ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL FOUR

INSTRUCTIONAL GUIDE

SECTION 1

EO C429.01 – EXPLAIN REGULATIONS AND OPERATING PROCEDURES FOR AVIATION TRANSMISSION AND LICENSING

Total Time: 30 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-804/PG-001, *Proficiency Level Four Qualification Standard and Plan*, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy the *Study Guide for the Restricted Operator Certificate With Aeronautical Qualification (ROC-A)* (RIC-21) available at http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01397.html, for each cadet.

PRE-LESSON ASSIGNMENT

Nil.

APPROACH

An interactive lecture was chosen for this lesson to clarify, emphasize and summarize regulations and operating procedures for aviation transmission and licensing.

INTRODUCTION

REVIEW

Nil.

OBJECTIVES

By the end of this lesson the cadet shall have explained regulations and operating procedures for aviation transmission and licensing.

IMPORTANCE

It is important for cadets to explain regulations and operating procedures as the knowledge gives the cadets a better understanding of aviation transmission and licensing procedures. This knowledge is required to obtain the Industry Canada Restricted Operator Certificate with Aeronautical Qualification (ROC-A).

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Distribute one copy of the *Study Guide for the Restricted Operator Certificate With Aeronautical Qualification (ROC-A) (RIC-21)* to each cadet. Have the cadets follow along with the study guide as content is presented.

Teaching point 1 **Explain priorities, privacy, and control of communication.**

Time: 5 min Method: Interactive Lecture

PRIORITIES

The priority of messages by flight service stations are:

- emergency communications, to include:
  - distress communication, and
  - urgency communications;
- flight safety communications, such as:
  - air traffic control (ATC) clearances,
  - airport advisories,
  - position reports, and
  - air file flight plans;
- scheduled broadcasts,
- unscheduled broadcasts,
  - notices to airmen (NOTAMS),
  - significant meteorological information (SIGMET), and
  - pilot weather report (PIREP); and
- other air-ground communications.

PRIVACY

No person shall reveal the contents, or the existence of communications transmitted, received, or intercepted by a radio station. Exceptions to this rule include revealing the contents to:

- the addressee of the message,
- authorized officials of the Government of Canada,
- officers of the court, and
- the operator of a telecommunication system necessary to forward or deliver the message.

The restrictions do not apply to the following messages:

- distress,
- urgency,
- safety, and

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- ALL STATIONS addressed, such as:
  - weather reports, and
  - storm warnings.

CONTROL OF COMMUNICATION

An aircraft station will comply with instructions given by a ground station relating to:

- the order and time of transmission,
- the choice of frequency, and
- the duration and suspension of communications.



The ground station normally retains transmission control with communications between ground and aircraft stations.

The aircraft station called by another aircraft becomes the controlling station.

Radio communication between stations should be restricted to safety and flight regularity. Unauthorized communication, profane or obscene language, and calls that interfere with or interrupt the working of another radio station can result in a fine not exceeding $5 000 and / or imprisonment for a term not exceeding one year. Anyone who knowingly sends, transmits, or causes any false or fraudulent distress signal, message, call, or radiogram of any kind may receive similar fines and / or imprisonment. A corporation can be fined up to $25 000.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS:

Q1. What messages have highest priority?

Q2. Which station retains transmission control between ground and aircraft stations?

Q3. What is the maximum fine given to an individual for unauthorized communications or interference with another radio station?

ANTICIPATED ANSWERS:

A1. Emergency communications.

A2. Ground station.

A3. $5 000.

Teaching point 2 **Explain time, date, and transmission of numbers.**

Time: 5 min Method: Interactive Lecture



Have the cadets follow along with the study guide as content is presented.

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TIME

The 24-hour system is used to express time during radiocommunication. Time is expressed using four figures; the first two representing the hour past midnight and the last two representing the minutes past the hour.

Time is usually referenced to one standard time zone. If communication is conducted in a single time zone, local time is used.

Standard time zones are indicated as the following:

- Newfoundland N
- Atlantic A
- Eastern E
- Central C
- Mountain M
- Pacific P
- Yukon Y

Examples of time references include:

- 12:45 a.m. expressed as 0045,
- 7:40 a.m. expressed as 0740,
- 12:00 p.m. expressed as 1200,
- 1:35 p.m. expressed as 1335,
- 4:07 p.m. (EST) expressed as 1607 E,
- 7:40 p.m. expressed as 1940, and
- 9:50 p.m. (PST) expressed as 2150 P.

Coordinated Universal Time (UTC), also known as Zulu time (Z) or Greenwich Mean Time (GMT), is used to avoid confusion between different time zones. An example of UTC is 0539Z expressed as ZERO FIFE TREE NINER ZULU.



To convert local time to Zulu time add:

- 2.5 hours to Newfoundland Daylight Time (NDT),
- 3.5 hours to Newfoundland Standard Time (NST),
- 3 hours to Atlantic Daylight Time (ADT),
- 4 hours to Atlantic Standard Time (AST),
- 4 hours to Eastern Daylight Savings Time (EDT),
- 5 hours to Eastern Standard Time (EST),
- 5 hours to Central Daylight Savings Time (CDT),
- 6 hours to Central Standard Time (CST),
- 6 hours to Mountain Daylight Savings Time (MDT),
- 7 hours to Mountain Standard Time (MST),
- 7 hours to Pacific Daylight Savings Time (PDT), and
- 8 hours to Pacific Standard Time (PST) .

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DATE

The date is expressed as a six-figure group. The first two figures represent the day of the month and the last four figures indicate the time.

TRANSMISSION OF NUMBERS

When referring to numbers, each digit is pronounced separately, except whole thousands. Whole thousands are communicated by pronouncing each digit in the number of thousands followed by the word thousand expressed as TOU-SAND. The word hundred is expressed as HUN-DRED. If a decimal is within the number, the word decimal is pronounced DAY-SEE-MAL. For example:

- 8 000 is expressed as AIT TOUSAND,
- 150 is expressed as WUN FIFE ZERO, and
- 75 is expressed as SEVEN FIFE.

Monetary denominations are transmitted with groups of digits including the decimal. Dollars is expressed if monetary denomination is higher than one dollar. For example, $28.45 is expressed as DOLLARS TOO AIT DAY-SEE-MAL FOWER FIFE.

Altitude above sea level is expressed in thousands plus hundreds of feet. Separate digits are used to express flight level. For example:

- 2 800 is expressed as TOO TOUSAND AIT HUNDRED, and
- FL375 is expressed as FLIGHT LEVEL TREE SEVEN FIFE.

Aircraft type numbers are expressed in group forms. For example:

- Flight 498 is expressed as FLIGHT FOWER NINER AIT, and
- DC10 is expressed as DC TEN.

Wind speed and cloud formation heights are expressed in group forms. For example:

- Wind 270 / 10 is expressed as WIND TOO SEVEN ZERO DEGREES WUN ZERO KNOTS, and
- 36BKN is expressed as THIRTY SIX HUNDRED BROKEN.

Aircraft headings are given in groups of three digits. For example:

- 005 degrees is expressed as HEADING ZERO ZERO FIFE, and
- 350 degrees is expressed as HEADING TREE FIFE ZERO.

Aerodrome elevation is expressed in feet using the expression FIELD ELEVATION. For example:

- 178 is expressed as FIELD ELEVATION WUN SEVEN AIT, and
- 4900 is expressed as FIELD ELEVATION FOWER TOUSAND NINER ZERO ZERO.

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CONFIRMATION OF TEACHING POINT 2

QUESTIONS:

Q1. How is time expressed for the 24-hour system?

Q2. How many figures will be used to express date and time together?

Q3. How is aerodrome elevation expressed?

ANTICIPATED ANSWERS:

A1. Four figures.

A2. Six figures.

A3. In feet using the expression FIELD ELEVATION.

Teaching point 3 **Explain operating procedures.**

Time: 5 min Method: Interactive Lecture



Have the cadets follow along with the study guide as content is presented.

OPERATING PROCEDURES

Words and Phrases



Slang expressions are not used during radiocommunication procedures including:

- ten-four,
- over and out,
- breaker-breaker, and
- come in please.

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Standard phrases and words are used whenever applicable including:

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	Have I received the following ____? or Did you receive the message?
Correction	An error has been made in this transmission (or message). The correct version is ____.
Disregard	Consider this transmission as not sent.
Do you read?	I have called you more than once. If you are receiving me, reply.
Go ahead	Proceed with your message.
How do you read me?	What is the readability of my transmission?
I say again	I will repeat.
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.
Read back	Repeat all or the specified part of this message back to me exactly as received (do not use the word Repeat).
Roger	Okay, I have received all of your last transmission.
Say again	Repeat.
Stand by	I must pause for a few seconds or minutes, please wait and I will call you.
Seelonce	International expression to indicate that silence has been imposed on the frequency due to a distress situation.
Seelonce feenee	International expression to indicate that the distress situation has ended.
That is correct	Self-explanatory.
Verify	Check coding or text to confirm with originator.
Wilco	Your instructions received, understood, and will be complied with.
Words twice	As a request, communication is difficult, please send each word or group of words twice, or As information, since communication is difficult, I will send each word or group of words twice.

Call Signs

Call signs are assigned for identification purposes and should be used when contact is being established and again when communications are concluded. An aircraft's call sign can be the same as the aircraft's markings. Transport Canada (TC) assigns call signs and marks to aircraft.



Aircraft marks include C- (Canadian nationality mark) followed by the four–letter registration marks with aircraft letters starting with G or F and ultralight letters starting with I.

Aircraft registered before January 1, 1974 are identified with the nationality mark CF.

Aeronautical call signs are pronounced phonetically. During the initial contact, the manufacturer's name or type of aircraft is included, followed by the four letters of the registration. In further communications, the caller letters can be abbreviated to the last three letters.

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- Cessna 172 GFLR is expressed as CESSNA WUN SEVEN TOO GOLF FOXTROT LIMA ROMEO then FOXTROT LIMA ROMEO, and
- Ultralight IKKO is expressed as ULTRALIGHT INDIA KILO KILO OSCAR then KILO KILO OSCAR.

Air carriers. Companies use their name followed by the flight number or the last three characters of the aircraft registration.

Civil registration. Private aircraft use the manufacturer's name or the type of the aircraft followed by the last four letters of the registration.

Ground stations. The name of the airport or its geographical location followed by a suitable word indicating the function of the station.

Examples:

- Area control centre: OTTAWA CENTRE,
- Flight information service station: WINNIPEG INFORMATION,
- Surface movement control: TORONTO GROUND,
- Private aeronautical station: RADIO, and
- Company dispatch: DISPATCH.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS:

Q1. Why are call signs assigned?

Q2. Who assigns call signs?

Q3. How are ground station call signs created?

ANTICIPATED ANSWERS:

A1. Identification purpose.

A2. TC.

A3. Call signs are comprised of:

- name of the airport, or the airport geographical location, and
- suitable word indicating the function of the station.

Teaching point 4 **Explain calling procedures.**

Time: 10 min Method: Interactive Lecture



Have the cadets follow along with the study guide as content is presented.

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CALLING PROCEDURES

A ground station that has a radio message for an aircraft within its operational service area may call the aircraft. When a ground station receives calls from several aircraft, the ground station will decide the order to take the calls.



If the radio conditions are good, the station's call sign is stated once but if conditions are poor, it is stated three times.

All stations shall listen to the communication channel before transmitting to ensure the transmission will not interfere with communication already in progress.

A station that has distress, urgency, or safety communications to transmit can interrupt a transmission of lower priority that is in progress.



The call sign of the station or aircraft being called is always spoken first followed by THIS IS and the calling station's or aircraft's call sign.

Single Station Call

A transmission is sent to a single station by stating:

- the call sign of the station being called,
- this is,
- the call sign of the station calling,
- the frequency on which the calling station is transmitting, and
- over (invitation to reply).

Example:

OTTAWA TOWER, (OTTAWA TOWER, OTTAWA TOWER),

THIS IS,

CESSNA WUN SEVEN TOO FOXTROT ALFA DELTA TANGO,

ON FREQUENCY WUN WUN AIT DAY-SEE-MAL SEVEN,

OVER.

All Station General Call

When a station needs to establish communication with any station within range or in a certain area, the call should be made to all stations.

Example:

ALL STATIONS, ALL STATIONS, ALL STATIONS,

THIS IS,

TORONTO RADIO (say three times if necessary),

BE ADVISED OF ___ IN THE AREA ___,

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OUT.

Multiple Station Call

When more than one station is being called, the call signs of the desired stations may be transmitted in any sequence followed by THIS IS. The operators replying to multiple station calls should reply in the order in which they were called.

Example:

CESSNA WUN SEVEN TOO FOXTROT NOVEMBER INDIA LIMA,

PIPER FOXTROT X-RAY QUEBEC QUEBEC,

PIPER GOLF LIMA LIMA DELTA,

THIS IS,

TORONTO RADIO (say three times if necessary),

OVER.

REPLYING

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

Example:

CESSNA WUN SEVEN TOO FOXTROT NOVEMBER INDIA LIMA,

THIS IS,

TORONTO TOWER,

GO AHEAD.

PIPER GOLF LIMA LIMA DELTA,

THIS IS,

TORONTO TOWER,

STAND BY TOO MINUTES.

Corrections and Repetitions

If an error is made during a transmission, the word correction is spoken followed by the correct word or phrase.

Example: PROCEED TO DOCK FIFE CORRECTION DOCK SEVEN.

If the receiving station requires an entire message to be repeated, the operator states SAY AGAIN. If only a portion of the message is required, the receiving station says the following:

- SAY AGAIN ALL BEFORE ____ (the first word satisfactorily received);
- SAY AGAIN ____ (the word before the missing portion) TO ____ (the word after the missing portion); and
- SAY AGAIN ALL AFTER ____ (the last word satisfactorily received).

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Example:

VANCOUVER RADIO,

THIS IS,

STINSON FOXTROT ALFA BRAVO CHARLIE,

SAY AGAIN ALL BEFORE HANGAR,

OVER.

WINNIPEG TOWER,

THIS IS,

STINSON FOXTROT ALFA BRAVO CHARLIE,

SAY AGAIN ALTITUDE TO DESCEND,

OVER.

MONTREAL CENTRE,

THIS IS,

STINSON FOXTROT ALFA BRAVO CHARLIE,

SAY AGAIN ALL AFTER FLIGHT PLAN,

OVER.

Message Handling Procedures

When transmitting a message, the radio operator should:

1. Plan the message content before transmitting.
2. Listen briefly before starting to transmit the message to avoid interfering with other transmissions.
3. Deliver the radio message clearly and concisely using standard phrases.

The message format normally consists of the following four parts:

1. The call sign indicating the addressee and the originator.
2. The addressee reply.
3. The message.
4. The acknowledgement or ending.

The words THIS IS and OVER can be omitted on subsequent calls once the initial contact has been made with the addressee.

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Example:

Call-up by aircraft	BROCKVILLE RADIO, THIS IS, PIPER FOXTROT ALFA BRAVO CHARLIE, OVER.
Reply by ground station	PIPER FOXTROT ALFA BRAVO CHARLIE, THIS IS, BROCKVILLE RADIO, GO AHEAD.
Message–Aircraft	BROCKVILLE RADIO, PIPER FOXTROT ALFA BRAVO CHARLIE, FOWER MILES AT WUN THOUSAND, LANDING BROCKVILLE.
Message–Ground	PIPER FOXTROT ALFA BRAVO CHARLIE, BROCKVILLE RADIO, ROGER, WIND WUN SIX ZERO DEGREES AT WUN FIFE KNOTS, ALTIMETER TOO NINER NINER SEVEN.
Acknowledgement–Aircraft	BROCKVILLE RADIO, PIPER FOXTROT ALFA BRAVO CHARLIE, ROGER, OUT.

Signal (or Radio) Checks



Call using the appropriate frequency that will not interfere with the normal work of other aircraft or ground stations.

A signal (or radio) check is conducted by:

- calling another aircraft or ground station to request a signal check;
- stating signal (or radio) check 1, 2, 3, 4, 5. How do you read me? Over;
- including station call sign;
- transmitting the signal for less than 10 seconds; and

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- replying or receiving a reply to a signal (or radio) check, use the following readability scale:
  - 1–bad (unreadable),
  - 2–poor (readable now and then),
  - 3–fair (readable but with difficulty),
  - 4–good (readable), and
  - 5–excellent (perfectly readable).

Communication checks are categorized as follows:

- signal check (made while aircraft is airborne),
- pre-flight check (made prior to departure), and
- maintenance check (made by ground maintenance).

Example:

Call-up by aircraft	WATSON LAKE RADIO, THIS IS, CESSNA FOXTROT ALFA BRAVO CHARLIE, REQUEST SIGNAL CHECK ON FREQUENCY FIFE SIX DAY-SEE-MAL AIT ZERO.
Response by station	CESSNA FOXTROT ALFA BRAVO CHARLIE, THIS IS, WATSON LAKE RADIO, READING YOU STRENGTH FIFE, OVER.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS:

Q1. When is the call sign not stated three times?

Q2. When can a station interrupt with the call of another station?

Q3. What does the radio operator do when transmitting a message?

ANTICIPATED ANSWERS:

A1. When the radio conditions are good.

A2. When it has a distress, urgency, or safety communication to transmit.

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A3. The radio operator will:

- plan the message content;
- listen briefly before starting to transmit the message to avoid interfering with other transmissions; and
- deliver the radio message clearly and concisely using standard phrases.

END OF LESSON CONFIRMATION

QUESTIONS:

Q1. List the priority of messages.

Q2. How are date and time expressed?

Q3. What phrase is used when a station needs to establish communication with any station within range or in a certain area?

ANTICIPATED ANSWERS:

A1. Priority of messages include:

- emergency communications,
- flight safety communications,
- scheduled broadcasts,
- unscheduled broadcasts, and
- other air-ground communications.

A2. Six figures:

- first two figures represent the day of the month,
- next two figures represent the hour past midnight, and
- last two figures represent the minutes past the hour.

A3. ALL STATIONS.

CONCLUSION

HOMEWORK / READING / PRACTICE

Review the phonetic alphabet on page 6 in *Study Guide for the Radiotelephone Operator's Restricted Certificate (Aeronautical) (ROC-21)*.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-804/PG-001*Proficiency Level Four Qualification Standard and Plan*, Chapter 3, Annex B, 429 PC.

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CLOSING STATEMENT

Being able to explain regulations and operating procedures gives the cadets a better understanding of aviation transmission and licensing procedures. This knowledge is required to obtain the Industry Canada Restricted Operator Certificate with Aeronautical Qualification (ROC-A).

INSTRUCTOR NOTES / REMARKS

If the squadron chooses to have cadets obtain the ROC-A, all complimentary EOs for this PO must be instructed and a qualified examiner must conduct 429 PC.

Cadets who are qualified Advanced Aviation may assist with this instruction.

REFERENCES

C3-116 ISBN 0-9680390-5-7 MacDonald, A. F., & Peppler, I. L. (2000). *From the ground up: Millennium edition*. Ottawa, ON: Aviation Publishers Co. Limited.

C3-182 *Study Guide for the Restricted Operator Certificate With Aeronautical Qualification (ROC-A) (RIC-21)*. (2008). Retrieved September 28, 2008, from www.ic.gc.ca/epic/site/smt-gst.nsf/en/sf01397e.html

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