ROYAL CANADIAN ARMY CADETS

SILVER STAR

INSTRUCTIONAL GUIDE

SECTION 4

EO C325.01 – COMMUNICATE DURING AN EXPEDITION

Total Time: 120 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/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.

Ensure that all hand-held radios are ready to use (serviceable, batteries fully charged).

Review the owners' manual associated with the hand-held radio being used.

Photocopy Annex I (one per cadet) and Annex J (one per group).

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1–3 and TP 7 to introduce communicating using basic voice procedures, familiarizing the cadet with the parts of the hand-held radio and alternative methods of emergency communication.

Demonstration and performance was chosen for TPs 4–6 as it allows the instructor to demonstrate and explain the communication skills the cadet is expected to acquire, while providing an opportunity for the cadet to practice basic voice procedures, transmitting messages over a radio net, and using alternative methods of communication under the supervision of an instructor.

A practical activity was chosen for TP 8 as it is an interactive way to for the cadet to practice communicating with a hand-held radio using basic voice procedures and transmitting a message using an alternative method of communication. This activity contributes to the cadets' development of communication skills in a fun and challenging setting.

INTRODUCTION

REVIEW

N/A.

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OBJECTIVES

By the end of this lesson the cadet shall be expected to communicate during an expedition by operating a hand-held radio and employing an alternative emergency communication method to transmit the Morse code message, Save Our Souls (SOS).

IMPORTANCE

It is important for cadets to know how to operate hand-held radios in order to communicate between groups during expeditions. As an outdoor leader there will be a requirement for cadets to operate radios as part of daily responsibilities, as well as in emergency situations. Due to the nature of the expedition activities and the remote locations in which they occur, knowing how to communicate is critical for the safety of all group members.

Teaching point 1 **Explain the Elements of Radio Etiquette**

Time: 5 min Method: Interactive Lecture



The information presented in this TP is an introduction to elements of radio etiquette. The cadets may have some previous knowledge of the material. Ask lead-in questions to gain their insight.

APPROPRIATE LANGUAGE

The way that one talks on the air is guided by national and international standards. These standards are termed voice procedure.

Voice procedure is intended to maximize clarity and reduce misunderstanding in spoken communication. One must follow basic radio rules, to include:

- Avoid sending transmissions without proper authority.
- Avoid transmissions using the operator’s name.
- Never use profane, indecent or obscene language.
- Allow emergency calls to take priority over all other calls. If a person is talking, stop and wait until the emergency is finished.
- Keep communications official. Do not chat.

ENUNCIATION

Enunciation is the act of speaking clearly. When making transmissions, each message will be as short as possible and should not exceed 10 seconds in length. To reduce the possibility of confusion while transmitting, subject matter should be kept to one topic.

When sending a transmission via radio it is important to pronounce words clearly and concisely. Before transmitting, wait for a period long enough so as not to interfere with transmissions already in progress. To ensure the message is received clearly, follow these tips:

- Speak slowly.
- Write down the message prior to transmitting (if it is lengthy).
- Hold the PTT button one second before and after speaking, to ensure the entire message was heard.

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- Transmit only what is needed.
- Refrain from using slang terms.

NO DUFFS

No Duff is the term spoken over the radio to identify that what is being said is not a drill. This term is only spoken during emergency situations when serious information has to be passed along. It shall never be used as part of an exercise or as a joke. Upon hearing No Duff, all radio communications will cease between parties. Normal communications may continue when the sender of No Duff has ended the transmission.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What are two basic radio rules?

Q2. What should be the maximum length of a transmission?

Q3. When sending transmissions, how should words be pronounced?

ANTICIPATED ANSWERS

A1. The basic radio rules are:

- Avoid sending transmissions without proper authority.
- Avoid using the operator's name.
- Never use of profane, indecent or obscene language.
- Allow emergency calls to take priority over all other calls. If a person is talking, stop and wait until the emergency is finished.
- Keep communications official. Do not chat.

A2. Each message will be as short as possible, and should not exceed 10 seconds.

A3. Pronounce words clearly and concisely.

Teaching point 2 **Describe the Phonetic Alphabet**

Time: 10 min Method: Interactive Lecture



Distribute the handout at Annex I to the cadets. As the information is presented have the cadets follow the handout. Have the cadets repeat the alphabet and numbers as they are presented.

PHONETIC ALPHABET

Purpose

Radios are usually used outdoors and are sometimes subject to background noise such as inclement weather, equipment, and other people. For this reason, the use of the International Phonetic Alphabet is required. The phonetic alphabet associates the letters of the alphabet with a word to assist in clarifying statements over a radio.

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Uses

The phonetic alphabet is used whenever isolated letters or groups of letters are pronounced separately, when spelling words, or when communication is difficult.

Structure

The following table identifies the phonetic symbol and its corresponding pronunciation.

Letter	Phonetic	Pronunciation		Letter	Phonetic	Pronunciation
A	ALFA	AL FAH		N	NOVEMBER	NO VÈM BER
B	BRAVO	BRAH VOH		O	OSCAR	OSS CAR
C	CHARLIE	CHAR LEE		P	PAPA	PAH PAH
D	DELTA	DELL TAH		Q	QUEBEC	KÉH BECK
E	ECHO	ECK OH		R	ROMEO	ROW ME OH
F	FOXTROT	FOKS TROT		S	SIERRA	SEE AIR RAH
G	GOLF	GOLF		T	TANGO	TANG GO
H	HOTEL	HOH TÈLL		U	UNIFORM	YOU NEE FORM
I	INDIA	IN DEE AH		V	VICTOR	VIK TAR
J	JULIETT	JEW LEE ÈTT		W	WHISKEY	WISS KEY
K	KILO	KEY LOH		X	X-RAY	ECKS RAY
L	LIMA	LEE MAH		Y	YANKEE	YANG KEY
M	MIKE	MÏ KE		Z	ZULU	ZOO LOO



Spell the word CADETS using the phonetic alphabet: CHARLIE – ALFA – DELTA – ECHO – TANGO – SIERRA.

Pronunciation of Numerals

When numbers are used in a radio transmission, they are always spoken as separate numbers digit by digit, (15 is spoken as ONE–FIFE) except multiples of a thousand, which may be spoken. The procedural word FIGURES can be used before transmitting such numbers.

The table identifies the number and its corresponding pronunciation.

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Number	Pronunciation	Number	Pronunciation
0	ZE-RO	5	FIFE
1	WUN	6	SIX
2	TOO	7	SEV-EN
3	TREE	8	AIT
4	FOW-ER	9	NIN-ER



Have the cadets recite the entire alphabet using phonetic pronunciations.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. What is used to spell words over a radio?

Q2. How is the figure five spoken over the radio?

Q3. Using the phonetic alphabet, how would you spell radio?

ANTICIPATED ANSWERS

A1. The phonetic alphabet is used to spell words over a radio.

A2. The figure five is spoken “FIFE” over the radio.

A3. Radio would be spelled as follows: ROMEO–ALFA–DELTA–INDIA–OSCAR.

Teaching point 3 **Identify and Briefly Describe the Parts of a Hand-Held Radio**

Time: 5 min Method: Interactive Lecture



Radios presented in this lesson are the Talkabout FRS/GMRS Recreational Two-Way Radio Models T5000, T5500, and T5550. Models may vary. Refer to the manufacturer’s owners’ manual as required.



Divide cadets into groups of no more than four and assign each group a radio. Cadets will point to the specific parts as they are explained.

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PARTS OF THE HAND-HELD RADIO AND THEIR FUNCTIONS

On-Off/Volume Knob. Controls volume and power to the unit.

Light Emitting Diode (LED). This light will be illuminated when the radio is on.

Push-to-Talk Button (PTT). A depressible button that allows transmissions.

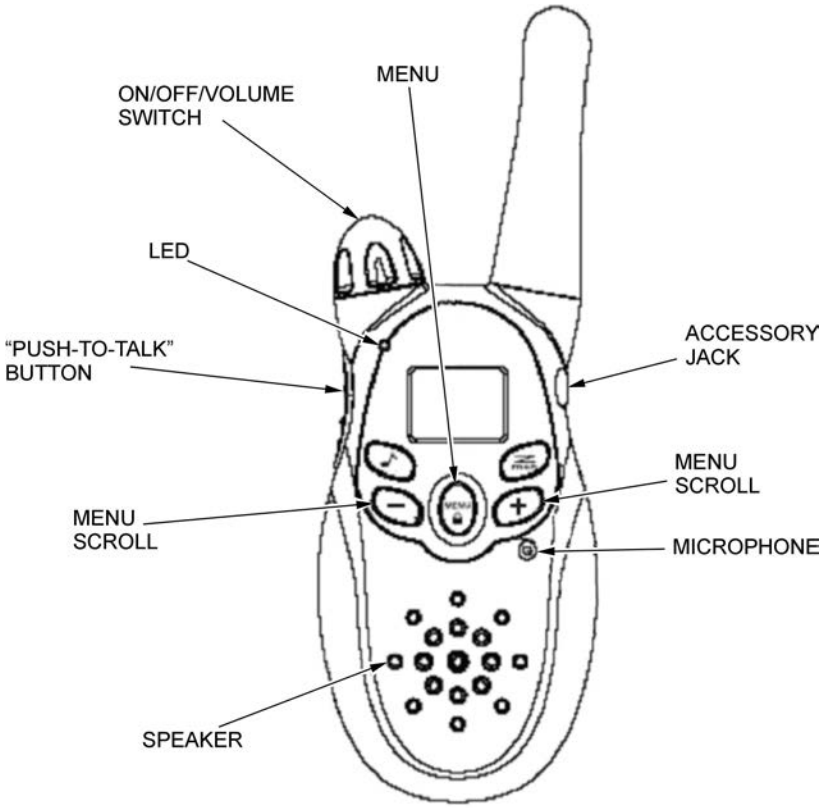
Speaker. Converts electric current into audible sound.

Antenna. An electrical device designed to transmit or receive radio waves.

Accessory Jack. Used to insert accessory items such as a headset.

Menu Scroll/Channel/Frequency Selector. Push to scroll through the menu options and channels. Use the "+" and "-" symbol in order to scroll through the menu options.

Microphone. Converts sound into an electrical signal.



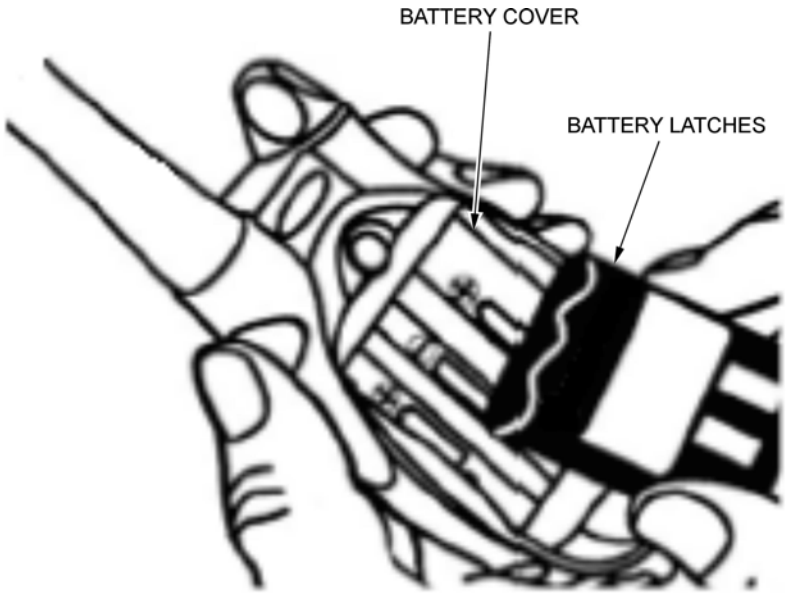
Motorola, Inc. Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 11)

Figure 1 Hand-Held Radio

Battery Cover. Covers the storage compartment of the battery (located on the reverse side of the radio).

Battery Cover Latches. Secures the cover to the radio (located on the reverse side of the radio).

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Motorola, Inc. Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)

Figure 2 Battery Compartment

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. Name the parts of the radio.

Q2. What function does the antenna perform?

Q3. What function does the microphone perform?

ANTICIPATED ANSWERS

A1. The 10 parts of the Talkabout radio are: on-off / volume knob, LED, PTT, speaker, antenna, accessory jack, menu scroll, microphone, battery cover, and battery cover latches.

A2. The antenna transmits and receives radio waves.

A3. The microphone converts sound into an electrical signal.

Teaching point 4 **Explain, Demonstrate and Have the Cadet Practice Using a Hand-Held Radio**

Time: 15 min Method: Demonstration and Performance



For this TP, it is recommended that instruction take the following format:

(1) Explain and demonstrate each skill while cadets observe.

(2) Monitor the cadets' performance as they practice each skill.

Note: Assistant instructors may be employed to monitor the cadets' performance.

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TURNING THE RADIO ON/OFF

To turn the radio ON, turn the on-off/volume knob clockwise. The radio will beep and the radio display will briefly show all feature icons on the radio.

To turn the radio OFF, turn the on-off/volume knob counter-clockwise. A clicking sound will indicate that the radio is turned off.

ADJUSTING FREQUENCIES

Selecting a Channel (Frequency)

The radio operates on a group of frequencies that are accessed through radio channels. To set the channel of the radio, push the Menu button, which will cause the current channel to flash. Using the Menu scroll button, scroll through the channels and push the PTT button to select the desired channel.

OPERATING THE PTT BUTTON

To send and receive messages, check the channel activity by pressing the monitor (MON) button. Static will be heard if the channel is clear to use. Do not transmit if someone is talking on the channel.

To send messages:

1. Press the PTT button.
2. Observe a standard pause.
3. Speak loudly, clearly and briefly into the microphone.
4. Release the PTT button (to maximize clarity, hold the radio 3–5 cm from the mouth).

The LED will glow continuously when sending messages.

In order to listen to messages, the PTT button must be fully released.

CHANGING THE BATTERIES



Explain to the cadets the type of battery required to operate the hand-held radio. Consult the owner's manual to ensure the proper size and type of battery is being used. The Talkabout radios discussed in this lesson use three AA batteries.

Many hand-held radios will use three AA batteries for power. In order to install the batteries or to replace them, follow these steps:

1. Lift the battery latch to release the battery cover.
2. Remove the battery cover.
3. Insert three AA batteries as shown on the inside of the battery compartment.
4. Replace the battery cover and clip the battery latch to secure.
5. Discard spent batteries safely.

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Motorola, Inc. Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)

Figure 3 Batteries



Motorola, Inc. Talkabout FRS/GMRS Recreational Two-Way Radios Models T5000, T5500, T5550 User's Guide, Motorola, Inc. (p. 13)

Figure 4 Changing the Batteries

Batteries may corrode over time if left in radios and can cause permanent damage; therefore, they should be removed before storing radios for extended periods of time.

Batteries are made of various materials comprised of heavy metals including nickel cadmium, alkaline, mercury, nickel metal hydride, and lead acid. These elements can harm the environment if not properly discarded. As such, batteries are one of the most complex items to dispose of or recycle.

Batteries, if not properly disposed of, may cause:

- pollution of lakes and streams as the metals vaporize into the air when burned;
- leaching of heavy metals from solid waste landfills;
- exposure of the environment and water to lead and acid;
- corrosion from the strong acids; and
- burns or other injury to eyes and skin.

Batteries are not all the same and each have specific instructions for their proper disposal and/or recycling. The batteries most people use are household types; however, due to the variety of different rules and regulations, check with the local community recycling facility to determine the household battery recycling options or supporting unit/base POL/HAZMAT section.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. How would one change channels on the radio?

Q2. What position must the PTT button be in to receive a message?

Q3. What is the most common type of battery used for hand-held radios?

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ANTICIPATED ANSWERS

A1. To set the channel of the radio, push the Menu button, which will cause the current channel to flash. Using the Menu scroll button, scroll through the channels and push the PTT button to select the desired channel.

A2. The PTT button must be released to receive a message.

A3. The most common type of battery used for hand-held radios are AA.

Teaching point 5 **Explain, Demonstrate and Have the Cadet Practice Radio Communication**

Time: 20 min Method: Demonstration and Performance



The following section deals with call signs and transmission sequence. It is the basis for developing clear and understandable communications. Discuss the use of call signs and transmission sequence and demonstrate voice procedure using the examples provided below. Cadets will have an opportunity to practice sending radio transmissions during the practical activity.

USING CALL SIGNS

Call signs are used to identify and organize persons or groups (also know as stations) within a radio network. A call sign may take the form of a pair of words or a combination of letters and figures to a maximum of four.

UNDERSTANDING TRANSMISSION SEQUENCE

When a station originates a call it must first avoid interfering with other radio transmissions. An operator shall listen to make certain that a frequency is clear before making any transmissions.

Before conducting regular traffic over the radio it may be necessary to make contact with other stations involved to ascertain that communication is possible.

To initiate a call, the transmission sequence is as follows:

1. The initiating station will transmit the call sign of the intended receiver followed by the initiating station's call sign with the phrase "THIS IS" between them (see Example 1, step 1.).

2. The receiving station will acknowledge the initiating station's call by transmitting its call sign and finishing the transmission with the word "OVER" (see Example 1, step 2.).

3. After a reply is received the initiating station will end the transmission, if nothing further is to be said, by transmitting its call sign, acknowledging the receipt of the answer with the word "ROGER" and concluding the message by ending with the word "OUT" (see Example 1, step 3.).

Example 1 of a Radio Call

1. One Alfa transmits: Two Bravo – this is One Alfa – Over.

2. Two Bravo responds to the initial call transmitting: Two Bravo – Over.

3. One Alfa concludes radio transmissions by transmitting: One Alfa – Roger – Out.

Example 2 of a Radio Call

1. One Alfa transmits: Two Bravo – this is One Alfa – Message – Over.

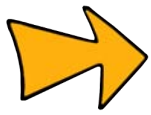
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2. Two Bravo responds to the initial call, transmitting: Two Bravo – Send message – Over.

3. One Alfa continues with the message, transmitting: One Alfa – will reach your location in two-fife minutes – Over.

4. Two Bravo responds to the message, transmitting: Two Bravo – Roger – Over.

5. One Alfa concludes the call by: One Alfa – Out.



The station that starts the transmission must end it.

CONDUCTING RADIO CHECKS

All stations are considered to have good signal strength unless otherwise notified. Strength of signals and readability checks will only be conducted when requested or when problems occur. The following prowords will be used to complete this procedure:



Prowords are prounceable words or phrases which have been assigned meanings for the purpose of expediting message handling on circuits where radiotelephone procedure is employed.

RADIO CHECK: What is my strength and readability?

ROGER: I have received your transmission satisfactorily.

NOTHING HEARD: To be used when no reply is received from a call station.

When answering a radio check both signal strength and readability are reported, as follows:

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REPORTS	REPLY	MEANING
REPORT OF SIGNAL STRENGTH	LOUD	Signal is very strong.
	GOOD	Signal is good.
	WEAK	Signal is weak.
	VERY WEAK	Signal is very weak.
	FADING	Signal is fading and continuous communications cannot be relied on.
REPORT OF READABILITY	CLEAR	Excellent quality.
	READABLE	Quality is satisfactory.
	UNREADABLE	I cannot read you.
	DISTORTED	Having trouble reading you due to your signal being distorted.
	INTERFERENCE	Having trouble reading you due to interference.
	INTERMITTENT	Having trouble reading you due to your signal being intermittent.

Example of a Radio Check to One Station

1. One Alfa transmits: Two Bravo – this is One Alfa – Radio Check – Over.
2. Two Bravo answers the radio check with the answer transmitting: Two Bravo – Loud and Clear – Over.
3. One Alfa concludes the radio transmission by transmitting: One Alfa – Roger – Out.

Example of a Radio Check to Multiple Stations

1. One Alfa transmits: Three Alfa, Two Bravo, One Charlie – this is One Alfa – Radio Check – Over.
2. In sequence the radio stations respond to the radio check by transmitting:
   - Three Alfa – Loud and clear – Over.
   - Two Bravo – Good with interference – Over.
   - One Charlie – Loud and readable – Over.
3. One Alfa concludes radio transmissions by transmitting: One Alfa – Roger – Out.

CONFIRMATION OF TEACHING POINT 5

The cadets' participation in practicing voice procedure will serve as the confirmation of this TP.

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Teaching point 6 **Explain, Demonstrate and Have the Cadet Transmit an SOS Message by Morse Code With Sound and With Light**

Time: 10 min Method: Demonstration and Performance



For this skill, it is recommended that instruction take the following format:

(1) Explain and demonstrate transmitting an SOS message using Morse code with sound and with light.

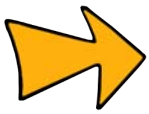
(2) Explain and demonstrate each step of transmitting an SOS message using Morse code with sound and with light. Monitor the cadets as they practice each step.

(3) Monitor the cadets' performance as they practice transmitting the complete SOS message using Morse code with sound and with light.

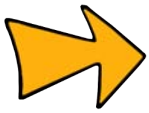
Note: Assistant instructors may be used to monitor the cadets' performance.

MORSE CODE

Morse code is a method for transmitting telegraphic information, using standardized sequences of short and long elements to represent the letters, numerals, punctuation and special characters of a message. In the Navy, Morse code is referred to as the dot-dash system, with each letter and number being represented by a particular arrangement of dots and dashes. When transmitting, dots (di) are represented by short, and dashes (dah) by long, bursts of sound or light. It was invented by Samuel F. B. Morse (1791-1872), who is also known for producing the first working telegraph set in 1836.



The following is an example of the dots and dashes used to spell cadet: C **-. -.** A **.-** D**-..** E**.** T**-**



The first Morse code message was "What hath God wrought" and was delivered from Washington, District of Columbia to Baltimore, Maryland.

Morse Code is usable in sound signalling (radio and whistle) and visual signalling (lights and flags).



An example of sound signalling is to use the PTT button on a hand-held radio. An example of light signalling is to use a flashlight.

SOS

The most well known Morse code transmission is Save Our Souls (SOS). SOS has been the obligatory signal since July 1, 1908.

The following format is used to transmit SOS:

- di-di-di-dah-dah-dah-di-di-di;
- **...---...**

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CONFIRMATION OF TEACHING POINT 6

The cadets' transmission of an SOS message, with light and with sound, will serve as the confirmation of this TP.

Teaching point 7 **Discuss Alternative Methods of Communication**

Time: 10 min Method: Interactive Lecture

A cellular phone, satellite phone or personal locator beacon can be a big help in an emergency situation allowing individuals to contact help almost immediately. That is, provided, there is reception, the batteries are charged, or there is no damage to the unit.

In the outdoor community there is a great deal of discussion about the use of cellular phones and satellite phones. Some argue that they are essential backcountry safety devices and some feel they intrude on the experience of the outdoors. It is important to recognize that communication devices work differently in different areas and situations, and as such should not be relied on completely.

SATELLITE PHONES

- Satellite phones require an unobstructed signal to the sky in order to establish a satellite connection.
- Although the technology is getting better all the time, connections often still cannot be made in deep forests, canyons, low-lying area and deep gorges.
- Satellite phones require a lot of battery power, so depending on the duration of the trip additional batteries or solar recharging panels may have to be brought.

CELLULAR PHONES

- Cellular phones often do not work in remote areas.
- When going into wilderness settings, a cellular phone should not be relied upon as the sole emergency contact device.
- Cellular phones are limited by their service area.
- Cellular phones are vulnerable to cold, moisture, sand and heat – requiring users to protect them from hazards.



Some cellular phones have internal Global Position System (GPS) locators which can be useful when in wilderness areas. In emergency situations this allows for rescuers to pinpoint the location of those being rescued. However, the same limitations as discussed above exist. For example, if the individuals are in a low lying, forest covered area, the signal would not be received.

PERSONAL LOCATOR BEACON

- Lightweight and reliable.
- Must be registered with a national search-and-rescue organization.
- In an emergency, press a button on the palm-sized unit to send a unique signal with GPS coordinates to a central call centre via satellite.

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- When stranded but not in immediate danger or to check in as OK, send a help or OK message to your contacts via e-mail.

CONFIRMATION OF TEACHING POINT 7

QUESTIONS

Q1. When attempting to make a call using a satellite phone what are some considerations that should be made to ensure that they are able to establish a satellite connection?

Q2. What is the main limitation of using a cellular telephone?

Q3. What are the benefits of a GPS locator in a cell phone?

ANTICIPATED ANSWERS

A1. To ensure the establishment of a good satellite connection the individual should ensure that they have an unobstructed signal to the sky, and that they are not in a deep forest, a canyon, low-lying area or a deep gorge.

A2. Cellular phones are limited by their service area.

A3. In emergency situations this allows for rescuers to pinpoint the location of those being rescued. However, the same limitations as discussed above exist. For example, if the individuals are in a low-lying, forest covered area, the signal would not be received.

Teaching point 8 **Conduct a Communication Activity**

Time: 40 min Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadet to practice radio communications through employing the phonetic alphabet, beginning and ending radio transmissions, conducting radio checks, and transmitting an SOS Morse code message using sound/light.

RESOURCES

- Large space with a minimum of 5 m (16 ft) between members of each group,
- One hand-held radio per group,
- Three AA batteries per radio,
- Radio Communication Exercise located at Annex J, and
- One flashlight per group.

ACTIVITY LAYOUT

N/A.

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ACTIVITY INSTRUCTIONS

1. Divide cadets into three groups.

2. Assign a call sign to each member of each group (depending on numbers there may be a requirement to assign the same call sign to more than one person in a group, or assign two call signs to one person in a group).

3. Hand out a copy of the Radio Communication Exercise to each group.

4. Assign each group a specific area with at least 5 m (16 ft) between them.

5. Acting as 1, complete the radio communication exercise.

6. Once the radio communication exercise is complete, have each group transmit a SOS message using the PTT button on their radios and using a flashlight.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 8

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

END OF LESSON CONFIRMATION

The cadets' participation in the communication activity will serves as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

As an outdoor leader understanding the principles of radio communication and being able to transit radio messages is very important. Daily expedition routine may require an outdoor leader to communicate between their group and other groups. As well, situations may arise when the outdoor leader must implement emergency communication strategies.

INSTRUCTOR NOTES/REMARKS

Hand-held radio models may vary. The instructor will be responsible for consulting the owner's manual for detailed instructions on radio operation.

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