ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 5

EO C240.02 – INVENT A COMMUNICATION SYSTEM FOR SPACE

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/PG-001, 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 message cue cards located at Annex A to be used during the in-class activity in TP2.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 to orient the cadets to space communication, to give an overview of it and to generate interest in the subject.

An in-class activity was chosen for TP2 as it is an interactive way to present the content and stimulate an interest among cadets.

A group discussion was chosen for TP3 as it allows the cadets to interact with their peers and share their knowledge, experience, opinions and feelings about space communication.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson and in groups of no more than four the cadet shall be expected to invent a communication system for space.

IMPORTANCE

It is important for cadets to understand how to communicate in space using methods other than speech. Communication is one of the challenges to living in space. If radio communication is lost in space, astronauts

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

must still be able to communicate with one another. The cadets' participation in a non-verbal communication activity will help stimulate an interest in other methods of communication.

Teaching point 1 **Explain That Astronauts Use Radio Communication While in Space to Communicate With Other Astronauts and Ground Control**

Time: 5 min Method: Interactive Lecture

RADIO COMMUNICATION

While in space, shuttle astronauts use ultra high frequency (UHF) radio transceivers to communicate with their colleagues inside the shuttle cabin. The astronauts also sometimes use their UHF radios to talk with ground control during launch or landing.

COMMUNICATIONS CARRIER ASSEMBLY (CCA)

The CCA is a fabric cap worn by the astronaut. It contains microphones and speakers for use with the radio. It allows for hands-free radio communication while wearing a spacesuit.

RADIO COMMUNICATION FAILURE

It is virtually impossible to provide regulations and procedures applicable to all possible situations associated with two-way radio communication failure. During two-way radio communication failure, when confronted with a situation not covered in the regulations, astronauts are expected to exercise good judgement in whatever alternative communication method they choose to communicate with each other.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. While in space, what do shuttle astronauts use to communicate with their colleagues inside the shuttle cabin?

Q2. What allows hands-free radio communication while wearing a spacesuit?

Q3. What must astronauts do during two-way radio communication failure?

ANTICIPATED ANSWERS

A1. While in space, shuttle astronauts use UHF radio transceivers to communicate with their colleagues inside the shuttle cabin.

A2. The CCA is a fabric cap worn by the astronaut. It contains microphones and speakers for use with the radio.

A3. Astronauts are expected to exercise good judgement in whatever alternative communication method they choose to communicate with each other.

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

Teaching point 2 **Invent a Communication System for Space**

Time: 40 min Method: In-Class Activity

ACTIVITY

OBJECTIVE

The objective of this activity is to have cadets invent a communication system for space that does not involve the use of speech.

RESOURCES

Message cue cards located at Annex A.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Divide the cadets into groups of no more than four.

2. Provide the groups with a message cue card located at Annex A to focus on what they must be able to communicate using their communication invention.

3. Groups will have 30 minutes to invent a communication system for space.



If the groups complete the task quickly, have them make up additional messages using their inventions.



Use the remaining 10 minutes to complete the following steps.

4. One cadet from each group will present their group's invention to the class by communicating the message from their cue card using the invention.

5. Once the cadet has communicated the message using their invention, the class must determine the message. The cadet cannot communicate the message to the class using speech.

6. The cadet will read the message aloud to the class once they determine the message.



If the class cannot determine the message, have the group read out the message to the class. The group will not be penalized if they are unsuccessful in communicating the message.

7. Repeat steps 4–6 until all groups have presented their invention.

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' invention of a communication system for space will serve as the confirmation of this TP.

Teaching point 3 **Discuss Communication System Inventions With the Entire Group**

Time: 10 min Method: Group Discussion

BACKGROUND KNOWLEDGE



The point of the group discussion is to discuss the non-verbal communication inventions using the tips for answering/facilitating discussion and the suggested questions provided.

GROUP DISCUSSION



TIPS FOR ANSWERING/FACILITATING DISCUSSION

- Establish ground rules for discussion, e.g. everyone should listen respectfully; don't interrupt; only one person speaks at a time; no one's ideas should be made fun of; you can disagree with ideas but not with the person; try to understand others as much as you hope they understand you; etc.
- Sit the group in a circle, making sure all cadets can be seen by everyone else.
- Ask questions that will provoke thought; in other words avoid questions with yes or no answers.
- Manage time by ensuring the cadets stay on topic.
- Listen and respond in a way that indicates you have heard and understood the cadet. This can be done by paraphrasing their ideas.
- Give the cadets time to respond to your questions.
- Ensure every cadet has an opportunity to participate. One option is to go around the group and have each cadet answer the question with a short answer. Cadets must also have the option to pass if they wish.
- Additional questions should be prepared ahead of time.

SUGGESTED QUESTIONS

Q1. Why did your group select this alternative method of communication to communicate your message?

Q2. What was the biggest challenge in developing your invention?

Q3. What was the most challenging part in communicating your message?

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

Q4. How would you modify the inventions to be more effective?

Q5. Are there other non-verbal communication systems that could have been more effective?



Other questions and answers will develop throughout the group discussion. The group discussion should not be limited to only those suggested.



Reinforce those answers given and comments made during the group discussion, ensuring the teaching point has been covered.

CONFIRMATION OF TEACHING POINT 3

The cadets' participation in the group discussion will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the invention of a communication system for space will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Participating in the invention of a communication system for space may emphasize how important communication is for astronauts in space.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-135 Virtual Skies. (2007). *Two-way Radio Communication Failure (Aeronautical Information Manual Section 6.4.1).* Retrieved 18 March 2007, from http://virtualskies.arc.nasa.gov/communication/youDecide/AIM6_4_1.html.

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

THIS PAGE INTENTIONALLY LEFT BLANK

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

MESSAGE CUE CARDS

I am out of air.

I am stuck.

Come here.

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

I am sick.

I need help.

I am lost.

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.