



Reference Guide

How to Prepare for and Deliver a GeoFoxing Activity

GeoFoxing: A combination of Fox Hunting,
Geocaching and Orienteering while
Communicating with RFS Radios

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GeoFoxing- A fun, challenging game with real-world STEM applications

In this activity, participants work in teams of 2 or 3 and have the following equipment:

- A handheld Garmin eTrex 22X GPS device for geocaching
- A Sniffer4 Amateur Radio receiver and directional Antenna for fox hunting
- A Bridgecom Buddy FRS radio for communicating with base and other participants to get clues
- An orienteering kit consisting of a park map, compass, clipboard and pencil

Objectives:

- Provide a fun, challenging environment for youth to learn about Map reading, and the use of Compass, GPS receiver and Directional Radio equipment to locate assets (people, animals, property)
- Optional: Find all geocaches and foxes and return to base in the shortest time

A Few Safety and Other Requests:

- Participants must be appropriately dressed with proper footwear in order to play.
- Participants must sign our participation agreement and liability waiver in order to play.
- The activity is conducted on public property. We do not hide fox transmitters or geocaches on private property. There will always be a safe way to get to the geocache or fox. Participants are reminded to be careful when crossing roads; look for other routes or cross walks for very busy roads. Don't cross a stream or river. If they are not sure, they are to check with the organizer.
- If for any reason, such as a thunderstorm, the game must be ended early, the air horn will blast three (3) long blasts and participants contacted by FRS radios if used.

Number of Players:

- The maximum number of players will determine how many foxes and caches to deploy and thus the length of the game as follows. A minimum of 2 players on one team is required.

Age of Players:

- Players must be at least 8 years of age. Older age groups will be better able to manage all of the equipment to their advantage.

Length of the Game (depending on number of players):

A time limit will be established depending on the number of players, caches and foxes deployed:

- 1-4 teams of up to 3 players(max 12 players) - 60 minutes to find 2 geocaches and 2 foxes (4)
- 1-6 teams of up to 3 players(max 18 players) - 90 minutes to find 3 geocaches and 3 foxes (6)
- 1-8 teams of up to 3 players(max 24 players) - 120 minutes to find 4 geocaches and 4 foxes (8)
- 1-10 teams of up to 3 players(max 30 players) - 180 minutes to find 5 geocaches and 5 foxes (10)

Game Setup

- Geocaches and foxes will be placed by organizers as per planning map in advance of game start.

- There will be a clearly identified base with a table and chairs and shelter (optional) where participants will meet, equipment will be handed out and where a briefing will occur.

How the game is played:

Each member of a team will be assigned one of the kits (orienteering, geocaching, fox hunting, FRS Radio)

There will be an instructor-led session (10 minutes max) to show participants how to use their kit.

Teams will each be assigned a unique combination of foxes and geocaches to find. Each team will depart the start area in different directions looking for their first geocache or fox.

There will always be sufficient numbers of geocaches and foxes deployed so that no two teams will ever be looking for the same asset at the same time.

If the first asset to find is a geocache, the team will use their geocaching knowledge and handheld GPS unit to find it. Once found, the team will be able to see a Q-Code on a label pasted to the bottom of the cache which is a clear plastic box. They will record the Q-code adjacent this geocache on their control sheet.

If the first asset to find is a fox, then they will be using their fox hunting knowledge and the Sniffer4/ directional Yagi antenna to find the fox. Once they get close to the fox, there will be an orange triangular flag with a tag attached which also depicts a unique Q-code.

Teams will continue down their combination list of fox and geocache assets until they have found all of them and then they will return back to the start area.

Each team will also be given an FRS radio so they can participate in a controlled Net with a Net Controller stationed at the start/end location. Net Control will engage the teams with questions and they can also ask for help if they run into trouble finding an asset or using their equipment.

We also plan to add an orienteering kit (map, compass, clipboard) so teams may also get bearings they can plot on the map to identify obstacles like fences or ditches or hills or water features that are between the team and the asset, so that they can plan their route and not have to back track. This is important because good early decisions can increase your probability of winning when you don't waste time trying to take the shortest path between assets without consideration for terrain and obstacles.

At the start of the game:

An air horn will sound to indicate that all teams can simultaneously leave the start area and begin the game. For large groups, you could stagger the start times, allowing several teams to go every few minutes to avoid any injuries.

At the end of the game:

A call will go out on the FRS radio and an air horn will be blown three (3) long blasts to signal everyone to return to base when time runs out. The participants will sign in all of their equipment. There will be a debrief session (10 minutes) to gather feedback on what went well and what could be better.

Equipment Set-up: Fox Hunting Receiver/Antenna

[Refer to the Fox Hunting Reference Guide]

Equipment Set-up: Garmin eTrex 22x GPS Receiver

Introduction

⚠ WARNING

See the *Important Safety and Product Information* guide in the product box for product warnings and other important information.

Device Overview



①	Zoom keys. Press to zoom in and out.
②	Back key. Press to return to the previous menu.
③	Thumb Stick™ controller. Move directionally to scroll or highlight an item. Press to select an item.
④	Menu key. Press to open the menu for a page. Press twice to return to the main menu.
⑤	⏻ Press to adjust the backlight. Hold to turn the device on or off.
⑥	Mini-USB port (under weather cap).
⑦	Battery cover.
⑧	Battery cover locking ring.
⑨	Mounting spine.

Battery Information

⚠ WARNING

The temperature rating for the device may exceed the usable range of some batteries. Alkaline batteries can rupture at high temperatures.

NOTICE

Alkaline batteries lose a significant amount of their capacity as the temperature decreases. Use lithium batteries when operating the device in below freezing conditions.

Installing AA Batteries

The handheld device operates on two AA batteries (not included). Use NiMH or lithium batteries for best results.

- 1 Turn the D-ring counter-clockwise, and pull up to remove the cover.
- 2 Insert two AA batteries, observing polarity.



- 3 Replace the battery cover, and turn the D-ring clockwise.

Selecting the Battery Type

- 1 From the main menu, select **Setup > System > Battery Type**.
- 2 Select **Alkaline**, **Lithium**, or **Rechargeable NiMH**.

Maximizing Battery Life

You can do several things to extend the life of the batteries.

- Reduce the backlight brightness (*Adjusting the Backlight Brightness*, page 6).
- Reduce the backlight timeout (*Display Settings*, page 8).
- Use battery save mode (*Turning On Battery Save Mode*, page 1).
- Decrease the map drawing speed (*Map Settings*, page 4).
- Turn off GLONASS (*GPS and Other Satellite Systems*, page 8).

Turning On Battery Save Mode

You can use battery save mode to prolong the battery life.

Select **Setup > Display > Battery Save > On**.

In battery save mode, the screen shuts off when the backlight times out. You can select ⏻ to turn on the screen, and you can double tap ⏻ to view the status page.

Long-Term Storage

When you do not plan to use the device for several months, remove the batteries. Stored data is not lost when batteries are removed.

Turning On the Device

Hold ⏻.

Acquiring Satellite Signals

It may take 30 to 60 seconds to acquire satellite signals.

- 1 Go outdoors to an open area.
- 2 If necessary, turn on the device.
- 3 Wait while the device searches for satellites.

? flashes while the device determines your location.

📶 shows the satellite signal strength.

Turning On the Backlight

Select any key to turn on the backlight.

The backlight turns on automatically when alerts and messages are displayed.

Opening the Main Menu

The main menu gives you access to tools and setup screens for waypoints, activities, routes, and more (*Additional Main Menu Tools*, page 6).

From any page, select **menu** twice.

Waypoints, Routes, and Tracks

Where To? Menu

You can use the Where To? menu to find a destination to navigate to. Not all Where To? categories are available in all areas and maps.

Finding a Location Near Another Location

- 1 Select **Where To? > menu > Search Near**.
- 2 Select an option.
- 3 Select a location.

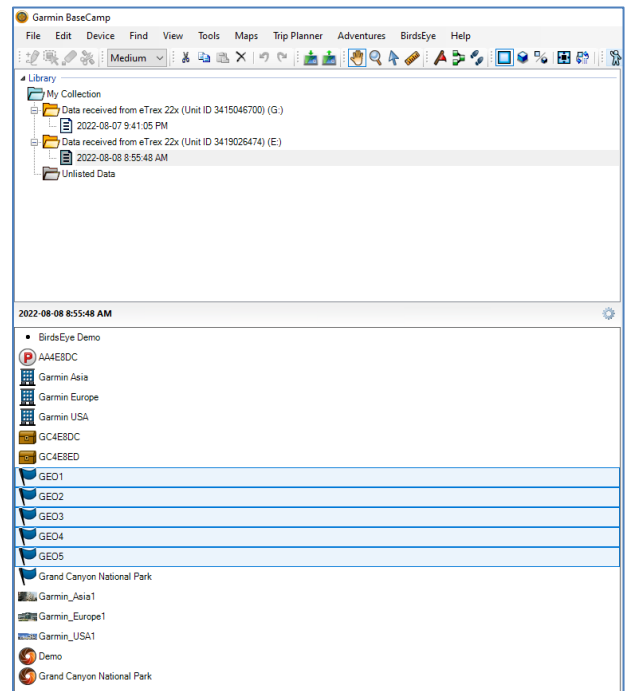
Waypoints

Waypoints are locations you record and store in the device. Waypoints can mark where you are, where you are going, or where you have been. You can add details about the location, such as name, elevation, and depth.

Event Organizer Notes for GPS Handheld:

A few Days before the event (so you don't have to do this in the rain)

1. Visit the park with an Orienteering map of the park and one of the Garmin GPS 22x handheld receivers. Using the map and visual orientation, decide roughly where you will hide the geocaches on game day.
2. Walk to each of the general areas and if there is a suitable hiding spot to put the geocache, either something natural like a rock, or culvert, or group of bushes or large tree with some sort of cavity at the base, to hide a 3" x 4" x 2" plastic box, then stand as close to the site as possible.
3. Ensure the GPS is powered on and synched to the satellites.
4. Use the Thumb stick controller to select the menu panel "Mark Waypoint". A default number will be assigned in the top right field of the screen. Highlight this field using the Thumb stick controller and push on the control to select it. A virtual keyboard will be displayed so you can rename this waypoint to whatever you like. If this is the first geocache location you are marking at the park, then label it GEO1. Increment the label each time...GEO2, GEO3, etc. Five GeoCaches for an event with another five foxes should be enough for a 2 hour event. NOTE: we will likely need to group Geocaches into folders named for each park once we have more than one park in our events inventory so that we can leave all the geocaches loaded on the GPS devices and then select the correct park each time from the list of waypoints.
5. Check that all batteries are charged to full, just prior to each use of the GPS units so that they will operate all day. We are using rechargeable Lithium batteries. Please refer to instructions on previous page to ensure the correct battery type is selected in the Setup/System/Battery Type menu. Only use the Lithium battery charger to recharge these batteries. They must be removed from the unit for charging.
6. Return home and using a PC with Garmin BaseCamp installed, plug your Garmin Etrex 22X into the computer USB port with the cable supplied in the GPS storage case. Launch Garmin Basecamp and download the Waypoints from the GPS device to your computer. They will show up in a list.
7. Now go to the "Show hidden icons up chevron in the right hand tray of your display and click on it to find and click on the USB icon to safely remove hardware and Eject Media. Click on the Garmin device and wait for the message that you can safely remove it.
8. Now connect your next GPS unit and wait for it to connect and be recognized by Garmin Basecamp.
9. With your cursor, highlight the GEO1, GEO2, GEO3, etc. lines and right mouse click to display a drop down menu. Click on "Send to" and



choose your Garmin Device. You will see a blue bar flash next to the device in the list to show data is being transferred. When done, repeat step 7-9 for each GPS unit and check that you can see the 5 GeoCaches in the list of waypoints in each unit.

On the day of the event

10. Turn on Battery Save Mode. You can use battery save mode to prolong the battery life. Select Setup > Display > Battery Save > On. In battery save mode, the screen shuts off when the backlight times out. You can select Power symbol to turn on the screen, and you can double tap Power symbol to view the status page which displays remaining battery life.
11. Each GPS handheld unit has a Unit number label attached to the top of the screen such as GPS-6.
12. Each participating team should receive one GPS handheld, one FRS radio and one Foxhunt Receiver Antenna all with the same number as their team. Example, Team 1, gets all #1 devices.
13. Have the participants turn on their GPS device by pressing and holding the power button (5) on the right hand of the unit for 2 seconds. When the unit is fully booted up, it will display a screen with a number of backlit panels. The screen should look like this.
14. Use the thumb stick controller to highlight the “Where to? Panel in the top left of the screen and then push down on the thumb stick to select the panel.
15. Now use the thumb stick controller again to highlight the Waypoints panel and select it.
16. The Geocaches have been pre-loaded into each device and will be displayed as GEO1, GEO2, GEO3, GEO4 and GEO5.
17. Each team will be given a unique sequence of geocaches and foxes to find in a certain order to ensure no two teams are looking for the same asset at the same time.
18. Using the thumb stick controller, scroll down the list to the next Geo cache on your list and push on the thumb stick controller to select it.
19. This will bring up a map with the geocache marked as a blue flag.
20. You will see “Go” marked at the bottom of the page. Push down on the thumb stick controller to activate navigation.
21. Hold GPS unit parallel to the ground and follow the purple line in the direction of the arrowhead cursor until you get message on GPS display –that you are close. Then look carefully for the Geocache.
22. The Geocache is a small 3” x 4”x2” clear or green plastic box with a lid to protect the contents. You do not have to open the box to see a Q-code on a label on the bottom of the box. Each team will write down that Q-code on their team control sheet to prove that they have found the GeoCache. They should carefully put the geocache back where they found it and be sure that it is hidden out of plain view.



IMPORTANT – Do not move geocache to a different spot or others will not be able to find it!

At the end of the event

Make sure all the equipment is returned, powered off and placed in the proper spot in the carrying case. Before putting the equipment back on the shelf, remove the batteries and place them in the Battery Storage Suitcase ready to be charged just before the next event.

Tips

Deleting a Waypoint

- On the main screen, Select **Waypoint Manager**.
- Using the Thumb stick controller, Select a waypoint from the list.
- Select **Menu** (left side button #4) > Select Delete.

GPS Storage Photos

- Craftsman Case with 2 drawers.
- Each drawer can hold 6 GPS devices, batteries and programming cable.
- Case is stackable so the entire GEOfoxing equipment can be rolled out to the event control area.



Equipment Set-up: Bridgecom Buddy - FRS Radio

IMPORTANT: Do Not Use these Radios if it is raining or forecasted to Rain and do not submerge in water.

Each radio comes with a charger, charging cable, belt clip and wrist band. A Li-ION 1200 mAh rechargeable battery is included. Channels 1-7, 15 and 16 are 2 watts (High) transmit power. Channel 8-14 are .5 watts (Low) power.



There is a programming cable and programming software to allow an administrator to change the radio settings. Out of the box setup as per screenshot below. Preset with a PL Tone to 67.0 on all channels.

Bridgecom F10

File Program Setting Help

Model Information

Freq Range [462-467MHz] Squelch Level 5 Scan Mode Carrier

Time Out Timer[s] 180 Battery Save

R/W Password Vox Level Off Beep Tone

Change Password VOX Delay Time[s] 0.5

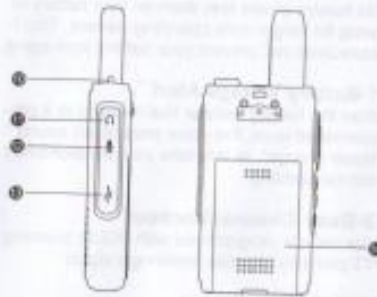
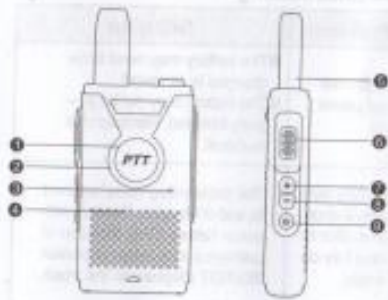
CH.	RX Freq	DEC	TX Freq	ENC	TX Power	Scan Add	Busy Lock	Compander	Spec Code
1	462.56250	67.0	462.56250	67.0	High	Yes	Off	No	Off
2	462.58750	67.0	462.58750	67.0	High	Yes	Off	No	Off
3	462.61250	67.0	462.61250	67.0	High	Yes	Off	No	Off
4	462.63750	67.0	462.63750	67.0	High	Yes	Off	No	Off
5	462.66250	67.0	462.66250	67.0	High	Yes	Off	No	Off
6	462.68750	67.0	462.68750	67.0	High	Yes	Off	No	Off
7	462.71250	67.0	462.71250	67.0	High	Yes	Off	No	Off
8	467.56250	67.0	467.56250	67.0	Low	Yes	Off	No	Off
9	467.58750	67.0	467.58750	67.0	Low	Yes	Off	No	Off
10	467.61250	67.0	467.61250	67.0	Low	Yes	Off	No	Off
11	467.63750	67.0	467.63750	67.0	Low	Yes	Off	No	Off
12	467.66250	67.0	467.66250	67.0	Low	Yes	Off	No	Off
13	467.68750	67.0	467.68750	67.0	Low	Yes	Off	No	Off
14	467.71250	67.0	467.71250	67.0	Low	Yes	Off	No	Off
15	462.55000	67.0	462.55000	67.0	High	Yes	Off	No	Off
16	462.57500	67.0	462.57500	67.0	High	Yes	Off	No	Off

COM6 NUM

Using the Buddy FRS Radio

Package Contents

Radio *1 ; Li-Ion Battery Pack*1 ; User's Manual*1
Belt Clip*1; Hand-Strap*1; Adaptor *1; USB cable*1



- 1 PTT
- 2 light
- 3 Mic
- 4 Speaker
- 5 Antenna
- 6 Side key PTT
- 7 Channel +
- 8 Channel -
- 9 Power on /off Switch
- 10 Volume Switch
- 11 Earphone Interface
- 12 Microphone Interface
- 13 USB Interface
- 14 Battery

Basic parameters:

Size: 130*52*14
Weight: 80g
Operating Voltage: 3.3-4.2v DC
FRS Channels: 16
Working Temperature: -20 C ~+50 C

Status of Indicator light

1-Indicator

The front panel green light illuminates when radio is receiving. The red light illuminates when radio is transmitting.

2-Channel Switch

A voice prompt indicates the channel selected, 1-16, use the + button to move up in channels, use the - to move down in channels.

3-Power Switch

Press and hold the orange power button to turn the radio ON or OFF.

4- PTT

The radio has two PTT switches, one located on the left side and one located on the front. Hold the radio approximately 1 inch from your face centering the microphone. Press and hold either PTT and begin speaking. Release the PTT to receive a response.

5- Monitor

Always monitor for channel activity before transmitting, press and hold the + (UP) button to open the squelch for receive activity. Using the monitor is also useful for listening for weak signals.

6- Squelch level

The purpose of the squelch is to mute the speaker when no signals are present the default squelch level is 5, squelch levels 0-9 can be set using the PC programming software.

Level 0 fully opens the squelch. The higher the squelch level, the stronger the signals must be when receiving.

7- TOT

This function limits the length of time a user can

occupy a channel during a continuous transmission, this function can be useful in preventing damage to your radio due to longer transmissions than normal. The radio issues a warning alarm signaling a time-out of the transmission, release the PTT to resume normal operation.

8-Scan

By default, all 16 channels have been added to scan, your radio enters scan automatically when set to channel 16.

Using the PC programming software, you can add or delete channels from the scan list.

9-Privacy Tones

By default, your radio is set to CTCSS tone 67.0, with the programming software you can customize CTCSS or DCS privacy tones per channel. A special privacy code is also available per channel as an ON or Off selection.

When a channel is programmed with CTCSS or DCS, squelch will only open when the tone signal matches (Decodes) the received CTCSS or DCS tone. If your radio receives different tones other than those programmed the squelch will not be opened and is indicated by a green light with no speaker audio, observe the green light is off before attempting to transmit to avoid talking over user on the same frequency. Using the monitor function will open the squelch allowing you to listen or verify the conversation has ended. The Busy Channel Lockout feature can be used in conjunction with privacy tones to keep from stepping over other users.

10-Power Saving Function

This feature allows less drain on your battery allowing for longer daily operating periods. This feature does not prevent your battery from aging.

11-Battery Voltage Alert

When the battery voltage has lowered to a pre-determined level, the voice prompt will sound "Please charge", at this time you are prohibited from transmitting.

12-Busy Channel Lockout

If the radio is programmed with BCLO, pressing PTT prohibits TX while receiving a signal.

13-High /Low Power

Radio power setting is per operating frequency. Channels 1 -7, 15, 16 are high power, channels 8 - 14 are low power.

14-VOX

You can enable or disable VOX with your PC programming software.

When the VOX function is active, when talking into the microphone your voice activates the transmitter.

When using a headset, adjust the VOX level to an appropriate level. If the microphone is too sensitive noise will activate the transmitter; if the microphone is not sensitive enough, your voice will not activate transmitter.

15-Charging Indicator

The radio is charged by using the supplied Android USB cable. When charging, the indicator light is red.

16-Channel Locking Function

Press and hold the - (Down) key to lock the channel UP/Down buttons indicated by two beeps. Press and hold the - (Down) key a second time to unlock the UP/DOWN buttons indicated by a single beep.

Troubleshooting

Problem	Solution
Radio will not power on	<ul style="list-style-type: none"> ■ The battery may need to be charged or renewed. ■ The battery may not be properly installed. Remove and re-install.
Battery lasts only a short time after being fully charged.	The battery may have reached its end of life cycle. Replace with a new battery. Only dispose of batteries at a recycle center. DO NOT dispose in the trash.
Unable to speak to other users.	<ul style="list-style-type: none"> ■ Verify the frequency and or the tone settings you are using are the same as other users ■ Verify transmitting is within effective operating range of other users.
Hearing other conversations on a channel	Program privacy tones or program different privacy tones on that channel.

FRS Radio Storage





A few days before the event

Take all the radios out of the storage case. Charge all of the radio batteries to ensure they will last the entire day. The radio is charged by plugging the USB cable which came with it into the USB port on the right side of the radio and the other end into the charging brick which is then plugged into a power bar or AC outlet. Put all the radios back into the storage case in the proper slots.

On the day of the event

Each FRS Radio unit has a Unit number written on the front of the antenna in silver marker such as FRS1.

Each participating team should receive one GPS handheld, one FRS radio and one Foxhunt Receiver Antenna all with the same number as their team. Example, Team 1, gets all #1 devices.

Have the participants turn on their FRS Radio by pressing and holding the orange power button on the left hand side of the unit for 2 seconds. When the unit is first turned on, a voice will announce the channel the radio is set to. Use the channel +/- buttons on the left hand side of the unit to change the channel you want to use. IMPORTANT – do not use Channel 1 because this is the channel that everyone uses and likely to have interference. The voice will announce each new channel as you select it. There is a tab switch on the top of the radio adjacent the antenna for volume control. Pull the tab towards you to increase the volume. Push the tab away from you to lower the volume. To transmit, push the PTT button on the upper left side of the radio or the circular button in the center of the front panel. Hold the radio about 8 inches from your face and speak directly into the microphone which is a small hole on the right lower side of the circular PTT button. To turn the radio off, simply hold the orange power button on the left side of the radio for 2 seconds. The unit voice will announce “Off”.

During the event

There will be a volunteer assigned to be Net Control and who will periodically make announcements or call upon each team to respond to “trivia” questions (make a list beforehand). The interaction should be sporadic. Maybe every 10 minutes so that the teams can concentrate on finding their geocache and fox assignments. The volunteer can also offer assistance if a team calls for help. There could be roving volunteers also with radios who can walk to the teams but they must be registered with Net Control who must stay at the Check-in/Check-out registration area to ensure the security of all the equipment.

Suggestions for Net Control

Announce “This is Net Control – would each team please respond by repeating may call as follows:

This is Net Control for Roll Call. Team 1 please report with – This is Team 1 and all is OK.

Team radio operators can also call Net Control if they have a questions or something to share.

Net Control could encourage dialogue by making an announcement like – This is Net Control, does anyone know what we call this activity? What did you do this summer? Favorite animal and why? Favorite meal? Please give me your team number and I will invite you to speak.

One team can send a message or ask a question of another team but they must ask for permission from Net Control as follows: Net Control this is Team 1 with a message for Team 4. Net Control says – Team 1, Go ahead with your message for Team 4.

At the end of the event

Collect all the radios, make sure they are not damaged. Make sure they are powered off and put them back into the storage case in the proper slots.

Equipment Set-up: Orienteering Map, Compass, Clipboard and Pen

[this is a place holder and will be added once we have the maps, compass, clipboards to be able to include this in our Geofoxing events]

Storing all of the Equipment

All of the equipment is stored in a stack of waterproof cases until the next event.



Playing Field/Park Set-up

On the day of the event, a group of volunteers will meet at the park fully 90 minutes before the start time.

One volunteer will depart the Registration area with the map and all of the Geocaches to hide them according to the map instructions.

One volunteer will depart the Registration area with the map and all of the Fox Transmitter tubes (after they have been turned on and validated) and securely attach them with the cable locks to trees or benches close to where the orange orienteering flag will also be hung with the Q-code attached.

One volunteer will set up and stay at the Registration desk where all of the GPS, Radio and Fox receiving equipment will be set out ready for use.

Once the participants arrive, they will be organized into their teams and equipment will be handed out.

There will be a briefing to explain how to use the equipment and there will be a homing fox set-up to test the fox hunting equipment and demonstrate technique. Each team will be given a clip board and pen with their assignment showing which geocaches and foxes they are being asked to find and record on their assignment sheet. They will be reminded that they do not need to cross any roads or trespass on any private property. Please be careful of the equipment.

The event will typically run for 2 hours and an air horn will be sounded with 3 long blasts to signal the end of the event if everyone has not returned by the announced end time.

Leave 10 minutes at the end of the event to collect all of the equipment and have a debrief with the participants to ask what they liked most and what could be better in future events. You can also ask if they would like to do this again and whether they would be interested in Amateur Radio as a hobby. There should be a handout explaining how to get involved in Amateur Radio and what you can do in the hobby.





Team Assignment Sheet – Print this sheet and complete at the event

If we go around the circle the same way with the foxes from 1 to 5 then we could easily make some nice assumptions about what the order for the teams would be.

T1 F1 G3 F5 G4 F6 (home)

T2 F2 G5 F4 G2 F6 (home)

T3 F3 G1 F2 G3 F6 (home)

T4 F4 G2 F3 G1 F6 (home)

T5 F5 G4 F1 G5 F6 (home)

T6 G1 F5 G2 F3 F6 (home)

T7 G2 F4 G4 F1 F6 (home)

T8 G3 F1 G1 F4 F6 (home)

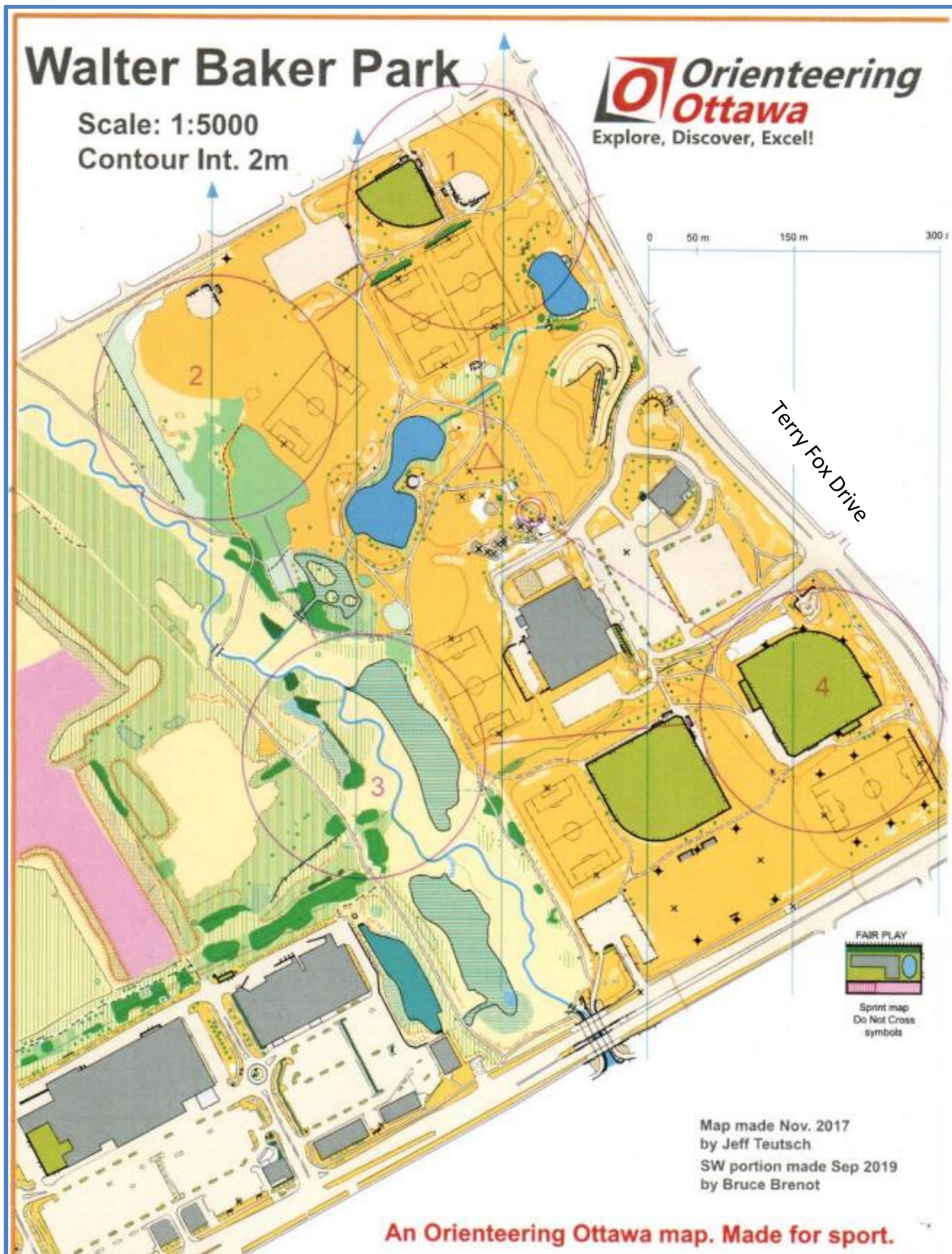
T9 G4 F3 G5 F2 F6 (home) Just in case

T10 G5 F2 G3 F5 F6 (home) Just in case

So above is my idea of the sequence for each team. While we don't have particular F locations we know that F1 is likely to be near the north end of the hill, F2 we discussed putting on the east side of the lake by the soccer fields along Terry Fox, F3 up by the outhouses, F4 down somewhere between G3 and G4 and F5 up against the building where Emily put it.

Appendix A - Example Maps and Photos

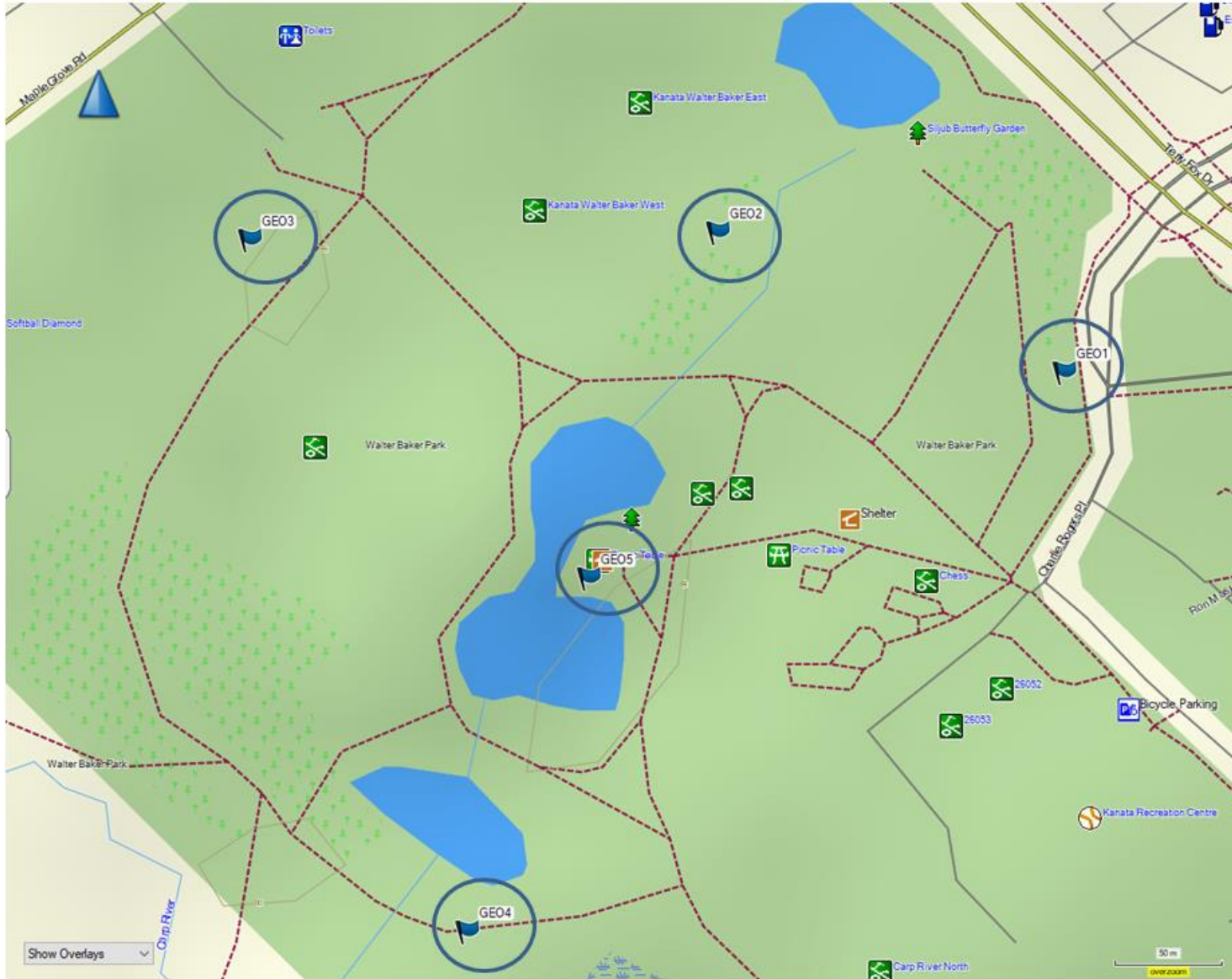
Map of Walter Baker Park in Kanata




Partial Map of Walter Baker Park with Geocache Locations Marked



Zoomed In - Partial Map of Walter Baker Park with Geocache Locations Marked



Walter Baker Park - GeoCache Placement Photos

Identifier	Pictures	
GEO1		
GEO2		

GEO3




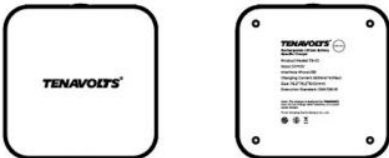
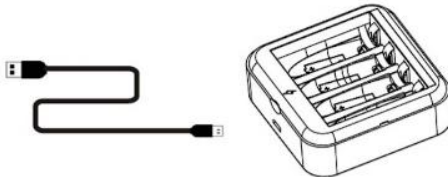
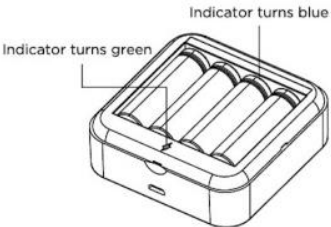
GEO4



GEO5



Appendix B - TENAVOLTS Rechargeable Lithium AA Battery User Manual

<p style="text-align: center;">TENAVOLTS® Rechargeable Lithium Battery</p> <p style="text-align: center;">User Manual</p> 	<p>Charger Introduction TS-C1</p> <p>The charger included, recharging and storing batteries in one, is designed for TENAVOLTS rechargeable lithium battery (1.5V constant power) only, which could charge 4 batteries at the same time.</p> <p>Note: The output voltage is 5V. Do not charge the Ni-MH, alkaline or other batteries.</p>  <p style="text-align: center;">The pictures above are for illustration only. The final product shall prevail.</p>	<p>Charger Introduction TS-C1</p> <p>1. Connect the charger</p> <p>Use the USB cable to connect the phone adapter DC5V2A port (or computer USB port) with the charger's MicroUSB port. The green light of the charger indicates the charger is working normally.</p>  <p>2. Put in TENAVOLTS rechargeable lithium battery</p> <p>Double check the direction of positive and negative poles before putting batteries in the charger. The blue light of the indicator shows the battery is charging. The charger can charge AA or AAA batteries</p>																																																													
 <p>Indicator turns green</p> <p>Indicator turns blue</p> <p>3. Charging complete</p> <p>The new generation of fast charging technology enables charging and using. After the battery is fully charged, the indicator at the bottom of the battery will turn off. And the green indicator will keep on at default.</p> <p>Attention</p> <ol style="list-style-type: none"> The charger output power is DC 5V, can only charge TENAVOLTS AA/AAA rechargeable lithium batteries. Do not charge Ni-MH, alkaline or other type battery, otherwise there may cause leakage, combustion, explosion and other dangers. 	<ol style="list-style-type: none"> The charger can only be connected to a 5V mobile phone adapter or a USB port such as laptop. If the input voltage exceeds 6V, it may cause damage to the charger. The optimum operating temperature of the charger is 68-77°F. Please ensure the charger ventilated and dry during charging process . Please confirm the positive & negative poles before charging. Do not dismantle, knock or beat the charger. <table border="1"> <thead> <tr> <th rowspan="2">Product Part</th> <th colspan="6">Hazardous Substances</th> </tr> <tr> <th>Lead (Pb)</th> <th>Mercury (Hg)</th> <th>Cadmium (Cd)</th> <th>Hexavalent chromium (Cr)</th> <th>Polybrominated biphenyls (PBB)</th> <th>Polybrominated diphenyl ethers (PBDE)</th> </tr> </thead> <tbody> <tr> <td>Metallic Connect Strip</td> <td>○</td> <td>○</td> <td>○</td> <td>X</td> <td>○</td> <td>○</td> </tr> <tr> <td>Circuit Board</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>Shell</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>USB Cable</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> </tbody> </table> <p>This table is prepared according to the provisions specified in SF/T 11364. ○ means that the content of the hazardous substance in all homogeneous materials of this component is below the limit requirements specified in GB/T 26572</p> <p>X: means that the content of the hazardous substance at least in a certain homogeneous material of this component exceeds the limit requirements specified in GB/T 26572</p>	Product Part	Hazardous Substances						Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)	Metallic Connect Strip	○	○	○	X	○	○	Circuit Board	○	○	○	○	○	○	Shell	○	○	○	○	○	○	USB Cable	○	○	○	○	○	○	<p>Specifications</p> <table border="1"> <thead> <tr> <th>Model</th> <th>TS-C1</th> </tr> </thead> <tbody> <tr> <td>Battery Type</td> <td>Rechargeable Lithium Battery</td> </tr> <tr> <td>Size</td> <td>76.2*76.2*27.7(mm)</td> </tr> <tr> <td>Charge Slot</td> <td>AA*4 Or AAA*4</td> </tr> <tr> <td>Input/Output Voltage</td> <td>DC 5V/DC 5V</td> </tr> <tr> <td>Charge Port</td> <td>Micro USB</td> </tr> <tr> <td>Adapter</td> <td>DC 5V/2A</td> </tr> <tr> <td>Charge Current</td> <td>500mA*4(Max)</td> </tr> <tr> <td>Weight</td> <td>64.2g</td> </tr> <tr> <td>Execution Standard</td> <td>GB4706.18</td> </tr> </tbody> </table> <p>Manufacturer: Fujian Nanping Nanfu Battery Co., Ltd. Address: No. 109 Industrial Road, Nanping City, Fujian Tel: 400-8873599 www.nanfu.com</p>	Model	TS-C1	Battery Type	Rechargeable Lithium Battery	Size	76.2*76.2*27.7(mm)	Charge Slot	AA*4 Or AAA*4	Input/Output Voltage	DC 5V/DC 5V	Charge Port	Micro USB	Adapter	DC 5V/2A	Charge Current	500mA*4(Max)	Weight	64.2g	Execution Standard	GB4706.18
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TENAVOLTS Rechargeable Lithium Battery Specific Charger Model TS-C1 and HITRENDS SMART USB Charger Model YA60WS-8U

Each TENAVOLTS charging station with 4xAA lithium batteries installed, draws, 2 Amps and the HITRENDS SMART USB Multi-port Charger has a maximum current rating of 12Amps@5 Volts DC or 60 Watts.

IMPORTANT – Do not exceed plugging in maximum four (4) TENAVOLTS charging stations (8 Amps) because HITRENDS unit runs warm at that load and Amazon reviews report burning the unit out if all ports are used simultaneously. You can only use all 8 ports if the combination of loads does not exceed this 67% max. Load rating. It takes about 2 hours to charge a set of 16 batteries. There are 48 batteries so it will take a minimum of 3 sessions x 2 hours or 6 hours to charge all batteries.



Lithium AA and 9-volt Battery Storage



EBL 5 Bay Charger and 9-volt lithium Batteries Instructions

About EBL

- EBL is one of the leading battery and charger manufacturing company, engaged in AA, AAA, C, D, 9V batteries and related battery chargers. EBL batteries have become increasingly popular due to reliable battery lifetime and improved recharge ability and stability.

Individual Smart Charger

- Each slot of this charger is independent, so the charger can charge 1-5 pcs 9v Li ion rechargeable batteries individually.

Fast Charging

- Maximal output of each slot is 120mAh-150mAh.
- It take about 5.5 hours to fully charge 5 pack 600mAh 9V li ion batteries.
- Please Note: this charger can only charge lithium-ion 9v batteries.

Innovative USB Charging Port

- Different from traditional battery charger, this charger is powered by USB cable instead of DC cable. This is a new charging method for battery chargers, very convenient and portable
- Please note: the USB charger head does not come with charger

LED Indicators

- LED Indicators show the charging progress: red - charging; green - charge completed; no manual timing required.

Protection

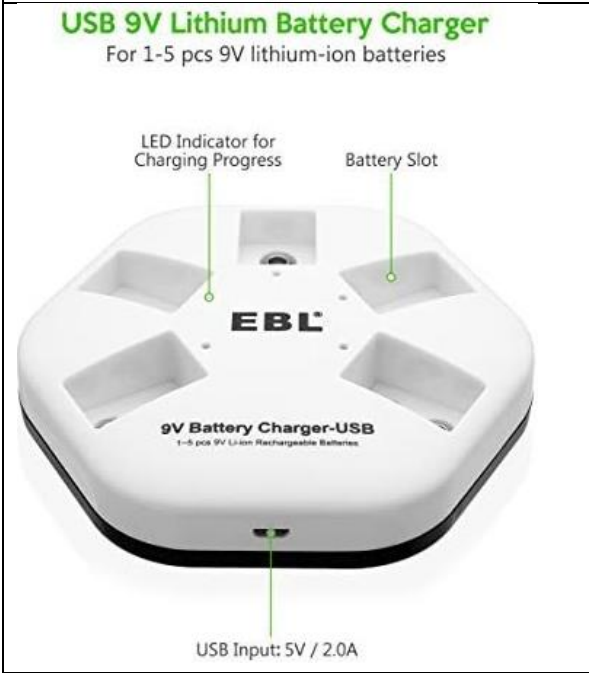
- With $-\Delta V$ cut-off and MCU control, the charger provides constant current and constant voltage to protect you batteries from over current, over voltage, overheat, over charge and short circuit.

Charger specification

- Input: 5V 2A
- Output: 8.5V 750mAh
- Battery charge rate: $\geq 80\%$

High Quality Batteries

- EBL 600mAh 6F22 9V lithium-ion rechargeable batteries are low self-discharge.
- They can be charged up to 1200 times without any memory effect.
- Ideal batteries for fire alarms, home security devices, professional audio and medical devices.
- What you get: EBL 5 bay 9V battery charger; USB cable*1; EBL 600mAh Li ion 9V batteries *5; Battery case for 9V batteries*1



Appendix C -- INSTRUCTIONS for Participants

-- Send this section to the organizer to hand out to participants to read before the event --

We look forward to your participation in our GEOFOXING activity. It will be both educational and fun.

You will be able to explore some technologies that you may already be familiar with, but you may never have used them in the ways we will show you. We will help you to understand where these technologies can be found in the world today, why they are important and how they are used.

The Garmin eTrex 22x GPS Handheld Receiver

The first technology is the Global Positioning System (or “GPS”). GPS is a constellation of satellites that orbit the earth and transmit timing information which when received on the ground using a GPS receiver, allows the user to determine where they are located, get directions, find things like gas stations, restaurants, hotels, etc. GPS devices can help you to plan routes for road trips or when you are hiking, to know where we are; a multi-million dollar system that was originally built by the US military.

We call these systems – navigation systems. But by themselves, they can only tell the individual who has the device, where they are on the planet in terms of latitude, longitude and elevation or a civic address. We can mark a spot on the map screen of such a device called a “waypoint” and then we can tell the unit - to show us how to get back to that spot again. We can also drop a crumb trail along a path so we can show somebody else the trail we took or use that trail to retrace our steps to get back to where we started. This is important in a forested area where knowing where we started might not be good enough to find our way back, especially if it gets dark or the weather turns bad.

Some navigation systems can also transmit their current location using the cell network or via satellite communications. All the major courier companies like Canpar, Fedex, Purolater and UPS use this technology to keep track of their trucks so that they can provide customers with near real-time estimates of when their package will arrive. This technology can also be used to improve efficiency by re-routing vehicles in real-time when there is an accident up ahead and so much more.

There is a global game called Geocaching and a website with the same name called www.geocaching.com where you can look for hidden treasures called geocaches which can be hidden by anyone and they give you geographic coordinates and some clues so you can try to find it. When you do find it, there is usually a log book in a waterproof container along with a few little prizes. If you take one, the etiquette of geocaching says, you must replace it with something of similar value.

Today, we will be using a Garmin eTrex 22x GPS Handheld receiver to find some geocaches close by. Turn on your GPS device by pressing and holding the power button on the right hand of the unit for 2 seconds. When the unit is fully booted up, it will display a screen with a number of backlit panels. The screen should look like this.

Use the thumb stick controller to highlight the “Where to? panel in the top right of the



screen and then push down on the thumb stick to select the panel.

Use the thumb stick controller again to highlight the Waypoints panel and select it.

The Geocaches have been pre-loaded into each device and will be displayed as GEO1, GEO2, GEO3, GEO4 and GEO5.

Each team will be given a unique sequence of geocaches and foxes to find in a certain order to ensure no two teams are looking for the same asset at the same time.

Using the thumb stick controller, scroll down the list to the next Geo cache on your list and push on the thumb stick controller to select it.

This will bring up a map with the geocache marked as a blue flag.

You will see “Go” marked at the bottom of the page. Push down on the thumb stick controller to activate navigation.

Hold GPS unit parallel to the ground and follow the purple line in the direction of the arrowhead cursor until you get message on GPS display –that you are close. Then look carefully for the Geocache. Geocaches might be hiding under a log, or a rock or be on a branch in a tree. It will not be located anywhere near water or where it would be unsafe to get to it.



The Geocache is a small 3” x 4”x2” clear or green plastic box with a lid to protect the contents. You do not have to open the box to see a Q-code on a label on the bottom of the box. Each team will write down that Q-code on their team control sheet to prove that they have found the GeoCache. They should carefully put the geocache back where they found it and be sure that it is hidden out of plain view.

IMPORTANT – Do not move geocache to a different spot or others will not be able to find it!

The Bridgecom Buddy FRS Radio

If you need to ask a question to clarify how to use your equipment or because you are having trouble finding what you are looking for, instead of walking back to the start point, you can contact us using your BUDDY FRS radio to ask for help.

So you guessed it - the next technology we will learn something about today is Radio. Mostly we know about receiving radio stations. This is sometimes referred to as Broadcast Radio. It is in one direction where we only receive the music or news or advertising but we cannot talk back. Other radios are referred to as 2-way radios. Radio can transmit as well as receive. It allows us to talk or text with other people at a distance. Did you know that your smart phone is a radio? So are some TV remote controls. And Garage Door openers...and the key fob that opens a car door. Basically, our world is dependent upon radio for so many things that we don't even think about. And in the case of our mobile phone, it uses a network of “cell towers” to allow us to communicate, the same as you might do on a

computer over the internet or a telephone at home or at school or a business office. We take for granted that our cellphone and the internet will always work –right? But that is not true. Sometimes there can be equipment failure or high winds, lightening, floods, an earthquake that can disrupt electrical power, cut wires and fiber optic cables which can take hours, days, weeks or even longer to restore. When this happens, our normal daily activities can be interrupted and which may vary in severity from inconvenient to dangerous or even life threatening. We are seeing situations like this more and more due to climate change.

Today, you will be using a Bridgecom Buddy Family Radio Service (Or “FRS”) 2-way (transmit and receive) radio that will allow you to communicate with other participants and with a Net Control which is somebody at our base camp here to get information or provide information that will help you complete your assignment. We might even call upon you to answer trivia questions which can earn bonus points.



Some GPS devices can also include a radio which can transmit the GPS location information in real-time using a cellphone network or satellites so that friends and family can always know where we are. And these devices can also allow us to send a short message like “I’m OK”, or “I broke my leg. Please send help.”

Or a boat owner or commercial trucking company can program a geo-fence around where their assets are supposed to be so that if it ever crosses over the fence, an alarm will go off immediately. If it is a refrigerated truck and the temperature starts to rise, an alarm can dispatch a technician to exactly where the truck or container is located to fix the problem. Rail companies send parts to a destination where they know their train asset will be even several days in advance so that a technician can do maintenance and repairs before the train has a fault which would require it to be taken out of service.

Turn on your FRS Radio by pressing and holding the orange power button on the left hand side of the unit for 2 seconds. When the unit is first turned on, a voice will announce the channel the radio is set to. For this event, the radio has been set to Channel 5. There is a tab switch on the top of the radio adjacent the antenna for volume control. Pull the tab towards you to increase the volume. Push the tab away from you to lower the volume. To transmit, push the PTT button on the upper left side of the radio or the circular button in the center of the front panel. Hold the radio about 8 inches from your face and speak directly into the microphone which is a small hole on the right lower side of the circular PTT button. To turn the radio off, simply hold the orange power button on the left side of the radio for 2 seconds. The unit voice will announce “Off”.

Radio Direction Finding – “Fox Hunting”

This technology is used by researchers to track wildlife, both on land and in the oceans. Sometimes, they use GPS and Satellites. But then, they use Radio Direction Finding equipment to locate a specific animal to give it medical assistance or change the batteries on a tracking collar. This same technology is used to find an elderly person who has a memory problem and may wander away from a healthcare facility and could be at risk if they are not found quickly. And, it can be used to identify the source of

radio signals that are interfering with another radio such as might be the case near a power station or an airport or an electric vehicle charging station.

Today, we will be using direction finding equipment to find hidden transmitters. The transmitters are installed in camouflaged plastic tubes like the one we have hanging from a tree limb at the start point.



You will see nearby the fox, an orange coloured triangular flag with a Q-code card hanging from a string. We want you to write down the Q-code for the hidden transmitter which we call a "Fox" on your participant sheet.

You will be using a Fox Hunting receiver called a "SNIFFER 4" which is attached to a directional handheld "YAGI" antenna to find the fox. The receiver is pre-programmed with the frequencies of 5 hidden foxes and your participant sheet will tell you which ones you need to find and in which order. Most often you will alternate between finding a fox and finding a geocache. The 6th frequency is actually the demo fox here at "Home base" so once you are all done, you can press #6 on your fox hunting receiver to follow the signal home.



To turn on your SNIFFER 4, briefly depress (1 second) the button in the upper right corner. Then briefly depress (1 second) the number on the keypad corresponding to the transmitter you want to find.

Sweep the antenna back and forth and rotate it 90 degrees to find the strongest audible signal of the fox. As you sweep, the frequency will increase in pitch as you approach the direction of the fox. And, there is a single digit display on the SNIFFER 4 which starts at 0 and will increase as you get closer to the Fox. When the number is 9, you are within 20 feet and should be able to see the orange flag with the Q Code card hanging from it.



Note: Radio signals are polarized so if the transmitter is in a vertical orientation, then you will get the strongest signal if you orient your antenna with the elements in the vertical direction. If the Fox is lying on the ground or tied horizontally to a branch, then the SNIFFER will have the strongest signal when it is held with the antenna elements in a horizontal orientation.

The transmitter will transmit for 15 seconds and then stop for 15 seconds so if you stop hearing it, then it is best to stop moving until it starts again, otherwise you might walk right past it. Also, sometimes you can get fooled because the antenna also picks up the Fox transmitter off the back of the antenna where

you are holding it. So, you can turn 180 degrees to see which direction is the strongest using the single digit display and then continue in the direction of the strongest signal.

Fox Hunting is a practical application of Amateur Radio. For more information about Fox Hunting and Geofxing, visit www.ardfottawa.ca You can also take a course to get your Amateur Radio license which can start you off on a rewarding and life-long hobby. Amateur Radio is a great way to meet new friends and could lead you to a career in engineering where you could apply this knowledge to solve problems and innovate future solutions. www.oarc.net/courses If you have your Amateur Radio license, you can apply to attend a week long summer camp at Carleton University. <https://youthontheair.org/camps/>

DID YOU KNOW...Not that long ago, if you wanted a taxi to pick you up and take you somewhere, you had to call a taxi company on a land-line phone - not a cellular or smart phone - sometimes that meant finding a payphone - and speak with a dispatcher who would take your information and tell you approximately how long you would have to wait. Then, the dispatcher would broadcast your location and destination on a commercial taxi radio or computerized dispatch system to all vehicles. One of the drivers would accept the job. When they arrived, they might know your first name; may or may not remember where you are going and you had no idea who the driver was. You only looked for a vehicle with a Taxi sign on the roof. After you told the driver where you were going, they would start the meter and when you got to your destination they would stop the meter and tell you how much you owed. You would need to pay by cash unless the driver had a credit card machine and all this took several minutes to complete. You had to specifically ask for a receipt which was usually something scribbled on the back of a business card. All this when you might be late for a meeting or an airline flight!

Today, you download an app like UBER or LYFT on your smartphone and complete a profile including your payment info. When you need to go somewhere, you open the App and specify a destination. With Location Services turned on (uses GPS on your phone and the cellular radio network), the App knows where you are and tells you what your ride will cost. It shows you all the drivers who are close by. You can pick one or the app will pick one for you. The App will tell you the name of the driver, the type and colour of vehicle and license plate#. If you accept, the app tells you how long until they will arrive and shows their vehicle approaching on a map. The driver also gets a message with your name and where you are going. You can text or call the driver directly. When they arrive, you both know everything necessary about the trip. When you arrive at your destination, you say thanks, get out of the vehicle, take your luggage and walk away from the vehicle. Within minutes you get a prompt to provide a rating for your ride and also if you would like to provide a tip. The fare is automatically charged to your payment method on file.

In the future, there will not be a driver behind the wheel of the taxi that pulls up to take you to your destination! It will be an autonomous vehicle. There are some autonomous vehicles on our roads today. Where do the ideas come from for these uses of technologies to create such amazing solutions? They come from the minds of curious people like you, who became interested in creating the future from hands on experiences like this one. Visit <https://areaxo.com/> to see autonomous vehicle research in Ottawa.