

# Forthcoming programme

June 28	Data Modes in Amateur Radio—Talk by Dave Harris G0CER
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July 1/2 (weekend) VHF NFD from Long Mynd. On site from 10:15am Saturday

- July 5 Open Evening, G3ZME on air, Committee meeting
- July 12 Dayton Hamfest 2006—Report and Pictures from Ohio by the gang who went.
- July 19 Quiz vs Salop ARS @ HQ. G3JKX in the Chair.
- July 26 B-B-Q in HQ Garden (indoors if wet). £1.50 Members, £3 non-members
- Aug 2 open Evening / OTA / Committee meeting
- August 9 Portable In Telford Town Park (behind Focus D. I. Y). Club HQ closed
- August 16 Doctors' Surgery! Any problems or questions? Perhaps get it sorted...
- August 23 Digital Photography Picture Manipulation, with Bob MORJS
- Sept. 6 First-in-the-month G3ZME on air & Committee meeting

**Sept 9 (Saturday) Visit to Museum of History of Science, Oxford,** to see the special exhibition "Wireless World—Marconi and the making of Radio" (Provisional Date) (details on Pg 4)

- Sept. 13 Telford Hamfest 2006 Preparation night. Please support this one.
- Sept. 20 TDARS Debate around the theme: "Is SDR the future of Amateur Radio ?"

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@aol.com. Advanced course contact Eric M0KZB tel: 01743 240286, or Mike G3JKX.



When I typed the last Newsletter in April, the cold, wet weather seemed endless—and it continued more or less right through May. Suddenly, the longest day is upon us, and the weather has greatly improved.

So, what's happening outside?

Some of the group have had a go at the Practical Wireless QRP (real QRP-max 3 watts) contest from near Stafford, and also hope to take part in the RSGB Backpacker's contests on 2 or 6 metres. Others of us have been up the Brown Clee microwaving. The hedge and trees at the Club HQ have had another incredible growth spurt, so need hacking back (see programme Aug 30th). A visit to Oxford to see the unique Marconi Exhibition at the Museum of Science History is being organised for a Saturday in September. Antenna work at several Members' QTHs is required or under way, and the 'TF mast needs straightening and checking. Telford Hamfest, outlined last time and booked for Oct. 1st, is under way, with a reasonable response from would-be exhibitors and traders. We're having another Barbecue at the end of July (26th) in the Club QTH garden, and probably some antenna work too. And Finally, VHF NFD is just around the corner and needs all hands on deck; if you haven't taken part for a few years, please give some thought to coming along this year-your club needs YOU to help put up the camp, establish the various stations, erect antennas etc etc. Always an enjoyable event, with good team spirit and plenty of fresh air. The Mynd is always an memorable experience, even on Sunday morning at 5 am.

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## TDARS Information and pictures Web Site www.tdars.org.uk

CHAIRMAN: Richard Wilkinson G0VXG	( 883671)
VICE-CHAIRMAN: Martyn Vincent	(255416)
SECRETARY: Mike Street G3JKX	(299677)
TREASURER: Jim Wakenell G8UGL	(684173)
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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

#### <u>CLUB NET</u>: SUNDAYS 144.600 FM AFTER 9 PM. GB3TF ALSO MONITORED FOR ANYONE NOT ABLE TO OPERATE ON 2 METRES. ALSO FIRST WEDNESDAY IN MONTH AFTER 2000 HRS LOCAL TIME ON 3657 KHz +/- QRM.

<u>REMINDER</u>: 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!

#### Mike's Piece

During a recent tutorial the subject of the different classes of amplifier bias arose. As you probably know the base current of a transistor amplifier, with no signal present, usually depends on the bias voltage applied from a voltage dividing pair of resistors. In Class A, we adjust this voltage to make the collector take about half of the saturation current (the most it can manage) then, when we apply an appropriately sized signal between the base and emitter, the output voltage will swing between almost the rail voltage and down to a very low voltage. Assuming we have not overdone the input voltage swing, the output will be a larger, exact reproduction of the input signal, only upside down. Should we overdo the drive signal, the device will reach maximum current too soon in the input cycle and the current may be cut off altogether during the other half cycle. This means that the output signal will have flat tops and bottoms, generating distortion which, in an RF circuit, produces lots of nasty signals nobody wants to hear. For SSB, where the amplitude is always varying, Class A is almost a must, the output quality being superb, but only if the bias is set correctly and the voltage swing of the input signal is within limits. The only problem with Class A amplifiers is that the amount of amplification is limited and the efficiency is only 30% or so, meaning that much waste heat is being generated, so the device/s will need lots of cooling.

So could we get a higher output SSB signal and yet get the efficiency up? Well, there is Class B biasing, where the device is only just conducting with no signal present. Ah, you say, doesn't that mean that half the input waveform is not going to be amplified and therefore lost? Quite true ! However, we can arrange for two devices to work together, one device working when the other is off and vice-versa. Say the input signal is applied to two devices, one PNP and the other NPN. Then the common output circuit gets half from one device followed by a pulse from the other, resulting in a distortion free signal, *if, and only if* the *devices are equally matched* for conductance and the bias is set perfectly. Whilst a device is on, the other is doing nothing and so is cooling off and the efficiency is greater than Class A but less than Class C, maybe 50%.

We could use two '*push-pull*' NPN or PNP devices, working like a two cylinder horizontally opposed motor-cycle engine. Here the input signal has to be split so that input for each device gets the same signal, but in anti-phase. A centre tapped primary of a transformer is connected between the collectors/drains, the supply going to the centre-tap. The signals from each amplifier are then combined in the transformer output winding. Again, the devices should be a matched pair and the Class B bias set very accurately.

In Class C operation, the bias is adjusted until the device/s stop conducting altogether, with no signal present. We now size the input signal such that *only the very peaks cause the device to conduct*. Then the collector/drain voltage falls rapidly but rises again equally rapidly when the device is cut off again as the input signal falls shortly afterwards. For this small fraction of each cycle the device conducts heavily, but for the remainder of the cycle it can cool off. A tuned circuit in the output will ring like a bell when the voltage falls and rises rapidly. The resulting oscillation would normally die away but, fortunately, the tuned circuit is being struck every cycle by another voltage swing from the o/p of the device, enabling the tuned circuit to produce a sine wave output. It should be obvious that Class C can only be used if *the driving signal amplitude is constant*, i.e. CW and, using FM, where only the frequency changes. Class C efficiency? 66%.

Class C devices make good frequency multipliers, with the o/p tuned circuit being hit with a pulse every other cycle (doubling) every three (tripling) and sometimes every five cycles (quintupling) The Q will need to be high to ensure a good 'flywheel' effect.

And yes, there is also Class D biasing, which can be up to 90% efficient, but that is another story.

Finally, for high power PA circuits, it is vital that the supply voltage is 'stiff', in our parlance. It should be self evident that if the supply voltage to amplifiers sags on peaks of current demand, the output signal will not be an exact reproduction of the amplifier input. So, always go for a PSU with a few more amps available than your rig needs. Keep that in mind that when your SSB rig is not transmitting anything at all, i.e. between gaps in your speech, most of the other devices in your rig are still drawing current, sometimes several amps. So allow for this as well as the PA current required.

That's about it for this time. Keep well, keep happy. Vy 73 Mike G3JKX (& also KB1NPZ now)

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<u>Reminder:</u> Deadline for the TDARS Radio Activity Competition—both HF and VHF Sections—is Wednesday July 19th.. Please hand or post to Martyn G3UKV or e-mail (ukv@ukv.me.uk) by that date. Thanks.



- This is an item from GB2RS about the museum we are planning to visit on Sept 9. "Marconi's grandson Guglielmo and his daughter Princess Elettra will attend the opening of a major new <u>Marconi exhibition at the Museum of History of Science</u> in Oxford on 24 April. The exhibition – called Wireless World: Marconi and the making of radio – covers the history of radio from Marconi's early demonstrations in the 1880s to the beginning of regular public broadcasts in the 1920s. Original equipment and documents from those pioneering days of radio will be on display, including apparatus from Marconi's very first demonstrations, Marconigram messages sent by the stricken Titanic just before it sank and the microphone used by Nellie Melba to deliver the first ever life public entertainment broadcast on 15 June 1920." There's a bit more info on page 11 of the June edition of RadCom or try www.mhs.ox.ac.uk/
- NOTE: If you haven't already renewed, <u>TDARS SUBSCRIPTIONS FOR 2006-07</u> <u>NOW OVERDUE</u>—Contact Jim G8UGL ASAP, £29 normal, £15 Full-time student, £23 Concessionary non-earners.
- <u>The Club station</u>, using the IC756, is now permanently available in its secure bench mounting location. The 2m/70cm rig will also shortly join its HF partner, since the dual-band collinear is now repaired and re-installed on the roof. One or two extra keys will be cut so that authorised use is readily available to Members.
- A new order for <u>TDARS polo and sweatshirts</u> is just about to be placed. You can have them with just the club logo (Phoenix), or logo plus callsign. Contact Eric M0KZB immediately for further information or to place an order. Money up front, please. Tel 01743 240286. Other TDARS <u>memorabilia</u> <u>and souvenir items</u> have been ordered by Richard M1RKH from the States on a trial basis. Richard's tel 01952 505800







- Not may have noticed the <u>"Club of the Month" entry in RadCom</u> for the past year or so. Not knowing how, when or if an entry is published, the Committee have decided to submit an item under this heading to RSGB on behalf of TDARS. Richard 'RKH has done the bizz, which has been circulated to the committee and slightly amended. A photo of our 2005 expedition to N. Ireland is also being attached, so hopefully the Editor will see fit to publish our contribution some time in the next few months.
- A <u>TDARS Lottery licence</u> has been purchased from the local Borough Council (T&W), so a regular Club "49 squares" flutter is a step nearer. The final name and details are not yet finalised, but will be announced shortly. Probably a quid a go.

## TDARS PLC (by Richard G0VXG)

## (This subject arose from an 'Open Forum' meeting held at the Club on Wed. 17th May)

## From Richard 'RKH

Dear Wilkinson Management Consultancy– here's my bulleted points for consideration under our IPO this Summer. I hope the market for Amateur Radios remains as buoyant as it is now and we have a good offering price.

I think Bob had the good sense to attach revenue to his ideas. Maybe we could do the same here and see where it leads.

#### **Objectives**

- Produce a stimulating plan for every Wednesday that is interesting, different, varied and interactive.
- Cater for all abilities, novice to pro
- Make sure we keep a radio focus as much as possible
- Always run events at cost or better at profit

Eric also made the comment about everyone not using call signs anymore.

#### **Business Plan**

- Extend Tea Swindle to snack and cake nights at extra charge.
- Use voluntary donations at subs time and also donations for special projects (a bit like a benevolent fund)
- Hire quality external speakers, not necessarily in radio, charge entrance, hire venue, and have broader range of invited people (relatives, relations, non radio people, other clubs)
- Merchandise: in addition to mugs etc also provide more radio essentials like connectors and coax
- Have weekly small money things like raffle and lucky number square
- Hold a Hamfest twice a year
- Make best use of junk sales and unwanted or donated equipment
- Repeat successful old visits and implement new and further away events
- Keep an informal weekly head count know what is successful
- Spread the word locally and improve awareness
- Accept, nurture, talk to newcomers, make the effort to find out what they want.

Further discussions indicated that most people see this as a social meeting venue that also has radio. It was the interaction side that people come for. Comments on the friendly nature of the club. We spoke about the options of adding a weekly fee and also covering all costs in yearly subs.

## From Bob 'RJS

The brief included 'Funding', 'Objectives' and 'Advertising Material'

This group (chaired by MORJS - members not recorded) decided that funding was the only area worth investigating. The rationale being that without a financially secure future other matters are irrelevant.

Nine headings were discussed; the feasibility of each considered and the potential contribution to increased revenue was estimated.

1 Could a small weekly charge be made to club members who attended the meeting over and above the annual subscription?

This was considered to be impractical due to the difficulty and reliably of collecting the cash.

It was considered to be unfair on the most regular attendees - those usually being the 'doers' in the club and therefore vital to its well being. i.e not the ones to penalise!

This method of collecting cash had been used many years ago and was discarded then due to its lack of efficiency and efficacy.

#### Revenue £0.00

2 A less flexible approach to paying for coffee or tea provided at club meetings. It was believed that some members did not pay for their drinks and quite possibly did not even know that were required to. It was estimated that an extra £2 per week should be generated. **Revenue £100.00** 

3 A raffle of an as yet unspecified nature was considered. This to be open each week to club members only. **Revenue £150.00** 

4 Where costs are involved with any club events (eg VHF NFD or a visiting speaker) that participating members be asked to make a contribution to those costs. Even non -participating members could also be asked. **Revenue £100.00** 

5 Register the club as a charity. (one club member has provided information as to how to set about doing this) It would be possible to recoup 25% of the subscriptions of all tax paying members. **Revenue £100.00** 

6 Club relevant merchandising materials. e.g. mugs, shirts, badges, QSL cards Log Books etc etc to be available to members and sold at a slight profit **Revenue £50.00** 

7 Increase the annual subscription. This was not considered to be desirable or practical at this time. **Revenue £0.00** 

8 Increase the membership. This could be helped by a Committee appointed 'Membership Officer' whose main job would be to persuade members to more actively encourage their Radio Amateur friends to join or in some cases re-join the club. He would promote the concept within the club that acquiring new members is the job of all existing members and not just the usual few dedicated ones who are involved with running courses. It was believed that we should be able to generate 3 more new members net. **Revenue £100.00** 

9 Apply for a National Lottery grant. No revenue was put on this item. **Revenue £00.00** 

#### TOTAL REVENUE IMPROVEMENT £600.00

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## Microwave Workshop at Sheffield by Richard M1RKH

There were over twenty of us who on Saturday 27<sup>th</sup> May descended to Sheffield for a course organized by the UK Microwave Group. The course had been advertised in Scatterpoint, the UK u-wave group Newsletter and in Radcom and was full to the limit of the small classroom booked for us.

The aim of the course was simple - it was a basic introduction to microwaves, concepts, antennas and basic operation, with the emphasis being on showing people some of the easier and more cost effective ways of entering the microwave world. The course lasted all day with plenty of coffee breaks and discussion time. Primarily the majority of attendees were from that area, though some travelled from Portsmouth, Manchester and Telford.

Peter Day G3PHO who is the Chairman of the UKuG (UK microwave group) opened proceedings with an introductory talk about microwaves in general, explaining that this is one area where there are still being many cutting edge developments and also one area where home construction will yield world class results. It's not rocket science and can easily be achieved with moderate construction skills, and there are many kits available on the market from DB6NT and others. eBay is also a good source of components.

Peter Blakeborough G3PYB explained to us how simple parts from old satellite receivers and burglar alarms and traffic detectors could be used to operate at 10GHz for both audio and video. You often see these so called Solfan heads on sale cheaply at rallies. These are essentially Doppler units that operate at 10GHz, using a Gunn diode to do the oscillating. The receiving end is made from old satellite LNB's, modified slightly to bring them into the correct band and when linked with an old analogue Set Top Box can be used to receive and transmit analogue video and voice. The cost of the component parts would easily be in the 20 to 30 pounds range. Many of them falling out of skips. This whole system of wide band FM was once popular in the dark days when the current club microwavers had hair (*...just wotchit—Ed*) but has long been forgotten, it does however make a great entry point into microwave operation and is slowly building up some momentum again.

Barry Chambers G8AGN described how transmitters and receivers fit together in microwaves and the day was rounded off with a talk on antennas from Gordon Fiander G0EWN who described some of the multitude of dishes, horns etc that can be purchased and constructed.

We finished the day on the car park doing some operation with the 10GHz WBFM gear and then departed - a day well spent.

Membership of the UKuG is cheap at £12, and like the G-QRP magazine is great value for money - these are two publications I just love to receive and I always find some great examples of ingenuity amongst the stuff I can't understand. And I guess this is the point - there is so much I don't understand about these areas that I just can't help trying to learn more and more.

A CD was produced with the days proceedings on and many other useful folders of information. If you want one then please drop me an e-mail (if you tell me face to face I will forget).

And one last thing, I am going to try and get a set-up going for wideband FM over the next few months. If anyone wants to join me and build some kit, I'd be grateful of the fellow operators and someone to bounce ideas off. Drop me an e-mail.





(These hair challenged ol' microwavers can still manage a surprise or two ...)

#### Mike's Piece: No. 2

My aerial rotator decided it was going to jam! As usual, there was an opening on 2 mtrs to the south where I haven't had much luck. I could hear everyone else making nice contacts down into Spain etc and I couldn't. Why mention all this? Well, I hadn't done any maintenance on my rotator which had been up for some 15 years. Should I be surprised ? Of course not. We amateurs never seem to do any *maintenance*! So down it had to come and naturally the bolts holding the two halves of the rotator were corroded in. Out with WD40 and the Ronson gas jet. Once inside I found that the lower white metal bearing was binding on the claw that held it in, as the rotor had worn the soft surface down. It was a simple matter to place a greased washer onto the spindle to return it to working order. Naturally, most of the grease had to be replaced on the gears, which had melted off over the years! The cog on the end of the motor had worn badly too, but lifting the rotor had the fortunate effect of raising the cog to an unworn part. So it is all back and working but at the cost of most of a weekend. Chris MØECM and Dave 2EØDCM came round to give me a hand to put the pole, antenna and rotator back up again, which was kind of them.

What am I getting at? Well, we should all consider helping each other get our aerials checked over and sorted out BEFORE they go wrong. Could yours fall on someone or something?

A few years ago, Martyn, G3UKV, decided to check out the 4 mtr yagi we use on NFD. He found that there was corrosion. YOU would be corroded if you'd been out in all weathers for years! He found that there was 50+ ohms resistance at the coaxial connections to the dipole of the yagi for a start off.

Imagine you are getting 50 watts up to the aerial end of the 50 ohm coaxial cable. How much RF current is there? Let's see,  $P = I^2 R$ . so  $P/R = I^2 = 50/50 = 1$ , the square root of which is 1 amp of course. Ah, but we have 5 ohms resistance in the connections. Then what? 1amp at 5 ohms means a 5 volt loss? AND the 5 ohms is in series with the 50 ohm aerial impedance so the SWR will be wrong too. Don't forget that the received signal strength will be less too. This could be disastrous during a contest where every contact counts, especially if you can work the weak ones that other stations cannot hear. Point made, I think.

Whilst my aerial was down I obviously gave it a good going over. Several loose elements on the boom needed tightening up. As usual the bolts were stuck fast. So as not to damage the bolt heads, I gave them all the heat treatment and a drop of WD40 after which they all came loose and were easily re-tightened. All the bird muck was removed as well. The acid in this eats aluminium (and plastic) for breakfast. Have you bought a new antenna? The bird muck problem will not happen if you paint it with two coats of Finni-gans Hammerite *beforehand*.

The self amalgamating tape where the coax connectors join was replaced. If rain gets into the connections or the cable you are in trouble. Talking of the coax, USING CHEAP CABLE IS NOT AN OPTION. You get what you pay for. Good coax has enough braiding so that you cannot see the insulation surrounding the coaxial centre wire. If you can, then some of your precious RF will get out and interference will get in! Buy coax which has foil AND braiding if you can. The more expensive stuff has lower losses too. Here you win twice, because you get more power up to the antenna and you get larger received signals down to the rig. Do unroll your new length of coax carefully. If you pull it off the roll it may kink. Then the centre wire isn't central any more and you will have problems with the SWR. Buying second hand coax can be a bit dodgy unless it is Andrews Heliax or similar hard line, low loss cable. Even if this has been lying about in the open, the foam dielectric won't let the rain in, so you can buy odd lengths at a rally with confidence. Make sure there are no cuts in the plastic outer covering though. Where these cuts are could be where the solid copper outer has been dented, so check it carefully before you buy! Hard line coax is very stiff, so you'll need to join it to the antenna with a metre or so of flexible cable such as Popes 100 (or similar) in order to get your signal nicely round the rotator!

That's about it for this time. Vy 73. Mike G3JKX <u>mjstreetg3jkx@aol.com</u> 01952 299677

**LATE NEWS:** Dave Gourley G0MJY from Kidderminster is our new RSGB Regional Manager (Midlands). He's looking for a deputy manager for our area. Offers ?

Thanks to M0RJS, M1RKH, G0VXG and G3JKX for Newsletter input this time.