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T.D.A.R.S.

Telford & District Amateur Radio Society

News Letter

G3ZME G6ZME Issue 221 Date Jan.2007

Dawley Bank Community Centre, Bank Road, Dawley, Telford, Shropshire. TF4 2AZ

Forthcoming programme

Jan. 17 **Club Construction Project—SDR (Software Defined Radio receiver)**

Jan.24 **"Hot Stuff" - Soldering tuition for those that need it. Show or be Shown!**

Jan. 31 **PIC evening led by Richard 'VXG and Dave 'EIX.**

Feb. 7 **Open evening—HF OTA– Committee meeting**

Feb. 14 **HQ closed. VISIT to Mid-Cheshire ARS, Cotebrook Village Hall, CW6 0JJ (see P3)**

Feb.21 **Under-a-Fiver Construction Competition. (Probably nearer a tenner these days.)**

Feb.28 **Home Electrical Installations & Safety by G0UFE and G4NKC**

March 3 (Sat.) Microwave Workshop. Regional event. 10:30—16:30 hrs. TDARS HQ

March 7 **Open evening—HF OTA– Committee meeting**

March 14 **Main Construction Competition. Anything goes ….even if it doesn't!**

March 21 **RSGB Regional Manager, Dave Gourley M0MJY visit. (postponed from October)**

March 28 **Annual General Meeting. Agenda this Newsletter**

April 4 **Open Evening/HF OTA/ Committee Meeting**

CLUB MEETINGS EVERY WEDNESDAY AT Bank Road Community Centre, Bank Road, Dawley Bank. Rooms available from 7:30 pm. ALL WELCOME. COME AND MEET EVERYONE !

For Foundation & Intermediate training, contact Mike G3JKX tel: 01952 299677, mjstreetg3jkx@blueyonder.co.uk. Advanced course contact Eric M0KZB tel: 01743 240286, e.arkinstall@virgin.net, x or Mike G3JKX, as above. **SEE PAGE 4**

Editorial

At the risk of being labelled a “Luddite”, I shall stick my neck out and pour a glass or two of cold water over one or two current sacred cows, which I think represent the myth that we must always jump on the latest bandwagon and follow the trend or else fade into historic oblivion.
The first is the dash towards using a computer for everything in the shack. My PC is quite ancient by 2007 standards, as it’s at least 3 years old. I wouldn’t be without it. However, it’s limitations, particularly when trying to use it to implement the Club SDR receiver project recently was evident. I could only receive about 15KHz at a time due to a crummy motherboard-based sound card, and the very noisy audio out was about half a second behind a ‘real’ receiver loudspeaker nearby. I disliked trying to tune sideband on it—it feels like tying a knot in elastic, and the frequency display (on the PC) is quite awful, showing bad imaging etc. A comment on an Internet reflector makes me wonder whether it is ***just*** the shortcoming of my PC. The author was using the latest gismo, with the ‘professional’ Delta 44 soundcard, and this is what he said:- “I only ask as I have two SDR1000s and I'm beginning to get to the conclusion that they are not the 'great thing' that was sold by Flex-Radio and Waters & Stanton…” (Dave, G0DJA). ***Perhaps*** a sound approach— but unsound implementation….?
Then there’s lead-free solder. Last summer I purchased a reel of the standard 60/40 leaded solder I’ve used for the last 45 years or so. Very fine stuff, so ideal for surface mount components etc. I don’t want to run out of stock and find it’s no longer available, say in 5 years time. I have to admit I’ve not even bothered to buy or try the lead-free stuff, as reports are very mixed, and apparently it’s not good enough for the MoD or the Health Service, so I’ll steer clear of it. Another comment from the internet says it all for me: “Don’t worry about Lead-free....how do we manage when they ban arsenic, antimony, phosphorous, chlorine, fluorine, and lot of other ‘toxic’ elements used in electronics?? Still, they will soon be looking at di-hydrogen oxide, now that is a real killer, 400 people this week in the far East, plus innumerable others not reported.
Oh what it is to be governed by the technically illiterate. As an aside, a TV news ‘science correspondent’ referred to ‘toxic carbon dioxide’ the other week, what about all that ‘toxic nitrogen’?! I am afraid a degree in Media Studies does not really qualify one to make decisions on these cases, but it doesn’t stop 'em. It is amazing how we can throw away 100 years of technology and knowledge on such a whim, and precious little data. Anyone for ultra-sonic vibration welding ??” (Alan, G3NYK)

So I shall continue to normally have my PC “Off” whilst operating, especially when hunting weak DX, and I shall continue to use my teeth to un-reel a bit more dreaded-leaded solder when both hands are busy doing the soldering job! (Yes, I know, I’ve been told—it explains a lot ….)

MIV

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TDARS Information and pictures Web Site www.tdars.org *(note:no .uk)*

CHAIRMAN: Richard Wilkinson G0VXG (883671)

VICE-CHAIRMAN: Martyn Vincent (255416)

SECRETARY: Mike Street G3JKX (299677)

TREASURER: Jim Wakenell G8UGL (684173)

CURATOR: Derek Southey G0EYX (01785 604904)

NEWSLETTER EDITOR: Martyn Vincent G3UKV (255416)

Committee: Richard M1RKH;Mike G4NKC;Simon G0UFE;Chris M0ECM; Dylan M1IHM; Bob M0RJS

Assistant Curator: Kevin Hutchinson G8UPF (01746 764556)
QSL Manager : Malcolm 2E1DJM; Trophies/Certs: G3UKV, M1RKH

Ephemera: Club News

The first Club **"Lucky 49 squares"** winner was announced at the TDARS Christmas Dinner, and it was Bob M0RJS, with No. 43, which was the 'bonus' number from the previous Saturday's National Lottery. Bob bought more tickets than anyone else, so perhaps there is some justice in this world…. He re-invested £10 of it immediately into the second draw, which will take place when the remaining numbers have been purchased by Members. It's not just open to the Committee you know ……!

Just a reminder that our **visit to the Mid Cheshire A.R.S.** lads takes place on Wed. 14th February. The QTH is Cotebrook Village Hall, Stable Lane, Cotebrook, Cheshire CW6 OJJ. It's NE of Tarporley, just off the A49. Here's the directions from Simon G8ATB of MIDCARS:

> "Travel north on the A49, as you enter Cotebrook (it's a hamlet) you will go down a hill, on the right hand side you will pass the Alveny Arms (our alternative club!) at the bottom of the dip. Stable lane is approximately 150m past the Alveny Arms on the left hand side, turn into Stable Lane and the village hall is approx 100m on the RHS next door to the Church. If you miss the turn into Stable Lane, you can take the next turn left, off the A49, immediately past the church."

Several of the **SDR receivers Club Projects** for either 40/80 or 20 metres have now been put together by members. However, the soldering is quite challenging, even after the SMD components have been mounted. A very fine soldering-iron point, good lighting and a magnifying glass (to check for solder splashes) are essential. Linking to your PC requires connection to the sound-card line input. Ask for help at any stage;—both Richards have offered, and others will also help. Don't be put off by the Editorial !

TDARS Members are invited to the **Microwave Workshop** planned for Saturday 3rd March at Club HQ. It is intended as a hands-on practical day, plus presentations covering equipment, antennas, propagation, operating techniques etc. It will run from 10:30 am to 4:30 pm. However, please let Richard 'RKH know if you intend to come, so that we have enough handouts, CDs etc. on the day. It has been extensively publicised in RadCom, PW, Monitoring Monthly and GB2RS, and it should be a useful day.

G3ZME T.D.A.R.S. G6ZME

The **'Cafepress' TDARS promotional items** advertised in the last Newsletter have not turned out to be particularly good 'value-for-money', mainly due to high postal costs from the USA. So the Committee have put this idea on hold, for the present time.

Numbers were down at the **Club's Christmas 'Do'** last month, due to a date clash for some members, and driving through the River Severn in flood for others. However Don M0FHM and his good lady, Norma, have fully recovered from their night-time ordeal and their Megane is almost as good as new. No trout or salmon were found under the seats..

The **AGM Agenda** below is a bit early, but just in case the March Newsletter is late, it's enclosed. Please note any additional Agenda items or proposals must be with Mike G3JKX no later than Wed. 21st. March to be included in the AGM.

Mike 'JKX, Eric 'KZB and Martyn 'UKV have all offered to provide **Morse tuition** if there is anyone wanting to start or refresh their knowledge and use of this very effective mode of communication. 7.30pm any Wednesday evening at the club, plus 9:30pm after the club net on Sundays (+/- 144.6 MHz, Sunday evenings.) A special **Certificate of Achievement** will be printed for anyone achieving 5 or 12 wpm (send and receive), based on the original RSGB format. It takes a bit of graft to achieve, but is well worth the effort. **Contact** Mike, Eric or Martyn to get started.

The **RSGB has set up a free website** for Radio Clubs. Don, M0FHM, our web-master has provided a basic home page on the site (www.radioclubs.net/tdars), but the rest of the web pages remain as shown on the normal web site (Page 2). Of course there is a link from the RSGB page to our own website. At present, Google can't seem to find the new RSGB club pages, and RSGB's main website doesn't seem to mention a link!

Mike has announced that the next **Intermediate Course** starts on Mon. 15 January at his QTH (1900 hrs), followed subsequent Mondays at the Club HQ, also at 19:00 hrs. A weekend **Foundation Level** course take place at Mike's (G3JKX) house on Sat/Sunday 27-28 January 2007. For a place on either course, contact Mike on 01952 299677 soonest.

CLUB NET: SUNDAYS 144.600 MHz FM AFTER 9 PM. GB3TF ALSO MONITORED FOR ANY-ONE NOT ABLE TO OPERATE ON 2 METRES. Very quiet in recent months. CU there soon. Several members on 3.657 MHz SSB for a regular net at 09:00 hrs on Mondays and Fridays. Normal daytime monitoring anytime 145.500 MHz (replaces 144.600 MHz for trial period)

TDARS SUBSCRIPTIONS FOR 2006-07—If you haven't paid, please contact Jim G8UGL : £29 normal, £15 Full-time student, £23 Concessionary non-earners.

A shot of the Martlesham tower that holds up the beacons and their antennas for GB3MH(L) on 23, 13, 9, 6 and 3cm near Ipswich, Suffolk.
Taken whilst visiting the Martlesham Microwave Round-table in November 2006. Martyn 'UKV points out the obvious.
Venue was BT Adastral Research Centre.

Mike's Piece about Modulation

Please look in your dictionary, ANY dictionary, and look up 'Amplitude Modulation'. I am going to bet you any money you like that the description of AM reads something like this…….

'In AM the carrier wave is varied in amplitude in sympathy with the modulating signal'

It says this in every dictionary that I can find and also in the 2005 edition of the Radio Communication Handbook and shows the usual curvaceous oscilloscope waveform to prove it. This description is completely and utterly **WRONG! Because, in fact, t*he carrier amplitude does not vary one jot whether there is any modulation or not!*** This can be proved mathematically.

The usual picture of the oscilloscope screen, showing a 100% amplitude modulated carrier wave, happens because the ***carrier frequency and both sidebands are added together in the first amplifier of the oscilloscope***. When using AM, a PA actually produces **3 signals, all at once**, **the antenna likewise**, ……the carrier frequency, together with an upper and lower sideband.

To better see what is happening, we really need to look at things on a spectrum analyser. This shows signal amplitudes vertically as usual, but with lower frequency signals displayed on the left of the screen and higher frequencies on the right. With an audio tone, of say 700Hz, fed into the mic socket, all you *should* see on the screen are 3 vertical lines. The lower sideband 700 Hz to the left of the carrier frequency, which is in the centre, with the upper sideband 700 Hz equally spaced on the right of it. The carrier should be at least 100% bigger than either sideband. ***If you now reduce or remove the modulating audio, the size of the carrier does not alter at all*.** However, if we reintroduce the tone signal again and increase the microphone gain too far, other signal spikes appear each side of the carrier. These are usually caused by amplifier/mixer stages being over-driven in the Tx, producing **harmonics** and **mixtures of these**. So a very wide bandwidth of rubbish is being generated. And **still, the carrier amplitude does not change**! The important thing is that those unwanted signals are taking away power that was being used to generate the voice sidebands you really want to be heard at the receiving end. Objectionable sideband splatter is being produced. Yuk!

On SSB, if we used just one modulating tone, all we would see would be a single RF sine-wave. We must use a 2 tone audio generator to modulate the Tx. Why? To get that signal mixing in the oscilloscope first amplifier again, so that we can see the '*usual*' modulated waveform. Using two tones (which must not be harmonically related, e.g. 700 & 1900Hz) we then get the '*usual*' modulated signal displayed. However, on a spectrum analyser, the two tones produce two signals on screen, on LSB to the left, or, on USB, to the right of where the carrier would have been, if it had not cancelled out in the balanced modulator. Now, if we increase the mic gain too far, or speak into the microphone too loudly or have too much speech compression on, unwanted audio harmonics appear to the left and right of the wanted signals.

I have my K2 and FT857 rigs available to do tests. When either rig was starting to be overdriven, I could actually hear the audio harmonics being produced, just by listening carefully to the other Rx. Because ham rigs have a 'communications' 300Hz to 3000Hz audio bandwidth, with the K2 crystal filter shorted out I was amazed at the bandwidth of rubbish being produced when the FT857 was over-driven. So gentlemen, I give you a challenge. Call your friendly neighbourhood ham who produces an S9+ signal in your Rx and really listen carefully to each other and adjust the mic gain and processing controls until the bandwidth is contained within 3 kHz or so of your dial reading. Remember that receivers can produce the same effects if you overdrive the Rx RF stages, so keep the RF gain down. Use the widest bandwidth you have or short out the I.F. filter like I did, so that you can hear what's really going on. Better still, make a 2 tone generator and, as we all haven't got a spectrum analyser, get your nearby ham to tell you if strong tones *other than the two being injected* are heard.

If they're there, then there is non-linearity somewhere &/or mic gain needs adjusting. We all owe it to other band users to keep our bandwidth within limits. You'll learn a lot by building and using a 2 tone generator and carrying out tests which **our licences require us to do!** Get careful bandwidth reports from others or better, build a 2 tone generator and a single band direct conversion Rx, (in a screened box) so that you can you test your own transmissions sometimes? They're all you need.
But an oscilloscope is useful too! You can always borrow one from the club, if you are a paid-up member. That's all for this time.
Vy 73 Mike G3JKX 01952 299677 mjstreetg3jkx@blueyonder co.uk

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Glue stick variable BFO by Richard G0VXG

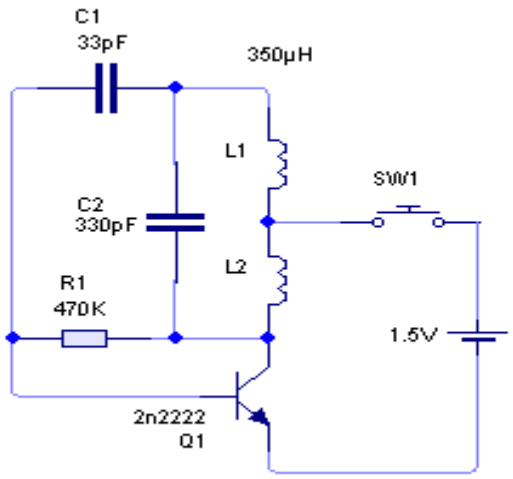
This Christmas a well known drug store was selling AM/FM PLL SW radios for £2.99. These cover 30m, 40m, and part of the 20m amateur bands. (Ed note: similar to last year's SuperDug radio, but that covered all 40, 30, 20, 17 and 15metre bands). They have reasonable audio quality but because they are AM they cannot resolve SSB or CW. There have been other circuits (Hans Summers) but these are fixed frequency and I found them ok for CW but not so good for SSB. The glue stick has a piece of threaded plastic in its centre and if this could be used to lower and higher a piece of ferrite near a coil then a variable BFO could be created. The switch for the oscillator is controlled by the screw top.

Circuit

This is based on a Hartley oscillator and uses a centre tapped 350uH coil and a 330pF capacitor. A ferrite toroid or similar is used to tune between 455 and 460kHz. The circuit runs on a 1v5 button cell and consumes about 80uA.

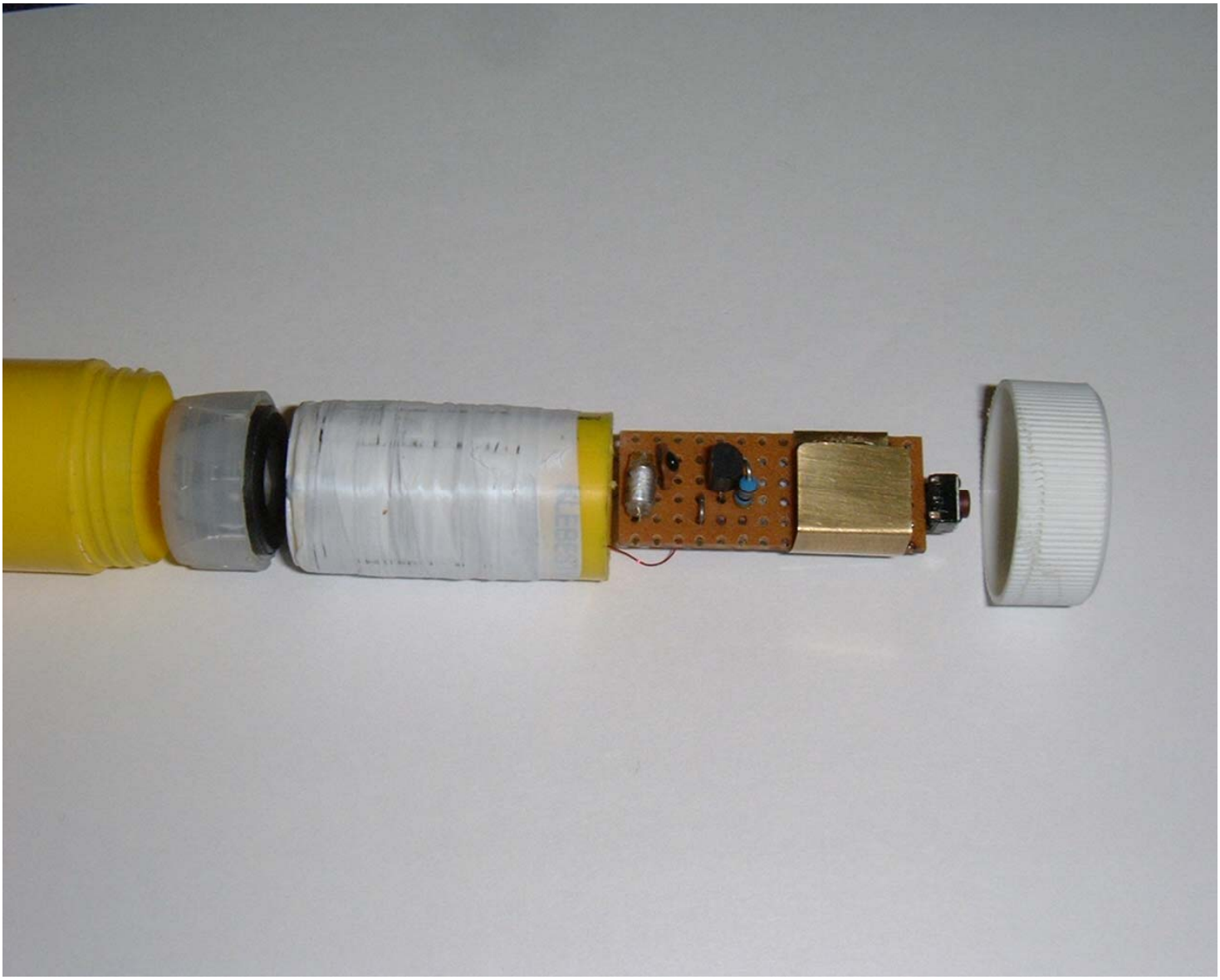
Construction

Take your discarded glue stick mine was about 10.5 cm by 2.5 cm and remove the top and glue holder. Dip the "adjustable" end into some boiling water for about 30 seconds. Once the plastic is soft you can remove it by twisting and pulling. Soak all of the 4 parts in some hot water to remove the glue. Cut the threaded plastic to 3cm. This will allow the smaller 4 cm tube to sit on top of the threaded plastic and be level with the top of the glue tube. Re fit the adjustable end back into the tube. Obtain a 1 by 1.8cm ferrite toroid (or equivalent) this should sit neatly into the glue holder. Drop the glue holder and ferrite into the tube and make sure that it goes up and down. Using the small tube, start winding the coil from one end, when 1.25cm has been wound make a centre tap about 5cm long, continue winding until the coil is 2.5cm long, leave about 5cm of wire at each end of the coil. NB this tube will have to fit inside the larger tube when wound with the coil. With the 3 wires coming up the outside of the tube wind a single layer of PTFE tape over the wires and the coil. Cut a 2cm disc of thick card and bond to where the coil starts, this stops the threaded plastic from entering the smaller tube. The Vero board needs to have a button cell battery holder added. This can be made from 2 pieces of brass or tin, the zero volt connection just lies on the Vero board and is folded around so that it can be soldered to 2 tracks underneath. The other piece needs to be bent so that it forms an "N" shape and again this is soldered to 2 tracks on the other side of the board. The switch is soldered to the top of board such that one pin is connected to positive and the other just connected to a free track (this will be connected to the centre tap of the coil) Check that the circuit fits snugly into the small tube, then solder the 3 wires from the coil as shown. Test the BFO and push the small tube into the larger tube, the switch should be just proud of the top of the tube. Screw the cap gently onto the tube and the BFO should switch on. If it does not work you might need to add a disc of card in the lid such that it exerts a little more pressure onto the switch. The BFO works within a 6 inch diameter of the radio for strong signals place close to the radio for weaker ones move further away.



Components

Glue stick 10.5 * 2.5 cm
Internal tube 4 * 2 cm
Vero board 6 * 14 holes
Button cell eg AG13
Miniature switch
Ferrite toroid
0.1mm enamelled wire
NPN transistor eg 2N2222
330p, 33p capacitor



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REMINDER: Paid up Members are welcome to borrow items of Club Equipment, so long as they're returned the following week and the usual "signing out" process is followed strictly. That's a privilege of TDARS Membership. If you can't return it on time, please find someone else who can, or don't borrow it that week!

T.D.A.R.S. NOTICE OF 38th ANNUAL GENERAL MEETING.

DATE/TIME: Wednesday 28th March 2007 at 8pm.

VENUE: TDARS HQ– Bank Road (Dawley Bank) Community Centre, Telford

AGENDA: 1) Apologies
2) Chairman's opening remarks/report
3) Minutes of AGM held 29th March 2006
4) Matters Arising
5) Treasurer's Report
6) Election of 2007 Committee
7) Presentation of Trophies

Any proposals for inclusion at the A.G.M. must be sent (or handed) to the Hon. Secretary (Mike street G3JKX 12 Ullswater Close, Priorslee, Telford TF2 9RB, or E-mail Mjstreetg3jkx@blueyonder.co.uk) to arrive no later than Wed. 21st March 2007.

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Congratulations to Steve 2E0DAM who was elected to be the Equipment Officer at the recent AGM of Shropshire County Raynet at the Shirehall, Shrewsbury. The Group has a lively Committee, devoted to providing communications for pre-arranged events (such as the Long Mynd Hike in October and the Derwen Walk in the summer) and in the event of a local or National emergency situation. Most of the committee belongs to Salop ARS, but it was good to see a handful from TDARS at this meeting in January. Total attendance was 20. We are in RAYNET Zone 9.

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Robin (G1MHU) sent a very amusing attachment called "**Winders for Brummies**", but not easy to copy odd bits from it. However, here's an example of how it reports 'Unexpected Error' (in MS Windows format/layout)…"Winders has Encountered an Unexpected error and will 'ave ter cloze"...options: Awlroight…..Fergeddit…..It wor me, I dae do it. " Pop Robin an e-mail for the full monty. It's a .pps file.

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Late update re Morse training. Roger Cooke G3LDI put an item in February P.W., as he has taken on the administration of the RSGB's GB2CW slow morse transmissions, that take place on 2m, 80m and 160m. He has accepted an offer from Martyn G3UKV to transmit regular practice sessions for a trial period during daytime—possibly around 9:00 am. Obviously this will not suit those who are at work at this time, but our own TDARS arrangements and other GB2CW transmissions cover mainly cover evenings and weekends. More to follow ……

This year (2007) is the **250th Anniversary of Thomas Telford's birth**. He wasn't born in Shropshire, of course—he's a Scot. However, many groups have planned various events during the year. Will TDARS be one such organisation? Further information from any member of the Committee. Special callsign GB4TTF ??

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