



Chelmsford Amateur Radio Society

Established 1936

Affiliated to the RSGB
President: Harry Heap G5HF
Secretary: George Farr G3UTC

Club Call Sign: G0MWT
Chairman: John Bowen G8DET
Treasurer: Brian Thwaites G3CVI

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May 2004

This Month's Meeting BBC World Service Transmitters and DRM by Simon Gosby of the BBC Tuesday May 4th. at 7-30pm at the MASC Beehive Lane

It's not so much as what you know in this life but who you know and Trevor M5AKA has been instrumental in persuading **Simon Gosby** to come and talk to us about his work. Simon is the **Project Manager of Transmission Services for the BBC World Service**. His presentation is in two parts and the first part is about the transmitters that carry the BBC World Service. The talk will be illustrated with pictures of these transmitters and the transmission sites. Come along and see what a Balun for a one megawatt transmitter on 6MHz looks like – it's big – and how the BBC distributes it's programs around the world.

Digital TV is now with us and will replace the existing service in the future but it is not generally known that AM sound transmissions will eventually be replaced by a digital system. The new digital system DRM, for short, is designed for use on the long, medium and short waves and will provide near FM quality sound broadcasting. The really clever part is that the 9 kHz channelling can be retained. Sounds too good to be true! Simon will demonstrate the dramatic difference between the existing AM system and DRM transmissions with a number of recordings. The concepts of DRM will be explained in a simple easy to understand fashion and it all adds up to a very interesting evening.

As usual we will be having our raffle. Colin G0TRM will be choosing the prizes and I, together with Jim 2E0JPS will be selling the tickets. Please support us in our battle against ever rising costs!

Dates for Your Diary

May 4	CARS Mtg. MASC 7-30pm, Talk by Simon Gosby.
May 10	Waters & Stanton Open Evening. See below.
May 12	CARS Committee Mtg. Danbury Village Hall 7-30pm.
May 30	Waters & Stanton Open Day.
June 1	CARS Mtg. MASC 7-30pm. Constructors Competition.

The Club Net Controllers

May - David M0BQC June – Chris G0IPU

Waters & Stanton Open Evening

Have you reserved your place at the Open Evening on Monday 10th. May. This is an event for local Club members. W & S would like some idea of numbers so contact John G8DET on 01245-224677.

Congratulations!

Congratulations to all the following who passed the Foundation Course exam on the 15th. March: Stephen Potter, Vincent Frostick, Steve Hall, Scott Davis (12), Mathew Davis (14), Mrs. Myra Davis, Douglas Knowles, John Reynolds, Tony King, Glenys Anthony, Vic Anthony, Derek Vanstone and Wayne Knapp.

CARS meets at 7-30 pm on the first Tuesday of the month at the MASC, Beehive Lane, Chelmsford.

For details contact our Secretary: George G3UTC on 01277-622707.

Club Nets: Tuesdays 8-30pm: (2nd) 145.375 : (3rd) 1.947 : (4th) 1.947 : (5th) 145.375. All +/- QRM.

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Please advise changes of address to Geoff G7KLV.

Last Month's Meeting. Amateur Radio Aerials by Tony Gilbey, G4YTG.

Tony started off by saying that he wanted to explain what we have got to do (as radio amateurs) to get aerials working, because we cannot do what the professionals do. Professionals all use aerials that are the correct height, the correct length and in clear space, but unfortunately this is not always the case for radio amateurs. Also, radio amateurs often have only a few aerials, which need to cover the entire frequency range over which they need to operate, while professional aerials are usually specific to a single job (i.e. a single frequency).

The professionals DO have to compromise at very low frequencies though. For a half-wave dipole, the following length aerials are required.

Freq. MHz	Length ft.
160	3
16	30
1.6	300
0.16	3000

An aerial of 3000 ft is obviously not practical even for professionals, so they need to do something about it. In the VLF business, you have to have very big aerials which still don't work.

Tony then spoke about the Rugby aerial. This consists of twelve 820 ft vertical masts (the aerial is arranged horizontally, supported by these masts), and is still not big enough. A quarter wavelength aerial could be used, and if this has a good earth then there is an 'image' of it underneath. This halves the length of the aerial (although this is still 1500 ft for 0.16 MHz!).

A coil could be added at the bottom of the antenna. All the current will now be in this coil and this is quite nasty. A 'top' could therefore be added to the top of the vertical part of the antenna. The current will then run up the vertical part of the aerial. This looks to the transmitter like a tuned circuit and like a long aerial. This is exactly how the Rugby antenna works. The top part of the antenna is three miles round although it is the only vertical part that acts as the aerial! The coil at Rugby is 16 ft diameter and about 20 turns. There is 600 to 900 amps of current going up the aerial. See Fig. 1 on the accompanying JPG file.

Tony then stated that there is NO SUCH THING as aerial gain. If you put a watt into an aerial, you can't radiate any more than a watt. There IS aerial directivity however. Looking at the end of the wire, the radiation pattern is virtually circular. From the top though, this is a figure-of-eight shape: In 3D this would look like a doughnut. Due to my lack of drawing skills I won't even attempt to draw a doughnut! By the way, it is the sort with a hole in the middle, not jam! See Fig. 2.

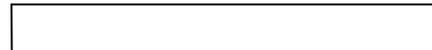
Then Tony went on to the quarter wave line. If you put a short circuit at the far end of a quarter wave line you see an open circuit at the near end, as shown. A C at one end looks like an L at the other end and so on.

Quarter wave line

A short circuit at the far end looks like an open circuit at the near end



An open circuit at the far end looks like a short circuit at the near end



An L at the far end looks like a C at the near end



A C at the far end looks like an L at the near end



Next, Tony discussed what we want from an antenna.

We want it to tune, to radiate, to (ideally) have space around it and to be up high. A 10m aerial ideally needs to be 10m high. If the aerial is much lower, only a very small amount of power is going out (rather than up). As wavelength increases however, so does ideal height.

Wavelength	Height
10m	16ft
20m	32ft
40m	64ft
80m	65 to 97ft

Tony then described the various antenna types:

J-Pole Half wavelength, energised at the bottom. As it's high impedance at the bottom it is short circuit. A little way up is a 50 ohm position onto which a feeder can be attached. Can be used at any frequency.

Slim-Jim A J-Pole with another section on the top. Used to be popular, not so much these days.

Ground Plane Widely used on UHF. Can be used on HF but will obviously be much bigger. Consists of a quarter wave vertical element, with quarter wave horizontal elements, giving an effective earth, and providing an 'image' underneath. Therefore looks like a half wave dipole.

Collinear Sets of half wave aerials set so that the radiating bits are all the same phase. A capacitor or inductor of the right size can be used to achieve this. 5/8 aerials can also be used to make up the collinear, as the connections will be a quarter of a wave apart. Some broadcasters use 5/8 collinears. As amateurs, VHF and UHF antennas are very good. They can be made high enough, the correct length, and aren't compromised.

Inverted Vee A half wave dipole with a high point in the middle (i.e. on a chimney) and low points at the ends. Horizontal lobes from one direction, vertical from the other. This does not matter for HF though, as polarisation is 'random' when it reflects off the ionosphere.

Trapped Antennas Antenna will be the right size for the lowest frequency to be used, and a tuned trap (which tunes to another frequency). This trap will not affect the lowest frequency. The trap can be one of various types (e.g. a coil and a condenser).

Yagi Uses a director, a radiating element and a reflector. Signal from reflector adds to signal from antenna. Can be used on HF but will be quite big (e.g. a 10m antenna for 14 MHz operation)

Multiband Windom Lots of these being used these days, one is called the 'Carolina Windom' for example.

For an 80m dipole (132 ft long) on the ends it is high impedance (i.e. volts and no current), and in the middle it is low impedance (i.e. no voltage, only current). Using the same dipole for 40m, 20m and 10m, the impedance changes between low and high a number of times along the antenna. There is a point at about 300 ohms, 47 ft along the line. A transformer can be used at this point that will enable the aerial to be fed with 50 ohms. The antenna should now work on 80m, 40m, 20m and 10m. See Fig. 3.

Loops Loop antennas are almost purely amateur. Very high current flows around the loop and there is a high voltage at the top. A very good capacitor is needed at the top to tune it. The pattern from straight ahead is a figure of eight pattern. As you go up from horizontal then the pattern begins to fill in. At 15 degrees (a good 'take-off' angle for dx working) you are alleged to have an all round pattern. These antennas are certainly very good for receiving, but Tony mentioned that he hadn't had much luck transmitting from one.

G5RV Tony's first comment about this was that "it doesn't tune to anything hardly, and is a mismatch on nearly all the bands". A very popular antenna. It was designed to be good on 14MHz, but to be usable on other bands. It has a 51ft top, and a length of feeder running down from it. On 80m, impedance matching isn't quite down to 50 ohms. On 40m though, there are two quite reasonable antennas which are fed in phase, so it is quite a good antenna. On 20m it all works very nicely, you have three half waves - two in phase and one out of phase, producing a 6 lobe system, three out either side. Pattern is almost circular on 20m. On 17m it is not far different to what it is on 20m. On 15m, it appears to be quite good, but it is in fact a pain! It has a very high resistance load.

Quad This is a dipole over a dipole, so you get the 'gain' (horrible word) from using a quad element, and they are of course smaller.

Discone Tony said that he had written an article for Practical Wireless about a 'Chicken Wire Discone'. This was printed in the magazine (although the chicken pictures that Tony had included around the text were removed for the magazine!).

The 'Chicken Wire' discone consists of a semi-circle of chicken wire wrapped into a cone. At the point of this (where the feeder goes) there is an insulator and a disk. The RF signal goes into the antenna and goes along the taper until it 'tunes' to the frequency. This antenna has a vswr of better than 1.2 to 1 over 75MHz to 800MHz, so it can be used on the 2m and 70cm bands.

Log Periodic This consists of a feeder going into a number of half-wave dipoles, decreasing in size by a log law. The signal will go along the feeder until it finds an element that is the correct size (i.e. half wave). The elements either side of this will act as a director and a reflector. Therefore there is an 'apparent' three element beam. The Log Periodic therefore has a wide frequency band, as the signal finds its own dipole.

Kite Antenna's Tony then spoke about flying antennas on kites. He often gets the response "your signal's gone down by about 10dB" before realising his antenna is on the ground! Conversely, he also gets the response "it feels like your antenna is hanging over my shack, because all of my meters are right over to the right". For an antenna man, flying kites is absolutely marvellous. Every antenna has to be tuned up, but for a kite it always tunes properly (providing the length of the dipole is correct) as there are no masts or earths near to it. Kite antennas work very well because you have a height advantage, and the clear air around it.

The first question to be asked was "how can I get a 132ft long wire into my garden?". Tony's response was to use traps, to use an antenna tuner, to use a good earth (e.g. chicken wire under the lawn). The next question was "what are the optimum height and angle for an inverted vee antenna?". Tony stated that the optimum height is "as high as you can get it", and the optimum angle of each element is 45 degrees to the horizontal.

Overall this was a very interesting talk, prepared by Tony at fairly short notice. Thanks Tony.

Report by Jim 2E0JPS.

Donald Imber G0VIS - Silent Key. An Obituary by Charles G0GJS

I first met Donald some five years ago in Liverpool at the AGM of the Radio Officers' Association. He was most enthusiastic and knowledgeable concerning the history of maritime communications which integrated well with his interests in amateur radio, indeed his amateur callsign which he had carefully selected reflected the QSOs that he had made with the Sydney Maritime Communications Centre as a Radio Officer aboard merchant navy ships - 'VIS'.

We were most fortunate at CARS when he joined us and made the monthly drive from Sible Hedingham to our Club meetings. He was very supportive and in February 2002 at quite short notice gave one of the best talks that we have had in recent years. Full of interest concerning the progress of Marconi maritime designs from the early years to the sixties, he had a wealth of slides and data which, delivered with dry wit and personal reminiscences of his career at sea, took us well into the evening as he dealt with the many follow-up questions. The talk was recorded and is in the safe keeping of Colin Page G0TRM.

Donald enrolled at the Norwood Technical College, London in 1961 at the age of 18 and completed a two-year course to obtain his qualifications and 'ticket' for maritime R/O duties before joining Marconi Marine. Cayzer, Irvine & Co, a shipping company later employed him. When he left the sea, Donald joined Government service as a Radio Engineer and for twenty years was with the Metropolitan Police where he was at the 'sharp end' of systems engineering.

His hobbies and interests were extensive. He was a keen archaeologist and took part in 'digs' in the Southwark area. A number of his works have been published. As an archivist, he had a major interest in Marconi; during his time with the Police Service he collected a significant amount of historical data which he passed on to the 'Met' when he retired. DIY was a very significant skill which he possessed and his local church and villagers were among the beneficiaries.

At his home Donald was creating in microcosm format a cameo consisting of a series of ships' Marconi Radio Rooms. These cover the periods of the spark era in the 1920s' through to the valved equipment in service in the 50/60s and comprise some original equipment, some refurbished and other items, which he had faithfully reproduced including a large 20s' vintage wall mounted ATU. His exhibits also featured auto call and auto alarm units.

Above all, Donald was much concerned with the well being of his family and friends. I consider myself very privileged to have known him.

The Constructor's Competition

As is our long standing custom, the June meeting is the occasion of the Constructor's Competition. I'm afraid this is rather short notice. Had the Editors been fully on-the-ball they would have reminded us before. Anyway, this Editor offers his apologies!

This is a fairly light hearted affair and usually attracts a wide range of entries. There are money prizes and a 'First Time Entry' prize. The judges are yourselves so it is openly democratic!

For those unacquainted with the procedure we would remind you to label your exhibit with its purpose and any relevant data or what have you. Be prepared to give a brief description of your masterpiece to the meeting. Voting papers are provided and the results will be announced after the refreshment break.

Bear in mind that we don't expect a home built transceiver (go on, surprise us!) and often the very simple entries win the prizes! Have a go and good luck!

More on the 'Antenna Toolkit' by Geoff G7KLV

In my short review of this book by the late Joe Carr I was unable to do it justice because the CD was missing from the Library copy. A few days later Simon Wilton G7HCD emailed me, offering me a copy. So, thank you Simon, I will try and finish what I started! The trouble is that I've now returned the book and the programs refer back to chapters in the book! However, I'll try and borrow the book again and report back later.

For Sale

Yaesu FT1500M 2M FM Transceiver.5/10/25/50W. Never used as mobile, only used for packet, orig box, mans, mic, leads etc, kpc3+ bsx tnc leads leads, immac condx, £105.

Kenwood PS31 22.5A 13.8 V DC power supply, manual vgc, £75.

Contact Dick G4DJC Tel: 01245-256416.