Aviation Voice Services
Operating Procedures Handbook

February 8, 2023

Collins Aerospace

Revision History		
Date	***Rev***	***Action/Preparer***
4-Nov-91	-	Original Issue
17-Jun-92	A	ECN 00208/J.B. Metzger
12-Aug-93	B	ECN 1165/J.B. Metzger
		ECN 1375/J.B. Metzger
2-Feb-94	C	ECN 1895/J.B. Metzger
26-Aug-94	D	ECN 2455/J.B. Metzger
17-Apr-96	E	ECN 3602/J.B. Metzger
24-Apr-96	F	ECN 3620/J.B. Metzger
7-May-97	G	ECN 3637/J.B. Metzger
23-Sep-97	H	ECN 4386/J.B. Metzger
9-Jan-98	I	ECN 4555/J.B. Metzger
17-Sep-98	J	ECN 4955/J.B. Metzger
25-Apr-00	K	SPCR 34446/A. Stutz
6-Sep-01	L	SPCR 38297/A. Stutz
20-Jun-03	M	SPCR 47626/B. Kauffman
22-Sep-04	N	SPCR 54809/A. Stutz
1-Jun-05	O	SPCR 56592/B. Kauffman
17-Jun-05	P	SPCR 56873/B. Kauffman
11-Sep-06	Q	SPCR 59643/B. Kauffman
27-Sep-06	R	SPCR 59705/B. Kauffman
18-Apr-07	S	SPCR 60607/B. Kauffman
18-May-09	T	AVIAS00003082/B. Kauffman
8-Jul-10	U	AVIAS00003117/B. Kauffman
26-Mar-12	V	AVIAS00003185/B. Kauffman
15-Apr-13	W	AVIAS00003223/B. Kauffman
28-Mar-14	X	B. Kauffman
14-Sep-16	Y	AVIAS00003285/A.Ward
26-Feb-20	Z	AVIAS00003445/N. Bradfield
8-Feb-23	AA	A.Kroner

ACRONYMS

ACARS	Aircraft Communications Addressing and Reporting System
A/G	Air/Ground
AFTN	Aeronautical Fixed Telecommunications Network
AOC	Aeronautical Operational Control
ARTCC	Air Route Traffic Control Center
ASRI	Aviation Spectrum Resources, Inc.
ATC	Air Traffic Control
AviNet®	Integrated network of message processing and switching processors
AVS	Aviation Voice Services
CAR	Caribbean
CEP	Central East Pacific
CFR	Code of Federal Regulations
CPDLC	Controller Pilot Data Link Communication
CWP	Central West Pacific
DTMF	Dual Tone Multi-Frequency
FAA	Federal Aviation Administration
FIR	Flight Information Region
GES	Ground Earth Station
GoM	Gulf of Mexico
HF	High Frequency
ICAO	International Civil Aviation Organization
INMARSAT	International Maritime Satellite Telecommunications Company
LDOCF	Long Distance Operational Control Facility
MWARA	Major World Air Route Area
NAT	North Atlantic
NP	North Pacific
RO	Radio Operator
SATCOM	Satellite Communications
SATVOICE	Satellite Voice
SELCAL	Selective Calling System
SMI	Standard Message Identifier
SMT	Standard Message Text
SP	South Pacific
SSB	Single Sideband
TEI	Text Element Identifier
VHF	Very High Frequency

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1. DESCRIPTION OF SERVICES

ARINC Incorporated, a part of Collins Aerospace, Connected Aviation Solutions (CAS), has been providing operational communications services to the aviation industry since 1929.

The Air/Ground Voice Services are provided by communications centers located in Islip, New York and Livermore, CA, and encompass Air Traffic Control (ATC) communications for the Federal Aviation Administration (FAA) and Aeronautical Operational Control (AOC) communication services for the airlines and other aircraft operators. High Frequency (HF) and Very High Frequency (VHF) voice radio are the primary means of air/ground communications, supplemented by data link, International Maritime Satellite Telecommunications Company (INMARSAT) and Iridium Satellite Voice Communications (SATVOICE).

ARINC Air/Ground communications services primarily consist of radio relay – passing information between aircraft and the FAA or their company dispatch center. This relay occurs in the form of message transcription and the establishment of a radio-to-telephone communications link, called a phone patch, to give customer operations personnel the ability to talk directly to aircrews over ARINC radio systems. These systems have the capability to conference in additional parties such as maintenance offices and in-flight medical consultation services. Additionally, communications centers can provide weather reports and forecasts on request.

To ensure that domestic and flag air carriers comply with FAR 121.711, all company radio frequencies and facilities (including VHF enroute networks and all incoming/outgoing phone lines) are continuously recorded at each communications center. Where the two communications centers are on the same frequency or frequencies, recordings are made for each. An air carrier's or aircraft operator's authorized representative may request an audio recording and/or message file(s) of their aircraft's communications with a Communications Center. Audio files are retained for 45 days from the date of the recording.

1.1 Air/Ground Domestic Radio

The Air/Ground Domestic Radio (AGDR) service provides communication relay services via phone patch or AviNet Messaging between aircraft operating above the contiguous United States, Mexico, and the west coast of Canada and Alaska and their dispatch centers. These services are provided utilizing a network of over 109 VHF radios. See the ARINC 1 and 5 Jeppesen Charts for coverage areas and corresponding frequencies. See the ARINC 2 and 6 Jeppesen charts for a list of on-ground coverage in the United States and Mexico.

1.2 Air/Ground International Radio

The Air/Ground International Radio (AGIR) service provides radio relay services to aircraft operating in oceanic airspace or in coastal regions of the U.S., Canada, Gulf of Mexico, and the Caribbean. These services are provided by HF and VHF radio as well as Satellite Voice (SATVOICE).

ATC communications services are provided for the FAA in the Anchorage, Houston, Miami, New York, and Oakland Flight Information Regions (FIRs) and the San Juan CERAP airspace on Major World Air Route Area (MWARA) HF radio frequencies. Coastal VHF communications are used for transitioning aircraft between domestic and oceanic airspace as well as communicating with non-HF equipped aircraft operating near domestic boundaries. As part of the AGIR communications service, airlines can have aircraft position reports dual routed to the FAA and the company dispatch office for flight following.

1.2.1 Atlantic – HF Groups

NAT (North Atlantic): The North Atlantic area of responsibility extends from the Moncton (CZQM) boundary south of Nova Scotia east to the Gander (CZQX) boundary south of Newfoundland at 4430N. The boundary then extends to Santa Maria (LPPO) boundary at 040W. The boundary with Santa Maria at 40W extends from 44030N to 2219N. The Piarco (TTZP) boundary extends from 2219N040W to 18N045W and continues west at 18N to 6130W at the San Juan (TJZS) boundary. The boundary then extends north at 60W to 4430N.

CAR (Caribbean): The Caribbean area of responsibility extends from approximately 39N060W south to the San Juan (TJZS) boundary at 18N06130W. The boundary then extends westward north of the Caribbean islands (St. Kitts, Guadeloupe, Antigua, Martinique), north of Puerto Rico and to the Miami boundary north of the Bahamas to 28N076W. CAR Extends northward to the boundaries with Jacksonville (KZJX) and New York ARTCC (KZNY) from 32N077W to 35N072W. The New York boundary extends to 39N067W again out to 39N060W.

1.2.2 Pacific – HF Groups

NP (North Pacific): The North Pacific is considered to be above 37N and west of 150W, west to the Tokyo FIR at 165E, and includes the Anchorage FIR and Russian Airspace. Some checkpoints along the Aleutian chain are in VHF range of remote relay stations; therefore, Anchorage controllers communicate directly with flights along much of their route. Tokyo Radio is the only other radio station using the North Pacific frequency groups

NP/Polar Routes: Anchorage ARTCC's current radio voice capabilities in the Arctic CTA do not extend past N75°. Lack of satellite coverage in the polar region affects CPDLC coverage as well. Because of the lack of ATC communications available in the Polar region, SFO provides communications using the NP1 HF family as primary and the Barrow, Alaska LDOCF as a secondary means for these aircraft.

CWP (Central West Pacific): The frequencies of the Central West Pacific family cover a vast amount of territory. The boundaries of the Oakland FIR have neighboring control authorities and radio stations. San Francisco shares this frequency group with Tokyo, Manila, and Port Moresby. The West Pacific frequencies are divided into 2 groups. CWP- 1 generally works flights east of 170E and flights traveling between Honolulu and the Orient, and CWP-2 works flights in the Guam area, west of 170E.

SP (South Pacific): Most flights traveling to and from the South Pacific operate during the mid-shift. Generally, the lower frequencies of the SP family are reliable during these hours. Several ground stations share this group: Brisbane, Auckland, Nadi, Tahiti, and San Francisco. Station interference is not normally a problem. Most flights leave SFO radio guard and enter Nadi's guard. Nadi radio operators (ROs) occasionally work traffic well into the SFO guard area when atmospheric conditions make reading the flights difficult.

CEP (Central East Pacific): The Central East Pacific has composite route structures which primarily cover the areas between the Continental United States and Hawaii. It also covers the route structures between Canada and Hawaii. When assuming radio guard on CEP flights, flights will monitor the primary and secondary HF assignment and set the aircraft transponder unit on code 2000 (also called Squawk Code).

2. COVERAGE AREAS

Control Point	Coverage	VHF	HF	Jeppesen Chart
New York	Eastern U.S. Maritime Canada	129.9 MHz	ATC - As assigned AOC - All LDOCF Frequencies	ARINC-1/2 ARINC-3
	North Atlantic	N/A		ARINC-3
	Gulf of Mexico Caribbean	130.7 MHz		ARINC-1/2 ARINC-3 ARINC-5/6
	South America	N/A	AOC - All LDOCF Frequencies	ARINC-9
San Francisco	Pacific Coast	131.95 MHz	ATC - As assigned AOC - All LDOCF Frequencies	ARINC-1/2 ARINC-4
	Coastal Alaska	129.4 MHz		ARINC-1/2 ARINC-4
	Pacific Ocean	N/A		ARINC-4
	Hawaii, Guam	131.95 MHz		ARINC-4
	Domestic U.S.	Various	N/A	ARINC-1/2
	Mexico	130.7 MHz	AOC - All LDOCF Frequencies	ARINC-5/6
	Coastal Asia	N/A		ARINC-4 ARINC-7
	North Pole	N/A		ARINC-4

ARINC operates 7 Long Distance Operational Control (LDOC) facilities which provide AOC communications to customers throughout the following regions; North Atlantic, South/Central American, Caribbean, Pacific and North Pole.

All aircraft operating on international routes in these areas of the world should maintain a listening watch or SELCAL guard on the appropriate ICAO MWARA frequencies.

ARINC LDOC stations operate on the same set of HF frequencies for ease of use and overlap between stations. Flight crews operating can expect to continue to pass routine Air/Ground messages on the ICAO MWARA enroute radio telephone HF or VHF networks.

ARINC LDOC Frequencies
3494 kHz
6640 kHz
8933 kHz
11342 kHz
13348 kHz
17925 kHz
21964 kHz

3. PROCEDURES

3.1 Air-to-Ground Calling

Prior to flight, the aircrew or the dispatch center can receive primary and secondary frequency assignments from the Communications Center based on geographic location and time of day. Additionally, the Communications Centers can add the dispatch center to distribution of regularly published frequency assignment e-mail broadcast messages so the best frequencies are always available within the customer operation. Updated frequencies for both Communications Centers are also available at www.radio.arinc.net.

If company communications are required during flight, an LDOC frequency assignment can be requested from the ARINC Radio Operator handling that flight's ATC communications.

For all of the HF and VHF frequencies, international and domestic regions, flight crews should be prepared to include the following information when transmitting a company message to a Communications Center by voice:

1. Aircraft flight identification as filed in the flight plan and currently being used in communications with air traffic control facilities and aircraft registration.
2. Transmitting frequency.
3. Message delivery instructions and the name of the company operating the aircraft.
4. Aircraft SELCAL code, if applicable.

Example:

Flight: "San Francisco, this is ACME fower-too on ate-niner-tree-tree."

Operator: "ACME fower-too, San Francisco, Go Ahead."

Flight: "San Francisco, ACME fower-too, SELCAL AQ-HS, Request Phone Patch with company dispatch."

Radio Operators transcribe all Air/Ground messages for immediate transmission through AviNet® messaging system (or via telephone if the customer does not have AviNet or AFTN messaging capabilities).

The flight crews should transmit their messages at a moderate speed to avoid unnecessary repetition. During transmission of a lengthy message, the flight crew should pause at intervals to ensure that the radio operator has the message complete to that point.

3.2 Ground-to-Air Calling

For Ground to Air communications, a ground party simply needs to contact the Communications Center responsible for the airspace where the aircraft is located using the information provided in the communications directory (Section 7). Note that aircraft need to be guarding ARINC frequencies in order to be heard by ARINC Radio Operators. When contacting a Communications Center to request contact with an aircraft, the caller should have approximate aircraft position, SELCAL, and callsign/flight ID information readily available to give to the Radio Operator.

3.3 SatVoice

ARINC can establish SATVOICE contact/message transcription and relay between aircraft/ground parties. For Air-to-Ground dialing, aircraft should use the SATVOICE short codes listed in Section 7, or dial the full phone number listed. When requesting Ground-to-Air call setup, please be prepared to provide aircraft Octal Codes. ARINC has a record of aircraft Octal Codes for most aircraft that transit the U.S. airspace. In some cases the Octal Code of the aircraft may have to be presented to the ARINC Radio Operator.

3.4 VHF Self-Serve Phone Patch

The ARINC radio system in the domestic U.S. and Mexico have additional features that allow customers to set up phone patches without the assistance of a Radio Operator. These features are not available on HF radio systems or on VHF radio systems in the Caribbean or east/west coast VHF nets.

3.4.1 Air-to-Ground DTMF Dialing

If the aircraft is equipped with a Dual-Tone Multi Frequency (DTMF) microphone, the ARINC radio system can be pre-programmed with speed dial number accessible by the customer aircraft to automatically dial the destination number.

DTMF microphones allow direct phone patch connections via Air-to-Ground VHF networks managed by San Francisco. Prior coordination with ARINC is necessary to set up customer access and office phone numbers in the system. ARINC will assign and configure 5-digit dialing numbers for ground party designated by the customer.

To initiate a DTMF call on the Domestic VHF networks, complete the following:

1. Setup and Dial Procedure
    - Tune VHF radio to area or ground frequency relative to the aircraft position shown on the Jeppesen ARINC-1 and ARINC-2 charts. Monitor the network for several seconds to see if it is already in use.
    - Push and hold the "Push to Talk" button on a DTMF equipped aircraft microphone.
    - Carefully key in the three-digit airline code followed by the two-digit “call to” location number.
    - Press the # key within 20 seconds of the last digit entered to “launch” the call.
    - Release the “Push to Talk” button after the five-digit and # tone sequence is transmitted.
    - Monitor the frequency while the ground system dials the phone number and ground party answers.
    - When the call is connected, conduct the call like any simplex phone patch using normal radio telephony procedures.
    - Press 0 # at the end of calls to terminate the call and release the network.
2. Assistance Notes
    - If an error is made while dialing, press * to clear all previous digits entered.
    - Call setup takes approximately 5-10 seconds.
    - A three-tone signal is heard when the dialing sequence is unsuccessful.
    - Press 0 # to disconnect all calls.
    - The ground party may disconnect the call by ‘hanging up’.
3. Radio Operator Assistance
    - Operator assistance is available at all times by pressing the 0 # keys to terminate the existing call; initiate standard Domestic Voice Operations procedures to reach a Radio Operator.

    Note: Since the direct dial feature on the Domestic VHF networks does not involve the assistance of a Radio Operator, call logs including flight ID, tail number, and a summary of the

information exchanged are not logged for these types of calls. However, radio traffic audio is recorded and retained 45 days.

3.4.2 Ground-to-Air Dialing

The domestic voice service has the capability for customers to directly access VHF networks using standard phone equipment and Company authorized access code. This allows operations and dispatch offices to make direct ground-to-air contact with their aircraft without Radio Operator intervention. Prior authorization and configuration by ARINC is required to use this Direct Access feature.

VHF Direct Access customers gain access to the networks using these specific procedures. From any touch-tone phone, perform the following:

1. Determine the location of your aircraft and identify the nearest VHF network to access.
2. Dial the access number (925) 371-1299.
3. After the ringing, a "chirp" and single "beep" will be heard.
4. After the beep, enter the Company access code and 2-digit network code (see table below).

Frequency	*Network*	*Access Code*
129.40	YN	01
131.175	MZ	02
129.45	IJ	03
128.90	JN	04
130.40	JD	05
131.80	KY	06
129.40	II	07
130.70	MX	08

5. If the correct access and network codes have been entered, a low-high 2-tone acknowledgment will be heard and the call will be connected.
6. If an incorrect access code or network code has been entered, three beeps will be heard and the call will be disconnected.
7. To change networks, you must hang up and redial.

Once the call is established:

1. Maintain silence for several seconds and monitor the network to see if it is in use.
2. Contact your aircraft.
3. Terminate the connection by hanging up the phone.

Standards for use:

1. Use only accepted phraseology and strict radio discipline.
2. Limit distribution of your access code to a small number of users.
3. For security purposes, it is not possible to change networks without hanging up and dialing back into the system.
4. Never use a speakerphone when using VHF Direct Access.
5. Keep background noise (e.g., typing, nearby conversations) to an absolute minimum when using this system.
6. Failure to comply with these standards will result in termination of Direct Access use.

Note: SELCAL is not supported over Dial Access and aircrews must guard VHF frequencies to receive Dial Access calls.

4. SELECTIVE CALLING SYSTEM (SELCAL)

4.1 Description of Service

The Selective Calling System, known as SELCAL, is a signaling method to alert an individual aircraft that a ground station wishes to communicate with it. SELCAL signals can be transmitted over HF or VHF radio telephone channels. A SELCAL transmission consists of a combination of four pre-selected audio tones whose transmission requires approximately two seconds. The tones are generated in the Communications Center's SELCAL encoder and are received by a decoder connected to the audio output of the aircraft receiver. Properly working SELCAL relieves the flight crew from maintaining a listening watch on assigned frequencies. This is especially useful on noisy HF channels.

4.2 Operation

Receipt of the assigned SELCAL codes activates a cockpit call system in the form of a light, chime signals, or both. On aircraft equipped with SELCAL, the flight crew has the capability to also maintain a conventional listening watch using headsets or cockpit speaker. Due to technical incompatibilities, the HF SSB suppressed carrier mode of operation will not be used to transmit SELCAL signals. Many aircraft HF SSB transceivers are designed to detect SELCAL signals transmitted in the full carrier mode even though the transceiver mode selector switch is in the suppressed carrier mode. Those transceivers not designed with this feature must have the selector switch in the full carrier mode of operation to reliably detect a SELCAL signal. The mode selector switch must be restored to the suppressed carrier mode before making voice transmissions.

SELCAL codes are assigned to aircraft operators and not to individual aircraft. Aviation Spectrum Resources (ASRI) is the registrar of SELCAL codes worldwide. Contact ASRI for SELCAL code issuance or code changes of any nature using the contact information at the end of this document.

4.3 SELCAL Tones

SELCAL units are based on 16 tone/letter assignments and are generally shared with more than one aircraft. ASRI as the SELCAL registrar, attempts to minimize assignment of duplicate SELCAL codes. This is accomplished by tracking SELCAL code assignment to the geographical area of operation. However, with jet aircraft, it is not uncommon to have more than one aircraft with the same SELCAL operating in the same geographical area at the same time. Owners of older aircraft should notify the ASRI SELCAL registrar of any change in geographical areas of operation. SELCAL systems are currently being expanded to include an additional 16 tones to increase the number of assignable codes and reduce duplicate assignments across the air transport industry.

Flight crews of SELCAL-equipped aircraft should be alert for possible duplication of SELCAL codes; listen closely to the Flight Identification (ID), as well as SELCAL, to avoid taking a clearance or other instructions meant for another flight.

5. PERMISSIBLE COMMUNICATIONS

Collins Aerospace is authorized to operate aviation radio stations in the aeronautical enroute band. These frequencies provide AOC communications to aircraft operators. It is through these radio stations that the aforementioned services are provided. ICAO defines AOC communications as those “required for the exercise of authority over the initiation, continuation, diversion, or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of a flight”. The operation of these stations is governed by rules contained in CFR part 87 (Aviation Services). Allowable communications on these stations is strictly enforced as outlined in the Scope of Service section contained in CFR 87.261(a), which states, “Aeronautical enroute stations provide operational control communications to aircraft along domestic or international air routes. Operational control communications include the safe, efficient and economical operation of aircraft, such as fuel, weather, position reports, aircraft performance and essential services and supplies. Public correspondence is prohibited”.

Specific types of *permissible* communications include those pertaining to the following:

- Communications relating to the initiation, continuation, diversion or termination of a flight.
- Performance of the aircraft, including its components.
- Aircraft servicing, including fueling, deicing and maintenance.
- Information of value to a flight crew that will enable the safe and efficient completion of a flight.
- Information of value to ground personnel concerned with the safe and efficient operation of a flight.
- Information of value to other flights in the same area.
- Information and corrections pertaining to weight, balance and passenger/cargo counts.
- Urgent medical information.
- Connections with other transportation (including ground transportation) and ongoing air transportation.
- Provisioning of essential supplies and services.

The following types of communications are *unacceptable*, except in an emergency situation:

- Public correspondence.
- Personal messages to or from crew members or passengers.
- All other communications that do not fall into the permissible communications category.

Radio Operators monitor all phone patches and will ensure that only permissible message traffic is handled. They are instructed to discontinue phone patches that contain unacceptable communications, and concerned users will be contacted as follow-up to these procedures.

6. AVINET AND AFTN MESSAGES

6.1 Message Format

Air/Ground messages transmitted from the Communications Centers are in Standard Message Text (SMT) format. A message type is identified by a Standard Message Identifier (SMI) on the first line of message text. Each element of message text is identified by a Text Element Identifier (TEI). An element of message text that cannot be associated with a TEI is entered as Free Talk. The Free Talk portion of the message is identified by a dash symbol followed by a space. The SMT format was developed primarily for airline use within their host computer flight management systems.

6.1.1 Standard Message Identifiers (SMIs)

AEP	Position Report with Weather Information
AGM	Miscellaneous A/G Message
ALR	Alert Message
ARR	Arrival Report
DEP	Departure Report
DLA	Flight Delay
ETA	Estimated Time of Arrival
GVR	Ground-Originated Voice Request
POS	Position Report without Weather Information

6.1.2 Text Element Identifiers (TEIs)

AD	Arrival Aerodrome
AF	Able Flight Level
AL	Altitude or Flight Level
AN	Aircraft Number
BF	Boarded Fuel (in gallons unless otherwise indicated)
CP	Cargo Payload
CZ	Cruising Speed
DA	Departure Aerodrome
DC	Delay Code
DS	Destination Station
DT	Communication Service Information
ED	Estimated Time of Departure
EN	Endurance (fuel endurance in hours and minutes)
EO	Estimated Time Over
FB	Fuel on Board (in lbs. unless otherwise indicated)
FI	Flight Identification
IC	Icing
IN	Time In
LP	Logbook Page
MN	Maintenance
NP	Next Report Point

OF	Time Off
ON	Time On
OS	Other Supplementary Information
OT	Out Time
OV	Present Position Over
PB	Persons on Board
RF	Request Flight Level
RI	Return in Time
RO	Return on Time
RT	Route Information
SK	Sky Conditions
SL	SELCAL Code
TA	Static Air Temperature
TB	Turbulence
WV	Wind Information (Direction xxx, Speed xxx)
WX	Weather with no Assigned TEI
ZW	Zero Fuel Weight (in lbs. unless otherwise indicated)

Example - Departure Report:

```
QU JFKOOXX
SFOXGXA 121937
DEP
FI N1234/DA JFK/OT 1934/OF 1936/DS ORD 2145
DT SFO IH 121936 02
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Decoded:

DEPARTURE REPORT FOR N1234, DEPARTED KENNEDY (JFK) OUT OF BLOCKS 1934Z, OFF 1936Z, ESTIMATING DESTINATION STATION O'HARE (ORD) AT 2145Z

Example - Int'l Position Report with Weather:

```
QU SFOOOXX FAAOOXA
SFOXGXA 122020
AEP
FI N1234/OV BAART 2016 F290/EO BARAZ 2105/NP BILLO
TA MS40/WV 260010/SK CLR/TB SMTH
DT SFO VE A 122020 15
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Decoded:

INTERNATIONAL POSITION REPORT FOR N1234, OVER FIX BAART AT 2016Z, AT FL290, ESTIMATING OVER FIX BARAZ AT 2105Z, NEXT FIX BILLO, TEMPERATURE MINUS FORTY DEGREES CELSIUS, WIND VELOCITY 260˚AT 010 KNOTS, SKY CLEAR, TURBULENCE SMOOTH.

7. COMMUNICATIONS DIRECTORY

7.1 Radio Operations

Center	Phone	AviNet (IATA)	ICAO/AFTN	Email	Call Sign
NYC	(800) 645-1095	NYCXGXA	KNYCXAAG	nycradio@collins.com	New York
NYC Phone Patch	631.589.7272				
SFO	(800) 621-0140	SFOXGXA	KSFOXAAG	sforadio@collins.com	San Francisco
SFO Phone Patch	925.453.3547				

7.2 Air-to-Ground SatVoice

Center	SATVOICE Short Code
NYC	436623
SFO	436625

7.3 Administrative

Location	Mailing Address	Phone Number	Email
NYC	613 Johnson Ave Bohemia, NY 11716	(631) 244-2480	nycmgr@collins.com
SFO	6011 Industrial Way Livermore, CA 94551	(925) 294-8400	sfomgr@collins.com
AVS PMO	2551 Riva Road Annapolis, MD 21401	(410) 266-4264	Voice-Svcs@collins.com
ASRI	180 Admiral Cochrane Dr. #300 Annapolis, MD 21401	(410) 266-6030	info@asri.aero

For additional information or to download copies of Jeppesen charts, visit the Aviation Voice Services website.