

Chelmsford Amateur Radio Society.

NEWSLETTER No.291

April 1990

NEXT MEETING - Aerials for Restricted Sites & Aerials for the Lower Frequencies.

When ever technical topics are discussed by radio amateurs, the all embracing subject of aerials is bound to arise.

On Tuesday 3rd April we will have the opportunity to learn and revise on this topic when Phil Ashton, G3XAP presents his lecture on this most interesting subject.

The meeting starts at 7.30pm at The Marconi College, Arbour Lane, Chelmsford.

DATES FOR YOUR DIARY.

3 April	CLUB MEETING - Aerials for Restricted Sites, G3XAP.
21 April	INTERNATIONAL MARCONI DAY - Organised by the Cornwall Radio Club.
21/22 April	NATIONAL CONVENTION & AMATEUR RADIO EXHIBITION - NEC Birmingham.
28 April	OPEN DAY TO CELEBRATE G0MWT - 10am to 6pm at the QTH of G3PMX/G6HKM.
1 May	CLUB MEETING - Mini-Lectures by G0BDS, G0IPU & G3PMX.

RSGB EXHIBITION at NEC.

Unfortunately our proposal to run a coach to Birmingham on Saturday 21st April has not received sufficient support to make the journey economical compared with going by car.

We now suggest that members going to the exhibition by car and willing to share costs can enter their names on the list provided on the noticeboard at the April club meeting.

PLANNING FOR H.F. FIELD DAY 1990.

The next meeting of the Field Day committee will be held at 7.30pm on 10th April at the QTH of Dick G3WHR. Any member interested in assisting is invited to attend but please inform Dick that you are coming, Tel.(0621)981868.

THE SOCIETY'S CALLSIGN - G0MWT.

As announced last month the President and his wife will hold an open-day at their QTH to commemorate our new callsign and give operators the opportunity to go on air.

The station will be open on a leisurely basis between 10am and 6pm on Saturday 28th April with a constant supply of refreshment provided by willing helpers.

G0MWT is now in regular use on the Tuesday evening Net on 28.325MHz at 8.30pm (local time), we would like to have as many members callsigns in the log as we can achieve so please check in. If you haven't a 10 metre Tx why not call from a friends station?

TWINNING OF CHELMSFORD, ENGLAND WITH BACKNANG, WEST GERMANY.

As anticipated in the last Newsletter, contact has been established with Peter Uhrich, DK7SP on 3.74MHz, plus or minus any QRM; so far the contacts have been very good. For any member with 80 metres, the sked is held every Sunday at the new time 20.30 UTC.

According to reports in the local press, the celebrations to mark the twinning of Chelmsford with Backnang will be in the form of various festivities during the week 23rd to 29th April. At this time we are not sure if our Society is included in the official festivities, however, we will announce any developments at the April club meeting.

In any case, our G0MWT open-day conveniently coincides with the festival dates and we have already arranged with DK7SP to have QSO's during the day.

LAST MONTHS MEETING - 160M Direction Finding - Andrew G4KQE.

Dick G3WHR introduced his talk by saying that it is 10 years since we last had a lecture on Direction Finding, by the late Eric Mollart who was the RSGB organiser of National DF events.

Dick said this talk would not deal with the technical side of DF, e.g. building equipment, as that was well documented elsewhere, but that he would stick to the "doing" aspects. The overhead projector slides Dick had prepared showed the basic concept of DF; that is competitors take bearings on a hidden station and plot them on a map, then drive to where they think the transmitter hidden. DF however is similar to golf, sometimes the going is easy, but occasionally competitors end up in "the rough", by having to scramble through blackthorne thickets or wade through streams. One golden rule of DF is never believe what other competitors say or do! as that could easily lead you astray.

To demonstrate DF in action, we saw a video film made in 1981 by the Dartford Heath Group. This showed the transmitter and aerials being set up and the competitors assembling at the start to take their first bearing. The film followed the contestants throughout the afternoon, taking and plotting other bearings and arriving "on site". Several familiar faces of club members were seen thrashing through the undergrowth and climbing over logs in a river. The Dartford Heath events are held around the Medway Estuary, which tends to be a bit muddy, but Dick assured us that local events are not so difficult as Nationals.

(continued)

LAST MONTHS MEETING (continued).

After the film Dick described some of the tactics employed by the hidden operators to "keep them out as long as possible". First of all is to choose the site (or sites), be it in a wood, on a river bank or any other devious location. DF competitors have a tendency to follow aerials, so if one or two dummy pieces of wire can be put up it helps.

The aerial system itself can assist in the deception if a quarter wave is put up on its own, the competitors will find the transmitter very quickly. Earth stakes and tee-ing in to the main piece of wire really distorts the radiation pattern and can easily cause competitors to run away from the TX when they think the stronger signal is coming from an earth stake.

Hiding in a non-obvious place can cause confusion e.g. in a hollow tree as in a local event. Most competitors were "on site" by about 8.10pm but no-one found the TX before the finish at 9.00pm! The operators sometimes are not all they seem, as sometimes 'Fred', a tailors dummy, sits in a bush by an earth stake with a DF set receiver!

The local events run by Chelmsford and Colchester are usually fairly straight forward but when the National Qualifying events are arranged, all the devious tactics in the book are used. Dick had put a diagram on the notice board of the station he ran for the National Final two years ago. The station was hidden on an old railway track with culverts underneath. The aerial system consisted of many 'tee-in', earth stakes and dummy wires. "Fred" was hidden in one culvert with a DF receiver and caught a few competitors.

An important part of the hidden station's equipment is the ATU, which must be able to tune anything, and Dick showed us his home brew ATU, which has been used many times.

Turning to the "hunting" side, the basic requirements are a DF set with lightweight headphones, a map and a damped compass - not forgetting to differentiate between magnetic and grid North. The DF set must have a "sense" aerial to determine the direction as well as the bearing, otherwise the bearing could be 180 degrees out.

There are several proven designs for DF sets, and a list of parts and p.c.b are available. A good design appeared in a 1984 P.W. using the TAD100 receiver chip also a new design around the Hitachi TCA440 has been developed.

When hunting it is not a good idea to wear your best clothes or shorts, because you never know how many bushes you may have to crawl through. Several competitors wear hardwearing boiler suits, which being all in one and tear resistant are ideal for 'bush beating'. For an initial introduction to DF it is probably best to team up with a competitor on a local event in order to learn the ropes.

After the tea break, Dick explained that throughout the summer, local events are held every other week and trophies for best performance are awarded at the end of the season. A joint "Mid-Essex Trophy" is held in the autumn, which is a 2 station event. National qualifying events are held throughout the country on Sunday afternoons, at which two winners qualify for the National Final, which is a 3 station event at the end of season.

To finish the evening, Dick showed a video film of "Foxhunting" in China, which is more like orienteering than our DF. Competitors were obviously very fit and there was a lot of running (in short's) involved. The event was heavily scrutinised and there seemed to be more judges than competitors.

Our Top Band DF seems far less energetic in comparison and is more like Radio Amateurs running than Athletes trying to use radios.

Our thanks go to Dick for a very interesting and humorous evening and if anyone would like to have a go at either hiding or competing, then I'm sure he would be pleased to put you on the right lines.

DF NEWS - Dick G3WHR.

The 1990 DF season starts this month with four events to participate in.

1 April	RSGB GT Peck.	6 April	Colchester.
20 April	Chelmsford.	22 April	RSGB Northampton.

I've made some more copies of the Mid-Thames Mk.5 DF Receiver, so if you missed out at the last meeting - see me for a copy.

If you would like first hand experience of DF then just turn up at the start, a working torch would be a useful accessory for the first local event.

All Chelmsford Events start Tiptree Heath NGR 884184.

All Colchester Events start Fordham Heath NGR 945264.

Local events start at 7.30pm and end at 9.00pm (or later if nobody can find the hidden station). See you at the start.

INTERNATIONAL MARCONI DAY 1990.

Following the success of last years event, there will be another IMD between 00.01 and 23.59 UTC. on 21st April. Stations that will be active on 3.5 to 50MHZ are:- K1VV/IMD, VE1IMD, VO1IMD, EI2IMD, IY4FGM, GB0IMD, GB4IMD, GB2IMD, IY0TCI, IY1YTM, ZS6RSA, DA0IMD, GB2MDI, GB4MDI and one from France whose callsign is to be announced.

There are more stations taking part this year and all have a Marconi connection or are located at sites used by Marconi and his associates many years ago. There are prestigious awards for transmitters and SWL's. . . . more details on the noticeboard at the meeting.

SPECIAL EVENT STATION GB4CMD, 25th March 1990 - Richard G4ICP.

A few weeks ago, Gwyn G4FKH and I took up the challenge to organise and run a special event HF SSB station for the Cuton Mill District Brownies and Guides on the occasion of their annual "Thinking Day".

The station was set up in the Springfield Scout Hut at Lawn Lane, and we were fortunate that quite a few CARS members arrived early to assist with the aerial rigging. Some then stayed on to assist with the operating etc., and this was a great help.

In addition to our station one of the Guide Leaders had arranged for a 2m FM station to operate, which consisted of a Kenwood 50W mobile rig coupled to a Slim Jim. Many good contacts were made, including some with club members.

Meanwhile on HF, using my trusty old FT101Z, we were working all around the UK on 40M including some other special event "Thinking Day" stations. QRM forced us down to 80M where the quieter band was more suitable for our activities which included letting the girls talk on-air and pass their greetings messages. Most of them used "scripts" that they had prepared so helping them while speaking into the microphone.

Although we didn't work a large quantity of stations, we did have some very good quality contacts. One "Thinking Day" QSO lasted for well over 30 minutes, as there were so many Guides and Brownies who had messages to pass.

Outside our operating room the Guide leaders had arranged pictorial displays of different sorts of radio communication, including quite a lot on Amateur Radio.

There was a good attendance, including quite a few parents. Andrew G4KQE, even managed to get his picture in the Essex Chronicle!

It was nice to know that as representatives of the Chelmsford Amateur Radio Society, our efforts helped a lot of Guides and Brownies pass their radio communication badge - a fine achievement.

Was it worth it? Yes it was (even though I had to scrub the microphone afterwards to remove the sticky fingermarks!).

PACKET RADIO - A special request.

During our 80 metre contacts with DK7SP on the Chelmsford/Backnang net, Peter has requested the facility to send a message to our Society noticeboard via the European Packet Network.

Can any member help us to further this request? Presumably the message will have to be sent to a local packet mailbox for interception, if so, what is its callsign?

Any information on this matter should be addressed to Roy, G3PMX to pass on to DK7SP or even better join in on the net and discuss the technicalities directly with Peter.

COMMITTEE MEETING.

The April Committee Meeting will be held in the Telford Lodge (Marconi College Residence) at 7:30pm on Wednesday, 11th April. You are most welcome to join us.

73 from Roy & Ela Martyr, G3PMX & G6HKM
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REMINDER!

CONSTRUCTORS' COMPETITION - 5th June.

FOR THIS MONTHS TECHNICAL SUPPLEMENT - Turn to page 4.

THE MODIFIED "ALL H.F. SPECIAL" - G4FKH/G0LSY.

This is an updated design to the one appearing in our newsletter a couple of years ago. No originality is claimed by either of the authors for the theory or the techniques. However the results have been quite spectacular and pleasing.

Figure (1) represents the basic aerial and figure (2) a version for the Radio Amateur with a smaller garden. The common factors are the use of open line feeders and the 1:1 balun. John G0LSY has done all the hard work with the balun devices. Figures (3) and (4) show the construction which is detailed here:-

Three 19" long 1.4mm cu enamelled wires are made straight and laid side by side to form the trifilar, over this are pushed 23 P.T.F.E. sleeves, I/D 3.0mm, O/D 4.0mm x 11.0mm long. These are equally spaced along the trifilar leaving 25mm unsleeved at each end. The assembly is then laid on a flat surface and flattened with a roller to ensure the wires lay side by side. This assembly is then carefully wound on a pair of neosid toroids type 28-041-28 ferrite grade B, $\mu_i=1200$ min, $f=100$ KHz to 500 KHz, giving a total of 9 complete turns. This is then connected as figure (4).

Adjustment and Test Results.

The balanced output was terminated with a 51 ohm load and the assembly put on a swept display using the following equipment - Hewlett Packard 8620C Sweep Oscillator with 86222B RF Plug-in 0.01 - 2.4 Ghz. Pacific measurements 103B Amplitude Measurement System. Wiltron VSWR Bridge 5-2000Mhz, directivity 40db. It was found that optimum return loss over the band on display could be obtained by adjusting the spacing between adjacent turns on the toroids, giving the following results:-

F.Mhz.	10	20	30	40	50	Load Condition.
R.L. dB	30.6	26.0	23.0	20.0	18.0	} Balanced output } Terminated 51 ohms.
VSWR	1.06	1.1	1.15	1.22	1.28	
R.L. dB	0.2	0.25	0.3	0.5	0.7	} Balanced output } open circuit.
I.L. dB	0.1	0.12	0.15	0.25	0.35	

Note the balanced output open circuit state, which, assuming phase cancellation on the returning wave, shows the device to have very low insertion loss up to 50 Mhz. Several 1:1 bifilar baluns were constructed as described for the trifilar arrangement, but tests showed the VSWR bandwidth slightly less and the insertion loss slightly higher than the trifilar type. This was probably due to bifilar line being longer (28") than the trifilar (19"). It is also easier to electrically repeat another trifilar unit than a bifilar unit. So it was chosen for further tests on power.

In the shortened version of the aerial the length is decreased by winding as many turns as possible onto 3 ferrite rods that have been taped together. The exact frequency is then determined by lengthening or shortening the small section following the coils.

Performance Results

Both versions of the aerial have been used for some years now. A decent ATU is required for this type of aerial, and also helps with interference problems. The results with this new balun manifest themselves in two ways (a) a better match at the transmitter end and (b) general signal strength reports being 2 S-units higher. It has been used successfully both for dxing and local work. A further important benefit of the type of aerial is that with the overall symmetry BCI and TVI are kept to the absolute minimum. John has kindly indicated that he will produce the balun's for club members at a cost of £3.00 each, the proceeds going to the rig fund.

