVSM airspace shall include the following in Item 15 of the ICAO flight plan form:
  - The entry point at the lateral limits of the EUR/SAM Corridor RVSM airspace and the requested flight level for that portion of the route commencing immediately after the RVSM entry point; and
  - The exit point at the lateral limits of the EUR/SAM Corridor RVSM airspace and the requested flight level for that portion of the route commencing immediately after the RVSM exit point.

#### **Special Procedures for Crossing Traffic (East/West) Operations**

- a) For the purpose of this application, crossing traffic is defined as all that traffic entering or leaving the EUR/SAM RVSM airspace along its Eastern or Western boundaries (i.e., at any point other than its Northern (Canarias) or Southern (Brazil) boundaries).
- b) Crossing traffic can flight plan to enter and leave the RVSM airspace at any point along its boundaries, indicating in the flight plan the coordinates and estimated time of the entering and exit points into the RVSM airspace and of the crossing of each of the fixed ATS routes.
- c) Except when flying on published crossing routes/tracks, all crossing traffic intending to operate through the RVSM airspace must obtain an ATC clearance. This should be requested, sufficiently in advance to preclude operational difficulties, from the

ACC responsible for the first RVSM airspace to be entered, or, in case of communications difficulties, from any of the ACCs concerned with the EUR/SAM RVSM airspace or still from any other adjacent ACC.

**2.12.4.7 Flight Level Allocation Scheme (FLAS)****EUR/SAM Corridor**

Operators are requested to plan their flights under the following FLAS:

| ATS Routes      | Traffic Direction               | Flight Levels                                      |
|-----------------|---------------------------------|----------------------------------------------------|
| UN873,<br>UN857 | Southbound                      | 300, 320, 340, 360, 380, 400                       |
|                 | Northbound                      | 290, 310, 330, 350, 370, 390, 410                  |
| UN741           | Southbound Unidirectional Route | EVEN and ODD flight levels to be indistinctly used |
| UN866           | Northbound Unidirectional Route |                                                    |

**Random Traffic**

All flights crossing the common FIR boundary Sal/Santa Maria and vice versa are required to flight plan via a ULTEM and the entry/exit compulsory reporting points BAMUX, ERNEK, TEGTO, OBOMO, RUKAV, VEPOP and XIBOT.

**2.12.4.8 EUR/SAM Corridor Contingency Plan**

This procedure is applicable in the event of disruptions of air traffic services within the EUR/SAM corridor. This area covers the FIRs of Canaries, Sal Oceanic, Dakar Oceanic and Atlantico.

**2.12.4.8.1 Beginning of Contingency Situation**

When a specific ACC of the EUR/SAM corridor starts a contingency situation, it will proceed as follows:

- a) Inform by all possible and quickest means, to its concerned ACC about its contingency situation, specifying that the general contingency procedures of the EUR/SAM corridor, as well as the specific contingency procedures reflected in the relevant annexes of the letter of agreement between participating ATS units.
- b) Inform to its collateral ACCs about the real situation of the air traffic under its responsibility as well as the information about the estimated traffic at the moment that the contingency situation started.
- c) A common NOTAM notifying the contingency situation

in the EUR/SAM corridor will be published by the relevant ACC to all other ATS units. This common NOTAM will refer to the published AIC concerning the EUR/SAM contingency plan and indicates relevant procedures to be applied.

- d) Each ACC of EUR/SAM corridor shall broadcast via ground/air published VHF/HF frequency, the contingency situation experienced in the specific ACC to all air traffic under its responsibility. This broadcast should also include the details about the applicable contingency procedures.

#### 2.12.4.8.2 **General Procedures During Contingency Situation**

Pilots flying in a contingency airspace in the EUR/SAM corridor should follow the In-Flight Broadcast Procedures (IFBP) specified as follows:

- a) Must be in permanent contact on the pilot-to-pilot frequency 123.450MHZ.
- b) Report positions or estimates and the beginning and end of the climb/descent phases.
- c) Maintain a watch of conflicting traffic, both visually and by reference to ACAS.
- d) Turn on all aircraft exterior lights.
- e) Keep SSR transponder on all the time.
- f) Climb and descent phases must be clearly performed at the right side of the route axis. They are also requested to apply lateral deviation offset procedures as specified as published by the EUR/SAM corridor states.

#### 2.12.4.3 Lateral Separation

- g) No inflight change of level will be authorized except in case of emergency.

2.12.4.8.3 **Contingency ATS Routes of the  
EUR/SAM Corridor**

In the event of an ATS contingency situation of one specific ACC of the EUR/SAM corridor, the air traffic will be allocated with the restricted use of flight level and route direction as described as follows.

| Airway                                                                                                                            | Direction       | Available flight level     |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------|
| UN741                                                                                                                             | Southbound only | 300, 340, 360 and 380      |
| UN873                                                                                                                             |                 |                            |
| UN866                                                                                                                             | Northbound only | 290, 330, 350, 370 and 390 |
| UN857                                                                                                                             |                 |                            |
| Crossing traffic                                                                                                                  | Eastbound       | 310                        |
|                                                                                                                                   | Westbound       | 320                        |
| <b>Note :</b> Traffic flying random route will not be accepted and must be re-routed to one of the ATS routes as described above. |                 |                            |

After the contingency airspace is flown, the adjacent ACC may accommodate the air traffic according to the established ATS routes direction and flight level allocation scheme.

2.12.4.8.4 **Contingency Longitudinal Minima**

The contingency longitudinal separation minima in the EUR/SAM corridor is 20 MIN with Mach Number Technique (MNT). After the contingency airspace is flown, the adjacent ACC may resume to normal separation minima of 10 MIN with MNT.

2.12.4.8.5 **End of Contingency Procedures**

As soon as the contingency situation ceases, the ACC concerned will inform by all possible and quickest means the rest of the EUR/SAM ACCs. A NOTAM notifying the end of the contingency situation will be published.

In order to assure a safely and orderly transition to normal situation flow control restrictions are likely to be applied.

In case of partial recovery from the contingency situation, but enough to reduce the air traffic restrictions, the in-contingency ACC will issue a NOTAM informing of the new situation.



**2.13 Flight Plan and Clearance****2.13.1 Mach Number**

For turbo-jet ACFT  
intending to operate:

- within airspace and/or routes between Santiago and Lima FIRs and the adjacent control areas of the PAC region; or
- at or above FL250 within the Dakar Oceanic, Atlantico and Sal Oceanic FIRs; or
- along area navigation routes;

the planned true Mach number shall be specified in Item 15 of the FPL.

**2.14 Communication (NIL)**

**2.15 Flight Permission (NIL)**

**2.16 Miscellaneous (NIL)**

**2.17 Emergency (NIL)**

**2.18 Interception Principles and Signals (NIL)**

**2.19 Unlawful Interference (NIL)**

16-NOV-  
2017  
SAM

South America  
Regional SUP  
INFO

RSI

R-41

3 MET (NIL)



18-MAR-  
2021  
SAM

South America  
Regional SUP  
INFO

RSI

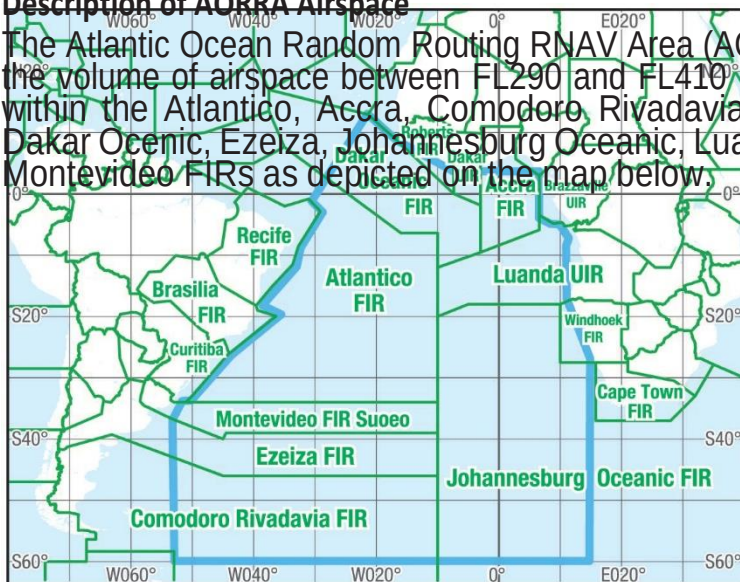
R-43

#### 4NAV

### 4.1 Atlantic Ocean Random Routing RNAV Area (AORRA)

#### Description of AORRA Airspace

The Atlantic Ocean Random Routing RNAV Area (AORRA) is the volume of airspace between FL290 and FL410 inclusive within the Atlántico, Accra, Comodoro Rivadavia, Dakar, Dakar Oceanic, Ezeiza, Johannesburg Oceanic, Luanda and Montevideo FIRs as depicted on the map below.



#### RNP 10 Procedures for Aircraft Operations Within the AORRA

No aircraft shall flight plan to operate in the AORRA airspace unless it is RNP 10 certified to operate in this airspace by the State of Registry or the State of operator, as the case may be, except in the following circumstances:

- The aircraft is being initially delivered to the State of

Registry or the State of the operator;

- b) The aircraft is certified but experienced navigation degradation and is being flown back to base or to a maintenance facility for repairs;
- c) The aircraft is engaged on a humanitarian or mercy flight;
- d) State aircraft.

#### **Approval of Airworthiness/Operations**

The operators operating or intending to operate in AORRA airspace shall obtain RNP 10 approval from the State's registry or State's Operator as appropriate, in accordance with the following conditions:

- a) The aircraft satisfies specifications of Minimum Aircraft System Performance Specifications (MASPS) of the State's registry.
- b) The aircraft is operated under the conditions indicated in the RNP 10 operational approval issue by the user's State.

## ADS-C/CPDLC    Data    Link

### Communication

ADS-C/CPDLC will be used within AORRA airspace by suitably equipped service providers to provide this sort of communication and/or surveillance to aircraft equipped with FANS 1/A functionalities. ADS-C/CPDLC are the primary form of surveillance/communication. HF communication will be considered a secondary means of communication.

### Flight Plans

- a) When it is intended to operate an aircraft in AORRA airspace, RNP 10 compliance shall be indicated by placing an "R" in box 10 of the FPL.
- b) Flight plans shall contain entry and exit point to/from AORRA airspace and the estimated time for every 5° of longitude.
- c) In the case of repetitive flight plans, RNP 10 compliance shall be indicated by placing an "R" in box Q of the RPL, as follows: EQPT/R.
- d) Non-RNP 10 compliant operators shall "RMK/NONRNP10" in field 18 of the ICAO FPL.

insert

### Operational Procedures Before Entering the AORRA Airspace

- a) Before entering the AORRA airspace the PIC of RNP 10 certified aircraft shall verify that the required equipment to fly within AORRA airspace is operating normally and verify with the greatest possible accuracy the position of the aircraft through external NAVAIDs.
- b) If any equipment is not operating normally, the pilot should notify ATC before entering the AORRA airspace.
- c) Whilst operating within the defined area of the AORRA, flight levels will comply with the ICAO standard table of cruising levels.
- d) RVSM transition procedures should be taken into consideration from/to RVSM airspace in the FIRs where RVSM transition areas is defined.

### Operational Procedures After Entering the AORRA Airspace

- a) If an aircraft cannot continue the flight in compliance with the ATC clearance issued and/or cannot maintain the precision required for the specified navigation

performance in the airspace, ATC will be advised immediately.

- b) Position reporting is required at entry/exit gate as well as any other position required by ATC: 10°E, 0°E/W, 10°W, 20°W, 30°W, 40°W, 50°W

18-MAR-2021

South America

RSI

SAM

Regional

SUP

AORRA Entry/Exit

INFO

Points

R-50

Aircraft may track via a flight plan preferred track between these gates. Prior entering or after exiting the AORRA at a particular gate, aircraft are to comply with the fixed route structure, published tracks associated with that particular entry/exit points or as instructed by ATC, and are required to flight plan accordingly.

| AORRA Entry/Exit Points |          |
|-------------------------|----------|
| UIR/FIR                 | Waypoint |
| Accra<br>(DGAC)         | AMPAN    |
|                         | ARKOS    |
|                         | ARMAR    |
|                         | BUGRI    |
|                         | EREGO    |
|                         | GANBI    |
|                         | GAPEL    |
|                         | GARLA    |
|                         | KIDNI    |
|                         | KINBU    |
|                         | KISMI    |
|                         | LOVLI    |
|                         | MERID    |
|                         | NAKUT    |
|                         | OPEMU    |
|                         | PINTI    |
|                         | SABSO    |
|                         | TAMOK    |
|                         | TENTIA   |



|                             |           |
|-----------------------------|-----------|
| Atlant<br>ico<br>(SBA<br>O) | TOBA<br>T |
|                             | CIDE<br>R |
|                             | EDVE<br>L |
|                             | EKAL<br>O |
|                             | GARU<br>P |
|                             | GELA<br>M |
|                             | IRON<br>A |
|                             | MIGE<br>X |
|                             | MUKE<br>K |
|                             | OBKO<br>L |
|                             | PALO<br>R |
|                             | POLV<br>O |
|                             | PORG<br>A |
|                             | SORS<br>A |
|                             | VURIL     |
|                             | VURT<br>O |

Sheet 1759400  
\*1759400\*

| AORRA Entry/Exit Points     |          |
|-----------------------------|----------|
| UIR/FIR                     | Waypoint |
| Brazzaville (FCCC)          | XURUT    |
| Comodoro Rivadavia (SAVU)   | EGLAS    |
|                             | IRIRO    |
| C Dakar Oceanic (GOOO)      | BOTBU    |
|                             | BUVUK    |
|                             | DIKBA    |
|                             | ENASA    |
|                             | EPEMI    |
|                             | ERKUS    |
|                             | GAKSA    |
|                             | GANDO    |
|                             | GANKO    |
|                             | GARKI    |
|                             | GUTAS    |
|                             | INATO    |
|                             | UDEBO    |
|                             | KOGUS    |
|                             | LUMKA    |
|                             | NUKEN    |
|                             | OXOVA    |
|                             | PISKA    |
|                             | RAKIM    |
|                             | RANOV    |
|                             | RIRAK    |
|                             | SETOX    |
|                             | SEVAM    |
|                             | SOLTU    |
|                             | TAROT    |
|                             | TINIS    |
|                             | TUROT    |
|                             | UNIKI    |
|                             | URAPI    |
|                             | VORUT    |
| Ezeiza (SAEU)               | BISUL    |
|                             | GUXOR    |
| Johannesburg Oceanic (FA10) | ALDOV    |
|                             | ANTOM    |

18-MAR-  
2021  
SAM

R-70

South America  
Regional SUP  
INFO

RSI

| AORRA Entry/Exit Points        |          |
|--------------------------------|----------|
| UIR/FIR                        | Waypoint |
| Johannesburg<br>Oceanic (FAJO) | BUXIR    |
|                                | EGVOL    |
|                                | EPNET    |
|                                | ETBOR    |
|                                | GEPA     |
|                                | GEPEV    |
|                                | IBLOK    |
|                                | IMKAM    |
|                                | ITLIK    |
|                                | ITMEK    |
|                                | NEPUM    |
|                                | NERAX    |
|                                | NIBEK    |
|                                | NIGAM    |
|                                | OKDOG    |
|                                | OKTEL    |
|                                | UVGOD    |
| Luanda                         | URAPI    |
|                                | OSUKU    |
|                                | GAPEL    |
|                                | TERBA    |
|                                | OPAPO    |
|                                | ONTA     |

|                            |  |       |
|----------------------------|--|-------|
| (FN<br>AN)                 |  | R     |
|                            |  | EKBO  |
|                            |  | B     |
|                            |  | NERU  |
|                            |  | P     |
|                            |  | TIMA  |
|                            |  | K     |
| Montevideo (SUEO)          |  | TETU  |
|                            |  | X     |
| Recife (SBRE)              |  | NIDU  |
|                            |  | S     |
| Rob<br>erts<br>(GL<br>RB)  |  | BIVEN |
|                            |  | REGIS |
|                            |  | BIME  |
|                            |  | N     |
|                            |  | MIRK  |
| Wind<br>hoek<br>(FY<br>WF) |  | O     |
|                            |  | UNEM  |
|                            |  | A     |
|                            |  | VONA  |
|                            |  | S     |
|                            |  | ANTE  |
|                            |  | P     |
|                            |  | DULG  |
|                            |  | O     |
|                            |  | ETUD  |
|                            |  | U     |
|                            |  | IBLOK |

| AORRA Entry/Exit Points |          |
|-------------------------|----------|
| UIR/FIR                 | Waypoint |
| Windhoek (FY WF)        | NEVEP    |
|                         | NIBEK    |
|                         | NIGAM    |

## 4.2 Degradation or Failure of the RNAV System

### Action by the Pilot-in-Command

When an ACFT cannot meet the requirements, as required by the RNAV route, as a result of a failure or degradation of the RNAV system, a revised clearance shall be requested by the pilot.

| RNAV Phraseology                             |                                                |
|----------------------------------------------|------------------------------------------------|
| Circumstances                                | Phraseology                                    |
| Informing ATC or RNAV degradation or failure | [aircraft call-sign] UNABLE RNAV DUE EQUIPMENT |
| Informing ATC of no RNAV capability          | [aircraft call-sign] NEGATIVE RNAV             |

### Action by the ATS Unit

Regarding in-flight degradation or failure of the RNAV system when the ACFT is on the RNAV 5 designated ATS route:

- the ACFT should be cleared to fly on the ATS VOR/DME route; or
- if such routes are unavailable, the ACFT should be cleared to fly via conventional NAVAIDS, i.e. VOR/DME; or
- when the aforementioned procedures are unavailable, the ATC unit should provide the ACFT, whenever possible, with radar vectors until the ACFT can resume its own navigation.

**Note:** ACFT cleared according to a) or b) may require, whenever possible, radar tracking by the corresponding ATC unit.



13-OCT-  
2022  
SAM

South America  
Regional SUP  
INFO

R-83

5COM

### 5.1 Clearance

HF communication is required over large parts of the South Atlantic. The normal radiotelephone language in South America is Spanish. The ATC controller often works on several frequencies at a time and therefore a reply to a message may not be provided instantly. Especially in South America all ATC controllers should be dealt with carefully. ATC is not always according to ICAO standard.

### 5.2 Position Reports

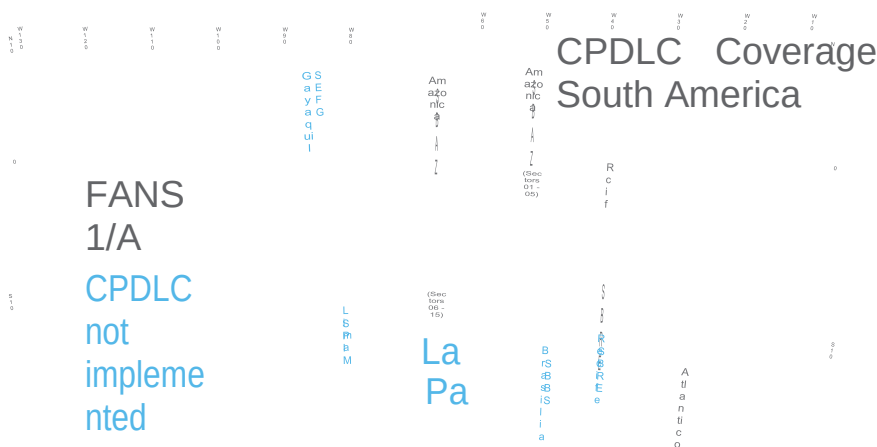
If the estimated time for the next position last reported to air traffic control is found to be in error by 3 MIN or more, a revised ETO shall be transmitted as soon as possible to the appropriate ATS unit.

### 5.3 Cruise Climb

ACFT cleared for cruise climb shall report their flight level to the nearest 100ft (30m) - e.g. FL354.

### 5.4 Data Link Services

W70



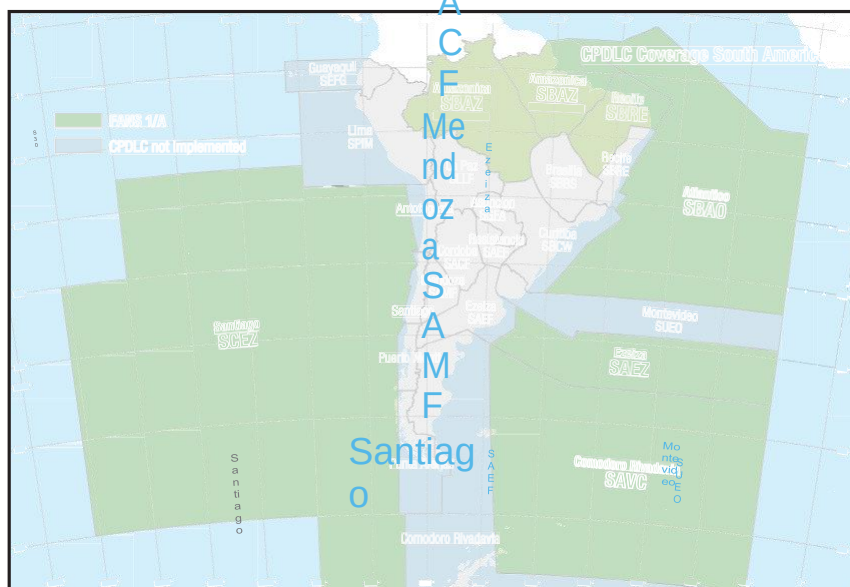


## ASUNCIÓN

C  
u  
r  
i  
t  
i  
b  
a

$S$   
 $B$   
 $A$   
 $O$

Co  
rd  
ob  
a  
S  
A  
C  
F  
Me  
nd  
oz  
a  
S  
A  
M  
E

Re  
sist  
en  
cia  
E  
FS  
B  
C  
W

Pue to  
Montt

Elizabeth

Punta  
Arenas

Comodoro  
Rivadavia

Comodor  
o  
Rivadavi  
a

W70

## INFO

## 5.4.1 Argentina

| Data Authority     | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|--------------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Comodoro Rivadavia | -               | SAVC          | 15-5min                 | YES   | YES   | FANS 1/A   |
| Ezeiza             | -               | SAEZ          |                         |       |       |            |

- **Comodoro Rivadavia FIR/UIR**

- CPDLC and ADS-C is AVBL in the Comodoro Rivadavia FIR/UIR starting at ATS Route UT103 eastbound up to the Johannesburg Oceanic FIR boundary.
- ICAO FPL Item 18 shall have the following remark: "RMK/COMODORO RIVADAVIA FANS 1" or "RMK/COMODORO RIVADAVIA FANS A", as applicable for the respective aircraft type.
- A CPDLC connection does not relieve the flight crew from the obligation to establish, maintain and monitor HF or VHF communication.
- Termination of data link services normally takes place 5min after leaving the Comodoro Rivadavia FIR/UIR.  
If connection is not terminated automatically, flight crews shall manually disconnect from ADS-C and CPDLC.  
This ensures that the ADS transmissions are terminated at the appropriate time in case there are any ADS contracts which are not automatically cancelled due to as system malfunction.

- **Ezeiza FIR/UIR**

- The CPDLC connection does not relieve flight crews of the obligation to establish, maintain and monitor HF or VHF voice communications.
- The disconnection will normally take place during the 5min after leaving the designated airspace of the

Ezeiza FIR/UIR.

- Pilots connected with FANS 1/A, 5min after leaving the designated airspace of the Ezeiza FIR/UIR, must disconnect from the ADS-C system and CPDLC in case Ezeiza has not done so.

#### 5.4.2 Brazil

| Data Authority                                                                                                                                                | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Capability |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|-------------------------|-------|-------|------------|
| Amazonica                                                                                                                                                     | FL250 or above  | SBAZ          | 25-40min<br>(Note)      | YES   | NO    | FANS 1/A   |
| Atlantico                                                                                                                                                     | -               | SBAO          |                         |       | YES   |            |
| Recife                                                                                                                                                        | FL250 or above  | SBRE          |                         |       | NO    |            |
| <b>Note:</b> If the ACFT takes off within the airspace which CPDLC is used as a mean of communication, the LOGON procedure shall be performed before takeoff. |                 |               |                         |       |       |            |

- ACFT inbound from Airspace with ADS-C / CPDLC:
  - The CPDLC and the ADS-C will be automatically transferred between the ACC responsible for the data authority and the ACC responsible for the adjacent FIR if that unit also uses such applications;
  - Pilots shall check the condition of the connection (active connection) with the system when crossing the FIR boundaries. If there is no automatic transfer of the connection when crossing the FIR boundary, the pilot shall terminate the existing CPDLC connection and perform the procedure to establish a new connection using the address of the corresponding FIR;

13-OCT-2022

South America

RSI

SAM

R-90

Regional

SUP

INFO

- Using the COMU-5 MONITOR (UM120) Message:

- The COMU-5 MONITOR (UM120) message may be used by the ATS Unit to transfer communications from one aircraft to another control area within its jurisdiction, thus avoiding frequency jamming;
- In response to a COMU-5 MONITOR (UM120) message, the crew shall send a DM67 MONITORING message to the respective ATS Unit in order to confirm that it has switched to the instructed VHF frequency;

#### **Continental Airspace**

- FIR SBRE: CPDLC (FANS 1/A, VDL Mode 2, VDL Mode 0/A) in sectors 01, 02, 03, 04, 05, 06, 09 and 10 will be used as additional means of communication;
- FIR SBAZ: CPDLC (FANS 1/A, VDL Mode 2, VDL Mode 0/A) in all sectors of the Belem Region will be used as additional means of communication;
- a • The initial contact in sector changes shall always be done via voice, to check VHF communication. After the initial contact, CPDLC communication shall be maintained, unless ATC instructs otherwise.
- When an ACFT flying from an ATS unit that has CPDLC is bound to a ATS unit without CPDLC capability, its connection will be terminated when communication is transferred. Pilots shall check the status of the FANS 1/A connection when crossing the FIR boundaries and terminate the CPDLC connection if it remains active.

#### **Atlantico FIR**

- FIR SBAO: CPDLC (FANS 1/A) will be used as the primary means of communication;
- ACFT flying from the Atlantico FIR to the FIRs not provided with CPDLC will have their connection terminated 5min before crossing the FIR boundary.

Pilots should check the status of the FANS 1/A connection when crossing the Atlantico FIR boundary and finish the CPDLC connection if it remains active;

- If CPDLC is not available or exceptionally required by the Atlantico ACC, communications with that facility shall be accomplished on HF frequency informed by the ATS Unit responsible for the adjacent FIR, or established by means of “MONITOR” or “CONTACT” messages;
- When crossing the boundary of the Atlantico FIR, the ACFT in data link communication (CPDLC) shall not perform SELCAL on the first contact, unless requested by ATS unit, in order to avoid jamming in the HF frequencies;
- The position messages of the ACFT connected to the Atlantico ACC will be accomplished by means of ADS-C. However, the pilot should send a position report in CPDLC at the FIR entry position to confirm that the ATS unit holds the status of Current Data Authority condition. Following the initial report in CPDLC at the boundary, no further reports will be required.

The position message shall only be transmitted at the HF frequency established, in case the ADS-C or CPDLC are not available, or when required by Atlantico ACC;

- Pilots will not be required to update estimates for waypoints when the aircraft is reporting in ADS-C. Exceptions to that procedure are those updates that are required when:
  - an estimate, previously reported orally or in CPDLC, is changed for more than 2 minutes; or
  - a step commenced by the pilot, such as a speed change, will change the estimate at the next report point for more than 2 minutes.
- When there is a CPDLC connection in airspace without ADS-C, pilots should ensure that the position message is conducted by CPDLC. The reporting of a position in CPDLC shall be routed manually by the pilot whenever crossing an ATC waypoint or while passing abeam, when a lateral deviation procedure is being used.

## INFO

## 5.4.3 Chile

| Data Authority | Vertical Limits | Logon Address | Logon Time Before Entry | CPDLC | ADS-C | Remarks  |
|----------------|-----------------|---------------|-------------------------|-------|-------|----------|
| Santiago       | SFC UNL         | SCEZ          | See below               | YES   | YES   | FANS 1/A |

- **Antofagasta FIR**

ADS-C connection for early air traffic surveillance purposes is established in AWY UL780/L780 and AWY UL302/L302. All Southbound TFC must logon for ADS-C connection at least 10min prior to crossing SORTA WPT or IREMI WPT. Early connection is not intended for CPDLC. Pilots must conduct normal and routine COM with the appropriate ATC via VHF and/or HF by the use of the published FREQs. This connection is only for flight level confirmation and ETO/ATO at entry points before the flight enters Chilean airspace.

- **Isla de Pascua FIR**

CPDLC and ADS-C are available within in SCIZ FIR for FANS 1/A capable ACFT. Aircraft entering the SCIZ FIR from adjacent non-CPDLC and non ADS-C airspace shall logon at least 15min but no more than 45min prior to entering to SCIZ FIR. ACFT without FANS 1/A capability or in the event of data link failure or outages, flight crews shall contact Oceanic Control via HF voice for routine communications. SATVOICE contact should be used as backup or distress and urgency situations.

- **Oceanic Control Area**

ADS-C / CDPLC available for FANS 1/A for ACFT within the Oceanic Control Area, with the exception of airways, UL302, L302, UL780, and L780 that must have required and appropriate VHF / HF equipment.

29-SEP-2022

South America

RSI

SAM

R-101

Regional SUP

INFO

## 5.5 SATCOM Short Codes &amp; PSTN

## Numbers

**Disclaimer:**

Inmarsat short codes are provided by courtesy of Inmarsat Global Ltd. The revision of the short codes is on a "as received from Inmarsat" basis. The linkage of the short codes with valid ACC phone numbers is under the responsibility of Inmarsat Global Ltd. Lufthansa Systems FlightNav Inc. is not taking liability for the attribution of the short codes and the programming of the respective ACC phone numbers.

Public Switched Telephone Network (PSTN) numbers have been denicted from State sources (AIPs) where available

| Country          | ATS Unit                  | Inmarsat Short Code | PSTN Number      | Remarks   |
|------------------|---------------------------|---------------------|------------------|-----------|
| Argentina        | Ezeiza ACC                | 470103              |                  |           |
| Brazil           | Atlantico ACC             | 471001              |                  |           |
|                  | Curitiba ACC              | 471004              |                  |           |
|                  | Recife ACC                | 471007              |                  |           |
| a<br>Chile       | Pascua Radio              | -                   | +881 652 418 475 | SAT phone |
|                  | Puerto Montt ACC          | 472503              |                  |           |
|                  | Punta Arenas ACC          | 472504              |                  |           |
|                  | Santiago ACC              | 472505              |                  |           |
|                  | Santiago Oceanico         | -                   | +881 652 415 790 | SAT phone |
| Ecuador          | Guayaquil ACC             | 473501              |                  |           |
|                  |                           | 473502              |                  |           |
| Falkland Islands | Mount Pleasant Operations | 422502              |                  |           |
|                  | Mount Pleasant ATC        | 422501              |                  |           |
| Peru             | Lima ACC                  | 476002              |                  |           |
|                  |                           | 476003              |                  |           |
| Uruguay          | Montevideo ACC            | 477001              |                  |           |





05-APR-  
2018  
SAM

South America  
Regional SUP  
INFO

RSI

R-103

## 6 Appendix

### 6.1 VOLMET / ATIS

#### 6.1.1 VOLMET Stations (VHF)

| VOLMET Station        | Frequency | Aerodromes                          |
|-----------------------|-----------|-------------------------------------|
| Brasilia              | 132.150   | Brasilia FIR - (ADs not specified)  |
|                       | 132.250   |                                     |
|                       | 132.400   |                                     |
|                       | 132.550   |                                     |
|                       | 132.600   |                                     |
| Curitiba              | 132.050   | Curitiba FIR - (ADs not specified)  |
|                       | 132.450   |                                     |
| Manaus<br>(Amazonico) | 132.050   | Amazonica FIR - (ADs not specified) |
|                       | 132.100   |                                     |
|                       | 132.150   |                                     |
|                       | 132.250   |                                     |
|                       | 132.300   |                                     |
|                       | 132.350   |                                     |
|                       | 132.400   |                                     |
| Recife                | 132.500   | Recife FIR - (ADs not specified)    |
|                       | 123.950   |                                     |
|                       | 124.900   |                                     |
|                       | 132.525   |                                     |

#### 6.1.2 VOLMET Stations (HF) - NIL

There are no VOLMET Stations on HF in the SAM Region.

Regional SUP

R-104

INFO

6.1.3 D-VOLMET

## Stations

| Country | APT ID | City                  | Aerodrome Name                        | Remarks |
|---------|--------|-----------------------|---------------------------------------|---------|
| Brazil  | SBAA   | Conceicao Do Araguaia | Conceicao Do Araguaia                 |         |
|         | SBAE   | Bauru                 | Bauru Arealva                         |         |
|         | SBAF   | Rio de Janeiro        | Campo Delio Jardim de Mattos          |         |
|         | SBAM   | Amapa                 | Amapa                                 |         |
|         | SBAN   | Anapolis              | Base Aerea                            |         |
|         | SBAQ   | Araraquara            | Araraquara                            |         |
|         | SBAR   | Aracaju               | Santa Maria Intl                      |         |
|         | SBAT   | Alta Floresta         | Aeroporto Piloto Osvaldo Marques Dias |         |
|         | SBAU   | Aracatuba             | Aracatuba                             |         |
|         | SBAX   | Araxa                 | Araxa                                 |         |
|         | SBBE   | Belem                 | Val de Cans/Julio Cezar Ribeiro Intl  |         |
|         | SBBG   | Bage                  | Comandante Gustavo Kraemer            |         |
|         | SBBH   | Belo Horizonte        | Pampulha - Carlos Drummond de Andrade |         |
|         | SBBI   | Curitiba              | Bacacheri                             |         |
|         | SBBQ   | Barbacena             | Maj Brig Doorgal Borges               |         |
|         | SBBR   | Brasilia              | Presidente Juscelino Kubitschek Intl  |         |
|         | SBBU   | Bauru                 | Bauru                                 |         |
|         | SBBV   | Boa Vista             | Atlas Brasil Cantanhede               |         |
|         | SBBW   | Barra Do Garcas       | Barra Do Garcas                       |         |
|         | SBBZ   | Armacao dos Buzios    | Umberto Modiano                       |         |
|         | SBCA   | Cascavel              | Coronel Adalberto Mendes da Silva     |         |
|         | SBCB   | Cabo Frio             | Cabo Frio                             |         |
|         | SBCC   | Guaranta do Norte     | Campo de Provas Brig. Veloso, MIL     |         |
|         | SBCD   | Cacador               | Cacador                               |         |
|         | SBCF   | Belo Horizonte        | Tancredo Neves Intl                   |         |
|         | SBCG   | Campo Grande          | Campo Grande Intl                     |         |
|         | SBCH   | Chapeco               | Chapeco                               |         |
|         | SBCI   | Carolina              | Brig Lysias Augusto Rodrigues         |         |
|         | SBCJ   | Parauapebas           | Carajas                               |         |
|         | SBCM   | Criciuma              | Forquilha                             |         |
|         | SBCO   | Porto Alegre          | Canoas                                |         |
|         | SBCP   | Campos Dos Goytacazes | Bartolomeu Lisandro                   |         |
|         | SBCR   | Corumba               | Corumba Intl                          |         |
|         | SBCT   | Curitiba              | Afonso Pena Intl                      |         |
|         | SBCV   | Caravelas             | Caravelas                             |         |
|         | SBCX   | Caxias do Sul         | Campo Dos Bugres                      |         |

SAM

05-APR-  
2018  
SAM

aaaaaa  
aaaaaa

RSI

| Country | APT ID | City                 | Aerodrome Name                  | Remarks |
|---------|--------|----------------------|---------------------------------|---------|
| Brazil  | SBCY   | Cuiaba               | Marechal Rondon Intl            |         |
|         | SBCZ   | Cruzeiro do Sul      | Cruzeiro do Sul Intl            |         |
|         | SBDN   | Presidente Prudente  | Presidente Prudente             |         |
|         | SBEG   | Manaus               | Eduardo Gomes Intl              |         |
|         | SBEK   | Jacareacanga         | Jacareacanga                    |         |
|         | SBES   | Sao Pedro de Aldeia  | Sao Pedro Da Aldeia Mil.        |         |
|         | SBFI   | Foz de Iguacu        | Cataratas Intl                  |         |
|         | SBFL   | Florianopolis        | Hercilio Luz Intl               |         |
|         | SBFN   | Fernando De Noronha  | Fernando De Noronha             |         |
|         | SBFZ   | Fortaleza            | Pinto Martins Intl              |         |
|         | SBGL   | Rio de Janeiro       | Galeao Antonio C Jobim Intl     |         |
|         | SBGM   | Guajara-Mirim        | Guajara-Mirim                   |         |
|         | SBGO   | Goiania              | Santa Genoveva                  |         |
|         | SBGP   | Gaviao Peixoto       | Embraer                         |         |
|         | SBGR   | Sao Paulo            | Guarulhos/Gov.A.F.Montoro Intl  |         |
|         | SBGU   | Guarapuava           | Guarapuava/T.T.De Faria         |         |
|         | SBGV   | Governador Valadares | Governador Valadares            |         |
|         | SBGW   | Guaratingueta        | Guaratingueta                   |         |
|         | SBHT   | Altamira             | Altamira                        |         |
|         | SBIC   | Itacoatiara          | Itacoatiara                     |         |
|         | SBIH   | Itaituba             | Itaituba                        |         |
|         | SBIL   | Ilheus               | Bahia Jorge Amado               |         |
|         | SBIP   | Ipatinga             | Usiminas                        |         |
|         | SBIT   | Itumbiara            | Hidroelectrica                  |         |
|         | SBIZ   | Imperatriz           | Prefeito Renato Moreira         |         |
|         | SBJC   | Belem                | Brigadeiro Protasio de Oliveira |         |
|         | SBJF   | Juiz De Fora         | Francisco de Assis              |         |
|         | SBJP   | Joao Pessoa          | Pres. Castro Pinto              |         |
|         | SBJR   | Rio de Janeiro       | Jacarepagua - Roberto Marinho   |         |
|         | SBJU   | Juazeiro Do Norte    | Orlando Bezerra de Menezes      |         |
|         | SBJV   | Joinville            | Lauro Carneiro de Loyola        |         |
|         | SBKG   | Campina Grande       | Presidente Joao Suassuna        |         |
|         | SBKP   | Campinas             | Viracopos Intl                  |         |
|         | SBLB   | Macaee               | Plataforma P-25                 |         |
|         | SBLE   | Lencois              | Lencois/Chapada Diamantina      |         |
|         | SBLJ   | Lages                | Lages                           |         |
|         | SBlo   | Londrina             | Governador Jose Richa           |         |
|         | SBLP   | Bom Jesus Da Lapa    | Bom Jesus Da Lapa               |         |
|         | SBLs   | Lagoa Santa          | Lagoa Santa                     |         |

South  
America

Regional  
SUP INFO

R-110

Regional SUP

R-120

INFO

a

a

| Country | APT ID | City                 | Aerodrome Name                       | Remarks |
|---------|--------|----------------------|--------------------------------------|---------|
| Brazil  | SBMA   | Maraba               | Joao Correa da Rocha                 | a       |
|         | SBMD   | Almeirim             | Monte Dourado                        | a       |
|         | SBME   | Macaé                | Macaé                                | a       |
|         | SBMG   | Maringá              | Silvio Name Junior                   | a       |
|         | SBMK   | Montes Claros        | Mário Ribeiro                        | a       |
|         | SBML   | Marília              | Marília                              | a       |
|         | SBMM   | Macaé                | Plataforma P-20                      | a       |
|         | SBMN   | Manaus               | Ponta Pelada                         | a       |
|         | SBMO   | Maceio               | Zumbi Dos Palmares Intl              | a       |
|         | SBMQ   | Macapá               | Macapá Alberto Alcolumbre            | a       |
|         | SBMS   | Mossoro              | Dix Sept Rosado                      | a       |
|         | SBMT   | Sao Paulo            | Marte                                | a       |
|         | SBMY   | Manicoré             | Manicoré                             | a       |
|         | SBNF   | Navegantes           | Ministro Victor Konder Intl          | a       |
|         | SBNM   | Santo Angelo         | Santo Angelo                         |         |
|         | SBNT   | Natal                | Augusto Severo                       |         |
|         | SBOI   | Oiapoque             | Oiapoque                             |         |
|         | SBPA   | Porto Alegre         | Salgado Filho Intl                   |         |
|         | SBPB   | Parnaíba             | Prefeito Doutor Joao Silva Filho     |         |
|         | SBPC   | Pocos de Caldas      | Pocos De Caldas                      |         |
|         | SBPF   | Passo Fundo          | Lauro Kurtz                          |         |
|         | SBPJ   | Palmas               | Brigadeiro Lysias Rodrigues          |         |
|         | SBPK   | Pelotas              | Pelotas Intl                         |         |
|         | SBPL   | Petrolina            | Senador Nilo Coelho                  |         |
|         | SBPN   | Porto National       | Porto National                       |         |
|         | SBPP   | Ponta Pora           | Ponta Pora Intl                      |         |
|         | SBPR   | Belo Horizonte       | Carlos Prates                        |         |
|         | SBPS   | Porto Seguro         | Porto Seguro                         |         |
|         | SBPV   | Porto Velho          | Gov. J.T.de Oliveira Int.            |         |
|         | SBQV   | Vitoria Da Conquista | Vitoria Da Conquista                 |         |
|         | SBRF   | Recife               | Guararapes Intl                      |         |
|         | SBRJ   | Rio De Janeiro       | Santos Dumont                        |         |
|         | SBRP   | Ribeirão Preto       | Leite Lopes                          |         |
|         | SBSC   | Rio De Janeiro       | Santa Cruz                           |         |
|         | SBSJ   | Sao Jose Dos Campos  | Professor Urbano Ernesto Stumpf Intl |         |
|         | SBSL   | Sao Luis             | Marechal Cunha Machado Intl          |         |
|         | SBSM   | Santa Maria          | Santa Maria                          |         |
|         | SBSN   | Santarem             | Maestro Wilson Fonseca               |         |
|         | SBSP   | Sao Paulo            | Sao Paulo Congonhas                  |         |

SAM



06-JAN-  
2022  
SAM

R-121

South America  
Regional SUP  
INFO

RSI

| Country | APT ID | City                     | Aerodrome Name             | Remarks |
|---------|--------|--------------------------|----------------------------|---------|
| Brazil  | SBSR   | Sao Jose Do Rio Preto    | Sao Jose Do Rio Preto      |         |
|         | SBST   | Guaruja                  | Base Area De Santos        |         |
|         | SBSV   | Salvador                 | Dep L E Magalhaes Intl     |         |
|         | SBTA   | Iaubate                  | Iaubate                    |         |
|         | SBTB   | Oriximina                | Trombetas                  |         |
|         | SBTC   | Una                      | Hotel Transamerica         |         |
|         | SBTD   | Toledo                   | Toledo                     |         |
|         | SBTE   | Teresina                 | Senador P.Portella         |         |
|         | SBTF   | Tefe                     | Tefe                       |         |
|         | SBTK   | Tarauaca                 | Tarauaca                   |         |
|         | SBTL   | Telemaco Borba           | Telemaco Borba             |         |
|         | SBTR   | Torres                   | Torres                     |         |
|         | SBTS   | Obidos                   | Tirios                     |         |
|         | SBTI   | Tabatinga                | Tabatinga Intl             |         |
|         | SBTU   | Tucuru                   | Tucuru                     |         |
|         | SBUA   | Sao Gabriel Da Cachoeira | Sao Gabriel Da Cachoeira   |         |
|         | SBUF   | Paulo Afonso             | Paulo Afonso               |         |
|         | SBUG   | Uruguaina                | Rubem Berta                |         |
|         | SBUL   | Uberlandia               | Ten Cel Av Cesar Bombonato |         |
|         | SBUP   | Urubupunga               | Urubupunga                 |         |
|         | SBUR   | Uberaba                  | Mario de Almeida Franco    |         |
|         | SBUY   | Coari                    | Urucu                      |         |

|      |              |                         |  |
|------|--------------|-------------------------|--|
| SBVG | Varginha     | Maj Trompowsky Brig     |  |
| SBVH | Vilhena      | Vilhena                 |  |
| SBVI | Vitoria      | Eurico de Aguiar Salles |  |
| SBYA | Iauarete     | Iauarete                |  |
| SBYS | Pirassununga | Campo Fontenelle        |  |

## INFO

## 6.1.4 ATIS

## Frequencies

| ICAO  | Airport                                     | D-ATIS | FREQ    | DEP/ARR | Language         |
|-------|---------------------------------------------|--------|---------|---------|------------------|
| EGY P | Mount Pleasant                              |        | 128.550 |         | English          |
| SAA R | Rosario Islas Malvinas                      |        | 127.400 |         | Spanish, English |
| SAB E | Buenos Aires Jorge Newbery Aeroparque       |        | 127.600 |         | Spanish          |
|       |                                             |        | 127.900 |         | English          |
| SAC O | Cordoba Ing Aer. A.L.V.Taravella Intl.      |        | 127.500 |         | English          |
| SAD P | Buenos Aires El Palomar                     |        | 127.625 |         | Spanish, English |
| SAE Z | Buenos Aires Ezeiza Intl-Ministro Pistarini |        | 127.800 |         | English, Spanish |
| SAM E | Mendoza El Plumerillo                       |        | 127.600 |         | English          |
| SAN T | Tucuman Tte.Benjamin Matienzo               | YES    |         |         | Spanish, English |
| SAR E | Resistencia                                 |        | 127.850 |         | Spanish, English |
| SARI  | Cataratas Del Iguazu M.D.C.Eduardo Krause   |        | 127.700 |         | English          |
| SAV T | Trelew Almirante Zar                        |        | 127.700 |         | English, English |
| SAW C | El Calarate                                 |        | 127.850 |         | English          |
| SAW G | Rio Gallegos Piloto Civ.N.Fernandez         |        | 127.600 |         | Spanish, English |
| SAW H | Ushuaia Islas Malvinas Argentinas           |        | 127.800 |         | English, Spanish |
| SAZ N | Neuquen Presidente Peron                    |        | 127.650 |         | English, Spanish |
| SAZ S | San Carlos De Bariloche Rio Negro           |        | 127.900 |         | English, Spanish |

|          |                                                      |     |             |  |                     |
|----------|------------------------------------------------------|-----|-------------|--|---------------------|
| SBB<br>E | Belem Val de Cans - Julio Cezar Ribeiro Intl         | YES | 127.<br>600 |  | English             |
| SBB<br>H | Belo Horizonte Pampulha - Carlos Drummond de Andrade | YES | 127.<br>450 |  | Portuguese, English |
| SBB<br>I | Curitiba Bacacheri                                   |     | 132.<br>325 |  | English, Portuguese |
| SBB<br>R | Brasilia Presidente Juscelino Kubitschek Intl        | YES | 127.<br>800 |  | English             |
| SBB<br>V | Boa Vista Atlas Brasil Cantanhede                    | YES |             |  | Portuguese, English |
| SBC<br>F | Belo Horizonte Tancredo Neves Intl                   | YES | 127.<br>850 |  | Portuguese, English |
| SBC<br>G | Campo Grande Intl                                    | YES | 127.<br>600 |  | Portuguese, English |
| SBC<br>T | Curitiba Afonso Pena Intl                            | YES | 127.<br>800 |  | English             |
| SBC<br>Y | Cuiaba Marechal Rondon Intl                          | YES | 127.<br>850 |  | Portuguese, English |
| SBE<br>G | Manaus Eduardo Gomes Intl                            | YES | 127.<br>650 |  | Portuguese, English |
| SBF<br>I | Foz de Cataratas Intl                                | YES |             |  | Portuguese, English |
| SBF<br>L | Florianopolis Hercilio Luz Intl                      | YES | 127.<br>450 |  | Portuguese, English |
| SBF<br>N | Fernando Noronha De                                  |     | 132.<br>775 |  | English             |
| SBF<br>Z | Fortaleza Pinto Martins Intl                         | YES | 127.<br>700 |  | English             |
| SBG<br>L | Rio de Janeiro Galeao - Antonio C Jobim Intl         | YES | 127.<br>600 |  | Portuguese, English |
|          |                                                      |     | 132.<br>650 |  | Portuguese, English |

06-JAN-  
2022  
SAM

R-123

South America  
Regional SUP  
INFO

RSI

| ICAO  | Airport                                                  | D-ATIS | FREQ    | DEP/AR R | Language            |
|-------|----------------------------------------------------------|--------|---------|----------|---------------------|
| SBG O | Goiania Santa Genoveva Intl                              | YES    | 127.675 |          | English, Portuguese |
| SBG R | Sao Paulo Guarulhos - Gov.A.F.Mo ntoro Intl              | YES    | 127.750 |          | Portuguese, English |
| SBK P | Campinas Viracopos Intl                                  | YES    | 127.825 |          | Portuguese, English |
| SBL O | Londrina Governador Jose Richa                           |        | 127.675 |          | English             |
| SBM N | Manaus Ponta Pelada                                      |        | 127.650 |          | Portuguese, English |
| SBM O | Maceio Zumbi Dos Palmares Intl                           | YES    |         |          | English             |
| SBN T | Natal Campo Augusto Severo                               | YES    | 127.600 |          | English             |
|       |                                                          |        | 132.650 |          | English             |
| SBP A | Porto Alegre Salgado Filho Intl                          | YES    | 132.350 |          | Portuguese, English |
| SBP S | Porto Seguro                                             | YES    | 127.650 |          | Portuguese, English |
| SBP V | Porto Velho Gov. J.T.de Oliveira Int.                    | YES    | 127.450 |          | English, Portuguese |
| SBR B | Rio Branco Placido de Castro                             | YES    |         |          | English, Portuguese |
| SBR F | Recife Guararapes Intl                                   | YES    | 127.650 |          | Portuguese, English |
| SBS G | Natal-Sao Goncalo do Amarante Gov. Aluizio Alves Intl    | YES    | 127.600 |          | Portuguese, English |
| SBS J | Sao Jose Dos Campos Professor Urbano Ernesto Stumpf Intl | YES    | 127.925 |          | English             |
| SBS L | Sao Luis Marechal Cunha Machado Intl.                    | YES    |         |          | Portuguese, English |
| SBS M | Santa Maria                                              |        | 127.750 |          | English             |

|          |                                                                 |     |             |     |                        |
|----------|-----------------------------------------------------------------|-----|-------------|-----|------------------------|
| SBS<br>P | Sao Paulo<br>Congonhas                                          | YES | 127.<br>650 |     | English,<br>Portuguese |
|          |                                                                 |     | 127.<br>825 |     | English,<br>Portuguese |
| SBS<br>V | Salvador Dep L E<br>Magalhaes Intl                              | YES | 127.<br>750 |     | Portuguese,<br>English |
| SBI<br>E | Terésina Senador<br>P.Portella                                  |     | 127.<br>800 |     | Portuguese,<br>English |
| SBV<br>T | Vitoria Eurico de<br>Aguar Salles                               |     | 127.<br>575 |     | English                |
| SCE<br>L | Santiago Arturo<br>Merino Benitez                               |     | 132.<br>100 | DEP | Spanish,<br>English    |
|          |                                                                 |     | 132.<br>700 | ARR | Spanish,<br>English    |
| SEG<br>U | Guayaquil Jose<br>Joaquin de Olmedo<br>Intl                     |     | 115.<br>900 |     | English,<br>Spanish    |
| SEQ<br>M | Quito Mariscal<br>Sucre Intl                                    |     | 118.<br>900 |     | English,<br>Spanish    |
| SGA<br>S | Luque Silvio<br>Pettirossi Intl                                 |     | 127.<br>600 |     | Spanish,<br>English    |
| SGE<br>S | Minga Guazu<br>Guarani Intl                                     |     | 127.<br>900 |     | Spanish,<br>English    |
| SPC<br>L | Pucallpa Cap. FAP<br>David Armando<br>Abensur Rengifo<br>Intl   |     | 130.<br>900 |     | Spanish                |
| SPHI     | Chiclayo Cap. FAP<br>Jose Abelardo<br>Quinones<br>Gonzales Intl |     | 132.<br>500 |     | Spanish,<br>English    |
| SPJ<br>C | Lima-Callao Jorge<br>Chavez Intl                                |     | 127.<br>900 |     | English,<br>Spanish    |
| SPQ<br>T | Iquitos Col. FAP<br>Francisco Secada<br>Vignetta Intl           |     | 132.<br>500 |     | Spanish,<br>English    |
| SPQ<br>U | Arequipa Alfredo<br>Rodriguez Ballon<br>Intl                    |     | 130.<br>900 |     | Spanish,<br>English    |

## INFO

| ICAO | Airport                                           | D-ATIS | FREQ    | DEP/ARR | Language         |
|------|---------------------------------------------------|--------|---------|---------|------------------|
| SPRU | Trujillo Cap.FAP Carlos Martinez de Pinillos Intl |        | 132.750 |         | Spanish, English |
| SPSO | Pisco Intl                                        |        | 132.950 |         | English, Spanish |
| SPST | Tarapoto Cad. FAP Guillermo del Castillo Paredes  |        | 130.850 |         | Spanish          |
| SPUR | Piura Cap.FAP Guillermo Concha Iberico            |        | 132.900 |         | English, Spanish |
| SPZO | Cusco Tte. FAP Alejandro Velasco Astete Intl      |        | 127.000 |         | Spanish, English |
| SULS | Maldonado Carlos A.Curbelo                        |        | 117.600 |         | Spanish, English |

~~SAM~~

South America

---

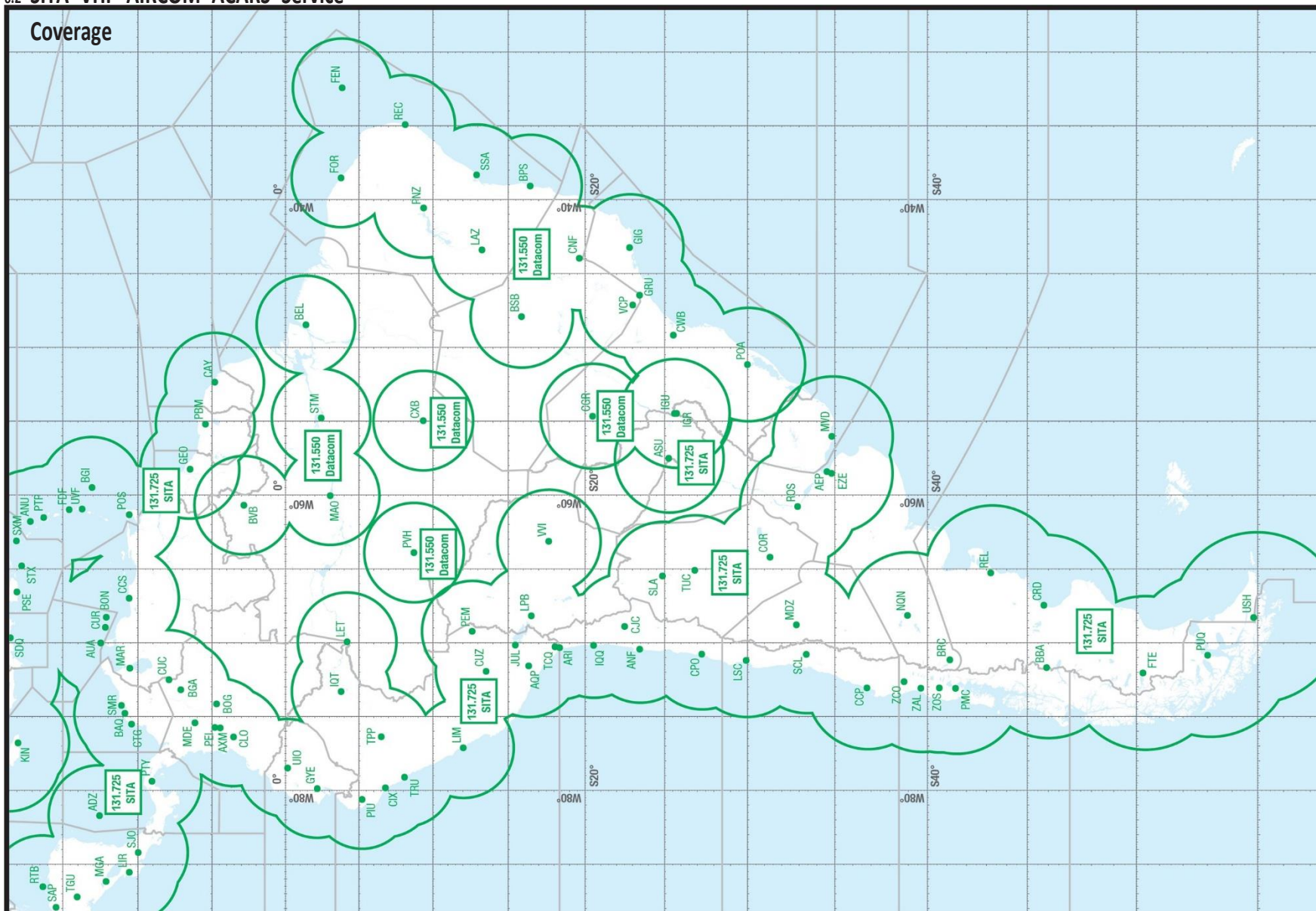
Regional SUP  
INFO

RSI

RSI

South America  
Regional SUP INFO

## 6.2 SITA VHF AIRCOM ACARS Service

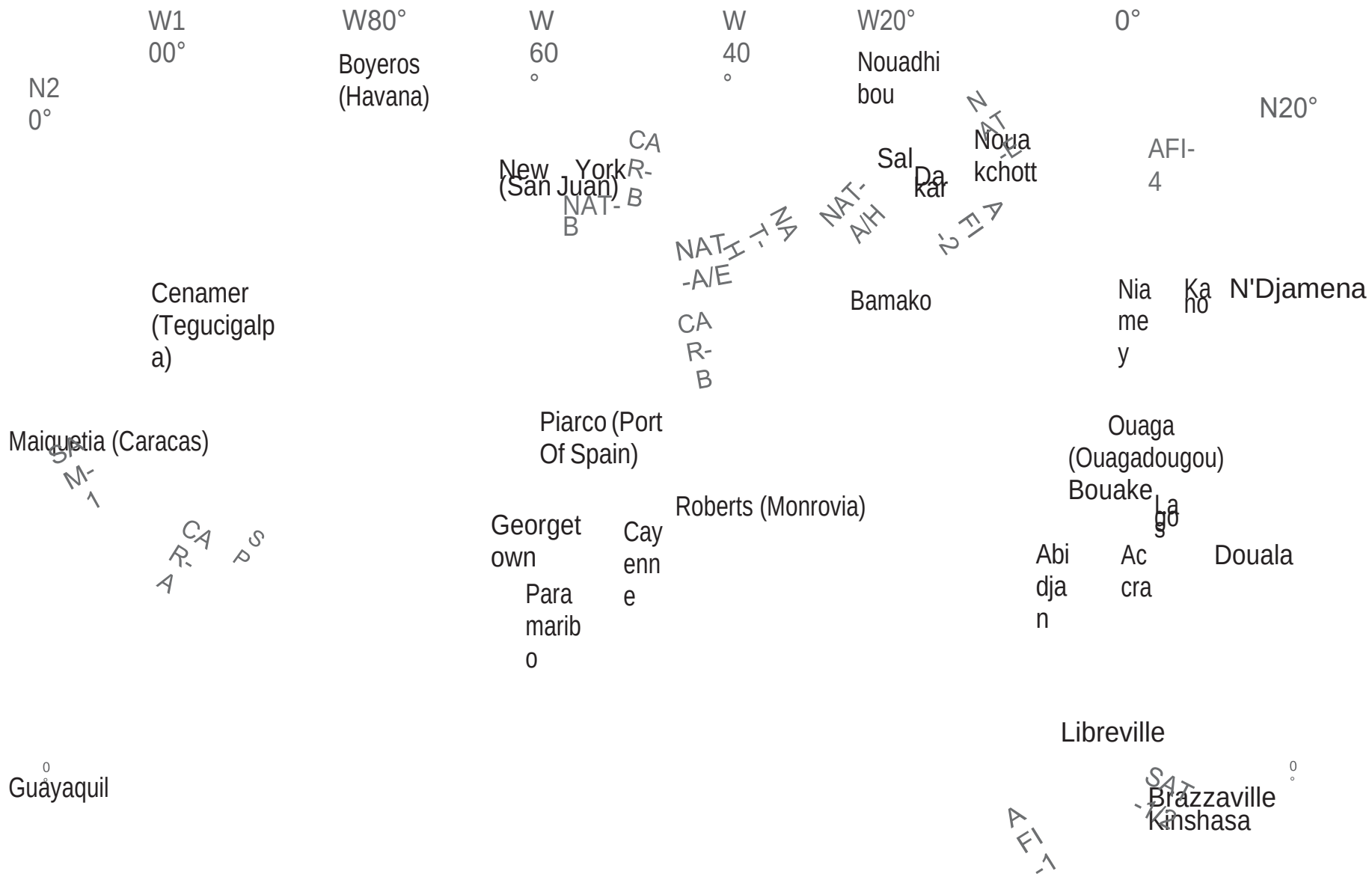




6.3 HF Frequencies - SAM

Region

6.3.1 HF Networks and Stations Overview



08-MAR-2018  
SA  
M

R-140

Lima

Atlantico (Recife)

Lua  
nda

S  
20°

Isla De  
Pascua

La  
Pa  
z

Antofa  
gasta

Asun  
cion

SA  
M-  
1

Resist  
encia  
Cor

Santiago

doba Ezeiza (Buenos Aires)

Mendoz

a

S40°

Puerto  
Montt

S20°

S40°

NZSA

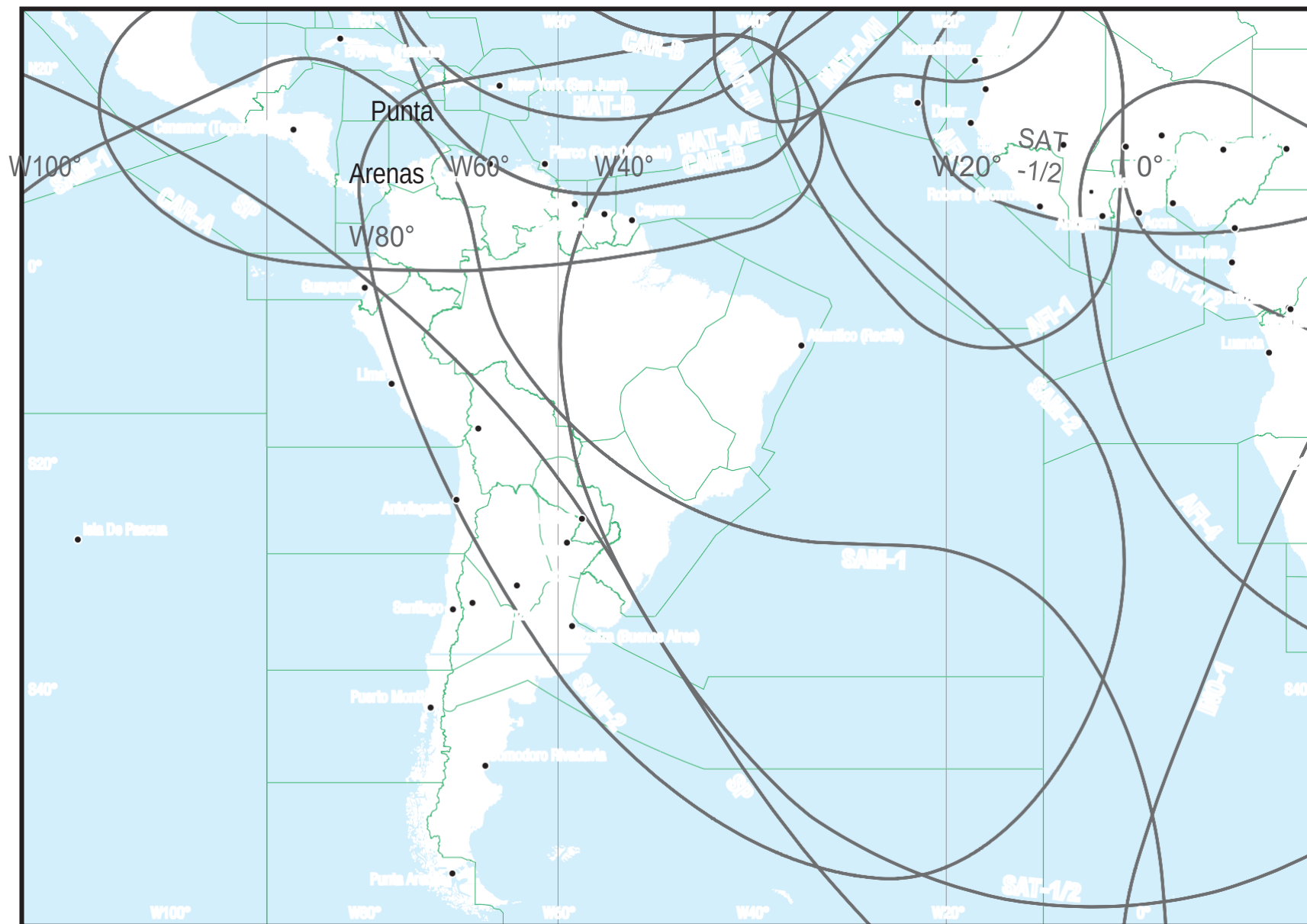
ATSA

NO1

US  
N

Comodoro Rivadavia

US



06-AUG-2020

SAM

South America  
Regional SUP  
INFO

RSI

RSI

South America  
Regional SUP INFO

6.3.2 HF

Frequency  
List

R-150

**Note 1:** Only the words in bold character are part of the call sign. Example: "**ADDIS** ABEBA" = call sign "ADDIS".

**Note 2:** SELCAL is given where published in the AIP. Not all countries publish the SELCAL capabilities.

| Call Sign (Note 1) |        | FREQ kHz | OPS HR | SELCAL (Note 2) | HF Network  | PRY/SEC | Remarks |
|--------------------|--------|----------|--------|-----------------|-------------|---------|---------|
| ALTO PATENA        | INFO   | 5454     |        |                 |             |         |         |
| ANTOFAGASTA        | RADIO  | 2944     |        |                 | SAM-1       |         |         |
| ANTOFAGASTA        | RADIO  | 4669     |        |                 | SAM-1       | PRY     |         |
| ANTOFAGASTA        | RADIO  | 6649     |        |                 | SAM-1       | PRY     |         |
| ANTOFAGASTA        | RADIO  | 10024    |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 2944     |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 4669     |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 6649     |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 10024    |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 11360    |        |                 | SAM-1       |         |         |
| ASUNCION           | RADIO  | 17907    |        |                 | SAM-1/SAM-2 |         |         |
| ASUNCION           | RADIO  | 3479     |        |                 | SAM-2       |         |         |
| ASUNCION           | RADIO  | 5526     |        |                 | SAM-2       |         |         |
| ASUNCION           | RADIO  | 8855     |        |                 | SAM-2       |         |         |
| ASUNCION           | RADIO  | 10096    |        |                 | SAM-2       |         |         |
| ASUNCION           | RADIO  | 6645     |        |                 |             |         |         |
| ASUNCION           | RADIO  | 11397    |        |                 |             |         |         |
| ATACAMA            | RADIO  | 10024    |        |                 |             |         |         |
| ATLANTICO          | CENTER | 6649     |        |                 | SAM-1       |         |         |
| ATLANTICO          | CENTER | 8855     |        |                 | SAM-2       |         |         |
| ATLANTICO          | CENTER | 10096    |        |                 | SAM-2       |         |         |
| ATLANTICO          | CENTER | 3452     |        |                 | SAT-1       |         |         |
| ATLANTICO          | CENTER | 8861     |        |                 | SAT-1       |         |         |

|                    |       |        |       |  |  |             |  |                                    |
|--------------------|-------|--------|-------|--|--|-------------|--|------------------------------------|
| ATLANTICO          |       | CENTER | 13357 |  |  | SAT-1       |  |                                    |
| ATLANTICO          |       | CENTER | 17955 |  |  | SAT-1/SAT-2 |  |                                    |
| ATLANTICO          |       | CENTER | 5565  |  |  | SAT-2       |  |                                    |
| ATLANTICO          |       | CENTER | 13315 |  |  | SAT-2       |  |                                    |
| ATLANTICO          |       | CENTER | 4684  |  |  |             |  |                                    |
| AYSEN              |       | RADIO  | 5454  |  |  |             |  |                                    |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 2944  |  |  | SAM-1       |  | International flights via Pacific  |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 6649  |  |  | SAM-1       |  |                                    |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 10024 |  |  | SAM-1       |  |                                    |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 11360 |  |  | SAM-1       |  |                                    |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 17907 |  |  | SAM-1/SAM-2 |  | International flights              |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 3479  |  |  | SAM-2       |  | International flights via Atlantic |
| BUENOS<br>(EZEIZA) | AIRES | CENTER | 5526  |  |  | SAM-2       |  |                                    |

South America  
Regional SUP  
INFO

RSI

RSI

South America  
Regional SUP  
INFO

06-AUG-2020

SAM

R-160

| Call Sign (Note 1)           | FREQ kHz | OPS HR | SELCAL (Note 2) | HF Network | PRY/SE C | Remarks                            |
|------------------------------|----------|--------|-----------------|------------|----------|------------------------------------|
| BUENOS AIRES CENTER (EZEIZA) | 8855     |        |                 | SAM-2      |          | International flights via Atlantic |
| BUENOS AIRES CENTER (EZEIZA) | 10096    |        |                 | SAM-2      |          |                                    |
| BUENOS AIRES CENTER (EZEIZA) | 2965     |        |                 |            |          | Domestic flights                   |
| BUENOS AIRES CENTER (EZEIZA) | 5547     |        |                 |            |          |                                    |
| BUENOS AIRES CENTER (EZEIZA) | 11282    |        |                 |            |          |                                    |
| BUENOS AIRES CENTER (EZEIZA) | 3016     |        |                 |            |          | Domestic flights                   |
| BUENOS AIRES CENTER (EZEIZA) | 5574     |        |                 |            |          |                                    |
| BUENOS AIRES CENTER (EZEIZA) | 6586     |        |                 |            |          |                                    |
| BUENOS AIRES CENTER (EZEIZA) | 10006    |        |                 |            |          |                                    |
| CHILE CHICO                  | INFO     | 5454   |                 |            |          |                                    |
| COCHRANE                     | INFO     | 5454   |                 |            |          |                                    |
| COMODORO RIVADAVIA           | CENTER   | 2965   |                 |            |          | Domestic flights                   |
| COMODORO RIVADAVIA           | CENTER   | 5547   |                 |            |          |                                    |
| COMODORO RIVADAVIA           | CENTER   | 6598   |                 |            |          |                                    |
| COMODORO RIVADAVIA           | CENTER   | 11282  |                 |            |          |                                    |
| CORDOBA                      | CENTER   | 2944   |                 | SAM-1      |          | International flights via Pacific  |
| CORDOBA                      | CENTER   | 6649   |                 | SAM-1      |          |                                    |
| CORDOBA                      | CENTER   | 10024  |                 | SAM-1      |          |                                    |
| CORDOBA                      | CENTER   | 3016   |                 |            |          | Domestic flights                   |
| CORDOBA                      | CENTER   | 6586   |                 |            |          |                                    |
| CORDOBA                      | CENTER   | 10006  |                 |            |          |                                    |
| COYHAIQUE                    | INFO     | 5454   |                 |            |          |                                    |
| FUTALEUFU                    | INFO     | 5454   |                 |            |          |                                    |
| GUAYAQUIL                    | RADIO    | 4669   |                 | SAM-1      |          |                                    |
| GUAYAQUIL                    | RADIO    | 6649   |                 | SAM-1      |          |                                    |

|           |         |       |     |     |       |  |                   |
|-----------|---------|-------|-----|-----|-------|--|-------------------|
| GUAYAQUIL | RADIO   | 10024 |     |     | SAM-1 |  |                   |
| GUAYAQUIL | RADIO   | 11360 |     |     | SAM-1 |  |                   |
| GUAYAQUIL | RADIO   | 5595  |     |     |       |  |                   |
| GUAYAQUIL | RADIO   | 6535  |     |     |       |  |                   |
| LA PAZ    | RADIO   | 6649  |     |     | SAM-1 |  | Unserviceable UFN |
| LA PAZ    | RADIO   | 10024 |     |     | SAM-1 |  | Unserviceable UFN |
| LA PAZ    | RADIO   | 5526  |     |     | SAM-2 |  | Unserviceable UFN |
| LA PAZ    | RADIO   | 8855  |     |     | SAM-2 |  | Unserviceable UFN |
| LA PAZ    | RADIO   | 10096 |     |     | SAM-2 |  | Unserviceable UFN |
| LA PAZ    | INFO    | 6622  |     |     |       |  |                   |
| LIMA      | CONTROL | 6649  |     | YES | SAM-1 |  |                   |
| LIMA      | CONTROL | 10024 |     | YES | SAM-1 |  |                   |
| MARSH     | RADIO   | 6649  | O/R |     | SAM-1 |  |                   |
| MARSH     | RADIO   | 10024 | O/R |     | SAM-1 |  |                   |

06-AUG-  
2020  
SAM

R-170

South America  
Regional SUP  
INFO

RSI

RSI

South America  
Regional SUP INFO

| Call Sign <small>(Note 1)</small> |       | FREQ kHz | OPS HR | SELCAL <small>(Note 2)</small> | HF Network | PRY/SEC | Remarks                                |
|-----------------------------------|-------|----------|--------|--------------------------------|------------|---------|----------------------------------------|
| MARSH                             | RADIO | 17907    | O/R    |                                | SAM-1      |         |                                        |
| MARSH                             | RADIO | 8867     | O/R    |                                |            |         |                                        |
| MENDOZA                           | RADIO | 2944     |        |                                | SAM-1      |         | International flights via Pacific      |
| MENDOZA                           | RADIO | 6649     |        |                                | SAM-1      |         |                                        |
| MENDOZA                           | RADIO | 10024    |        |                                | SAM-1      |         |                                        |
| MENDOZA                           | RADIO | 3016     |        |                                |            |         | Domestic flights                       |
| MENDOZA                           | RADIO | 6586     |        |                                |            |         |                                        |
| MENDOZA                           | RADIO | 10006    |        |                                |            |         |                                        |
| NEW YORK                          | RADIO | 3494     |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 6640     |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 8933     |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 11342    |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 13348    |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 17925    |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| NEW YORK                          | RADIO | 21964    |        | YES                            |            |         | LDOC - Santa Cruz, Bolivia Remote Site |
| PUERTO MONTT                      | RADIO | 5454     |        |                                |            |         |                                        |
| PUNTA ARENAS                      | RADIO | 3446     |        |                                |            |         |                                        |
| PUNTA ARENAS                      | RADIO | 5481     |        |                                |            |         |                                        |
| PUNTA ARENAS                      | RADIO | 6649     |        |                                | SAM-1      |         |                                        |
| PUNTA ARENAS                      | RADIO | 10024    |        |                                | SAM-1      |         |                                        |
| RESISTENCIA                       | RADIO | 2944     |        |                                | SAM-1      |         | International flights via Pacific      |
| RESISTENCIA                       | RADIO | 6649     |        |                                | SAM-1      |         |                                        |
| RESISTENCIA                       | RADIO | 10024    |        |                                | SAM-1      |         |                                        |
| RESISTENCIA                       | RADIO | 3016     |        |                                |            |         | Domestic flights                       |
| RESISTENCIA                       | RADIO | 5574     |        |                                |            |         |                                        |
| RESISTENCIA                       | RADIO | 10006    |        |                                |            |         |                                        |
| ROBINSON                          | INFO  | 10024    |        |                                |            |         |                                        |
| SANTIAGO                          | RADIO | 5583     |        |                                |            |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 4669     |        | YES                            | SAM-1      |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 6649     |        | YES                            | SAM-1      |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 10024    |        | YES                            | SAM-1      |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 3467     |        | YES                            | SP         |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 5643     |        | YES                            | SP         |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 8867     |        | YES                            | SP         |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 13261    |        | YES                            | SP         |         |                                        |
| SANTIAGO OCEANICO                 | RADIO | 13300    |        | YES                            |            |         |                                        |