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Network Radio

Chris Rolinson G7DDN addresses the question "What is Network Radio and why could it be good for amateur radio?"

In the run up to Christmas last year, I started getting a few e-mails from a Portuguese amateur, Duarte CT1EIZ, extolling the virtues of something he was referring to as Network Radios. I visited his website shop to have a look but came away thinking, like most of us, I suspect, *"What? They're just adapted Android smartphones with a PTT button on them. What is the point of that?"*

I was nonetheless intrigued because I have always had a suspicion that amateur radio and mobile technology could have a mutually beneficial relationship, if only… After all, just about every person on the planet carries an RF transceiver with them these days!

However, to date, amateur radio has had a difficult relationship with smartphones. Whenever we try to explain our hobby to anyone remotely showing interest, they tend to smile at us (or, worse still, laugh!) and say something along the lines of, *"I can do all you describe with this electronic slab in my pocket – what do I need amateur radio for?"*

And, let's be honest, we haven't been very effective at answering what is a fair question.

A Little History

Those of us of a certain age (myself included) can usually point to a 'magic moment' when radio touched our lives. For me it was picking up Swiss Radio International on the 31m broadcast band when I was about six. That was it. I was hooked!

But with the demise of shortwave radio, which has resulted in broadcasters (and other users) increasingly moving to online streaming, the nature of radio, and thus the way people experience it, has changed. Arguably, no one under the age of 40 has a radio 'moment of magic' similar to the one I describe above anymore.

My stepson's 18-year-old girlfriend wandered into my shack one day a few years ago and floored me when she asked what the tuning knob on my Elecraft K3 was and what it did. I had never thought that anyone would not know how to tune in a radio signal! It was an eye-opening moment.

It was then I realised that radio to most folk today is either a push-button device or (increasingly) something you stream over the internet. What we as amateurs take for granted is not how most people experience radio any more.

Fig 1: A Talkpod N58 running Zello & an Inrico T320 monitoring a Topband WebSDR. The desktop behind is running IRN.

So, if it is difficult for the average under-40 to see that amateur radio has a lot to offer them, perhaps Network Radios are actually that 'crossover' product that could help make us relevant again.

What is a Network Radio?

A Network Radio is a radio that uses a Network (obvious really!), thus, by extension, the internet in some form, accessed either via a WiFi or a cellular network.

I have been licensed long enough to know that some may object to this instantaneously by retorting, *"Well if doesn't transmit on an amateur band, it's not real amateur radio!"*

No-one could deny that these devices do not transmit on amateur bands but does that mean it cannot be considered amateur radio in any form whatsoever?

A Computer in Your Pocket...

In essence, a Network Radio is a pocket computer with a few add-ons. These devices have been designed from the outset for two-way radio users and the business sector at that.

Sporting the PTT hardware button as the major difference from a 'normal' smartphone, they also generally have smaller touchscreens in order to fit the HT form factor. They have very loud speakers for outdoor use and are also extremely rugged to handle. Most people who have played with one are reminded of heavy duty Motorola-style PMR gear. The photo, **Fig. 1**, shows a couple of popular models.

...and All That Implies

And because they are computers with PTT, they add some very useful features to existing amateur radio products.

One of my friends has set up his remote station in Scotland with Remote Hams software. He now uses it with his Inrico T298 Network HT. He controls the radio with his Network Radio's touchscreen and uses the PTT to send the remote HF radio into transmit.

He can now access his station from pretty much anywhere in the world where there is a WiFi or cellular signal but via what looks like and works like an HT. In effect, he has a 200-mile-long microphone-lead with front panel controls!

There's an App for That!

Almost any Android app can be adapted to work. Echolink has been updated this year to accept a hardware PTT button, so users can now access all kinds of repeaters and nodes from a Network Radio.

More exciting still is the International Radio Network (IRN), set up thanks to the foresight of Foundation Licence holder **Gareth M6IGJ**. This is a growing online network of amateur radio streams, accessed through an extremely robust voice-over-internet (VoIP) app called Teamspeak 3. It enables RF networks to come together using streaming computer technology so that, for example, I can sit in my house and transmit on my Network Radio, coming out on a repeater in Manchester, New York or Sydney. The RF cross-linking possibilities here are only just beginning to be explored but already there are examples of DMR, Fusion and D-STAR as well as analogue repeater streams coming in and out of the Network.

IRN is still growing and it is early days but there seems to be no reason why this might not mushroom to cover any and all kinds of amateur radio-related streaming audio. Clearly for all these uses, an amateur licence would still be required, although there are also areas of IRN that can be accessed by anyone, once issued with an IRN-style callsign, if not a licensed amateur.

Fig. 2: This is Rock Climbing... (Source: pixabay.com)

You Don't Need a PTT

Most non-PTT amateur apps work on these devices too, so APRSDroid, for example, turns your Network Radio into an APRS beacon, for about a fiver!

I've set up a few Remote SDRs such as Hack Green as shortcuts on my home page so I can listen to the amateur bands wherever and whenever I want.

WAB Finder is great for knowing which WAB square you are currently in; SOTA Finder helps you with your summit activations and there are plenty of broadcast radio apps, if Radio 4 is more to your listening taste.

Why All the Controversy?

Well, the main reason for all the controversy is that, in addition to all the above, they also work as Radio over Internet Protocol (RoIP) devices.

Put simply, you can contact other people (amateurs and non-amateurs) via PTT over the internet with no amateur licence required. The radios do not transmit on amateur frequencies but still work as 'radios', albeit using 'Internet Propagation'.

It's all about Propagation...

Most of us are aware that all radio signals from LF to Microwave are effectively line-of-sight. Enhanced propagation happens because of natural phenomena such as that which occurs in the ionosphere and the troposphere. Because we experience that on some bands most days of the year, it is easy to take it for granted.

The internet is now also a form of propagation for signals. Yes, they may well be digital signals but the internet is, in effect, a man-made form of enhancing signals so they travel longer distances than they otherwise would. Sometimes wires (or optical fibres) are involved, sometimes not.

This leads many to dismiss Network Radios out of hand. *"They do not transmit on 2m, so it's not 'real' amateur radio".* It's true they don't directly transmit on amateur bands. The real question is, does that matter? And, if so, how much does it matter?

An Example from Another Hobby

Let me try to draw a parallel – allow me to liken amateur radio to rock climbing.

The people in **Fig. 2** are rock climbing- but the people in **Fig. 3** are also rock climbing. The people in Fig. 2 are doing some pretty hair-raising things but, to my way of thinking, so are the people in Fig. 3. You won't catch me attempting either sort!

Yes, the man-made climbing wall (like the man-made internet propagation) is not the same as the mountain (ionospheric propagation) but it is still climbing, even if it is indoors (with no natural weather phenomena, either) and on a man-made structure.

Can you see the parallel I am trying to draw here? And here is the rub – do you think the advent of indoor climbing walls has attracted new people to the climbing hobby or has it put them off?

It's All About the Software...

In 2018, the internet is, for most people on the planet, the medium of choice for reliable long-distance communications and it is open to everyone – we are all 'end-users'. An app like Zello is particularly interesting to us as amateurs. Part social media, part PTT radio communications, it's a bridge between modern digital life and amateur radio. Zello allows us to create 'Two-way radio communities' with the safeguards of moderation built in.

Using Zello, we can effectively be our own end-users, our own 'Policemen' and to some degree even our own licensing authority because we can regulate both who can come on and their behaviour 'on the air'. If anyone on such a channel shows the kind of behaviour that we have all heard on repeaters over many years, they can simply be muted, blocked or even barred, never to be heard from again.

"It's Amateur Radio Jim, but not as we Know it"

There are a growing number of socially diverse amateur radio 'Communities' springing up on both IRN and Zello. DigiCommCafé is a worldwide group run from the USA, which has regular nets. There is a very active Network Radios group (mostly UK based) on Zello, which works just like any amateur radio channel and, I have to say, is a very friendly environment in which to make contacts. You will even meet enquirers to the hobby too because, of course, you don't need to have an amateur licence to use it. It's so popular that the organisers have had to open a 'Channel 2' to accommodate demand. I don't expect it to stop there…

My own club, Wythall Radio Club, has a Club Zello channel where we are the ones who set the rules. We insist it runs on amateur radio protocols and we moderate it accordingly. Members contact each other via the group. Unlicensed club members simply use a 'WRC callsign' that we allocate to them.

It's the End of Amateur Radio! Or is it?

You could view all this as apocalyptic, 'the end of the hobby as we know it', or you could see it as an opportunity for a long overdue injection of new ideas and new people into our radio world.

The so-called purists among us may never want to use the internet as propagation, which is fine, no one is forcing anyone to do so. I would, however, respectfully point out that many of us see no reason not to use internet propagation for such niceties as the DX Cluster, Reverse Beacon Network and PSK Reporter, just for starters.

Fig. 3: …and this is Rock Climbing too, yes? (Source: commons.wikimedia.org)

That is but one way our hobby has already adapted to new technologies. And, of course, there is eQSLing or setting up skeds via e-mail or online logging, all of which seem to be more than accepted now.

No one is suggesting we cease using our amateur bands. Goodness knows, we worked hard enough to get our licences to use them! But in these days of S9 noise, restricted back gardens, poor HF conditions, the challenges of physically erecting tall antennas and, dare I say, for some of us the distinct possibility of needing some form of care in the all-too-near future, what on earth is wrong with using Network Radios?

Crystal clear audio and S9+ signals pretty much 24/7 365 days a year. What's not to like? Are we going to dismiss them because they perhaps use 800MHz or 2.4GHz WiFi rather than 432MHz? Is that not entering the realm of splitting hairs?

No one is suggesting that Network Radios are going to replace our hobby as it stands but when we are able to take advantage of what new technologies can do for us, maybe we can finally reach out to 21st Century people after all and bring our great hobby, albeit maybe kicking and screaming just a little, more into the internet age.

It Grows and Grows...

Like it or not, I don't see this phenomenon doing anything but growing. Even the major radio retailers are now selling these devices.

In the 21st Century, technology is posing difficult questions of us as amateurs and one of the most difficult to come to terms with is the fact that we now have the power to make radio do whatever we want it to. That may sometimes involve taking us outside of our 'traditional' bands. What other kind of radio allows us to operate on an airliner 40,000 feet over the Atlantic Ocean or on the Cross-Channel ferry to France, with no need even to take an examination or hold a licence?

There is also an existential crisis that faces amateur radio. Probably more than 50% of our current demographic may no longer be with us within the next 20 years. Time may be running out for our great hobby, unless we embrace new technologies in a way that can attract new people to it. Will Network Radios play that role? Who knows? Either way, Pandora's box is open and the future could be very bright indeed and certainly this whole area is wide open for innovation. And innovation is where radio amateurs have historically always excelled, so what a great opportunity for us to shape another aspect of the future of our hobby.