



Fox Hunting...
How to have Fun with Amateur
Radio in the Woods!
www.ardfottawa.ca

March 31, 2022



Presented by:
Roger Egan VA3EGY
Harrie Jones VE3HYS



Presenter Introduction

- **Roger** – recently retired with a technical background in Electronics Engineering Technology; with more recent roles in Sales, Marketing and Customer Engagement. He has always been fascinated with Radio. Got his Amateur Radio license in 2017, but wants to make a difference in getting more younger people involved in his great hobby. By younger he means 8-14, 15-25 and 26-40 year old cohorts.
- **Harrie** – got his Amateur Radio license in 1975. He likes to build and repair things. Has been a member of the Ottawa Amateur Radio Club (OARC) executive since about 1985. Served as the chair of the St Lawrence Valley Repeater Council in the late 80's. Spent his career at CFRA etc. -- first as a tech and then as the chief engineer for 7 stations. He is also very active with youth focused on Scouts and teaching ham classes and helping new hams get active.
- Together, they have established a growing interest in Fox Hunting both within the Amateur Radio Community as well as youth community groups in Ottawa.

Today's Topics

- What is “basic” Fox Hunting?
- What is “Radio Orienteering” or “ARDF”?
- What Equipment Do you Need?
- What specialized equipment for a “better” experience
- Overcoming Challenges and Best Practice Techniques (secrets)
- Preparing for our Fox Hunt this Saturday April 2nd
- Questions and Some Useful Links

Event Types

- Mobile Fox Hunts
 - Multi-day events where participants drive around to triangulate on a fixed Fox
 - High (1-5W) or Low power (15mW) Transmitter; maybe more than one
 - Clues provided on groups.io such as Google Maps streetviews or riddles, etc.
- Park Events (walking)
 - 2-3 hours followed by a social (picnic or coffee shop)
 - 5 low power transmitters on different frequencies
- Combination Mobile & Park
 - Register in advance and check in at a start point to provide your odometer reading
 - Mobile portion will lead you to where the park event will continue
 - Have 2 hours to find the park then announce location on repeater for those still looking
 - 2-3 hours on-foot where each fox will provide a clue to the frequency of the next.
 - Winners will be determined by lowest odometer for the mobile and the total number of foxes found in the park (in the shortest time) or some other agreeable formula.

More Serious Events

- Sprints and Foxoring – International sport and rules
 - Up to 5 transmitters all on the same frequency
 - Participants are given a map with 100M circles typically 250 meters apart
 - The fox will be receivable somewhere within that 100 meter circle and none of the other foxes can be heard so requires a dummy load stub antenna
- Radio Orienteering – International sport and rules
 - 4, 5 or 6 transmitters depending on age category, different frequencies
 - Use both 2M and 80M events
 - Can be similar to orienteering using map, compass and fox hunting equipment
 - Participants check-in to the Fox with electronic tag they wear or take a picture or pull a tab with a number on it.
 - Winners are ranked by arrival time at the finish. You need to be fit!

ARDF Ottawa – Target Fox Hunting Approach

- One club event monthly from February thru June.
- Take a break in July and August. (or combine with a family picnic)
- Have some sort of prizes or award certificate for participation.
- Focus on Scouts in September thru December
- Take another break in January (Typically too cold).
- Points could accumulate towards an annual “Top Gun” award.
- Take turns being the organizer for knowledge transfer/succession planning, fresh ideas and to avoid volunteer burnout.

For multi-day Mobile Fox Hunt events

- Typically hide the Fox where there is access to AC power (an apartment balcony is popular or using an existing radio tower)
- Use a Groups.io page with daily photo hints to keep participants inspired and get them closer to the beacon.
- Participants send their guesses privately to the event organizer and responses are provided after 6pm each day.
- Participants with mobility issues can work as part of a team to share a bearing from their QTH which can be correlated to make a guess without leaving their homes. (must have a directional antenna and compass or map to use landmarks)

Tuesday May 26th



Wednesday May 27th



Thursday May 28th Clue



Friday May 29th Clue



Saturday's Clue



Sunday's Clue



Fox Hunting Techniques

- Body Fade – using your body as a shield with your radio in close
- Removing parts of your antenna system to attenuate the signal
- Changing the frequency of your receiver to reduce the signal
- Insert an adjustable offset attenuator between radio & antenna
- If driving, do a pattern looking for signal peaks
- Covertly follow another participant (smile)

Tricks for Frustrating Fox Hunters

- Use a directional antenna on the Fox and point it at a water tower
- Put the fox between two high rise buildings to create mis-leading reflections
- Use a long piece of leaky coax buried in the ground to create false indications of fox location
- Use two beacons transmitting on the same frequency at alternating times from different locations
- Put the beacon on one side of a river with no bridge to get to the other side for miles around
- Crank up the power on the beacon to 5 watts and put it on an antenna that is on a 60 foot tower. Fox Hunters will definitely need to use an offset attenuator to be able to get their sensitivity and selectivity down to where they can pinpoint a location.

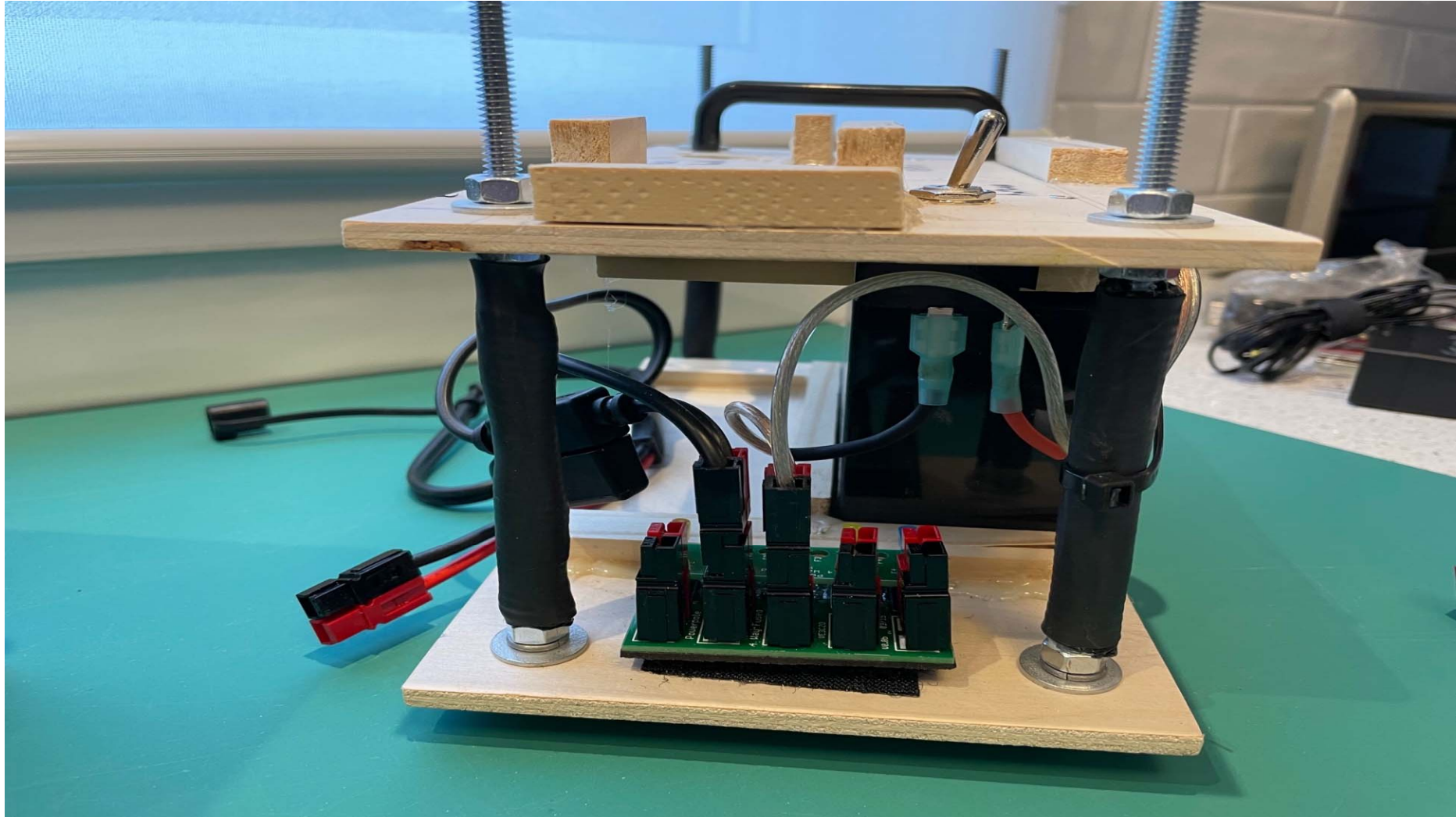
Our Fox Hunting Equipment Inventory

- 25 Frequency Offset Attenuator kits and Project Build session – club member owned
- Thanks to a \$3,000 grant from IEEE Ottawa, Life Members we were able to acquire
 - 12 Sniffer4 Receivers
 - 12 ARDF Fiberglass element Yagi Antennas with Gamma Match
 - Storage Racks and Case
 - 1 Tape Measure Yagi antenna built from the wb2hol plans with Hairpin Match
- Protective and Secure Transmitter housings (5 stealth tubes and 5 Ammo Boxes)
- Thanks to \$300 donations from OVMRC & OARC (\$600 total) we were able to acquire
 - 5 Byonics Microfox15 transmitters with USB programming cables
 - 2 more Byonics Microfox15 transmitters that OVMRC already had on hand as spares/ demo
 - 2 Byonics PicCon controllers for use with HT radios in the Ammo Boxes for high power beacon applications

Ammo Box Configuration

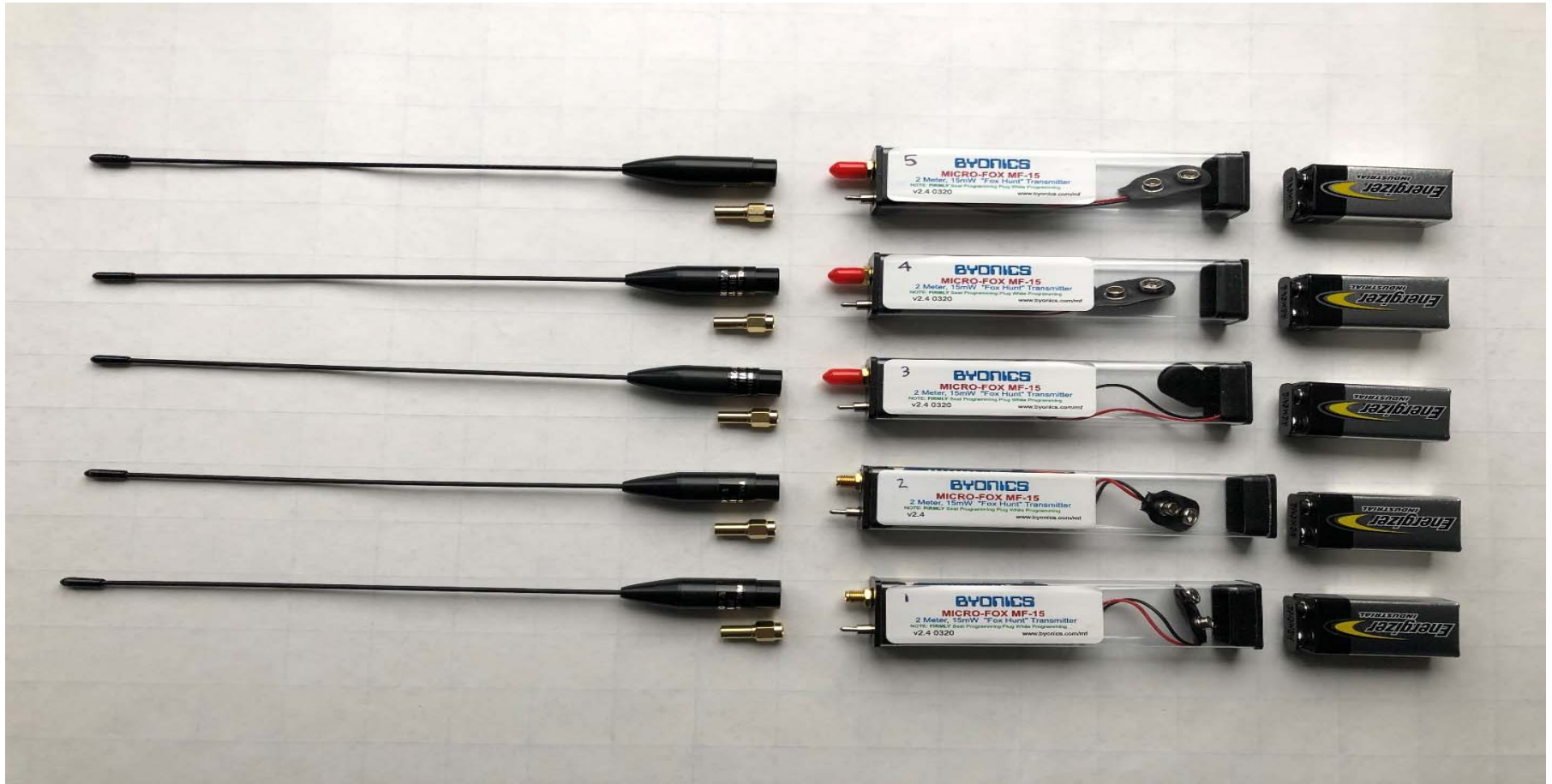






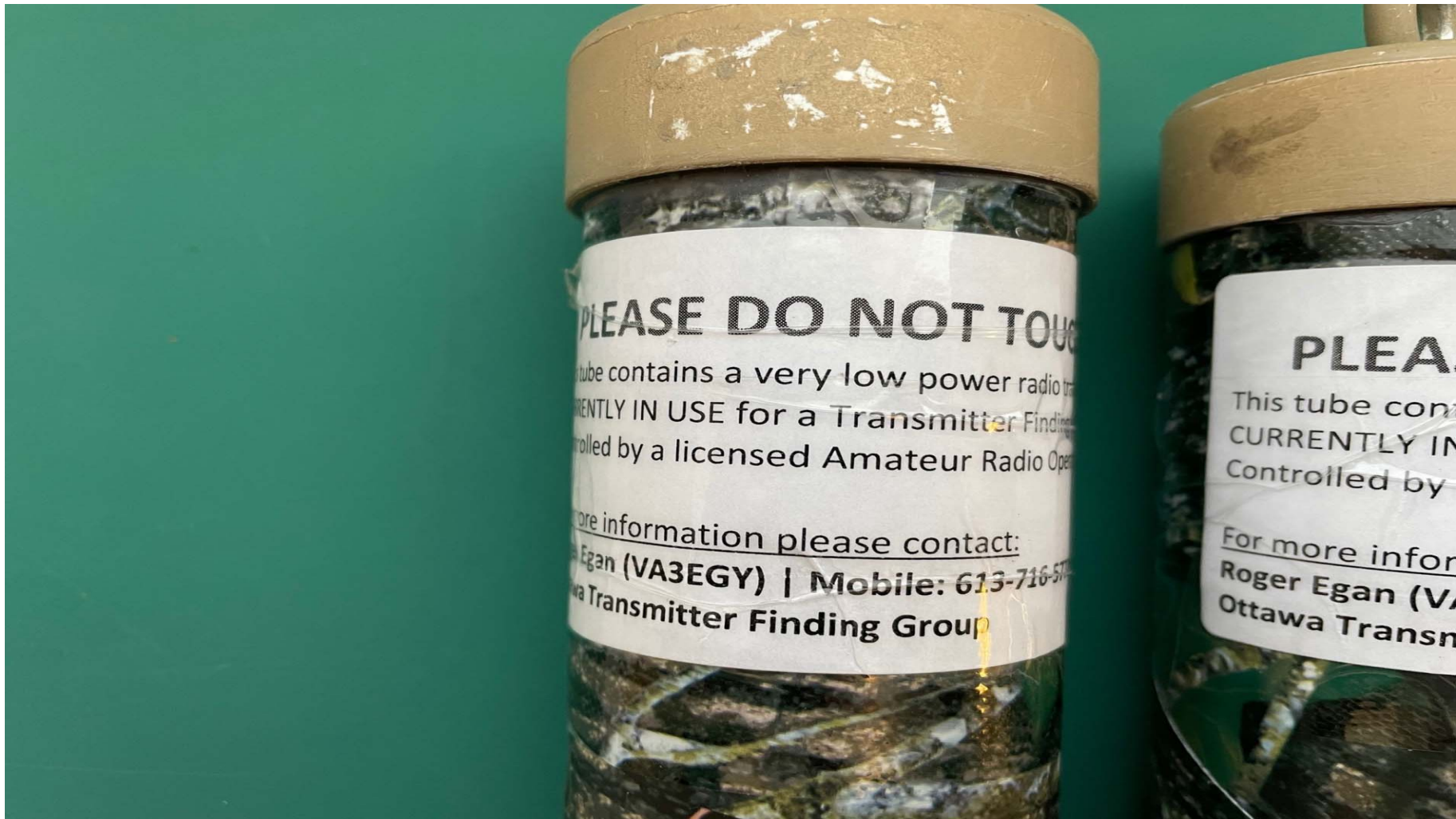
Low Power Equipment Highlights

- 5 Low Power Transmitters in ABS Plastic tube
 - (waterproof/lockable)
 - (Byonics Microfox15) transmitting 15mW (<https://www.byonics.com/mf>)
 - Powered by 9-volt battery (lasts 10-12 hours)
 - Powered by a 12 volt adapter for multi-day events
 - Using a Rubber duck antenna for 1-2 Mile range
 - Using a dummy load stub antenna for ~100 ft range
 - Units are hidden in a park setting for on-foot events
 - Carried by installer in backpack w/locks, cables & flags



Low Power Fox Transmitters (5)

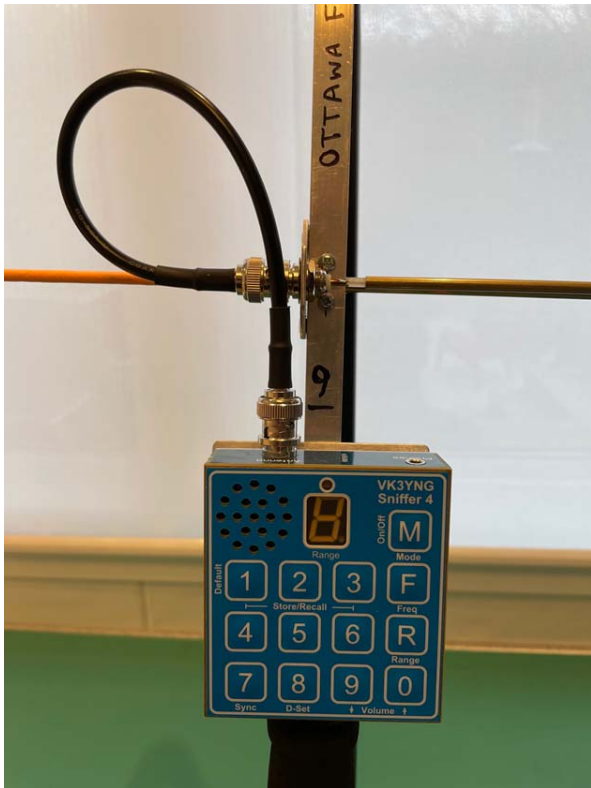




Fox Hunting Receiver Equipment

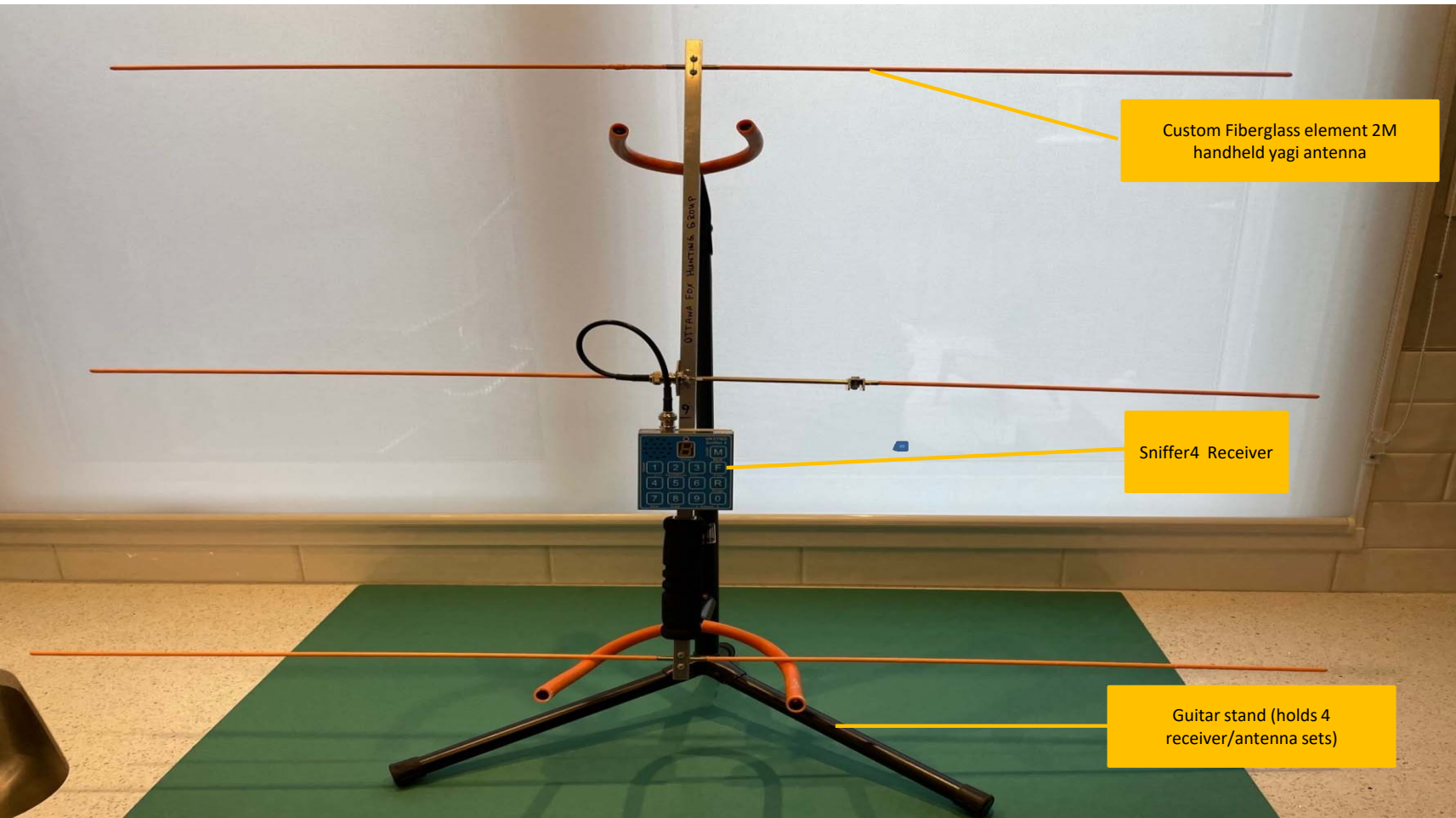
- 12 – Fiberglass 3-element yagi
- 12 - Sniffer4 multi-mode receivers
- Each receiver requires 2-AA batteries to run for 8-10 hours
- Simple to operate for youth and/or non-hams

The Sniffer4 Fox Hunting Receiver



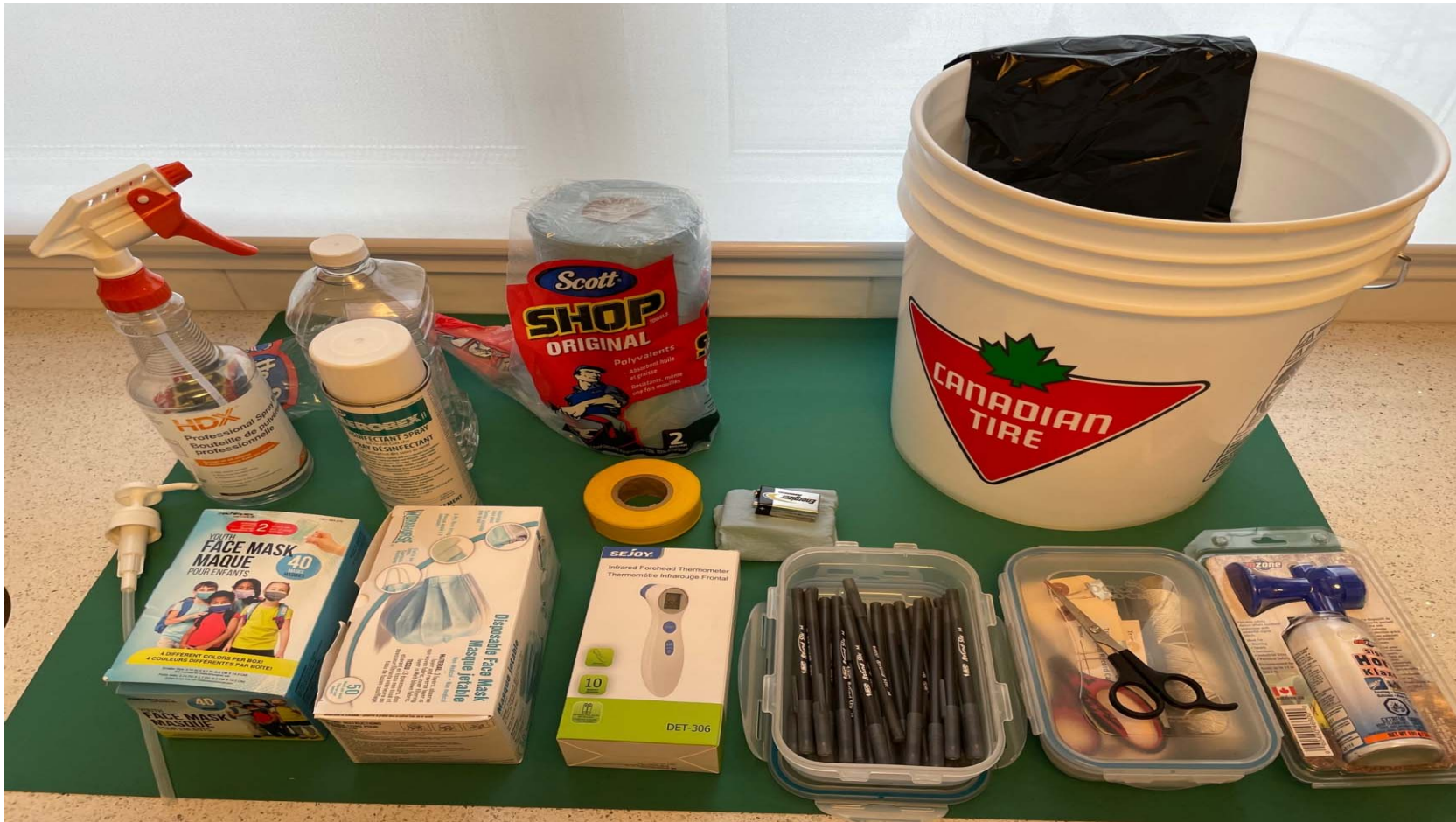
- Designed and manufactured in Melbourne Australia by Bryan Ackerley VK3YNG
- http://www.foxhunt.com.au/2m_sniffer/manual.htm

Fox Hunting Receiver/Antenna (12)





Event Day and COVID Supplies

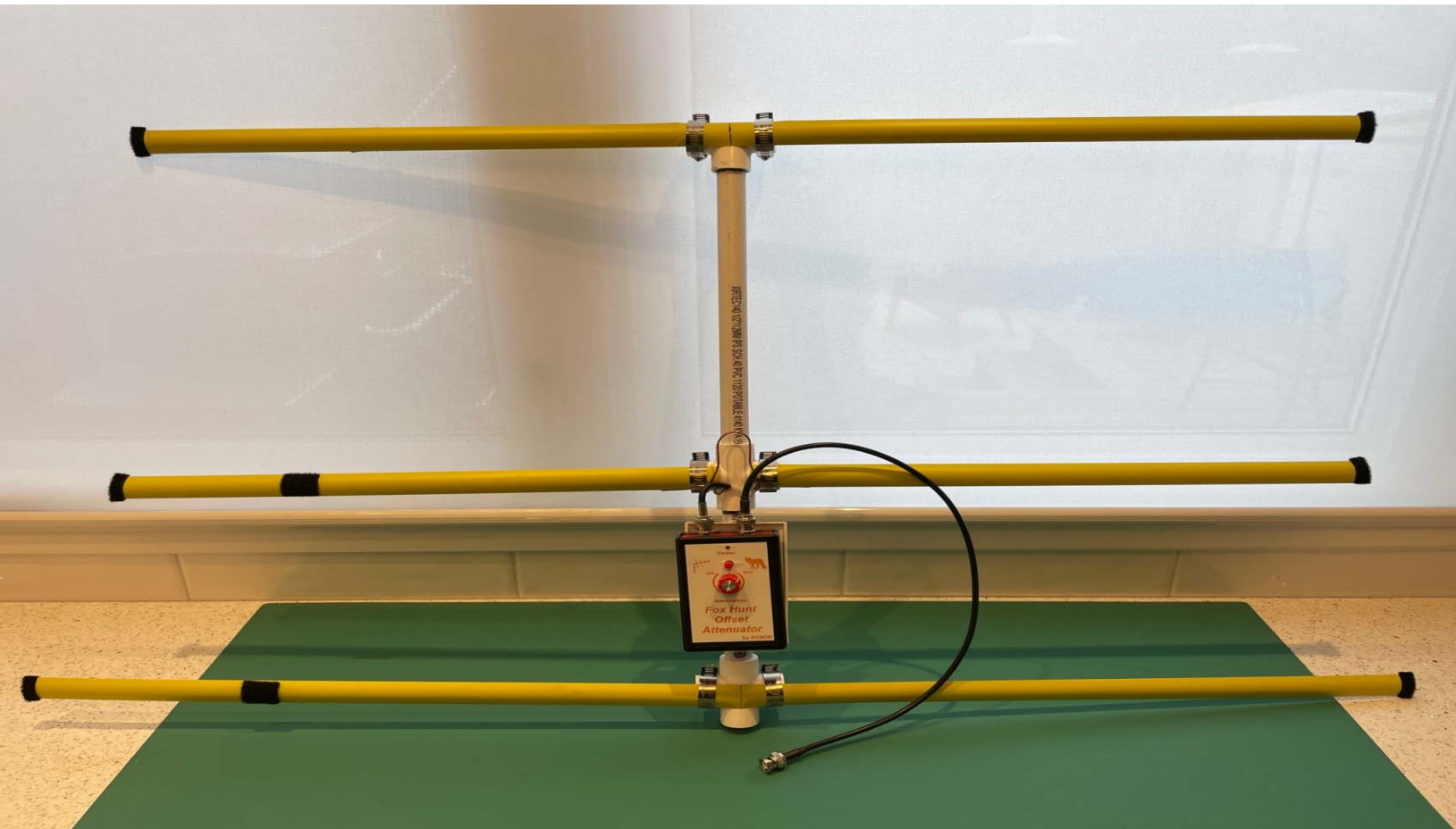


Traditional Gear for Licenced HAMs

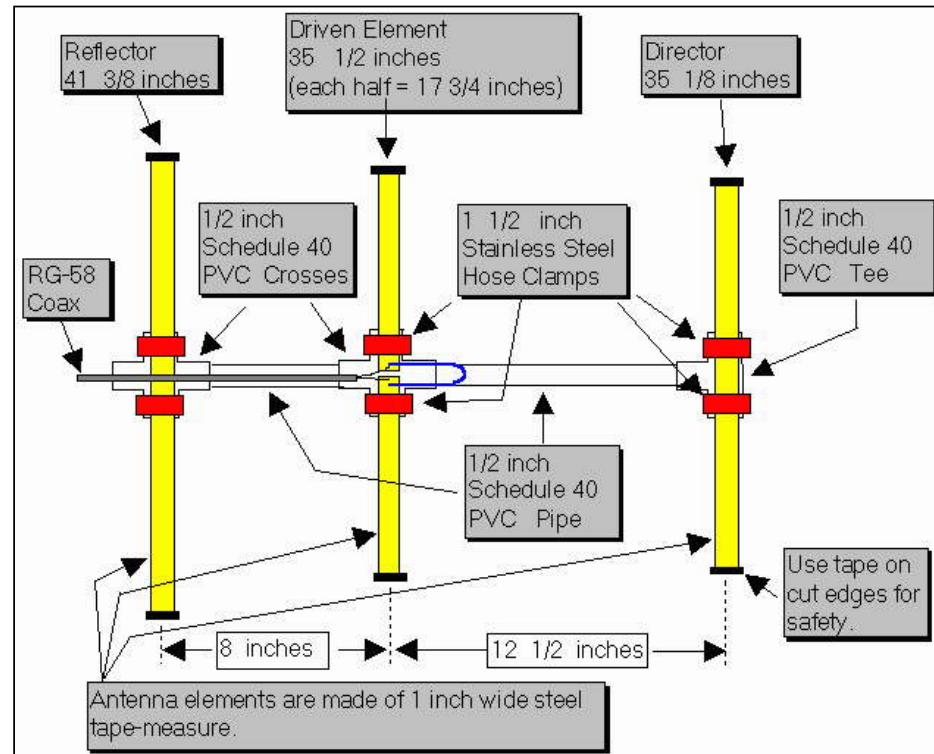
- HAM club members typically have
 - HT
 - Offset Attenuator (kit or purchase assembled)
 - Homebrew Tape Measure Yagi (WB2HOL Design)
- Some HAMs have other sophisticated gear from years gone by
- Lots of opportunities for DIY or Kit builds



Tape Measure Yagi w/Offset Attenuator



WB2HOL Tape Measure Yagi



See <https://www.pasty.com/~ccraa/antennas/Yagi-Beam.htm> for complete plans



Resistor
470

Resistor
2.2K

Resistor
1Meg

Resistor
4.7K

Diode
1N4148

Transistor
J113

LED
RED

Capacitor
.1uF 100nF

Capacitor
15pF

Capacitor
220pF

3rd Planet Solar /
KC9ON
Amateur Radio and Electronic Hobby Kits, Parts, and Accessories

FOX HUNT OFFSET ATTENUATOR V6 (thru-hole)

04

04

Radio

ANTENNA

Foxhunt V6

KC9ON

Power

MIN

MAX

PE-LD

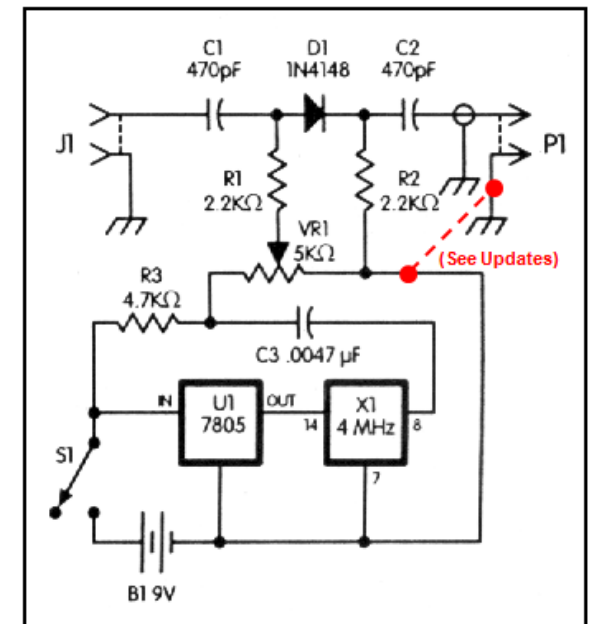
Fox Hunt Offset Attenuator

by KC9ON

2 Kits Available from:
<https://kc9on.com/product/fox-hunt-v6-smd/>
Includes a fresh 9 volt battery
Cost: \$30. each

Use an Offset Attenuator for Fox Hunting

- A mixer usually has 2 inputs, in this case for example:
 - 1 - from antenna (146.57 MHz)
 - 2 - from local oscillator LO (4 MHz)
- They have multiple outputs:
 - 1 - signal from antenna (146.57 MHz)
 - 2 - signal from LO (4 MHz)
 - 3 - antenna plus LO (150.57 MHz)
 - 4 - antenna minus LO (142.57 MHz)
- Start off listening to the signal from the antenna and when it gets really strong then re-tune your radio to one of the mixing products.
- As that signal increases (say on 150.57 MHz), use the pot to reduce the amount of energy (4 MHz) that you are feeding to the mixer thus creating a weaker signal on the off channel.
- If your radio cannot go higher or lower by 4 MHz, select the other offset.
- Only works with super heterodyne receivers NOT SDR like Baofeng.



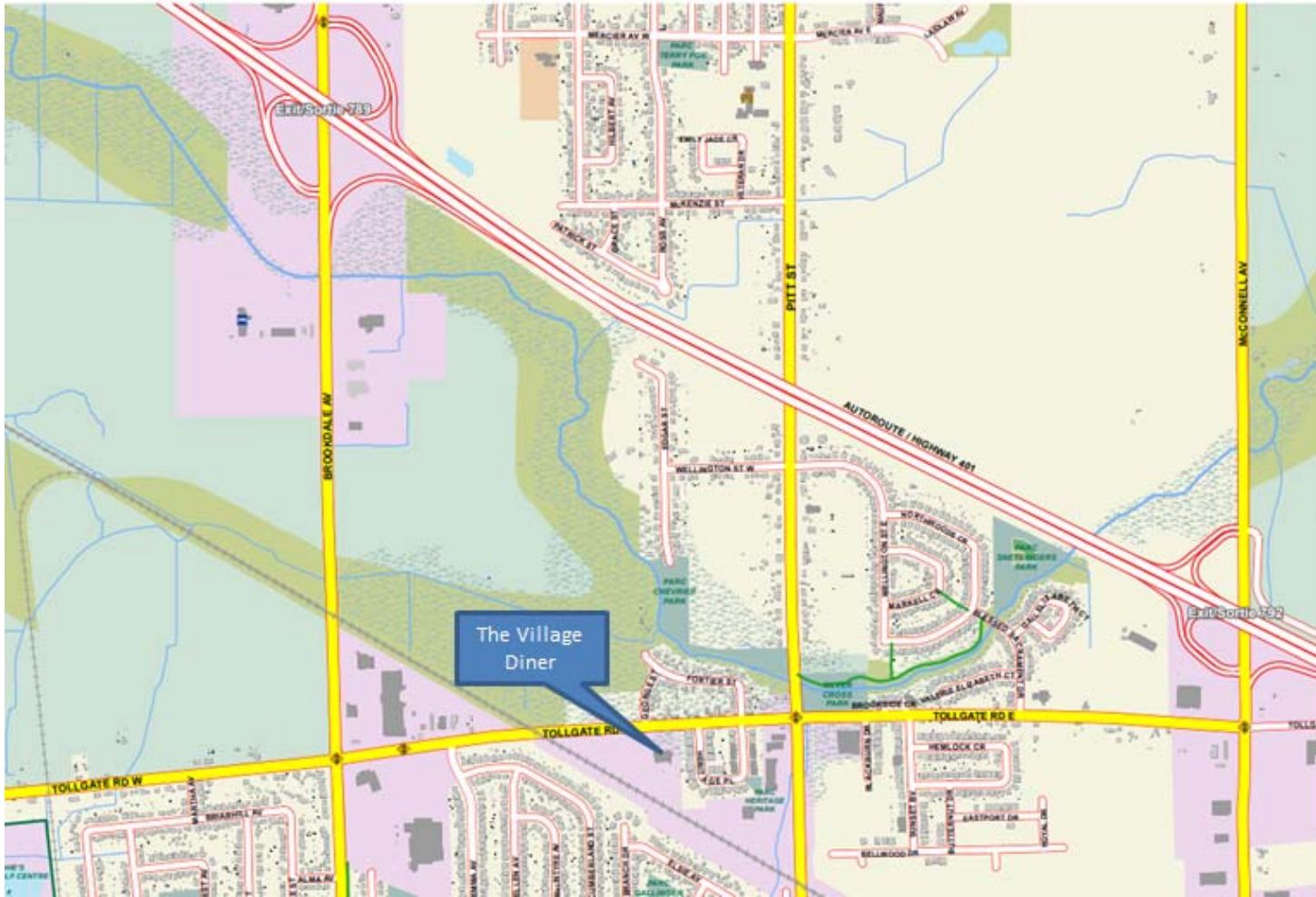
Saturday's Fox Hunt

1. Mobile Fox Hunt – Find the Beacon

- When: Saturday April 2nd at 10:00am immediately following Coffee/Breakfast (8:30-10:00am) at The Village Diner, 120 Tollgate Rd W.
- Where: Somewhere within Cornwall city limits - On public property
- Transmitting on 147.570 MHz FM analog at 1 watt power output.
- Transmission will be a musical series of tones, followed by a CW identification and pause before repeating continuously on 15 second intervals.
- If you can't find the beacon, we will talk you in starting at 10:20am on local repeater VE3SVC on 147.180 + and 110.9 Hz tone.

2. On Foot Portion – Find up to 3 Foxes (15mW)

- A pre-hunt briefing will begin at 10:30am (or earlier if you prefer)
- We will provide equipment for anyone who does not have their own. We would like everyone to attend the briefing and then hopefully most will attempt to find at least one fox before 12 noon.
- We will have a short debrief session at 12 noon to gather feedback and answer any questions.





Questions?

Some Useful Links

ARDF Ottawa Group Website

- <https://www.ARDFOttawa.ca>

Radio Orienteering – ARDF sport Video - Duration: 10:59

- <https://www.youtube.com/watch?v=tl4HztSY8Mo>

The 50th South East Radio Group Convention (Australia) and its annual foxhunting event – Duration: 6:37

- <https://www.youtube.com/watch?v=yHvvhdtHK74>