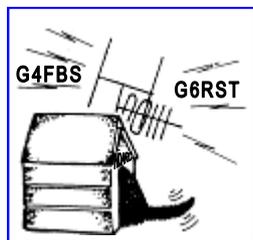


# Horndean & District Amateur Radio Club Journal

Volume 4

Number 2

*August & September 2018*



Nice Gloves

Horndean & District Amateur Radio Club  
Founded in 1975

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Articles, letters of interest, photographs are always needed and should be sent to the Editor :- Mike Clark. [m0zdz.mike@gmail.com](mailto:m0zdz.mike@gmail.com)

I use Microsoft Publisher to produce the journal so am happy to accept articles/photographs via email. A Word document or Picture attachment. Just use Journal article or Journal picture as the subject matter.

Opinions expressed in the journal are not necessarily those of the HDARC. The editor has the right to reproduce the articles for our affiliated club journals/newsletters. The Editor decision is always final.

**Closing date for next journal is : 7th September**

## Editorial

Hi all,

It doesn't seem 2 months ago I was putting together my first edition of the Journal; this deadline has come round so fast.



Hopefully I will get better at my time management as I gain more experience in the role.

Two interesting articles looking at the importance of good RF ground and ground tuning units.

Band conditions on HF have been very poor on the few occasions I've managed to get out portable; even our 2 special event stations struggled on HF (see Chris's write-up).

Hope you were inspired by the RSGB article on getting started in the IOTA contest in the last edition. Hopefully a few of you will give it a go at the end of July. Let me know how you got on and I can put a little article together on club members' exploits.

As always I am looking for more articles from members; doesn't have to be a long or a technical article. Could simply be your thoughts, exploits within the hobby.

Just type up in a word document and email it to me, pictures are also very welcome, and you don't have to wait till the deadline to send them through.

Till the next time, good DX

73 de Mike. M0ZDZ / G7Y  
Journal Editor HDARC (Trainee :)

**South East Hampshire RAYNET**  
By Bill, 2E0WGK



Saturday, 12 May 2018

Event: The Naomi House Gauntlet Games

Location; Cheesefoot Head, Winchester (google it, & visit – it's worth it)

I put those details at the top, as this is the event that I attended today (as I write this) as a member of the South East Hampshire RAYNET Group.

More about the event later, but this is mainly an article about RAYNET, so what is it?

Source: <http://www.raynet-uk.net/history.html>

The first recorded instance of amateur radio being used in an emergency was in the United States for the Eastern States Floods in 1936, followed in 1937 by the Ohio River Valley Flood, although our American colleagues claim to have been established since 1917.

**RAYNET was formed in 1953 after the severe East coast flood disaster -**

High spring tides, held upstream by the high winds of the previous day, were reinforced when the next flood tide came in, driven down the north sea by the fierce north easterly gales. Sea defences from the Humber estuary to Kent were swept away and the sea invaded the coastal towns and villages on a scale never before recorded. Over three hundred people were drowned, and many more had to be rescued by boats from the rooftops of what remained of their homes. Communications at this time consisted mainly of overhead telephone lines, and many of them were brought down by wind or falling trees. No-one knew what the full extent of the crisis was; the police authorities, in desperation, sought help from the few Radio Amateurs then licensed, and, although such assistance was at that time illegal, the Home Office permitted the use of amateur radios in order to direct and co-ordinate the land and waterborne rescue teams, and to ascertain the scale of the relief measures which would be required. The lives of many marooned victims, whose plight was made known to rescuers, were saved as a result. Since then, the network has grown into a nationwide movement; with the emergence of county planning organisations dedicated to civil protection, the scope for involvement in community welfare has increased considerably, and, with the increasingly leisure orientated society of modern times, involvement with the voluntary First Aid societies, in support of social events, has become almost a weekly routine in many country and urban environments.

The operational side of RAYNET is organised into geographical groups. I'm a member of the South East Hampshire RAYNET (SEHR) group. In addition to SEHR within Hampshire there are the NE Hampshire, NW Hampshire, and ➡

South West Hampshire (SWH) - I'm surprised to see this not listed on the <http://contact.raynet-uk.net/groups.asp> website, but I know it's there as I've done several jobs with it.

OK, so I referred to doing jobs with SWHR – what do I mean by that? There are many events that happen weekly in the UK. In a lot of cases, the events can be spread over a wide area, in locations where communications, particularly mobile phone reception is poor to non-existent. In a lot of cases the organisations running the event can't afford to equip themselves with PMR radios, and even when they do, the limitations of PMR is such that they frequently can't cover the whole site. These events offer RAYNET groups an opportunity to practice their procedures and test their capabilities, as well as providing an important service to these public events.

As you might expect, there is an annual calendar of activities, along with random events that spring up every so often. Over the last couple of years, I have been involved in;

Naomi House – The Gauntlet Games  
Naomi House – The Clarendon Walk  
The Stubbington 10K  
The Pub To Pub run  
The Rufus Ride  
The Butser Hill Challenge

There are also a couple that I've missed, but hopefully I'll get them next time round, including the Meon Valley Winter and Summer Plods.

Taking part in a RAYNET event provides an opportunity to visit some spectacular locations. Today's event, the Gauntlet Games took place in the Cheesefoot Head; pictures in no way do justice to the actual location (see page 6). It is a giant natural amphitheatre, hundreds of yards across – the thought occurred to me, is it ever used as such? During the second world war, boxing matches were held there to entertain the thousands of American soldiers stationed in the area. Until today, I never knew this place existed. Another popular event is the Butser Hill Challenge. This year, I was just below the top of Butser Hill, giving me a spectacular view out towards the Isle of Wight.

Quite often, one group will provide assistance to another – so for example the RAYNET activities for the Rufus Ride are managed by SWHR, they have, at least twice in the past, asked for assistance which SEHR has provided, and I hope they do again in the future, as it provides an opportunity to spend a few hours somewhere in the spectacular New Forest. It gives me an immense sense of satisfaction; helping people and visiting locations that I may normally not see.



Although the RAYNET regions are geographically aligned, you do not have to join the group in which you live. If, for example you live in Hampshire but regularly visit Dorset, you could join that group.

There is of course a more serious side to RAYNET; responding to a real disaster or other incident. Joining RAYNET is a commitment, a voluntary one, but a commitment nonetheless. You will be put on a callout list for incident response, and you may receive a phone call at odd hours in the event of an incident or an

## Cheesefoot Head



exercise (admittedly, you will generally know if an exercise is going to occur, and it is possible to opt out, but if possible attendance is good practice. An opportunity to familiarise yourself with procedures.

SEHR takes part in Simex – An annual disaster recovery exercise, which primarily happens on the waterfront at Eastney, to the east of Portsmouth, and in the forts at the top of Portsdown Hill. It's an excellent opportunity to make contacts with both the emergency services, (local and National), Government agencies and other "user Services" Coastguard, St Johns Ambulance etc along with other amateur volunteer emergency response groups such as 4x4 Response.

I've been a member of RAYNET for over 2 years now, I've taken part in a number of public events, including repeat visits, and enjoyed each one (even when the weather was bad – luckily, only once), and been deployed on Simex once, last year – unfortunately, I can't do this year's exercise due to work commitments. Joining RAYNET, gives you the opportunity to use yours and the group's equipment (SEHR are currently experimenting with a microwave-based Mesh network over a dispersed group) under occasionally testing circumstances. If you want to get involved with public events and have a bit of a challenge, then I can recommend that you look at RAYNET. I am the secretary of the SEHR group. Ask me a question, if I don't know the answer, I know a person who does. 

## The 160m Problem By Rob M0RZF

**160m antennas for small gardens is where experts falter and egos diminish**, with talk of 100x 40m long radials and Chu-Wheeler limits. In other words top-band for amateurs is a challenge unless you can put up a 20m+ high mast and have an acre of ground.

Just getting something with a low SWR can be a problem on 160m, with lossy tuners or loading coils. This article looks at a design which makes the experts furious and academics laugh because it goes against conventional theories of electromagnetic radiation.

The Wikipedia page for 160m says its populated by dedicated experimenters, and some very technical rag-chews take place there. Few commercially available antennas cover 160m, if you want to go on the band its generally a bespoke installation that makes best use of the space you have available. There's never enough room to set up a 160m antenna!

Two interesting designs are the Lazy-H and T-antenna with perimeter loaded radials. The Lazy-H is an end-loaded off centre fed dipole, shaped like an H on its side, hence the name. The T-antenna is a G5RV with novel ground system, as described in June 2018 RadCom. My own design is even more radical than those two.

I apologise for the lack of constructional detail because it must be kept confidential for now. You have to ask me at the club! So just signal reports/measurements are given here.

My problem is making a 160m antenna fit in a small garden and outperform a 40m long wire window with a tuner. This project does not prove any breakthroughs in science, just provides a good 160m signal. The 40m long window is not intended for 160m and is not a good reference antenna, so perhaps not a surprise the new antenna far outperforms it.

It's not based particularly on previous designs, but the result of a lengthy study of many academic papers and books [1] on small antennas. As often with antennas the construction evolved, but is based on easily available materials.

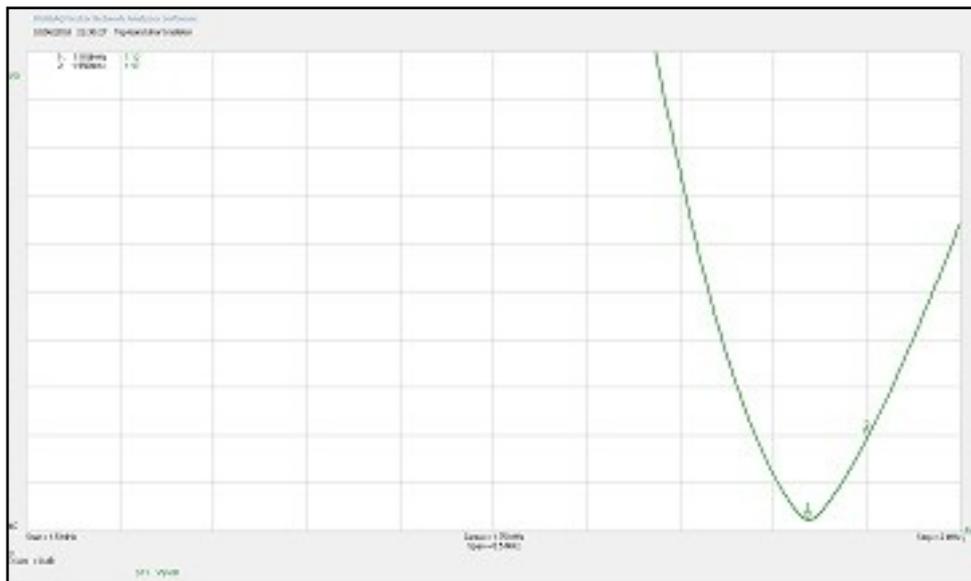
### What is good about this antenna?

It's 7m tall and with low windage and puts out a good signal on 160m. Conventional theory states an antenna radiates by charge acceleration (of electrons) in a wire approaching  $0.5\lambda$  in length. Reducing the length or height cuts



the efficiency and bandwidth, in a square-law formula. In simple terms a short antenna cannot produce charge acceleration over a long enough length for efficient far-field radiation. That's before we even look at the losses caused by ground.

The prototype has a good SWR dipping down to 1.3:1 and a usable 2:1 bandwidth of 70kHz.



The new antenna is not any kind of quad or loop design, despite its rectangular appearance. Don't forget how huge anything approaching a full size antenna is on 160m, where a quad is 40m per side at full size. Try fitting that in a Portsmouth garden!

Despite its unconventional design the far-field (Poynting vector) wave seems to be generated efficiently by this antenna. Based on previous experiments, the polarisation is probably vertical like the ground wave which predominates at 1.9MHz.

A 7m tall 160m antenna has a radiation resistance of  $<2\Omega$  according to the NEC simulator, which I don't trust to simulate this design. NEC (e.g. EZNEC) will tell you it performs very badly because NEC expects every antenna to be like a dipole, which this is not.



## Measurements

The problem with antennas is everything works. A phrase from BBC engineering is “you can load up a dead sheep”. In other words getting a low SWR you can transmit into is fairly meaningless. Its performance against a reference that counts.

On 28th May 2018 **the HDARC club net showed 12dB better** on all stations with the new antenna than the windom, based on several signal reports. With a 1.5:1 VSWR the Icom IC-9100 here was used for the first time on the club net, with 30W output. So the antenna has solved my problem of not being heard by HDARC members on the top-band net, even with some of them having high local noise problems.

The signal from M0RZF is audible on the DerbySDR ([1942kHz.net](http://1942kHz.net)) when using the new antenna but not audible on the windom. Derby is 148 miles from Portsmouth and transmitter power used was 30W on 1950kHz. Conditions were bad with summer static.

Far more comparative tests need to be done with the new antenna!

Frustratingly the SSB section of 160m is limited to 32W PEP. This is a major problem given the D-layer absorption at low frequencies. Local communication on the band is easy but even inter-G (or inter-M) across the country is difficult on 32W.

## Conclusion

The new antenna provides good performance on 160m with a short mast.

Maybe it works by a theory of electromagnetic radiation which is not yet defined [2]?

I find 160m is rarely used by the “primary user” mostly commercial marine traffic. LORAN navigation disappeared from the band years ago. If this new small antenna was commercialised and the power limit lifted, then 160m would see more activity. A proposal was submitted at the last ITU conference in 2016, here’s hoping they see sense in 2019...

I’m working on variants of this antenna for some other bands.

## References

Small Antenna Handbook, Robert C Hansen, Robert E. Collin, 2011.

M0RZF website, [www.m0rzf.co.uk](http://www.m0rzf.co.uk)



## **GB1WWM**

by Chris M0KTT

Our first weekend of operating Museums On The Air was at the WW1 Remembrance Centre, relocated to Bastion Six on the Hilsea Lines in Portsmouth, close to Hilsea Halt railway station.

Charles Haskell, the director, made us very welcome as usual, and we were allocated a room facing the parking area, which I guess was a small parade ground originally.

Owing to the limitations of the site, a vertical was the only option for HF. Ideally the roof of the museum would have been utilised, but there was so much undergrowth it proved impossible to access the roof. An inverted L was deployed, the vertical section strapped to a drainpipe, handily outside the operations room. VHF was taken care of via a Slim Jim atop the HF antenna pole.

Stuart G0FYX and myself set up shop at 09.30 Sat morning; the first VHF contact being Mick G3LIK. HF started a little later, at 11.21, to Gerald PA3GEG in the Netherlands.

Conditions on HF were very poor, with only 8 entries in the HF log by 3 pm, although a notable 2m contact was with Russ G4SAQ/MM on his yacht at Lymington. 18 contacts were made on VHF on the Saturday. Station visitors were Rob M0RZF, Dave SWL, Simon G0IEY and Julia G0IUY.

Arrived at the centre just after 0900 Sunday to open up the station, and attempted to call in on the local Top Band net, however there was very strong local interference, so gave up and started calling on 2 metres, where I spoke to Stuart, Rob M0RZF and Brian M0YBM. Roger M0KWN then arrived, and he took over on VHF, whilst I carried on with HF. 5 QSO's HF and 13 VHF on Sunday.

Conditions remained very poor for the rest of the day, furthest being Viktor, UT8IZZ Ukraine, and GB8CC, Ian, as well as other local stations. Several club members visited; Mike M0CAA and Sue, M0BOZ, Stuart G0FYX also Brian M0YBM, and Frank G0LFI and Christine M6UBI. If conditions on HF are not good next time, I may just operate VHF from the centre, as the location doesn't really lend itself to the setting up of a decent aerial system for the HF bands.

My thanks to Charles for the use of the Centre and his assistance, and also to everyone who turned up and helped with the station, operating and helping to pack away afterwards.



## GB2RAM

By Chris M0KTT



The second weekend of MOTA was, as last year, held at Fort Nelson, Portsdown Hill. As many of you will remember, we no longer had the use of the Royal Marines Museum in Southsea, as they are in the process of relocating to Portsmouth Dockyard.

Lesley, my XYL and myself met Frank G0LFI and went to the fort on Friday, to set up the club's gazebo, to save time on setting up Saturday morning.

On the Saturday, Stuart and I went to set up, where we met Rob M0RZF, and we started setting up tables, chairs, radios, power supplies etc, Mike M0ZDZ was also here to assist and we got on with putting up the masts that supported the 80m end fed dipole that Rob had brought along for evaluation. VHF being taken care of with a simple Slim Jim, mounted on a mast just above the parapet.

The weather was really warm and sunny, which was good for the 'Poppies Wave' which was on display at the northern parapet, and very impressive too.

As last week, HF conditions weren't very good, although the site for HF and VHF was much better, it being around 270 feet ASL, and no obstructions in the way, so we did 'get out' a bit better this time round. Our first HF contact was Edd, GB2OWM, in the Orkneys, and the pace was pretty slow for the rest of the day, with 39 contacts on HF, and 28 on VHF, including a contact with Jersey. →



Sunday operating was pretty quiet, as I was operating the station single-handed until just after lunchtime, when I was joined by Ken G0JWL.



Only 18 VHF and 19 HF contacts were made, but the weather remained very good, and we had a number of mildly interested visitors to the station.

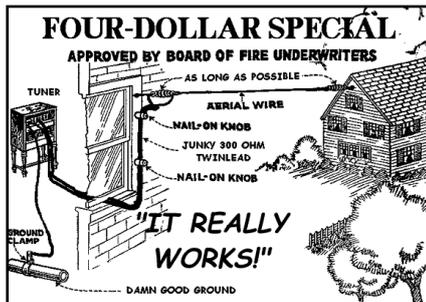
Visitor numbers to the forts main event was very good, I heard that around 5000 people had gone through the gates on the Saturday alone (see picture of queues above), which was very good indeed for the operations manager, Nigel Hosier and his team, who I must thank wholeheartedly for their help and cooperation. Nigel always makes us very welcome at the fort, and is keen for us to continue staging special event stations there.

My thanks go to all who helped to set up and run the station over the weekend (you know who you are).



## Importance of a well matched Antenna

By Doug G4BEQ



The importance of a well matched aerial in any amateur radio station is well known, or should be. However it is well worth mentioning that just because you have managed to get your SWR meter to read 1:1 with a bit of twiddling of the ATU does not mean the aerial is working well. Far from it. You could disconnect the aerial and place the feeder in a bag of sand and get the same result but negative contacts, even very local ones. Don't get me wrong, SWR is important because modern transmitters have a protection circuitry that shuts down the RF amp in cases where the reflected power is high, or gives up altogether.

If your transmitter is set to 50 watts you are hoping this is leaving the aerial, however if your SWR is around the 1:3 mark then something like 25% is being reflected back to the transmitter causing it to back off and produce less power. A high SWR does not necessarily mean a poor aerial; it could be caused by bad connections, poor or corroded joints.

OK so we are all now making sure we have a perfect aerial, but how many consider the earthing system?

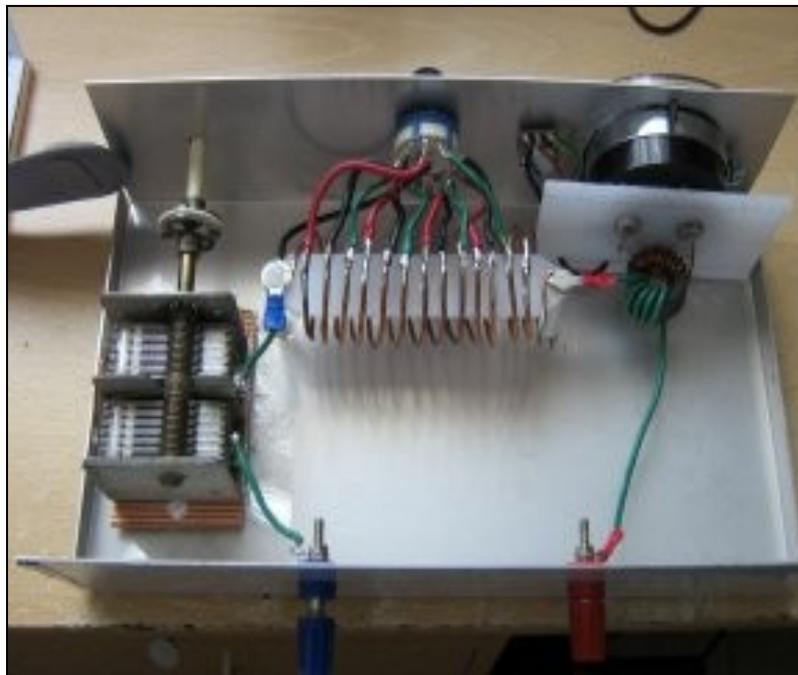
If we are lucky and can erect a well balanced aerial system then we only need to concern ourselves with an electrical safety earth, unless of course our equipment is 12 Volts and we are using batteries.

It is worth remembering that if you are using the house wiring earth it is very prone to mains borne interference and makes a very poor RF earth. Ideally your electrical safety and RF earths should be separate from the house wiring earth. If we are using an end fed aerial a good RF earth is very essential. The ideal RF ground would be to have your equipment mounted in a boat floating in salt water, or living over a copper mine. Unfortunately this for the majority of us is beyond our abilities. Russ, G4SAQ, is OK as he has a super yacht.



Living in a flat or a shack in the bedroom/attic can cause problems so how can the problem be resolved. You could convince your transmitter that all is well by using an electrical quarter wavelength long wire, open at the far end, connected to the rig's earth, and laid along the floor.

You would need a wire for each band/frequency you operate on. Insulate the far end as it can get rather hot which will upset the dog/cat if it decides to investigate it. Alternatively you could purchase an Artificial RF Ground, needing only one wire which you could snake round the shacks skirting board. MFJ and other firms produce these at a price. Having lived in a few odd places in my time I have often resorted to using one, not a commercial one as they are expensive, "roll your own" as they are not difficult to make, and much cheaper. These days you can find all the information you need on the internet. The circuit I am using came from an article published some years back in Practical Wireless by GD4EIP. This is available on the internet so will not show it here in case the editor has been overwhelmed with articles and is pushed for space. Lucky him having so many dedicated club members anxious to fill the pages of the Journal, with an eye to winning the John Taylor-Cram award at the next AGM, of course.



So, back to the “junk box “which is a “must” for any dedicated amateur? This is why it is essential for all amateurs to belong to a good radio club, as you can always raid other members “junk”. In my case Simon, G0IEY, helped out by providing me with some suitable wire for the coil, a single pole 12 position switch, and at one of the rallies found the terminal posts for the princely sum of £2. I obtained the meter from a pile of “junk” donated to the RNARS. Julia, G0IU Y, found me a suitable box at another rally at a cost of £8. All other bits I already had. For £10 and a couple of hours work I had an efficient earth system equal in performance to a commercial unit.



To obtain the best results, connect your transceiver or ATU to the correct terminal post on the back of the unit, which is the red one on mine, with the shortest possible lead. Mine stands on top of the ATU. Connect the counterpoise wire, which should be about a quarter electrical wavelength of the lowest frequency you operate on, to the other (blue) terminal post. Be careful not to reverse the wires. (It is only those members who take advantage of receiving the Journal electronically who have the benefit of seeing everything in glorious colour.....worth a thought)

Adjust the two controls to obtain maximum deflection on the meter. If the needle hits the stops then adjust the meter sensitivity pot. That is the one nearest the meter on my unit. Try several induction settings for the best reading. You may also have to readjust your ATU controls. Once you have carried out your initial trials make a note of the various knob positions so in future they can be set up very quickly albeit depending on conditions minor adjustments might be required.



## Palstar PM2000A Wattmeter.

By Mike M0ZDZ



A fairly recent addition to the ever increasing number of black boxes, the Palstar PM2000 Wattmeter. Not the cheapest meter available by far but what it has over the others is that it can display a True Active Peak Power reading. This is important when measuring power output when on SSB, especially when using high power amplifiers.

It has a hold function so it will display your highest peak reading for a few seconds rather than fluctuate with your speech. It has the ability to be easily calibrated if required in the future. I find the display easy to read and the controls self explanatory.

### Specifications

- Peak/Average power readings: 300 and 3000 watt range
- Peak and Peak/Hold (2 sec) function
- Frequency range: 1.8 MHz to 60 MHz
- True shielded directional coupler
- Displays forward power, reflected power, and SWR
- Dual movement meter system
- PL259 Coax connector
- Top cover is powder coat finished
- Dimensions: 4.75" wide x 4.25" high x 4" deep
- Weight 1.5 lbs.



## **A guide to building your own Portable Station incorporating a 1/4 Wave Vertical Antenna and a Ground Tuning Unit or GTU.**

By: Alex VK2HAS

**Credit:** I was first introduced to the GTU by Dave G4AKC who to my knowledge perfected the GTU and applied it to his pedestrian mobile and portable stations. Dave is well known by stations worldwide by his huge signals whilst Pedestrian Mobile from Blackpool.

**Introduction:** When I get on the air invariably I am Portable or Pedestrian Mobile. I usually set-up in parkland or when I get the opportunity from the beach. These locations afford much lower noise levels than in my suburbia location. My portable station puts out around 80 watts. In many cases stations are amazed at my signal strengths both local and DX, 5 by 7-9 are common place all over the world. I get many enquiries on my station equipment especially the antenna. My answer is simple, I report I am using a 1/4 wave vertical with a ground tuning unit (GTU). In most cases the operator does not understand what a GTU is or how it works?

**1/4 Wave Vertical Ground Plane Antenna:** Most operators would already know what this antenna is, there is a lot of information that can be accessed on the net on how to make one and how it works. Many people simply dismiss this simple antenna and turn their efforts into more sophisticated designs in the hope of better performance. Actually the 1/4 wave vertical in the right location can out-perform even a beam when working DX due to its low angle of radiation. What turns many people off is the installation of the radials and the never ending debate on how many radials are required for the perfect installation, somewhere between 4 and 120 are needed. And of course what is the perfect length?? Whether radials should be raised or laid on the ground. Imagine having the perfect 1/4 wave vertical with no radials. The advantages to a portable station are huge!

### **Enter the Ground Tuning Unit or GTU**

**Ground Plane or Counterpoise:** When we look at a 1/4 wave vertical it is in fact a dipole turned 90 degrees into the vertical position. In theory the currents in both halves should be equal. The top half current radiating the signal and the bottom half current forming the ground plane. If the ground plane current is insufficient caused by poor grounding system the radiated energy of the overall antenna will be hugely reduced.

**The GTU:** This is a device that replaces the radials or counterpoise and can be tuned to allow the maximum grounding current to flow thus ensuring maximum radiation from the top half of the antenna. The current in the top half element is maximized by resonating or tuning its physical length. The bottom half current is maximized by tuning it to resonance by a tuning circuit, the GTU. 

The GTU is installed between the normal counterpoise feed point and a small sheet of metal called a grounding foot insulated from earth just below the feed point. The RF grounding current flows from the feed point through the GTU into the foot and is radiated into the ground. The GTU can be adjusted to resonate the RF ground current for differing ground conductivity.

**GTU Circuitry:** Basically a GTU is made up of two circuits. A tuning or matching circuit to resonate and maximise RF ground current and a RF current measuring circuit to monitor the current and enable adjustments for maximum current flow.

**GTU Tuner Circuit:** This simply a variable inductor in series with a variable capacitor. The inductor can be made from a large 2" toroid with 20 turns tapped every second turn and switched by a 12 position selector switch or air wound inductor coil also tapped. Both are very successful. The variable air capacitor can be in the order of 320 to 500uf similar to that found in old fashion radio tuners. If you are using a metal mounting box both components must be insulated from ground.

**GTU RF Current Measuring Circuit:** There are many designs for this circuit. They are all based around a small toroid sensing transformer producing a RF current which is rectified and displayed on a meter. Because we are only interested in a maximum reading, calibration is not necessary. The only meter adjustment needed is to keep the needle off the end stops, this can be achieved by using a 200k linear pot in series with the meter.

**Ground conditions:** Ground conditions dictate how well a vertical antenna performs. The ground forms the other half of the antenna. With this in mind a vertical working at ground level over ideal ground conditions such as close proximity to the Sea (salt water) will produce far better results than the same vertical over poor conductivity ground such as dry earth or rock. Away from the sea.

**Operating your GTU portable station next to the Sea:** When operating close to the sea, the ideal ground plane is already present in that salt water provides the perfect medium for the vertical to work against. The purpose of the GTU when operating over salt water is to provide a very low impedance path down to the salt water on the operating frequency. This area is called the Fresnel zone. Your antenna is best located either over the sea or as close to it as possible. The performance enhancement of salt water diminishes rapidly as we move away from the Sea. The final radiated pattern does not develop until a distance of several wave lengths away from the center of the vertical antenna. The benefits of being close to the sea are many, both reflected and refracted signals off salt water enhance both receive and transmitted signals. Be aware setting up your portable station some distance from the sea (the car park :) will dramatically reduce performance, ideally you need to setup within a 1/2 wave length from the salt water. Wet sand left by the tide going out is still within the Fresnel Zone even though the sea can be several hundred meters out. 

**Operating your GTU portable station away from the Sea:** When operating over poor ground the adjustments of the GTU will be different. Over poor ground the GTU will produce a balance resonate counterpoise for the vertical to work against. This will still result in good performance. The GTU works in quite different ways depending upon the type of ground conditions.

**Typical Portable Station incorporating a GTU:** A typical station is a complete unit that can be carried in the boot of the car and lift out and set-up in a few minutes. It will be battery powered and have a vertical antenna made from a telescopic fibreglass fishing pole with a 1/4 wave length of wire attached. It will have wheels or light enough to be moved to a suitable location. I use a small aluminium trolley/ sack barrow. All the equipment is mounted onto the trolley including the radio, battery and antenna, everything. The trolley must be insulated from the ground. Rubber wheels or plastic on the base.



**There is no direct contact of the foot to ground just capacitive coupling!**

**Setting up and getting on the air:** After constructing you station you will need to learn how to tune it. Set yourself up in a clear area way from any structures and start the tuning process. It pays to have a pre resonate 1/4 wave antenna for the band you wish to tune to. Set the radio to mid way through the portion of the band you are going to use. Set it to CW and low power. Check the frequency is free. The aim in the tuning process is to get the highest GTU current reading with the lowest SWR. Basically you will need to key-up the microphone in very short burst and each time changing the selector on the GTU. Whilst looking at the SWR meter on the radio and the current meter on the GTU. You will probably get the highest current reading with an SWR of around 1.5:1. There is lots of information about SWR and verticals on the net but a vertical in perfect conditions is resonate about 36ohms, if you achieve a perfect 50ohm match (1:1) you have just used the lossy ground to match the vertical and have degraded its performance. If you have a built in tuner, use this to take out any miss match. Another valuable item is a simple field strength meter. This can be set-up a short distance from the antenna and you can monitor your signal strength while tuning for maximum output.

Good luck with your station; if constructed correctly you will not be disappointed.

**73 de  
Alex  
VK2HAS**





Dave G4AKC, operating from the promenade at Blackpool; even with the tide out Dave is still in the Fresnel Zone due to the wet sand. In his experiments he has found a very slight drop in performance as the tide goes out. Notice no connection between the trolley and the ground other than the insulated wheels.

***Many thanks to Alex for this great article and also thanks must go to Dave G4AKC, who's done a lot of work with the GTU and runs the Real HF Mobile Facebook group. Well worth joining up, lots information and session reports. Dave set-up a WhatsApp group and lots of the VK guys post when they are on and make skeds to link up with other group members. Easier to make the contact rather than try and crack a pile-up. My first contacts into Australia and New Zealand as M6 with 10w were from the beach using a copy of Dave's trolley except I purchased the MFJ-931 Artificial Ground (GTU by another name) as my tech. skills are not the best :( Above all it is operating next to the salt water and using a GTU that gives such impressive performance, with up to 10db of gain in the direction of the sea.  
Mike M0ZDZ***

Other recourses:

[ea5on.blogspot.co.uk/2015/06/ground-tuning-units-in-mobile.html](http://ea5on.blogspot.co.uk/2015/06/ground-tuning-units-in-mobile.html)

[www.facebook.com/search/top/?q=realhfmobile](https://www.facebook.com/search/top/?q=realhfmobile)

[www.youtube.com/watch?v=zU0I\\_YOYX0s](https://www.youtube.com/watch?v=zU0I_YOYX0s)



## The Treasurer- by Bill 2E0WGK

Within what will seem like a fairly short period, the date of the next Annual General Meeting will be announced. I expect it will be on the 19th of October (confirmed), indicating the end of the 2017-18 HDARC season, and the end of my current accounting year.

Usually 2 – 3 weeks before the AGM I will close the books, gather in all of the monies in the various floats, and make sure that the books are up to date and that my figures align with;

What the books say we have  
What my accounting software says we should have  
What the bank says we actually do have  
What cash I have in the cashbox

Just before we announce the closure of the books for the financial year, we announce that we are looking for two club members to take a look at the books. Usually, this time is a bit fraught for me as people don't really want to do this. I understand that. This is the first job as treasurer that I have ever had, and before (you'd think crazily) volunteering to take it on – I probably would never have volunteered to do that check because to be quite honest, beyond some really basic stuff, I didn't understand how it worked!

I'm now just over half way through my second year as treasurer, and as of today I can honestly say I am enjoying this role. Now, I must be doing OK as nobody has asked me to step down yet, and if you are happy to have me for your treasurer next year, I'm more than happy to continue in the post.

I am writing this article to make it easier for you to volunteer to the examination of the clubs books, so please stick with me and do not read this as your night time reading.

I want to take you through how I do this job, describe what tools I use and how I maintain my records. I do not by any means pretend to be perfect; I make mistakes, and sometimes my books aren't tidy, but when I do make a mistake, and if I need to, I shout about it straight away to Ken or Stuart.



Perhaps the most common mistake I make is to put an entry into the wrong book (I keep two, I'll explain about them in a minute) – I'll put a cash entry into the bank book or vice versa. I usually realise pretty quickly that I've done that, and it is normally easy to correct – sometimes it's a pain, as I don't realise for a couple of weeks, and then I have to make good the mistake and the subsequent figures – it all usually comes out alright in the end though.

When I do make a mistake in the books, I just score it through once or twice so you can still read what I wrote, but it's quite clear it shouldn't be there – to be honest, there aren't many instances of that in this year's books, mostly right at the beginning – I had introduced for me, a new method of accounting (I'll explain that in a minute). The new methods are working well for me, and I don't think I'll be making any changes for next year, except perhaps to buy some more robust books.

OK, so let's talk about the books. I bring them with me to club nights, and anybody is welcome to look at them, and ask me questions about them. As I said I have two books;

One for Cash transactions  
One for Bank transactions

When I put a new entry in either of the books, I record the detail of the transaction, and give it a number. The numbers always start at 1 at the beginning of each year. There are four types of transaction, two for each book, these are

In the Cash Book;

Cash Receipts – these all have a number which is the CR number in the form CRn/1718

Cash Payments – These have the CP number in the form CPn/1718

In the Bank book – the format is similar;

Bank Receipts – a BR Number BRn/1718

Bank Payments – a BP Number BPn/1718

At the start of the next season, the last part of the number will change to 1819. I've done it this way, as I am hoping that when you do the check of the books at the end of the year, it will make it very easy to track down where the paper trail for that transaction can be found. 

There is one oddity – occasionally I need to transfer cash from the cashbox to the bank. A cash transfer will have both a Cash Payment (CP) and a Bank Receipt (BR) number – there are usually only two or three transfers per year. I have yet to transfer from bank to cashbox. I use a piece of software, it's web-based, and is called club treasurer. It costs £30 per year and in my opinion well worth it, have a look at;

[www.clubtreasurer.com](http://www.clubtreasurer.com)

Whoever decides to volunteer to look at the books can have access to the club's account, which is a duplicate of the books, except it does all of the balancing calculations, can generate numerous reports, and is a great search tool – I'm more than happy to show the online accounts to anybody who is interested. Next is the evidence, this is where the documentation relating to each transaction can be found. I keep a ring binder for all the evidence and I am organising the ring binder in a certain way;

At the back of the folder are the cash transactions, these are separated into two categories; cash payments (CP) and cash receipts (CR), they are organised numerically, with the oldest at the bottom and the newest at the top.

Next comes the bank transactions. These are organised by statement; each statement will show a number of transactions, receipts (BR) and payments (BP), with each statement is the documentation associated with the transaction shown on the statement. One thing to note here, is that direct payments by club members into the account won't have any independent paperwork, other than the statement entry. To maintain a numerical trail, I printout the transaction details from the software and put that into the folder. It makes sense to me to do it that way. My thought is to give what amounts to a narrative, or story about the club's spending habits which in theory makes it easier to read – for every entry in the books, there is a corresponding piece of paper in the ring binder, whether cash or bank, an entry in the software, and for bank transactions a line in a statement.

It's worth noting that the software generates three account balance figures;



The software cashbox figure will always align with what is in the cash tin, unless it is at the end of a club evening, and I have either received a cash input, or made a cash payment – in this case, what's in the tin should agree with the final figures in the cash account book.

There will nearly always be two figures in the software for the bank balance;

The reconciled account balance; cheques and receipts have been accounted for in a statement, the reconciled figure stays the same until the next statement comes in and it is updated;

The unreconciled balance; there is usually a cheque or two outstanding for payment, or a cheque, standing order or bank transfer receipt that is not yet reflected in a statement. The software takes account of the unreconciled balance. What it boils down to for the account is that whilst the bank statement shows what we actually have in the bank, the account book shows what money we really do have.

Each month, when I receive the statement, I do the reconciliation. I then check the balances on the software. The bank, book and cash balances are then printed out – all the figures should agree. If they don't I have a problem. This year, so far – that hasn't happened.

One final comments about the software; cost codes – these are a software device by which each item is categorised. For example, there are cost codes for receiving payment for Foundation exam fees (4305), Intermediate (4310) and Advanced or Full (4315). There are also cost codes for sending these payments on to the RSGB; Foundation (7305), Intermediate (7310) and Full (7315), basically, anything beginning with a 4 is a receipt, with a 7 it's a payment. Whilst I have a little bit of control over which cost code is associated with which activity, they are generated by the software.

I never really understood how that worked until I became treasurer, to the point now where I am considering setting up a similar system for my home finances – that really is a bit sad isn't it?

(Please contact Bill nearer the time to volunteer for examining the club books.)



## **Horndean & District A.R.C Information.**



**Club Call signs**    *G4FBS (Held by MØKTT); G6RST (Held by G4WQZ)*

**Club Website**     <http://www.hdarc.co.uk>  
(Maintained by Neil 2E0LNX)

**Club Groups.io forum**    *Administrator is Stuart GØFYX*

**Club Meetings**     *Held at Deverell Hall, 84 London Rd, Purbrook, Waterlooville, Hants. PO7 5JU, on the 1st and 3rd Friday of each month. Commencing at 1930.*

**Club Nets**            *All times are local and frequencies plus/minus QRM.*

**Sunday**                *0900 CW until about 0930 then SSB on 1950 kHz.  
Net controller:- Stuart GØFYX*

*2000 FM 433.450 MHz  
Net controller:- John G4WQZ*

**Monday**                *1930 SSB 1950kHz  
Net controller:- Stuart GØFYX*

**Wednesday**         *1930 FM 145.375 MHz  
Net controller:- John G4WQZ*

### **Club Membership**

*Joining fee £2 . Annual fee £26. Those aged 10-18 pay half this rate, and under 10's have free junior membership. For Europe and rest of the World fees please contact the Membership Secretary. All annual fees payable on November 1st. If fees not paid by the following January 31st, membership is ended.*

### **Club Awards**

Full details from Stuart GØFYX (details on committee page).

**CLUB NEWS/DIARY**    Compiled by Stuart GØFYX

**News of club members**

We welcome 2 new club members, Bob M6RKK from Arundel, and Jon M6HZQ from Four Marks, Alton. Good to have you to support the club.

Thank you to HDARC station manager Chris MØKTT for arranging the two special event stations we ran in June, GB1WWM and GB2RAM. See write-up.

Congratulations to the 5 Foundation Licence candidates who sat their exam on July 6th, and all received indicative passes. Well done to main FL tutor Roger MØKWN.

**Diary**

Friday August 3rd Natter night/social evening

Friday August 17th Natter night/social evening

Saturday September 1st/Sunday September 2nd - SSB Field Day. See below.

Friday September 7th Natter night/social evening

Friday September 21st Talk by Rob MØRZF on 'The History of Transistors'

Saturday September 22nd/Sunday September 23rd - GB4MHR. See below.

Advance notice that the AGM will be on Friday October 19th. Details next issue.

**This 'n' that**

A reminder that the Club Project for 2017-8 is 'Build an antenna for any band you like'. You'll need to demonstrate that it works. Entries should be notified to the committee well before September 30th 2018, and the winner will be announced at the club AGM in October 2018. They will receive the Sid Jenkins Memorial Trophy to be retained for a year, and also receive a winners certificate.

SSB Field Day. This runs from 1300 utc on Saturday September 1st to 1300 utc the next day. The club will be taking part using the club callsign G4FBS/P from our Fort Widley club site. We need support for this, so please plan ahead, and if you are able to help, even for a hour or so, please let Chris MØKTT know. His email is on the committee page. Even if you don't want to operate, please come along and see/hear the station.  
Full rules are at <https://www.rsgbcc.org/hf/rules/2018/rmfd.shtml>

We will be running another special event on September 22nd and 23rd from Medstead and Four Marks Station on the Watercress Line, using the callsign GB4MHR (Mid-Hants Railway). Details will be given out nearer the date in the weekly emails sent to club members. We again ask for your support.

This session of the Mike Matthews Award finishes on July 31st, and is for CW QSO's made 01/02/18 to 31/07/18. Need 50 contacts including at least 5 club members at the time of the QSO. If in doubt check with GØFYX please.

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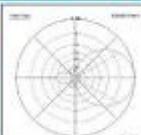
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