



PRINCIPAL AIR LTD

FLIGHT TRAINING / CHARTER

Study Guide for the Radiotelephone Operator's Restricted Certificate (Aeronautical)

General Information

Application

Applications to be examined for the Radiotelephone Operator's Restricted Certificate (Aeronautical) should be made to the nearest office of Industry Canada listed in Appendix F. The Department also has approved examiners, engaged in the aeronautical industry, who conduct examinations on behalf of the Department.

Candidate Requirements

The examination may consist of written, practical and oral exercises. The candidate must satisfy an examiner that he or she:

- is capable of operating radiotelephone equipment;
- possesses a general knowledge of radiotelephone operation procedures, of the international regulations applicable to the aeronautical service and, specifically, of those regulations relating to the safety of life;
- possesses a general knowledge of the *Radio Act* and the regulations made thereunder.

Eligibility

There are no nationality or age restrictions as to who may take the examination for, or hold a Radiotelephone Operator's Restricted Certificate (Aeronautical). Candidates must attest that they do not have a disability that would impair their ability to operate a radio station safely.

Documentation

Identification must be presented at the examination. A driver's license, a birth certificate, a baptismal certificate, a Certificate of Canadian Citizenship, or a Canadian Immigration Identification Card will all be accepted as proof of identity.

Regulations

Radio Operator's Certificate Requirements

A Radiotelephone Operator's Restricted Certificate (Aeronautical) is required by the operator of radiotelephone equipment on board aircraft and at aeronautical land (fixed and mobile) radio stations using aeronautical mobile frequencies. The radiotelephone equipment at such stations shall be of a type that requires only simple external switching and with a power output not exceeding 250 watts (peak envelope power) and where all frequency-determining elements are preset within the transceiver.

Radiotelephone operator's restricted certificates are issued for life and no revalidation is required. Please contact the nearest district office if your certificate is lost or requires replacement.

Priorities of Communications - Aeronautical Service

The order of priority for transmission of messages in the aeronautical service is:

1. Distress communications.
2. Urgency communications.
3. Communications relating to radio direction-finding.
4. Flight safety messages.
5. Meteorological messages.
6. Flight regularity messages.
7. Messages relating to the application of the United Nations Charter.
8. Government messages for which priority has been expressly requested.
9. Service communications relating to the workings of the telecommunication service or to communications previously exchanged.
10. All other aeronautical communications.

Secrecy of Communications

Radio operators and all persons who become acquainted with radiocommunications are bound to preserve the secrecy of communications. No person shall divulge the contents, or even the existence, of communications transmitted, received or intercepted by a radio station, except to the addressee of the message or his accredited agent, or to properly authorized officials of the Government of Canada or a competent legal tribunal, or an operator of a telecommunications system as is necessary for the furtherance of delivery of the communication. These restrictions do not apply to a message of distress, urgency, safety or to messages addressed to "ALL STATIONS", that is, weather reports, storm warnings, etc.

Any person who violates the secrecy of communications is liable, on summary conviction, in the case of an individual, to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars.

Control of Communications

In communications between aeronautical ground stations and aircraft stations, the aircraft station shall comply with the instructions given by the ground station in all matters relating to the order and time of transmission, the choice of frequency and to the duration and suspension of work. This does not apply in the cases of distress or urgency communications, where the control of the communications lies with the station initiating the priority call.

The operation of an aircraft station is under the control of the pilot or other person in charge of the station.

In communications between aircraft stations, normally the station **called** is the controlling station. If the station called is in agreement with the calling station, it shall transmit an indication that from that moment onwards it will listen on the working frequency or channel announced by the calling station. However, if the station called is not in agreement with the calling station on the working frequency or channel to be used,

it shall transmit an indication of the working frequency or channel to be used.

Examples:

a) Ground station calling an aircraft (the ground station has control of radiocommunications)

PIPER CHARLIE FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
OTTAWA RADIO
GO AHEAD ON TOWER FREQUENCY ONE TWO TWO DECIMAL ONE
OVER

b) Aircraft calling a ground station (the ground station has control of radiocommunications)

OTTAWA RADIO
THIS IS
PIPER CHARLIE FOXTROT X-RAY QUEBEC QUEBEC
ON FREQUENCY ONE TWO TWO DECIMAL ONE
OVER

c) One aircraft to another aircraft (the aircraft being called has the control of radiocommunications)

CESSNA CHARLIE FOXTROT X-RAY QUEBEC TANGO
THIS IS
PIPER CHARLIE FOXTROT X-RAY QUEBEC QUEBEC
ON FREQUENCY ONE ONE NINE DECIMAL SEVEN
OVER
PIPER CHARLIE FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
CESSNA CHARLIE FOXTROT X-RAY QUEBEC TANGO
CHANGE TO SEARCH AND RESCUE FREQUENCY ONE TWO
DECIMAL SIX
OUT

Superfluous Communications and Interference

Communications should be restricted to that necessary for the transmission of authorized messages. Profane or obscene language is strictly prohibited.

Any person who violates the regulation relative to unauthorized communications or profane language is liable, on summary conviction, in the case of an individual, to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars.

All radio stations shall be installed and operated so as not to interfere with or interrupt the working of another radio station. The only situation under which you may interrupt or interfere with the normal working of another station is when you are required to transmit a higher priority call or message, for example, distress, urgency or other priority calls or messages.

Any person who, without lawful excuse, interferes with or obstructs any radiocommunication is liable, on summary conviction, in the case of an individual, to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars.

False Distress Signals

Any person who knowingly sends, transmits, or causes to be sent or transmitted any false or fraudulent distress signal, message, call or radiogram of any kind is guilty of an offence and is liable, on summary conviction, in the case of an individual, to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars.

Operating Procedure

Speech Transmission Techniques

The efficient use of radio depends to a large extent on the method of speaking and on the articulation of the operator. As the distinctive sounds of consonants are liable to become blurred in the transmission of speech and as words of similar length containing the same vowel sounds are apt to sound alike, special care is necessary in their pronunciation.

When using radio, the operator should speak all words plainly and each word clearly to prevent words from running together. Avoid any tendency to shout, to accent syllables, or to talk too rapidly. The following points should be kept in mind when using radio:

- Speed: Keep the rate of speech constant, neither too fast nor too slow. Remember that the operator receiving your message may have to write it down.
- Rhythm: Preserve the rhythm of ordinary conversation. In separating words so that they are not run together, avoid the introduction of unnecessary sounds such as "er" and "um" between words.

Time and Date

The twenty-four hour clock system should be used to express time in the Aeronautical Service. Time should be expressed and transmitted by means of four figures, the first two denoting the hour past midnight and the last two the minutes past the hour.

- Examples:**
- 12:45 a.m is expressed as 0045
 - 12:00 noon is expressed as 1200
 - 11:45 p.m is expressed as 2345
 - 12:00 midnight .. is expressed as 2400 or 0000
 - 1:30 a.m is expressed as 0130
 - 1:45 p.m is expressed as 1345
 - 4:30 p.m. is expressed as 1630

Time is usually referenced to one standard time zone, Co-ordinated Universal Time (UTC) (formerly referred to as Greenwich Mean Time (GMT)) to avoid confusion between different time zones. The letter Z is the accepted abbreviation for UTC. When operations are conducted solely in one time zone, standard or local time may be used.

Where the date, as well as the time of day, is required, a six-figure group should be used. The first two figures indicate the day of the month and the following four figures indicate the time.

Examples:

Noon (EST) of the 16th day of the month is expressed as 161200 E
2:45 a.m. (PST) of the 24th day of the month is expressed as 240245 P

Phonetic Alphabet

The phonetic alphabet is used to avoid confusion when transmitting difficult or unusual words. The following internationally recognized alphabet should be learned thoroughly so that it is readily available whenever isolated letters or groups of letters are pronounced separately, or when communication is difficult. Call signs should also be spelled phonetically.

The ITU (International Telecommunication Union) phonetic alphabet is:

Letter	Word	Pronounced as
A	Alfa	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE or SHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
G	Golf	GOLF
H	Hotel	HOH TELL
I	India	IN DEE AH
J	Juliett	JEW LEE ETT
K	Kilo	KEY LOH
L	Lima	LEE MAH
M	Mike	MIKE
N	November	NO VEM BER
O	Oscar	OSS CAH
P	Papa	PAH PAH
Q	Quebec	KEH BECK
R	Romeo	ROW ME OH
S	Sierra	SEE AIR RAH
T	Tango	TANG GO
U	Uniform	YOU NEE FORM or OO NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEY
Z	Zulu	ZOO LOO

Note: The syllables to be emphasized are in bold.

Numbers are pronounced as follows:

- 0 - ZE-RO 5 - FIFE
- 1 - WUN 6 - SIX
- 2 - TOO 7 - SEV-en
- 3 - TREE 8 - AIT
- 4 - FOW-er 9 - NIN-er

Transmission of Numbers

All numbers except whole thousands should be transmitted by pronouncing each digit separately. Whole thousands should be transmitted by pronouncing each digit in the number of thousands followed by the word "thousand".

Examples: 10 becomes - one zero
75 becomes - seven five
100 becomes - one zero zero
5,800 becomes - five eight zero zero
11,000 becomes - one one thousand
68,009 becomes - six eight zero zero nine

Numbers containing a decimal point shall be transmitted as above, with the decimal point indicated by the word "decimal".

Example: 121.5 becomes - one two one decimal five

Monetary denominations, when transmitted with groups of digits, should be transmitted in the sequence in which they are written.

Examples: \$17.25 becomes - dollars one seven decimal two five
.75 becomes - seven five cents

Altitude above sea level should be expressed in thousands plus hundreds of feet. Separate digits shall be used to express flight levels.

Examples: 2700 - Two thousand seven hundred
FL265 - Flight level two six five

Aircraft identification flight numbers, aircraft type numbers and wind speed numbers may be expressed in group forms.

Examples: Flight 320 - Flight three twenty
DC10 - DC10
Wind 270/10 - Wind two seven zero at ten

Time: Universal Time Co-ordinated (UTC)

Examples: 0920Z - Zero niner two zero zulu
09 - Nine minutes past the hour

Aircraft headings are given in groups of three digits. If operating within the Southern Domestic Airspace, the heading is expressed in degrees "magnetic". If operating within the Northern Domestic Airspace, the heading is expressed in degrees "true".

Examples: 005 degrees - Heading zero zero five
350 degrees - Heading three five zero

Aerodrome elevations are expressed in feet, prefixed by the expression "field

elevation".

Examples: 150 - Field elevation one five zero
3500 - Field elevation three thousand five zero zero

Procedural Words and Phrases

While it is not practical to set down precise phraseology for all radiotelephone procedures, slang expressions such as "OK", "REPEAT", "TEN-FOUR", "OVER AND OUT", "BREAKER BREAKER", "COME IN PLEASE", etc., should not be used. Appendix B contains a list of words and phrases that should be used where applicable.

Call Signs

A distinctive call sign is assigned to radio stations for identification purposes and should be used at least when initial contact is being established and again when the communication is concluded. Aeronautical call signs should always be pronounced phonetically.

An aircraft's call sign is the same as the aircraft's markings. The call sign or markings are permanently assigned to the aircraft by Transport Canada. The term "HEAVY" after the call sign is used to identify an aircraft capable of a take-off weight of 300,000 lbs. or more. After communication has been established, and when no likelihood of confusion exists, the word "HEAVY" may be omitted.

Canadian Air Carriers

Canadian Air Carriers use their assigned company name as a call sign followed by the flight number, or the last three characters of the aircraft registration, and the word "HEAVY" if applicable.

Example: AIR CANADA ONE FOUR NINE HEAVY

Canadian Private Civil Registration

Canadian private aircraft use the manufacturer's name or their type of aircraft, followed by the last four letters of the registration.

Example: CESSNA-182 GFAC (spoken: CESSNA ONE EIGHT TWO GOLF FOXTROT ALFA CHARLIE)

Ground Stations

Ground station identification is the name of the airport, followed by the type of station.

Examples:

Airport traffic control tower - Ottawa tower
Ground control position in tower - Toronto ground
Flight service station - Ottawa radio
IFR clearance delivery position - Edmonton clearance delivery
Terminal control position - Vancouver terminal
Arrival control position - Ottawa arrival
Departure control position - Winnipeg departure control

Precision radar position - Montreal precision
Area control centre - Montreal centre
Community aerodrome radio station - Eskimo Point airport radio
Unicom - Carp Unicom
Private ground station - Assigned call sign/place name

Radiotelephone Calling Procedure

As a general rule, it rests with the aircraft station to establish communication with the aeronautical ground station. For this purpose, the aircraft station may call the aeronautical ground station when it comes within the operational service area of the station. However, a ground station having traffic for an aircraft station within its operational service area may call that station.

When an aeronautical ground station receives calls from several aircraft stations at practically the same time, it decides the order in which these stations may transmit their traffic. Its decision shall be based on the priority status of the messages.

Calling

Before transmitting, every operator shall listen for a period long enough to satisfy himself that he will not cause harmful interference to transmissions already in progress. If such interference seems likely, he shall wait for the first break in the transmission. The identifier of the station being called is **ALWAYS** spoken first, followed by the words "THIS IS" and the calling station's identifier.

A station having a distress or urgency message to transmit is entitled to interrupt a transmission of lower priority.

Single Station Call

When an operator wishes to establish communication with a specific station, the following items shall be transmitted in the order indicated:

1. The call sign of the station called (not more than three times, once if radio conditions are good).
2. The words "THIS IS".
3. The call sign of the station calling (not more than three times, once if radio conditions are good).
4. The frequency on which the station is transmitting.
5. The invitation to reply ("OVER").

Example: TORONTO TOWER (repeated up to three times)
THIS IS
CESSNA ONE EIGHT FIVE - FOXTROT ALFA DELTA TANGO
ON FREQUENCY ONE ONE EIGHT DECIMAL SEVEN OVER

General Call

When an operator wishes to establish communication with any station within range or in a certain area, the call should be made to "ALL STATIONS" using the same procedure as a single station call.

Example: ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
TORONTO AIR RADIO (three times if necessary)

Multiple Station Call

If more than one station is to be called simultaneously, the identifiers may be transmitted in any convenient sequence followed by the words "THIS IS" and your call sign. As a general rule, operators replying to a multiple station call should answer in the order in which they have been called.

Example: CESSNA FOXTROT NOVEMBER INDIA LIMA
PIPER FOXTROT X-RAY QUEBEC QUEBEC
PIPER GOLF LIMA LIMA DELTA
(All repeated three times if necessary)
THIS IS
TORONTO TOWER (three times if necessary)

Replying

An operator hearing a call directed to his station shall reply as soon as possible and advise the calling station to proceed with his message with the words "GO AHEAD", or not to proceed with the message with the words "STAND BY", followed by the anticipated number of minutes of delay.

Examples: PIPER FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
TORONTO TOWER
GO AHEAD
OVER
PIPER FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
TORONTO TOWER
STAND BY TWO MINUTES
OVER

When an operator of a station hears a call but is not sure of the identity of the calling station, he should reply immediately using the words "STATION CALLING", his station's identification, and the words "SAY AGAIN" and "OVER".

Example: STATION CALLING CESSNA FOXTROT NOVEMBER JULIETT INDIA
SAY AGAIN

OVER

To terminate communications, simply conclude your transmission with the word "OUT" (which means "conversation is ended and no response is expected").

Example: TORONTO TOWER
THIS IS
PIPER FOXTROT X-RAY QUEBEC QUEBEC
RECEIVED RUNWAY CLEARANCE
OUT

Corrections

When an error has been made in transmission, the word "CORRECTION" should be spoken and the correct version transmitted.

Examples: OVER OTTAWA AT TWO SEVEN CORRECTION TWO EIGHT
PROCEED TO DOCK FOUR CORRECTION DOCK FIVE

If the receiving station requires the repetition of a message, the operator should use the words "SAY AGAIN". If repetition of only a portion of a message is required, the receiving station should use the following:

1. SAY AGAIN ALL BEFORE ... (first word satisfactorily received); or
2. SAY AGAIN ... (word before missing portion) TO ... (word after missing portion), or
3. SAY AGAIN ALL AFTER ... (last word satisfactorily received).

Examples: VANCOUVER RADIO
THIS IS
STINSON FOXTROT ALFA BRAVO CHARLIE
SAY AGAIN ALL BEFORE "HANGAR"
OVER
WINNIPEG TOWER
THIS IS
CESSNA FOXTROT PAPA DELTA QUEBEC
SAY AGAIN "ALTITUDE" TO "DESCEND"
OVER
MONTREAL CENTER
THIS IS
CESSNA FOXTROT X-RAY QUEBEC TANGO
SAY AGAIN ALL AFTER "FLIGHT PLAN"
OVER

Message Handling Procedures

When transmitting a message, the operator should:

1. deliver the radio message clearly and concisely using standard phraseology whenever practical;
2. plan the content of the message before transmitting;
3. listen briefly before transmitting to avoid interference with other transmissions.

The message generally consists of four parts:

1. the call-up;
2. the reply;
3. the message;
4. the acknowledgement or ending.

Examples:

Call-up by aircraft SCHEFFERVILLE RADIO
THIS IS
PIPER FOXTROT ALFA BRAVO CHARLIE
OVER

Reply by ground station PIPER FOXTROT ALFA BRAVO CHARLIE
THIS IS
SCHEFFERVILLE RADIO
GO AHEAD
OVER

Message - Aircraft SCHEFFERVILLE RADIO
THIS IS
PIPER FOXTROT ALFA BRAVO CHARLIE
FOUR MILES AT ONE THOUSAND
LANDING SCHEFFERVILLE
OVER
- Ground PIPER FOXTROT ALFA BRAVO CHARLIE
THIS IS
SCHEFFERVILLE RADIO
ROGER
WIND - ONE SIX ZERO AT ONE FIVE
ALTIMETER - TWO NINER NINER SEVEN
OVER

Acknowledgement - Aircraft SCHEFFERVILLE RADIO
THIS IS
PIPER FOXTROT ALFA BRAVO CHARLIE
ROGER

On subsequent calls, the words "THIS IS" and "OVER" may be omitted and, if no likelihood of interference exists, the call sign for the station being called may be abbreviated as follows:

"SCHEFFERVILLE RADIO BRAVO CHARLIE CONFIRM RIGHT ON SIERRA"

Signal (or Radio) Checks

When your radio station requires a signal (or radio) check, follow this procedure:

1. Call another aircraft or ground station on any appropriate frequency which will not interfere with the normal working of other aircraft or ground stations, and request a radio check.
2. The signal check consists of "SIGNAL CHECK 1, 2, 3, 4, 5. HOW DO YOU READ ME? OVER."
3. Your station identification (call sign) should be transmitted during such test transmissions.
4. Signal checks should not last more than 10 seconds.
5. When replying or receiving a reply to a signal check, the following readability scale should be used:
 1. Bad (unreadable)
 2. Poor (readable now and then)
 3. Fair (readable but with difficulty)
 4. Good (readable)
 5. Excellent (perfectly readable)

Communications checks are categorized as follows:

Signal check - If the test is made while the aircraft is airborne.

Preflight check - If the test is made prior to departure.

Maintenance check - If the test is made by ground maintenance.

Example: WATSON LAKE RADIO
THIS IS
CESSNA FOXTROT ALFA BRAVO CHARLIE
SIGNAL CHECK ON FIVE SIX EIGHT ZERO
FOXTROT ALFA BRAVO CHARLIE
THIS IS
WATSON LAKE RADIO
READING YOU STRENGTH FIVE
OVER

Distress Communications

Emergency Conditions

In the aeronautical service, an emergency condition is classified in accordance with the degree of danger or hazard as follows:

Distress A condition of being threatened by grave and/or imminent danger and of requiring immediate assistance.

Urgency A condition concerning the safety of the aircraft or other vehicle, someone on board or within sight, but which does not require immediate assistance.

Distress Communications

Distress communications should be conducted in accordance with the procedures outlined in this section. These procedures shall not, however, prevent a station in distress from

making use of any means at its disposal to attract attention, to make known its position, and obtain assistance.

Frequencies to Be Used

The first transmission of the distress call and message by an aircraft should be made on the air-ground frequency in use at the time. If the aircraft is unable to establish communications on the frequency in use, the distress call and message should be repeated on the aeronautical emergency frequency (121.5 MHz) or any other frequency available in an effort to establish communications with any ground or other aircraft station.

Distress Signal

In radiotelephony, the spoken word for distress is "MAYDAY".
The distress signal indicates that the station sending the signal is:

1. threatened by grave and imminent danger and requires immediate assistance; or
2. aware that an aircraft, ship or other vehicle is threatened by grave and imminent danger and requires immediate assistance.

Distress Call

The distress call shall only be sent on the authority of the person in command of the station. The distress call should comprise:

1. the distress signal "MAYDAY" spoken three times;
2. the words "THIS IS";
3. the call sign of the aircraft in distress spoken three times.

Example: MAYDAY, MAYDAY, MAYDAY
 THIS IS
 PIPER FOXTROT X-RAY CHARLIE CHARLIE

The distress call shall not be addressed to a particular station and acknowledgement of receipt shall not be given before the distress message is sent.

Priority of Distress

The distress call has absolute priority over all other transmissions. All stations which hear it shall immediately cease any transmission capable of interfering with distress traffic and continue to listen on the frequency used for the distress call.

Control of Distress Traffic

The control of distress traffic is the responsibility of the aircraft in distress, or of the station which relays the distress message. These stations may, however, delegate the

control of distress traffic to another station such as an aeronautical station which, normally, has a very efficient interface with air traffic control (ATC) and all search and rescue (SAR) organizations.

Distress Message

The distress message shall follow the distress call as soon as possible.

The distress message should include as many as possible of the following elements:

1. the distress signal "MAYDAY";
2. the call sign of station in distress (once);
3. the nature of the distress condition and kind of assistance required (i.e., what has happened);
4. the intentions of the person in command;
5. the particulars of its position (airspeed, altitude, heading);
6. the number of persons on board and injuries (if applicable);
7. any other information which might facilitate rescue;
8. the call sign of the station in distress.

Example: MAYDAY
PIPER FOXTROT X-RAY QUEBEC QUEBEC
POSITION: 20 MILES EAST OF WINNIPEG
ALTITUDE: 1500 FEET
AIRSPEED: 125 KNOTS
HEADING: 270 T
STRUCK BY LIGHTNING
DITCHING AIRCRAFT
ONE PERSON ON BOARD
PIPER FOXTROT X-RAY QUEBEC QUEBEC

Note: If the aircraft can transmit the distress message immediately after the distress call, then items 1 and 2 may be omitted from the message.

Repetition of a Distress Message

The distress message shall be repeated at intervals by the aircraft in distress until an answer is received or until it is no longer feasible to continue. The intervals between repetitions of the distress message shall be sufficiently long to allow time for stations receiving the message to reply.

Any station that has heard an unacknowledged distress message and is not in a position to render assistance, shall take all possible steps to attract attention of other stations that are in a position to assist.

In addition, all necessary steps shall be taken to notify the appropriate search and rescue authorities of the situation.

Action by Station in Distress

When an aircraft is threatened by grave and imminent danger, and requires immediate assistance, the person in command should direct appropriate action as follows:

1. transmit the distress call;
2. transmit the distress message;

3. listen for acknowledgement of receipt;
4. exchange further distress traffic as applicable;
5. turn on automatic emergency equipment (emergency locator transmitter - ELT) if provided and when appropriate.

Distress Traffic

Distress traffic consists of all transmissions relative to the immediate assistance required by the station in distress. Essentially, all transmissions made after the initial distress call are considered as distress traffic. In distress traffic, the distress signal "MAYDAY" spoken once, shall precede all transmissions. This procedure is intended to alert stations not aware of the initial distress call and now monitoring the distress channel that traffic heard relates to a distress situation.

Any station in the aeronautical mobile service that has knowledge of distress traffic and cannot itself assist the station in distress shall follow such traffic until it is evident that assistance is being provided. All stations which are aware of distress traffic, and which are not taking part in it, are forbidden to transmit on the frequencies being used for distress traffic until a message is received indicating that normal working may be resumed (cancellation of distress).

Acknowledgement of Receipt of a Distress Message

The acknowledgement of receipt of a distress message shall be given in the following form:

1. the call sign of the station in distress;
2. the words "THIS IS";
3. the call sign of the station acknowledging receipt;
4. the words "RECEIVED MAYDAY".

Example: PIPER FOXTROT X-RAY QUEBEC QUEBEC
THIS IS
WINNIPEG TOWER
RECEIVED MAYDAY

Relay of a Distress Message

A distress message repeated by a station other than the station in distress shall transmit a signal comprised of:

1. the signal "MAYDAY RELAY" (spoken three times);
2. the words "THIS IS";
3. the call sign of the station relaying the message (three times);
4. the distress signal "MAYDAY" (once);
5. the particulars of the station in distress such as its location, nature of distress, number of persons on board, etc.

Example: MAYDAY RELAY, MAYDAY RELAY, MAYDAY RELAY

THIS IS
CESSNA NOVEMBER JULIETT INDIA
MAYDAY
PIPER FOXTROT X-RAY QUEBEC QUEBEC
POSITION: 20 MILES EAST OF WINNIPEG
ALTITUDE: 1500 FEET
AIRSPEED: 125 KNOTS
HEADING: 270 T
STRUCK BY LIGHTNING
DITCHING AIRCRAFT
ONE PERSON ON BOARD
PIPER FOXTROT X-RAY QUEBEC QUEBEC

Action by Other Stations

Action by Stations Other than the Station in Distress

An aircraft station that is not in distress should transmit the distress message when:

1. the station in distress is not in a position to transmit the message; or
2. the person in command of the station which intervenes believes that further help is necessary.

When a distress message is received and it is known that the aircraft is not in the immediate vicinity, sufficient time should be allowed before the distress message is acknowledged. This will permit stations nearer to the station in distress to reply.

Action by Stations Acknowledging Receipt of a Distress Message

1. Forward information immediately to the appropriate search and rescue agencies or organizations.
2. Continue to guard the frequency on which the distress message was received and, if possible, any other frequency that may be used by the station in distress.
3. Notify any station with direction-finding or radar facilities which may be of assistance... etc.
4. Cease all transmissions which may interfere with the distress traffic.

Action by other Stations Hearing a Distress Message

1. Continue to guard the frequency on which the distress message was received and, if possible, establish a continuous watch on appropriate distress and emergency frequencies.
2. Notify any station with direction-finding or radar facilities and request assistance unless it is known that this action has been, or will be, taken by the station acknowledging receipt of the distress message.
3. Cease all transmissions which may interfere with the distress traffic.

Imposition of Silence

The station in distress, or the station in control of distress traffic, may impose silence on all stations in the area or on any station which interferes with the distress traffic.

The station in distress, or the station in control, shall use the expression "STOP TRANSMITTING - DISTRESS" or the international expression "SILENCE MAYDAY" or "SEELONCE MAYDAY".

Other stations imposing silence during a distress situation shall use the expression "STOP TRANSMITTING - DISTRESS" or use the international expression "SILENCE DISTRESS" or "SEELONCE DISTRESS".

Should radio silence be imposed during a distress situation, all transmissions shall cease immediately except from those stations involved in distress traffic.

Examples: Imposition of silence on a specific station by the station in distress.
(Cessna C-FNJI is causing interference to distress traffic.)

CESSNA FOXTROT NOVEMBER JULIETT INDIA
THIS IS
PIPER FOXTROT X-RAY QUEBEC QUEBEC
STOP TRANSMITTING - MAYDAY
OUT

Imposition of silence on all stations by a station other than the station in distress.

ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
CESSNA FOXTROT NOVEMBER JULIETT INDIA
STOP TRANSMITTING DISTRESS
OUT

Cancellation of Distress

When a station is no longer in distress, or when it is no longer necessary to observe radio silence (i.e., rescue operation has concluded), the station that was in distress, the rescue vessel or the station that controlled distress traffic shall transmit a message addressed to "ALL STATIONS" on the distress frequency(ies) advising that the distress traffic has ended. The proper procedure for cancelling a distress message is:

1. the distress signal "MAYDAY" (once);
2. the words "ALL STATIONS" (three times);
3. the words "THIS IS";
4. the name and/or call sign of the station transmitting the message (three times);
5. the filing time of the message;
6. the call sign of the station in distress (once);
7. the words "DISTRESS TRAFFIC ENDED" or the international expression "SILENCE FINISHED" or "SEELONCE FEENEE";
8. a short plain-language description of why the distress situation is being cancelled;
9. the name or call sign of station transmitting the message;
10. the word "OUT".

Example: MAYDAY
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS

WINNIPEG TOWER
TIME 1630 Z
MAYDAY
PIPER FOXTROT X-RAY QUEBEC QUEBEC
DISTRESS TRAFFIC ENDED
PIPER FOXTROT X-RAY QUEBEC QUEBEC LOCATED BY SEARCH
AND RESCUE
WINNIPEG TOWER
OUT

Note: The procedure outlined is mainly for the benefit of other stations so they can resume regular service on the distress frequencies. To ensure that search and rescue stations are advised that a station is no longer in distress, a normal call to the nearest aeradio station detailing the reasons for canceling the distress call **MUST** be made.

Urgency Communications

Urgency Signal

The urgency signal indicates that the station calling has a very urgent message to transmit concerning the safety of an aircraft, ship or other vehicle, or the safety of a person.

The urgency signal is "PAN PAN" spoken three times. It should be used at the beginning of the first communication.

The urgency signal and the urgency message may be addressed to all stations or to a specific station.

Priority

The urgency signal has priority over all other communications except distress. Stations that hear only the urgency signal shall continue to listen for at least three minutes on the frequency on which the signal is heard. After that, if no urgency message has been heard, stations may resume normal service. All stations that hear the urgency signal must take care not to interfere with the urgency message which follows it. Stations that are in communication on frequencies other than those used for the transmission of the urgency message, may continue normal work without interruption, provided that the urgency message is not addressed to all stations.

Frequencies to Be Used

The first transmission of the urgency call and message by an aircraft should be made on the air-ground frequency in use at the time. If the aircraft is unable to establish communication on the frequency in use, the urgency call and message should be repeated on the aeronautical emergency frequency (121.5 MHz) or any other frequency available in an effort to establish communication with any ground or other aircraft station.

Urgency Message

The urgency signal shall be followed by a message giving further information of the incident that necessitated the use of the urgency signal. When the urgency message does not contain a specific address and is acknowledged by an aircraft or aeronautical ground station, that station shall forward the information to the appropriate authorities (air traffic control and search and rescue organizations). The urgency message should contain as many as required of the following elements and, if possible, in the following order:

1. the urgency signal "PAN PAN" (three times);
2. the name of the station addressed or the words "ALL STATIONS" (three times);
3. the words "THIS IS";
4. the identification of the aircraft;
5. the nature of the urgency condition;
6. the intentions of the person in command;
7. the present position, the flight level or the altitude and the heading;
8. any other useful information.

Example: PAN PAN, PAN PAN, PAN PAN
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
CESSNA FOXTROT NOVEMBER JULIETT INDIA
POSITION: UNKNOWN
AIRSPEED: 112 KNOTS
ALTITUDE: 1050 FEET
LOST, REQUEST RADAR CHECK
CESSNA FOXTROT NOVEMBER JULIETT INDIA
OVER

Example of reply:

PAN PAN
CESSNA FOXTROT NOVEMBER JULIETT INDIA
THIS IS WINNIPEG TOWER
YOUR POSITION IS 20 MILES SOUTH OF WINNIPEG
WINNIPEG TOWER
STANDING BY

Cancellation of Urgency Message

When the urgency signal has been used before a message addressed to all stations, which calls for action by stations receiving the message, the station responsible for its transmission shall cancel it as soon as it knows that action is no longer necessary. The cancellation message shall be addressed to all stations.

Example: PAN PAN
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
CESSNA FOXTROT NOVEMBER JULIETT INDIA
CESSNA FOXTROT NOVEMBER JULIETT INDIA HAS BEEN
POSITIONED AT 20 MILES SOUTH OF WINNIPEG AIRPORT

PROCEEDING NORMALLY
CESSNA FOXTROT NOVEMBER JULIETT INDIA
OUT

Appendix A

Definitions - Aeronautical Terms

1. Aerodrome

Any area of land, water (including frozen surface) or any other supporting structure used or designed, prepared or set apart for use, whether whole or in part, for the arrival and departure, movement or servicing of aircraft, and includes any buildings, installations and equipment in connection with it.

2. Aeronautical Mobile Service

A service relating to the safety or navigation of aircraft, provided by mobile stations installed in aircraft or land stations, or portable radio apparatus carried on aircraft solely for safety or survival purposes.

3. Aeronautical Mobile Station

A mobile station in the aeronautical mobile service.

4. Aeronautical Operational Control Communications (AOCC)

Communications related to the regularity of flight.

5. Aeronautical Station

A land station in the aeronautical mobile service.

6. Air Traffic Control Services (ATCS)

A service provided by or on behalf of the Air Services Branch, Department of Transport, for the purpose of:

- a) preventing collisions:
 - (i) between aircraft; and
 - (ii) on the maneuvering area between aircraft and obstructions; and
- b) expediting and maintaining an orderly flow of air traffic.

7. Controlled Airport

An airport at which an air traffic control unit is provided.

8. Flight Service Station

An aeronautical facility operated by Transport Canada providing mobile and fixed communications, flight information, search and rescue, alerting and weather services

to pilots and other users.

9. General Aviation Communications (GAC)

Communications relating to the safe, expeditious and economical operation of, primarily, non-scheduled aircraft.

10. Ground Communications

Communications between the aircraft operation agency's local station and the aircraft while the aircraft is on the ground, including ramp communications.

11. Private Advisory Service

a) A service provided at a non-controlled aerodrome to facilitate the operational control and safe and expeditious movement of all aircraft using that aerodrome;
or

b) a service provided at controlled airports or at aerodromes having a flight service station facility by aeronautical operators for communications relating to their "company" business.

12. Private Multiple Communications Stations

An aircraft or aeronautical station established to provide air-ground multipurpose communications of an operational nature.

Appendix B

Procedural Words and Phrases

Word or Phrase Meaning

ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRMATIVE	Yes, or permission granted.
BREAK	Indicates the separation between portions of the message. (To be used where there is no clear distinction between the text and other portions of the message.)
CHANNEL	Change to channel ... before proceeding.
CLEARED	Authorized to proceed under the conditions specified.
CONFIRM	My version is ... Is that correct?
CORRECTION	An error has been made in this transmission (message indicated). The correct version is
DISREGARD	Consider this transmission as not sent.
GO AHEAD	Proceed with your message.
HOW DO YOU READ?	Self-explanatory.
I SAY AGAIN	Self-explanatory (use instead of "I REPEAT").
MAYDAY	The spoken word for distress communications.
MAYDAY RELAY	The spoken word for the distress relay signal.
MONITOR	Listen on (frequency).
NEGATIVE	No, or that is not correct, or I do not agree.
OUT	Conversation is ended and no response is expected.
OVER	My transmission is ended and I expect a response from you.
PAN PAN	The spoken word for urgency communications.
READ BACK	Repeat all of this message back to me exactly as received after I have given "OVER" (do not use the word "REPEAT").
ROGER	I have received all of your last transmission.
ROGER NUMBER	I have receive your message Number _____.
SAY AGAIN	Self-explanatory. (Do not use the word "REPEAT".)
STAND BY	I must pause for a few seconds or minutes, please wait.
SEELONCE	International expression to indicate that silence has been imposed on the frequency due to a distress situation. The aeronautical phrase is "STOP TRANSMITTING".
SEELONCE FEENEE	Is the international expression for a distress cancellation. The aeronautical expression is "DISTRESS TRAFFIC ENDED".
SEELONCE MAYDAY	Is the international expression to inform an individual(s) that a distress situation is in progress. The command coming from the aircraft in distress. The aeronautical phrase is "STOP TRANSMITTING - MAYDAY".
THAT IS CORRECT	Self-explanatory.

VERIFY

Check coding, check text with originator and send correct version.

WILCO

Your instructions received, understood and will be complied with.

WORDS TWICE

(a) As a request: Communication is difficult, please send each word twice.

(b) As information: Since communication is difficult, I will send each word twice.

Appendix C

Equipment Fundamentals Maintenance

Microphone and Antenna Connections

There are various types of connectors used to attach cables to the electronic equipment. Each connector requires its own assembly technique. Care should be exercised when repairing or replacing connectors. The main problems with connectors are shorts (when two bare wires are touching either each other or the metal case) or open wires (when the wire is broken inside the plastic shield or outer covering).

All connections should be tight and clean. Where connections are exposed to the weather, they should be protected with a coating of silicone to prevent corrosion build-up and to keep water from getting inside the outer casing of the cable.

Fuses

Electric circuits are protected against overload and short circuits by fuses, each rated for a given amperage. **Never replace a fuse with one of a higher rating.** That will simply compromise or negate its protective function and create a definite fire hazard. Fuses (or circuit breakers, if your electrical system is so equipped) act as safety valves. When something goes wrong with a circuit, the fuse for that circuit blows (or the breaker trips off), shutting down power to the circuit. In addition to preventing overheating and possible fire, this action also warns you that there is a problem on the circuit. The fault should be corrected before the fuse is replaced.

Note: Always exercise caution when changing a fuse. Make sure that your hands are dry.

Appendix D

Radio Station Licenses

Unless otherwise exempted, all radio stations in Canada must be licensed by the Minister of Industry Canada. The license (or copy thereof) must be posted in a conspicuous place near the radio equipment.

The radio station license generally specifies the call sign of the station, the frequencies to be used for transmitting and any special conditions under which the station should be operated.

To obtain a radio station license, a completed license application form with the prescribed fee should be submitted to Industry Canada. To be eligible for licensing in Canada, radio equipment must be type-approved or found to be technically acceptable for licensing by the Department.

Station license fees are due on April 1 of each year. Billing notices are mailed to licensees directly from departmental headquarters in Ottawa.

Note: Any person who establishes a radio station without a radio authorization is liable, on summary conviction, in the case of an individual, to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding one year, or to both, or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars.

Inquiries concerning radio licensing may be directed to any of the district offices of Industry Canada.

Appendix E

Frequency Assignments

The following table indicates for each frequency band listed, the service and primary use of the band.

Band Service

108.0000 - 111.9750 MHz Aeronautical Radionavigational
111.9750 - 117.9750 MHz Aeronautical Radionavigational
117.9750 - 121.9625 MHz Air Traffic Control Services
121.9625 - 123.5875 MHz General Aviation Communications
123.5875 - 128.8125 MHz Air Traffic Control Services
128.8125 - 132.0125 MHz Aeronautical Operational Control Communications
132.0125 - 136.0000 MHz Air Traffic Control Services

Appendix F

District Offices of Industry Canada

If you require additional information about certificates, please contact a district office of Industry Canada in one of the cities listed below:

Corner Brook, Nfld. Sault Ste. Marie, Ont.

St. John's, Nfld. Sudbury, Ont.

Halifax, N.S. Thunder Bay, Ont.

Sydney, N.S. Timmins, Ont.

Charlottetown, P.E.I. Toronto, Ont.

Bathurst, N.B. Windsor, Ont.

Moncton, N.B. Brandon, Man.

Saint John, N.B. Winnipeg, Man.

Chicoutimi, Que. Regina, Sask.

Montreal, Que. Saskatoon, Sask.

Quebec, Que. Calgary, Alta.

Rimouski, Que. Edmonton, Alta.

Rouyn, Que. Grande Prairie, Alta.

Sept-Îles, Que. Cranbrook, B.C.

Sherbrooke, Que. Kelowna, B.C.

Trois-Rivières, Que. Langley, B.C.

Belleville, Ont. Prince George, B.C.

Hamilton, Ont. Prince Rupert, B.C.

Kenora, Ont. Vancouver, B.C.

Kingston, Ont. Victoria, B.C.

Kitchener, Ont. Whitehorse, Y.T.

London, Ont. Fort Smith, N.W.T.

North Bay, Ont. Yellowknife, N.W.T.

Ottawa, Ont.