Portable Operation /P

Milton Keynes Amateur Radio Society

What is /P

- /P Portable can be many things:
  - Just carrying a handheld on a walk in the park
  - Back packing to a hill-top with a small yagi
  - Sitting on a park bench with a 20m ¼ wave vertical
  - Parked on a hill with a 10m tower and 5m long yagi
  - Field day with multiple stations/antennas
  - Anything that’s not Fixed location or mobile in a vehicle.

Why go /P

- Cannot operate from home?
  - Too noisy, no space, restrictions, poor location etc.
- Remote locations offer benefits
  - Height
  - Less Noise
  - Challenges (SOTA, POTA etc.)
- Fun
  - Something different to try
  - Try new things
  - /P specific activities (Backpackers ..)

Portable usually = QRP

- QRP typically <= 5W maybe 10W
- Get a good antenna – the best you can carry
  - Wire antennas with gain, or at least minimal loss
  - Resonant rather than tuned
  - As high as possible
- Timing & Patience
  - Avoid pileups, first half of contests etc.
  - Favour specific QRP events
  - Delay responses to CQ/QRZ (don’t compete with bigger stations)
  - Use (or not to use) the /QRP suffix ?

Modes

- Voice (FM, SSB)
  - The simplest – but not always easy to copy
- Data
  - Works well for QRP but you need a computer – more to carry and power
- CW
  - Great for QRP, easily read, Small & Lightweight Keys

Batteries and Power

- How long do you intend to operate?
- Take the least (smallest/lightest) battery you need
  - Use the saved weight for the antenna
- Lithium (or LifePO if you can afford)
  - Lightweight, hold charge well, near constant discharge voltage
  - Be careful charging – use a dedicate Lithium charger
- Generators
  - Good for extended operating – field days – high power
  - Consider safety, environment, noise

Where to go ?

- Limited by the nature/size of your /P station
- Public spaces (parks etc.) risk to/from public
- Private land (farms etc.) less risk, but get permission
- Always seek permission from the landowner
- Always read and follow regulations re transportation of batteries
  - Especially on airplanes

Where to go? - SOTA

- **SOTA = Summits on the Air - www.sota.org.uk**
- SOTA awards points to activators and chasers towards awards. A successful activations requires 4 or more QSOs.
- Summits are graded according to difficulty in reaching them.
- You don’t need to be a hill walker to be an activator. Plenty of summits are close to a road.
- One of the activities in the RSGB “Beyond Exams” club scheme (now Brickworks) is to activate a SOTA summit so John (M6JPO at the time) took up the challenge!

Where to go? - SOTA

- Despite our area being relatively low lying there is a nearby SOTA summit at Wendover Woods. The Forestry Commission land is used by most activators and is easily accessed with a large car park.

THE CHILTERN SUMMIT

This Cairn at a height of 876ft (267m) marks the highest point on the Chiltern Hills ….

Where to go? - SOTA

- Already interested in contesting, John chose a Saturday afternoon when there was a 2m contest.
- The equipment was a Yaesu FT818 powered by one of the 12V wheelchair batteries and a small 4 element yagi mounted on a broom handle which was easily set for horizontal or vertical polarisation
- He started with 2m FM contacts back to other club members in MK and then worked quite a few regular contesters who were taken off guard by his new locator square!

Where to go? - SOTA

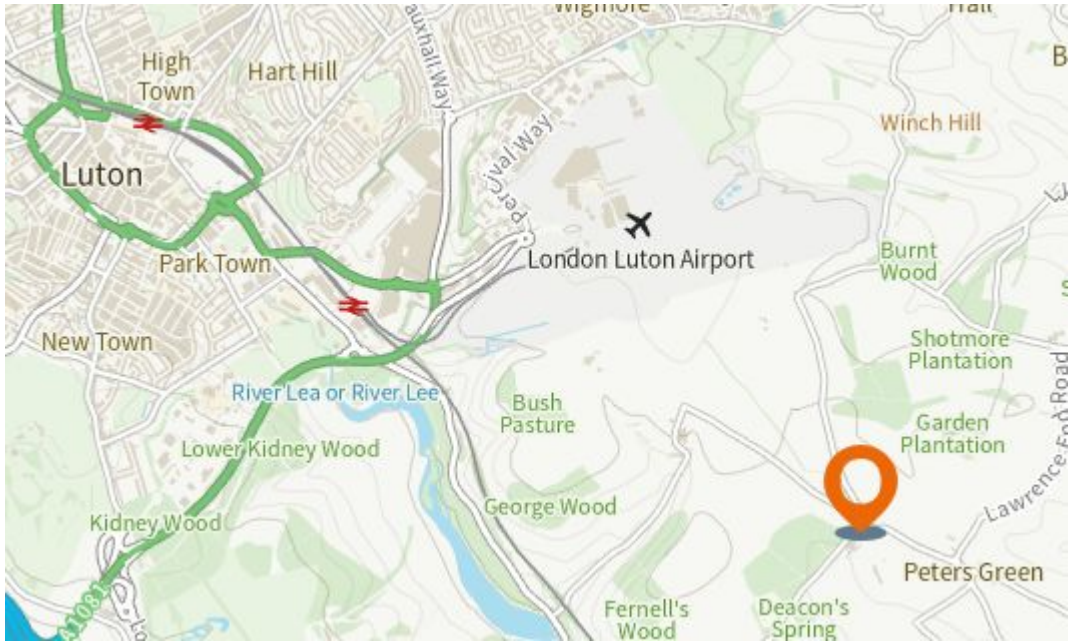
Vertical for FM or

horizontal for SSB contests

Where to go - G8IXK out on the hills

I used to go our portable for 2m & 70cm contests with a local group of 8 scouting colleagues operating as G8LVS from three different portable locations.

Local - Chiltern Green near Luton Airport on east end of Chiltern Ridge 144m IO91TU



- Common land
- Used for VHF & UHF contests
- Antenna 2 x 8 over 8 slot fed yagis on 2m (15+dBd gain with 45deg beamwidth) and 18 element on 70cm at 60’ agl on pneumatic mast
- Shack - Bedford minibus

Where to go - G8IXK out on the hills

Further afield - Axe Edge Moor 550m IO93AF

- Great site used for several years for VHF NFD
- Antenna 2 x 8 over 8 slot fed yagis for 2m and 18 element yagi for 70cm at 60’ agl on pneumatic mast

Where to go - G8IXK out on the hills

Mountain top - Tryfan (Snowdonia) 918m IO83AC

- Not too difficult to walk/scramble with equipment
- Shack - vango force 10 pitched just below peak using rocks
- Operated with Mark - now EI3KD
- 8 element beam at ~3m agl
- Didn’t work out well - It poured all night, ended up in bivvy bags & take-off not as good as expected

Be Safe !

- Can anyone get injured (you or the public, animals etc.) ?
- You are liable !
- Do your EMF calculations
- Make sure Antenna cannot be touched
  - or is visible while operating
- Risk assessment
  - Tripping on guy wires
  - Antenna falling on someone
  - RF Burns
  - Overhead mains cables etc.

Sources of /P Kit

- Make it, especially Antennas, radials etc. Improvise and Adapt
  - Wickes / Middle of Lidl etc.
- www.sotabeams.co.uk
  - Lots of /P antenna options and poles
  - Extras for Yaesu FT817/818
- https://moonrakeronline.com
  - Number of HF portable antenna options
  - Telescopic whips up to 5m long (for 10-20m)
-

Note CW paddle and paper logging - Dave G0GQP

Note the ¼ wave telescopic vertical with wire radials/counterpoise. Can tune 10/12/15/17/20 m by just adjusting length, or 40m with additional coil

What’s missing?

/P can also include a vehicle. Below are 4m and 6m yagis

Field days - great fun but take time to prepare

Next ones 1st/2nd July (VHF) 2nd/3rd Sept (HF). Everyone welcome!

Operating by sea aids propagation

Antenna is telescopic, fits in bag, 20-10m

A 5m Tape measure makes handy radial/counterpoise for 10-20m
other brands work too ;)

LifePO4 - batteries

Lightweight

Relatively safe

Flat discharge curve, usually 13v or just over, still +12.8v when nearly discharged.

Will charge / discharge thousands of times and hold charge when not in use.

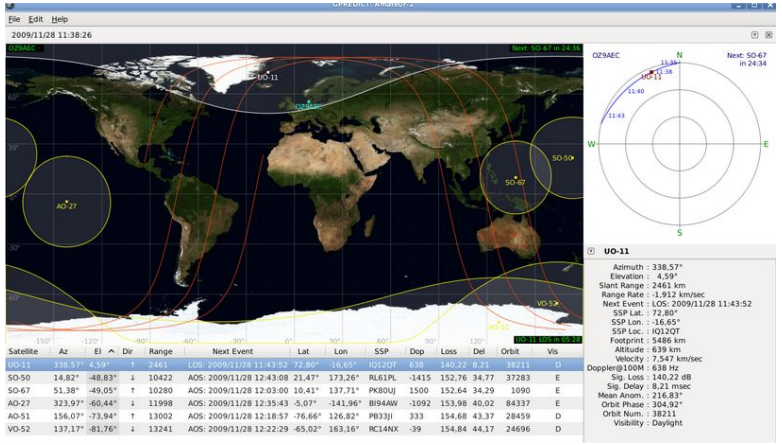
Extreme portable operation

OH8STN HAM RADIO

http://oh8stn.org

Julian OH8STN is an Ultra-Portable, Digital QRP fanatic. He enjoys designing and building bespoke gear, and solving many practical problems associated with portable off grid communications on HF. His website has a wealth of information for DIY battery storage, solar charging, using a Raspberry Pi in the field in blog posts and videos

Portable Satellite operation (LEO)



Portable satellite operation is not difficult. There are many ways you can do this, specially with today's technology.

Back in the days, people were calculating the orbit and drawing it on paper, then with a stopwatch and a compass they were pointing the antenna to the satellite.

In the world of Arduinos and Raspberry Pi, this is easy and can be done by software.

Few things to consider: Doppler shift, type of transponder (FM, Linear, or data), orbit, polarisation.

Portable Satellite operation (LEO)

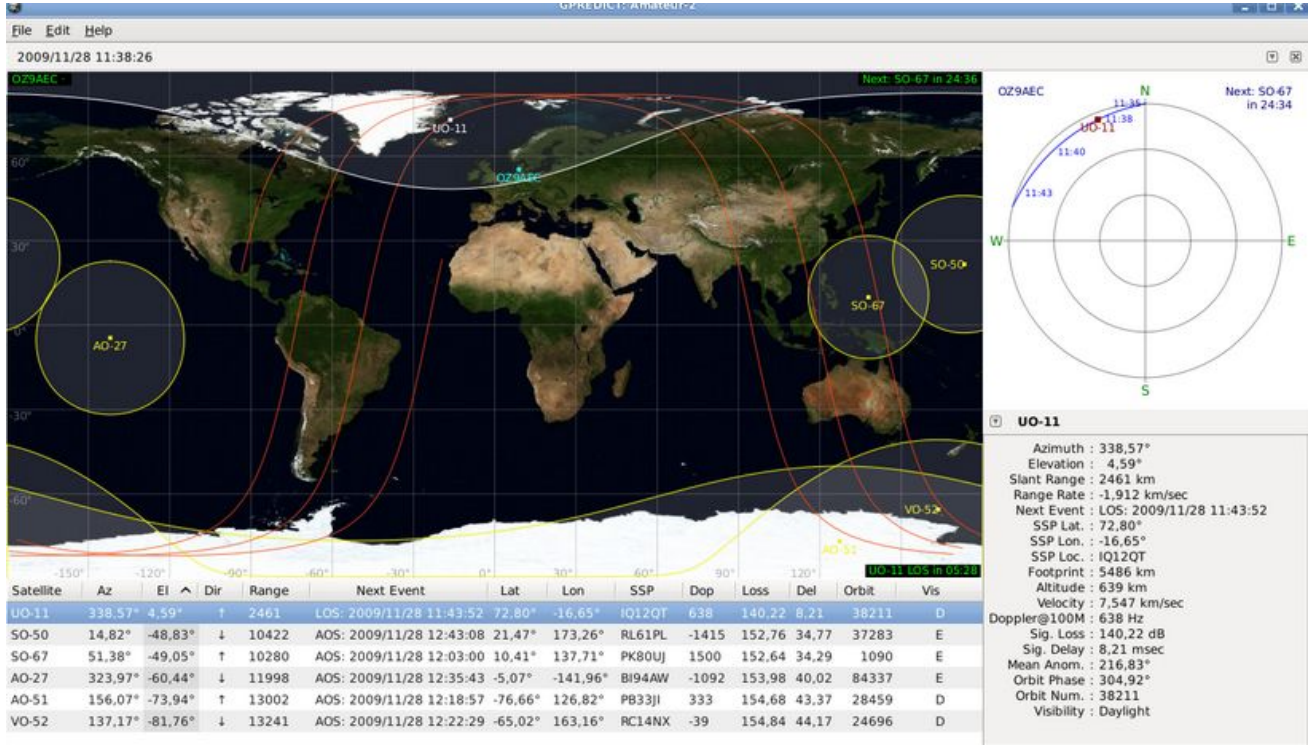
Tracking software:

The advantage is that software can track the satellite as well as the doppler shift using CAT control and ROTATOR control.

All this can run on an Arduino and (or) Raspberry PI.

Make sure you update TLE files and track the correct satellite!

(let's talk a bit about TLE…)




```
XW-3 (CAS-9)
1 50466U 21131B   21361.15310929 -.00000045  00000-0  00000+0 0  9991
2 50466  98.5981  73.3722 0003165 299.3678  60.7297 14.38435478   149
```

M0BOY’s LEO tracker - rotator (SARCNET)

The antenna:

Arrow 2 (2m and 70cm) with diplexer.

Lightweight, easy to assemble and pack away.

Modified to add SMA connector, no dangling cable.

The arm:

length of L aluminium profile + counterweight

M0BOY’s LEO tracker - rotator (SARCNET)

The “BOX”.

Sits on an aluminium speaker tripod.

Clamping done with a bicycle seatpost clamp for easiness of assembly.

M0BOY’s LEO tracker - rotator (SARCNET)

Inside the “BOX”.

2x worm geared motors 0.6RPM (ebay)

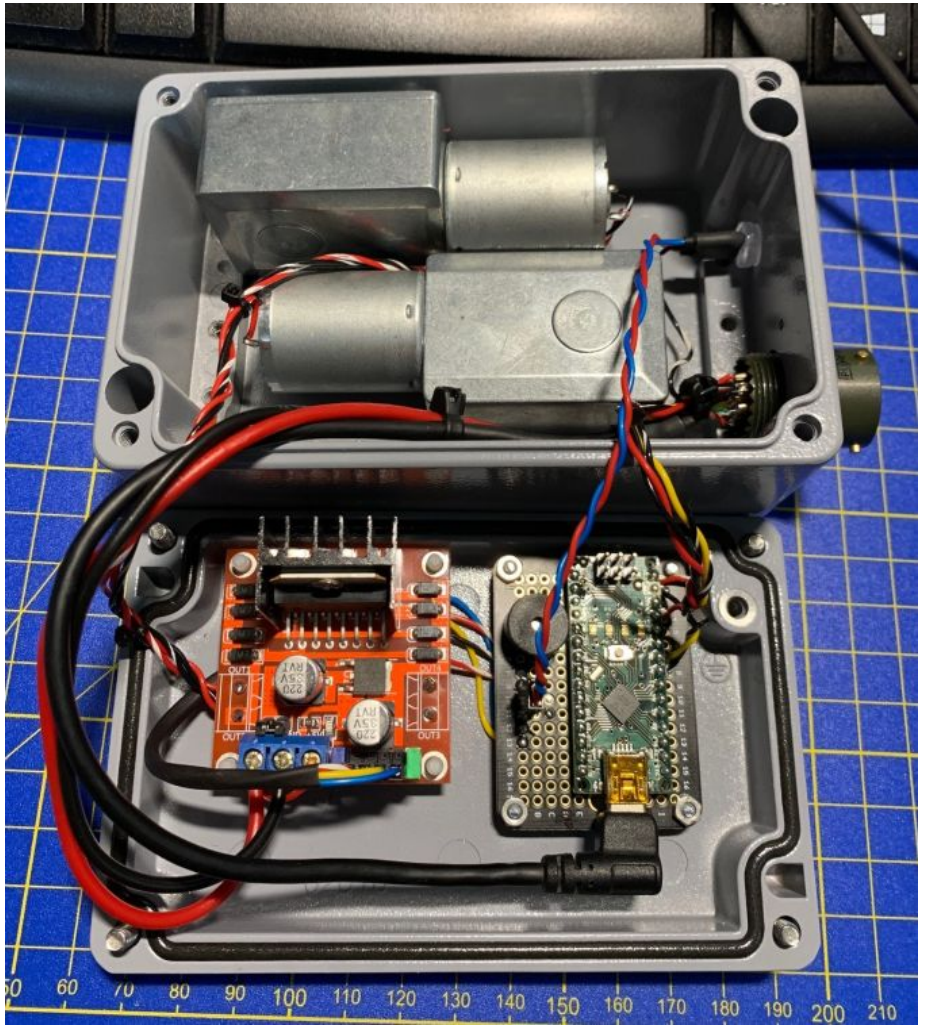
1x Arduino Nano (genuine)

1x LM298 full bridge motor driver with built in 5V LDO

1x bluetooth TTL module

1x digital I2C 3axis compass/gyro/accel.

Wires, speaker, connectors, LED’s



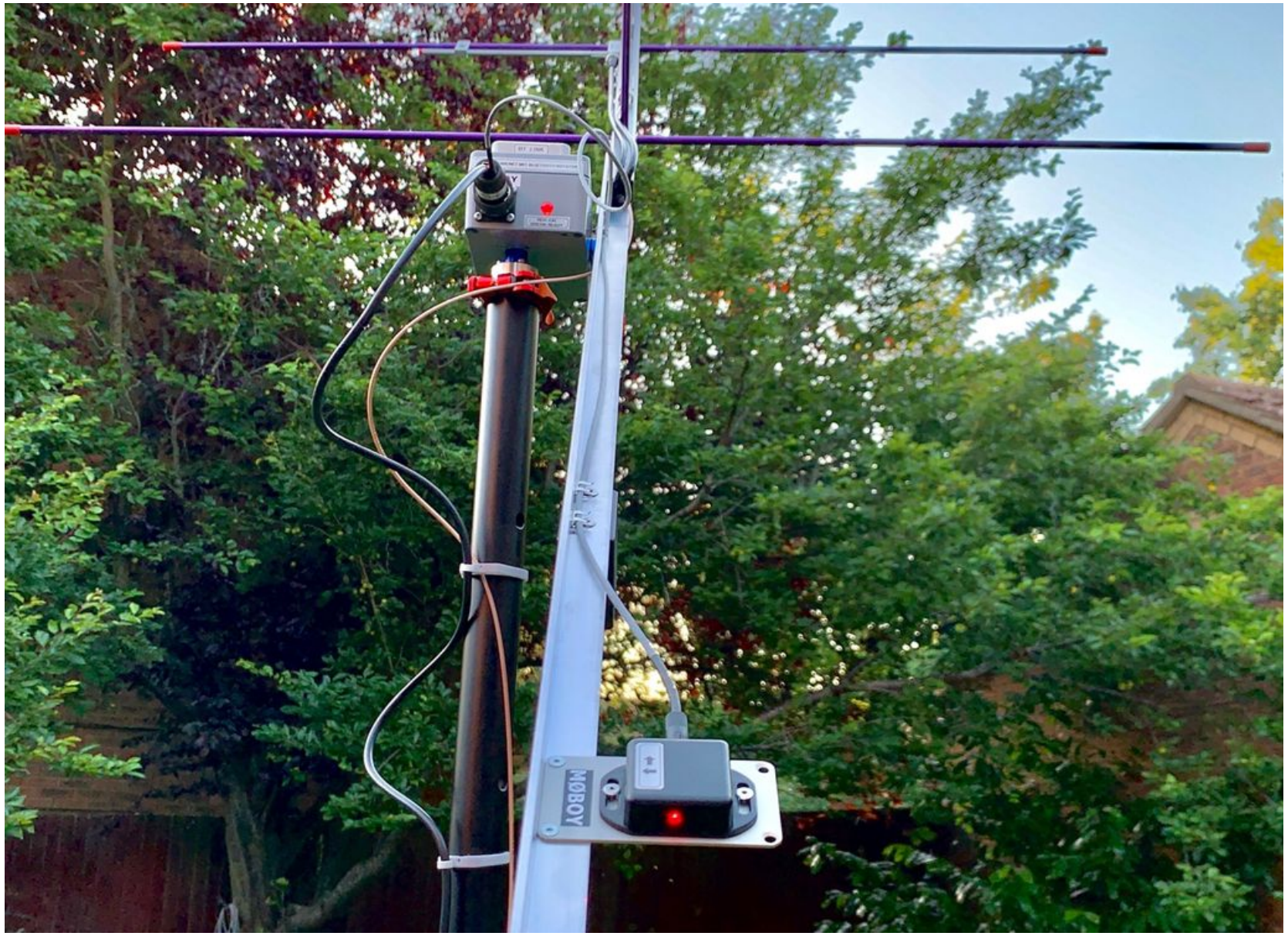
The thing:

Up and running in less than 10 minutes:

Open the tripod: 30 seconds
Clamp the rotator: 10 seconds
Assemble the antenna: 3 minutes
Attach the antenna and arm: 2 minutes
Connect battery, wait for parking to north: 2 minutes

While you assemble it, let the raspberry pi boot and update TLE

3-5 minutes to take down.



Some /P QSOs and reference data

https://www.youtube.com/angrysmiley
M0BOY: https://www.youtube.com/watch?v=JaK-BCZ-Wxc
SARCNET MK1: https://www.sarcnet.org/rotator-mk1.html
Tracking software:
GPREDICT: http://gpredict.oz9aec.net/
SATPC32: https://www.amsat.org/product/satpc32-by-electronic-download/
(SatPC32 can be used free adding your GPS coordinates)
Amsat status page: https://www.amsat.org/status/