



## North Bristol Amateur Radio Club

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G4GCT, M0NBC, G6PNB

March 2021

Covid-19 Edition



In the last Q5 I had mentioned the arrival of Rocky's daughter, Holly. Well, here she is with proud father Rocky, M6VRL. As you can see she is an avid radio fan already favouring an ICOM microphone and headset.

Call sign of M7HOL has been reserved for her. At the moment Holly is giving Rocky and Louise many sleepless nights but I guess Rocky can always work the 40m band through the night during feed time. (Sorry Louise)

### **Dick, G0XAY**

For those who have not had the news from our nets, Dick, G0XAY has been in hospital for the last 4 weeks or so. I have spoken to him on the phone, he is doing well but, he is very bored. Bearing in mind visitors are not permitted. I am glad to say it is not covid related and he is due to be released by Friday 5<sup>th</sup> March (If he is a good boy).

Seriously, we wish you well Dick and if it wasn't for this dreadful Covid-19 we would have been in to see you.

**This month** we take a look at WSPR (Weak Signal Propagation Reporter) and a short intro on the use of an old android phone connected to your Baofeng to use as a tracker.

## Silent Key

It is with great sadness announce in this Q5 with the news that Frank Fields G0CEN passed away on January 22<sup>nd</sup> as a result of covid-19

Frank was a member of both North and South Bristol clubs but decided to semi retire from the hobby a few years ago because of ill health.

I personally knew him for constructing my first bit of test equipment. It was a wave meter that I still have on my shelf in my shack. That was way back in 1989 (when I first joined NBARC). He was also a helper at The Longleat Radio Rally. He was also to be found in the back room of the club teaching the RAE (Radio Amateur Exam) when it use to be a City And Guilds exam.

RIP Frank, you were a great Ham and an even nicer man to know.

## Opening Of The Club And Events

On a lighter note but still related to Covid-19. On the 22<sup>nd</sup> of February, The PM announced the projections to the ending of lockdown.

It looks like everything is likely to open by June 21st so the opening of the club looks imminent, well relatively so. This is of course with the permission of She7, our landlord and providing there is no change to the virus. We will be back with the secret society, playing radio on hill tops and special event stations.



Lighthouses on The Air  
With Steve, Tony & Bob

Special event stations, as in Feb edition of Q5 starts off with Lighthouses/Lightships on the air starting in August, Churches on the air and Railways on the air both in September are looking even more likely to go ahead. There is of course no promises but, we will see what we can do

## WSPR – Weak Signal Propagation Reporting (network) by Dave Roake (M0RKE)

*“Sometimes a whisper speaks volumes”* – Scott Sheddan

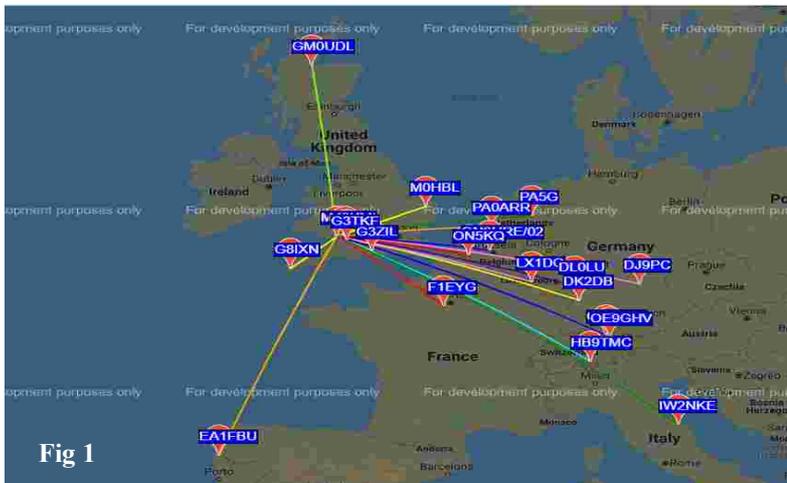


Fig 1

Of course I had heard of the letters, just as I had also heard of others (FT8 FSK etc) but it was as a result of a Club activity (not NBARC though) a few weeks ago that fired up my interest all over again. The activity was organised to see how many “reports” could be received of an automatic transmission on a fixed amateur band. Using identical stand-alone units, they were logged

in a single 24 hour period together with the location of the receiver, power output and signal to noise ratio. In reality, not all participants had such a box so an additional “open” category existed for those with transceivers able to generate the WSPR protocol and also different power outputs (not all transceivers could output LOW enough power!) The information received (called a ‘spot’) is forwarded to a central web site database which allows filtering and a global map of the reports.

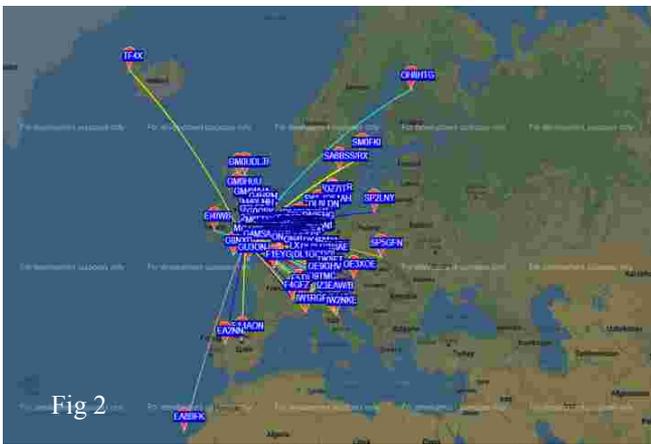
**Fig 1** shows a map of my own efforts.

Apart from a bit of (competitive) fun the activity highlighted how ostensibly an identical set of boxes using the same power at nearly the same location (ie the Bristol area) and a diverse combination of antennas highlighted the capabilities of WSPR for its primary purpose i.e. the study in near real time of how conditions affect the ability to communicate using differing antennas, power used, frequency used etc. Weak signal beacons have been in existence for many years, and indeed have broadly the same objectives. However, they need to be constantly monitored whilst WSPR does not and there is not (at least as far as I am aware) a real time reporting database with which you can compare things.

So what is the point of WSPR and why use LOW power levels? Well, like anything in the hobby, it comes down to your point of view. You could of course just whack up the power levels, call CQ and “hope” to be heard. You could also listen to see if there is any “activity”, no need for any reporting using a specially designed bit of circuitry and software. These are all fair points; many are content with that approach – nothing wrong there. However I found that use of WSPR to a really worthwhile additional tool for the hobby.

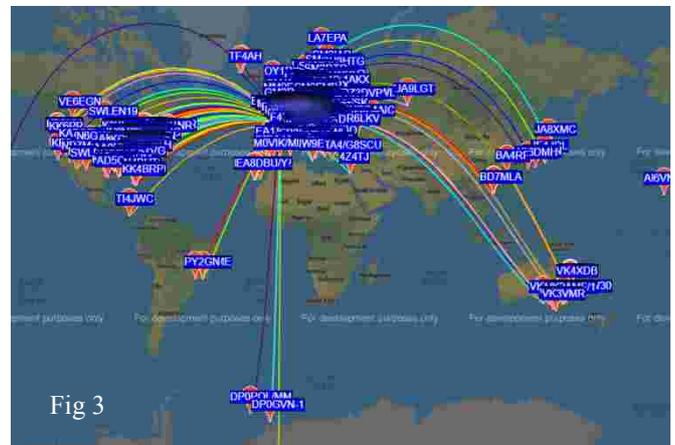
The Band selected for the 'day' was the 40M band (WSPR frequency: 7.0385 Mhz)

**Antennas:-** I had to start from scratch in the lead up to the chosen day. I had time to try 3 types:- an end fed 'loaded' wire with one leg grounded cut to the required Band, a G5RV half size (ie it had legs naturally resonant for the 14 Mhz Band (20M), a home brew resonant dipole using coax as a feed line (no baluns). I had to erect from scratch a suitable vertical mast in the middle of our lawn to keep the height at the feed point - another story in itself! I also tried the box with a very short feeder line and my 'standard' (one 20m long) into the garage shack. The power output from the box (as measured into a 50 ohms dummy load was 10mW- yes, 10 milliwatts !). This power was fixed by the design of the box. All the boxes [allegedly as there was some controversy on this point that I will not elaborate on] used the same power output in the standard class, but up to 5 watts in the open class. The results were for me at least very educational and revealing having some surprises in the data. I learnt a lot on the 'basics' but also found several useful points in design along the way. So what was the outcome of the day? Well antenna



design (including how it is fed), location and orientation are critical to how successful you are in getting heard. Power used was an obvious one ie the more you used the further you got worldwide (see Fig2 and Fig3) and the altitude of the antenna.

The thing I observed was that **UP TO A POINT** these points were obvious:- the more power you started with the further you got more consistently over the 24 hour period, the higher and obstruction free then the more likely the signal had of being launched effectively.



The opposite was also very revealing in that low power can get you a very long way and teaches you that if you put effort into the antenna design you can achieve remarkable results.

I linked up with one Club Member who used essentially the same box but able to deliver about 50mW with a very well designed antenna/feeder and he achieved worldwide 'spots' which eventually 'died' but the pattern was similar. Whilst I achieved very few 'spots' limited to Europe (more later). The WSPR system is very effective in showing how the antenna system is radiating and how well the transmitter in supplying it with RF energy.

For example my antennas were radically different in their effectiveness and all radiated almost exclusively to Europe with a few ‘off end’, water paths were highlighted well and also showing ‘spots’ from “off end” to the Canary Isles and Iceland. Unfortunately, with the resources at my disposal I was not able to make it over the pond whereas my Club Member friend had consistent results over the pond too.(Fig 4) I suspect that is due to a major obstruction near to my antennas blocking any chance of energy being launched in that direction whereas my mate had no such obstruction. Height above ground was also important but not as much as I had always been led to believe. Obstructions near the antenna were a major factor in how the signal was masked.

**Why use weak signals ?** Well it appears that to broadcast at (E)QRP highlights subtleties in the propagation path and highlights the effectiveness of your QTH that high(er) power levels tend to swamp things (ie brute force). This may or may not be of importance to the individual, but for myself I like to definitively know my kit is working to maximum effectiveness without throwing money and resources at the issue maybe unnecessarily.

**Conclusion.** WSPR is a good tool to assess how well your antenna and transmitter is working, what direction its main transmission is directed at (as well as how fare the signal gets and whether you are ground wave or reflecting) and allows you to fine tune your setup for maximum effectiveness. It also proves a very effective tool to see if the band you may want to use is really ‘dead’ or whether everyone is just listening! The more you get into the data the more you can extract regarding propagation and effectiveness of your QTH setup. For example after the event, I modified my box to align with my Club Member friend’s design and was able to progressively improve my antenna designs to achieve comparable results (except westwards towards the Americas) to his – no mean achievement in my opinion. Like all things it has limitations (eg means of generating the exacting signal which has to be GPS or similar locked and software to code/decode the data) and is dependent on the transmitting station entering correct data such as power output, location etc. Also the system relies on receiving stations to do the reporting which can be a bit patchy especially at non HF bands as well as location. If you want to see the decoding in process, head off to one of the online Kiwi SDR stations which have an option to decode WSPR (and report to WSPRorg.net) among other digital transmissions, both commercial and amateur

**Finale.** It is held by some that a rule of thumb is for an equivalent received signal strength of say SSB transmissions equates to 200 times the received WSPR signal strength (eg 10mW equates to 20W SSB!)

for a comparable signal to noise ratio. In my view this figure is unproven with lack of data to back it up. I think that it would be interesting (in my view at least) to see if that is true in future experimenting. I leave it with you now to take up the challenge:-“SHOUT AT THE WORLD OR TRY WSPRING INSTEAD”. It may save on your energy bills and your pocket when it comes to choice of your next bit of kit and possibly help keep the neighbours happy with lower levels of signal interference to their (and your) stuff indoors.

If you are interested in the topic, then why not head over to the WSPRnet.org website for more information. There are also plenty of Internet references on the subject ranging from technical (circuits of kit etc.) to analysis and effective use of the tool. Finally, maybe our Club could enter into a similar Club Project – it certainly fired the imagination both for me and the Club concerned.

73s Dave Roake

**Next month** we have Steve G8KUW giving his account of his WSPR project during lockdown. Don't miss it.

Another narrow bandwidth mode that is on the up in the club is CW (Morse) both Mat, G7FBD and Dave, M0RKE have been banging away at the key learning the dits from the dahs. Seriously, it takes a lot of careful study I wish them well and it is hoped that they will soon join Dave G3XOB our CW Guru on the air.



## Repeater Pips

I thought I would add this as some people do still fall foul of it (even the best of us) All good repeaters have the two Pip protocol. It is customary for a station to wait for the 2nd Pip to pass before taking the opportunity to transmit. If this is not honoured then the station will potentially Time Out after what ever time is left out of 4 minutes. Please remember, the Timeout Timer only resets itself after the 2nd Pip has been sent. It is, of course, permissible for stations to call-in if they wish to join the QSO after the first and before the 2nd Pip using your call sign only, do not start a conversation before you have been acknowledged. But to be sure of resetting the timer the acknowledging station should always wait for two Pip's. The Time out Timer is set for 4 minutes. If this time is exceeded the repeater will announce Timeout and shut down. As soon as the input is clear the repeater will come out of Time out and QSO's can continue.

**Note** Most repeaters use a 4min timer although there are some using 3min.

## APRS on the Cheap

I will start off by telling you about it's conception. It was an American radio ham, Bob Bruninga, WB4APR. He was a Naval man in the American navy and wanted to send text like messages to other stations. It was a little more involved as it also sent co-ordinates of either station. It was then able with appropriate software, plot the position and track on a map. Nowadays most of us just use APRS to just do that and don't sent TXT.

APRS stands for Automatic Packet Reporting System. It used the AX25 protocol. This protocol was already in general use in Packet radio. As the name suggests the data is sent in packets of information. These packets are accurate in that a packet burst is sent and the receiving station having received the packet it says please send the next. If the first packet is not fully received it will ask for it to be sent again until correctly received. All this is sent quicker then you can type.

That is our method of sending the data now we need to get hold of the bits we are going to send. We need a GPS receiver that gives us the information. In my first setup I used a old Ambulance tracker bought for £2 from the From Rally. This tracker didn't send AX25 it was POCSAG so I tapped into the GPS receiver picking up the NMEA signal converting this to AX25 via a pic chip to control the radio and send the sounds. The programme for this is freely available on the web. I, however cheated a bit and my lad, Paul bought for my birthday the Tiny Trak kit. You will be happy to know that I am not going any further into the workings or production of the kit.

**Now you will be happy to know there is an easier way.**

All you will need is an old android smart phone. It is not connected to a network but make sure it has GPS, and a Baofeng Handie. We use a Baofeng as it has VOX if your Handie doesn't have VOX it makes things more difficult as a transmit circuit is required

1. Download APRS Droid from the android app store
2. Link to Baofeng using an audio screened lead to the mic socket
3. Set up tx to vox level 2 (to start with)
4. Also set up RX lock to stop it TX while receiving.(See your radio details)

Let me explain the last item on the list. On youtube there has been a few amateurs using APRS Droid without setting up a lockout on received signal. So what was used was a Mobilinked TNC. (More expense). The Baofeng is more than capable of controlling this by it's self.

There is a good reason for having the radio not to transmit when a signal is being received. Obviously, the network would come to a grinding halt if all the transmitters transmitted over the top of each other. Setting the lockout enables stations to take it in turn automatically. More gentlemanly me thinks!!

## Setting up APRS Droid

After downloading, set up the software for your intended mode .

Click on Preferences You will then have a screen as shown below Fig1

You then enter your call sign and APRS pass code. This code is a little bit like the DMR code. It is applied for on aprs-is. Click on the line that says “Request Pass Code” and it will send you to the correct web page to fill in the form as in Fig2. A code will then be sent to you.

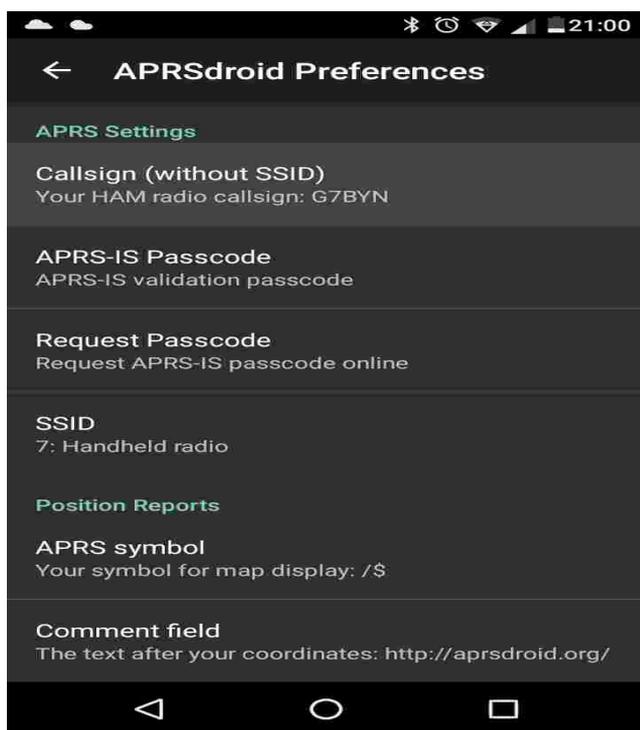


Fig 1



Fig2

## APRS Droid Cont'd

Click on the other lines and set up your requirements. SSID and the APRS symbol is the symbol as it appears on the screen eg a car, cyclist or house etc These symbol codes are available on [vachtrack.org](http://vachtrack.org).

Other fields that are required are as follows.

Location Source set to manual for a fixed station (then enter your lat & Long)

For mobile use GPS/Network Position

Connection Protocol:-set to AFSK via speaker/mic unless you are using a Kenwood GPSport or other settings speak for themselves.

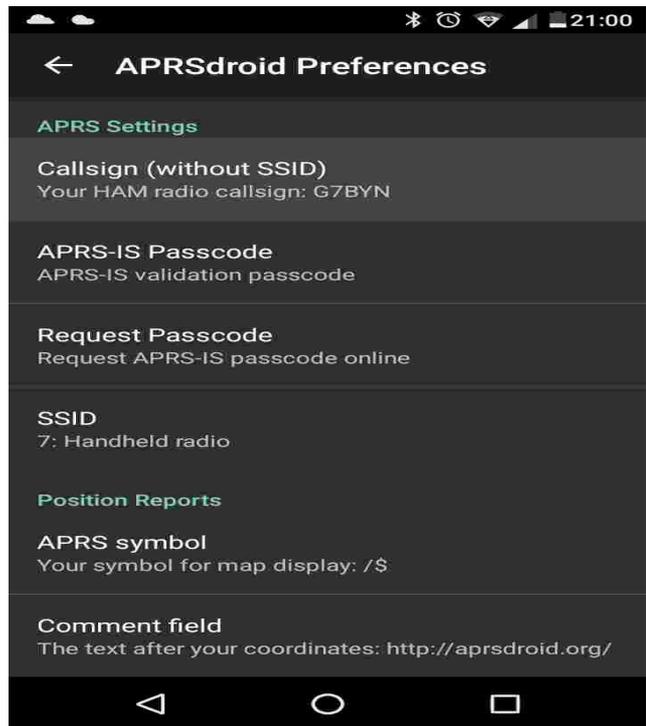
Most other settings are left as default.

Now have a play. You can always go back to default and if you are not sure what settings you used take screen shots.

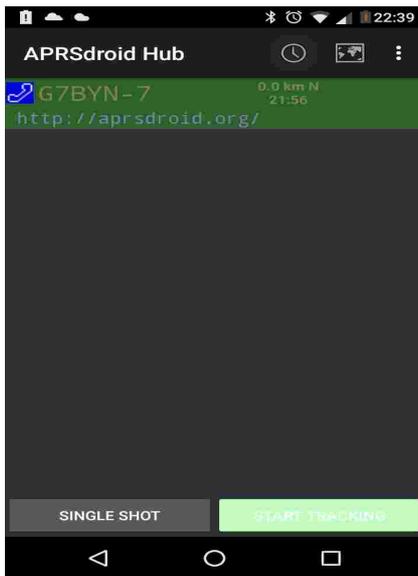
There are other settings to set up Beacon times, Vox delays etc have a go. There are you tube videos to help the setup but one thing they fail to say is, if you set the to GPS, and you have no GPS signal, you will not hear a beacon. For testing set to Manual position and add your coordinates. On the front screen press the one shot button, you will hear a beacon. If you do, all you do now is make up a lead to link your headphone O/P to the mic I/P on your rig.

**Rig Settings** a Baofeng with VOX was used. First Set the TX frequency required (144.800 for UK) then the VOX level to 2 to start with.

On your Android, set to half volume depress the “One Shot Button” the radio should switch to transmit. If it doesn't turn up the android vol a touch. Find the appropriate settings yourself all rigs are slightly different. When it does work, smile and have a cup of cocoa.



## APRS Droid Cont'd



Now that the TX works, you can Receive the packets in the same way. Audio from the Baofeng to the Mic of the Android phone. This of course requires a different lead. The multi plug for your Android phone.

From the front screen you see here the little map button at the top is pressed to bring up a map on the screen. Received stations can be tracked here. I don't propose to go into all the setup, it is just a taster of what can be done. If you do want to have a go at APRS do a bit more research. Contact me if you want.

TXT can also be sent to a particular station. In fact that is the original use of the APRS system but, for me to continue writing this project in full It would take a full 44 page instruction book. Not for this Q5 so I have summarised it. It is aimed at amateurs to have a go. When the club is back meeting again, I have a talk and demonstration almost ready to go on this very project so let us hope we can meet soon and you can see it working for yourself.

This little project is one that was knocked up quite quickly but I did state that I feel it impossible to write a full manual of how to set up with all types of radios and scenarios. In view of this it will be a suck it and see. Do a bit of research and try for yourself.

If you have any projects that you have been trying during lockdown please let me know. Then we can pass it on to others. Just a simple tint or tip may be all that is required to help a newbie get to grips with their new hobby so please share it with us.

Dave G7BYN.

# NBARC Nets

To spice up our nets, the Wed net will be a Technical net (Where possible). If members have a problem, or just want to know how something works, ask your question here.

This came about because some participants of our nets didn't want to spend the night talking about the weather and general chit chat. They said it was boring, so wouldn't come on any net. The Chit Chat evenings will be the club night being Friday and the Sunday net. We hope this will cater for all.

**Wednesday net** GB3BS 20:00 to 21:00 Local

**Friday net** GB3AC 19:00 to 19:30 Then QSY to GB3BS 19:30 to 20:00  
Note While GB3AC is out of order we will continue on GB3BS

**Saturday DMR Net GB7BS** 19:00 to 20:00 South west cluster TS2 (950)

**Sunday morning 80m Net** 3.65MHz 08:00 to the start of the News. This net is run by Dave (M0HDJ)

**Sunday Evening Net** Dave, M0RKE ran this net on GB3AA for a while but, the Sunday Net now reverts to GB3AC 20:00 to 21:00 clock time. From this month on, I personally will not be running this net, however, the net can still continue as a normal net.

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### Next Q5

Beginning of April  
Dave G7BYN

## Take a look at TX Factor

Episode 27 is now live  
Bob's interview with Don Field  
G3XTT  
Editor of PW

Available on Youtube