CPREC

G2LW

Palace Pulse

The newsletter of the

Crystal Palace Radio & Electronics Club

Affiliated to the Radio Society of Great Britain

Established January 1956

Meetings are held on the first Friday of each month.
The room opens at 7:30pm for an 8pm start at:
All Saints Parish Church,
Beulah Hill, London, SE19 3LG
(opposite the junction with Grange Road).
Visitors are always welcome.

Web sites:	Club Admin:	http://cprec.btck.co.uk/
	Club Technical:	http://cprec.btck.co.uk/OurTechnicalSite
Email:	cprec.g2lw@gmail.com	
Club Net:	Each Wednesday at 20:00 on FM on 145.525MHz (S21) ± QRM Experimental net each Saturday at 20:00 on FM on 51.55MHz	
Twitter	@BobFBurns or www.twitter.com/bobfburns	

Next meeting: Friday 3rd May 2019

CW Evening and Pixie Test and Maintenance

In this issue: *Future Meetings & Events, Recent Event News, * by Theorist, Technical Snippets, Members News, Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, Local Training Courses and Club Contact Information.*

See the last page for club contact information

Dear Reader

Future 2019 Club Meetings and Events

03 May	M	CW Evening and Pixie Test & Maintenance
11/12 May	E	Mills on the Air
07 Jun	M	On Air HF Noise Reduction Systems by John G8MNY
05 Jul	M	Railway Semaphores – Jim M0JFL
02 Aug	M	Summer Social and On the Air
06 Sep	M	Power Systems – Paul Dyer - TBC
04 Oct	M	Practical Fault Finding – Martin Butler - TBC
01 Nov		TBA
06 Dec	M	Christmas Social

C = Contest, CM = Committee meeting, E = External event, M = club meeting, R = Rally, T = Training course, V = Visit.

03 May 2019 - CW Evening and Pixie Test and Maintenance

The next meeting will be an opportunity for members to complete the construction of their Pixie transceivers and test them out. Running them into dummy loads will also enable them to be used to communicate across the room using Morse.

Please bring some tools if you need to complete the construction of your Pixie.

Two transmitter filters were published in the last two newsletters and one of these or something similar should be used with your Pixie in order to minimise spurious harmonic radiation.

11/12 May 2019 - Mills on the Air

The plan is to meet on site at 9am on Saturday 11 May to get the station and aerials erected and on the air. We can park the cars onsite to unload and then move them to an adjacent lane for the rest of the day. The address is Keston Mill, 126 Heathfield Rd, Bromley, Keston BR2 6BF.

Keston Windmill is a grade I listed Post mill in Keston, formerly in Kent and now in the London Borough of Bromley. The mill was built in 1716 and is conserved with its machinery intact but not in working order.

Two stations will be in operation - HF SSB/CW and VHF FM/SSB with separate power supplies and the callsign will be GB2KM. The HF aerial will be the club's HF dipole with the top set for 80m and open wire feeder running down the outside of the mill and into the radio shack to the Z-Match. The VHF aerial will be a three band colinear fed with an extended length of 50ohm coaxial cable. Headphones will be in use with the option to activate a loudspeaker or use additional headphones for visitors to listen to contacts.

The radio station will be placed in the room at the base of the mill called the Roundhouse. A mains supply will be provided from the main house via an extension cable but we have to rig our own lights as there none in the radio room. We will be keeping a record on site of the best contacts made on a white board.

If you can offer some help and have not already done so please contact our Secretary Alan as soon as possible. Foundation licencees may operate the station as there will be a an advanced licence holder on site at all times.

The Roundhouse:

Recent Event News

05 April 2019 - Construction Evening - Pixie QRP Transceiver

April's club night was a construction evening with members busy building the Pixie 40m CW transceiver.

Ten kits were purchased with eight taken during this meeting and two reserved for members unable to attend.

Gareth G4XAT finished his Pixie and it was powered up using Alan's power supply. It started "motor boating" when we turned up the voltage - apparently Damien said they need to be powered by battery. Gareth said he would take it home and put it on the 'scope to see if there was any construction mistakes.

Damien brought his Pixie in which was working but when we tried it on his "new" battery pack it didn't work. It turned out that the battery was flat, only measuring around 5 volts. Damien had scavenged the Ni-Cad batteries from some emergency lighting packs that were thrown out from work. Not surprisingly the batteries couldn't hold a charge and had probably been lying around for years.

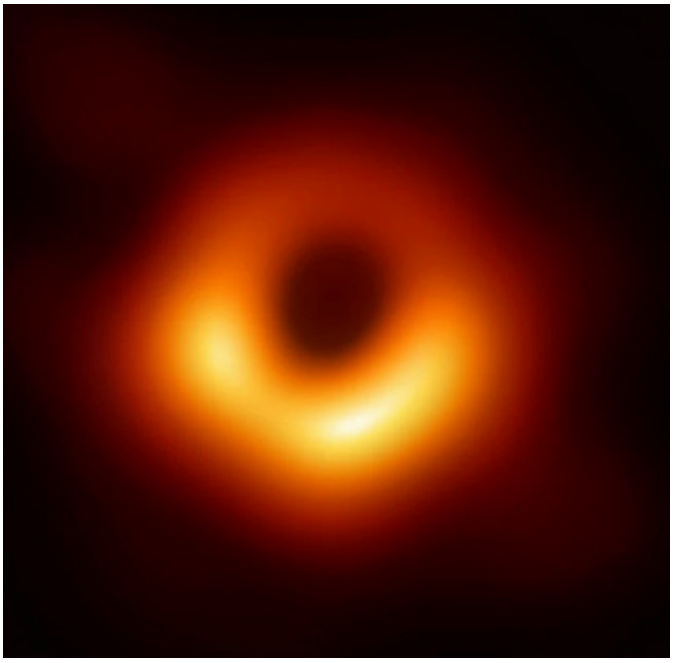
[You should always keep Nicad batteries charged, if left flat they degrade quickly and will not retain a charge - Ed]

The two remaining Pixies left were actually reserved for two club members and Alan will be writing to both to see if they still want the kits.

* by 'Theorist'

There was a lot of media excitement about the first picture of a black hole a few weeks ago (replicated nearby), and a lot of misleading facts and figures were bandied about in the media, but as usual real detail was missing. For example few reports noted that the image was produced by radio telescopes and processed to give

something a human can look at. The point of the operation was to test the General Theory of Relativity, and to give final proof of the existence of black holes. Most theoretical physicists probably hoped that the image would not be quite what was predicted, as that would offer new clues about the nature of black holes.



The technique used was VLBI or Very Long Baseline Interferometry. Interferometry is the general name given to a number of slightly different techniques whereby signals (usually from electromagnetic waves, but they can be from other forms) observed by at least three separated detectors/telescopes are combined to produce a single image or set of images. The effect is to produce images with the resolution of a single telescope with a diameter equivalent to the distance between the telescopes. The snag is that exact timing and synchronisation of the signals is necessary, only achievable with atomic clocks. However the longer the wavelengths used in interferometry the more 'wiggle room' there is for error in the timing, so images at radio wavelengths are very much easier to produce than those at visible wavelengths.

A modern realisation is that galaxies contain a large black hole at their centre. In the case of the Milky Way galaxy (i.e. our own) there is a black hole with a mass about 4 million solar masses known as Sag A*. The galaxy that contains the black hole where the observations were made is called M87, aka NGC 4486 in new money, and the black hole itself is denoted as M87* - an asterisk is now conventionally used to denote black holes. It has a mass of about 6 billion times that of the Sun and has recently been given the unofficial name of Pōwehi, which in Hawaiian apparently means 'embellished dark source of unending creation'. How such a short word contains so much information is a puzzle worthy of Claude Shannon. Be careful how you order breakfast in Hawaii.

For M87* eight radio telescopes around the world were used giving an effective baseline the diameter of the Earth. Collectively these eight are known as the Event Horizon Telescope or EHT. The teams involved needed five good nights of continuous observations with no problems with weather or any failures from all eight instruments or the recording devices. The exact time the signals were recorded had to be known - in this case the synchronisation in timing of the signals between the telescopes had to be better than one millionth of a millionth of a second. In other words eight telescopes recording signals from the same area of sky without interruption with that precision of timing for the five night period.

Over 5 million GBs of data were ultimately collected and stored on special HDDs which were Helium filled. There is a problem with the operation of normal HDDs at altitude due to heat build-up, and Helium alleviates this problem. Ultimately this huge amount of data all had to be processed and combined to produce the final image. The maths is complicated and I have never investigated the exact details. I do know that the whole thing was an outstanding technical triumph, and the subject of an excellent BBC documentary which should still be on i-player when the newsletter goes out.

What exactly though are we looking at? Essentially black holes attract a disk of rotating/orbiting matter called an accretion disk - think of something like the rings of Saturn, but with the matter orbiting extremely fast and becoming heated to millions of degrees through collisions. Black holes have something called an event horizon around them (hence the name of the telescope) which is the region from which nothing can escape, ignoring a twist discovered by Hawking. Because the black hole distorts the space-time around itself, if the accretion disk is seen edgewise on then the back of the disk will appear twice, forming a circle around the object, as in the artists impression nearby.

Because part of the disk will be moving rapidly away from us, and part will be moving rapidly towards us, there will be a Doppler shift in the frequency of the light seen. This is indicated in the processed image by the brighter part of the ring representing the higher frequency radio waves.

The black area at the centre is actually 2.6 times the radius of the **black hole's event horizon** and contains an image of the entire surface of the hole. In fact as you move to the edge of the black circular area you are actually seeing an infinite number of images of the whole event horizon surface as increasingly thin annular rings. There is an outstanding video explaining all this at https://www.youtube.com/watch?v=zUyH3XhpLTo which I cannot recommend highly enough.

The EHT was not the only instrument looking at M87* in April 17; NASA's Chandra X-ray Observatory was taking

a much wider view of the same region at the same time, and the results are shown nearby.

The 1,000 light-year long plume going out at 5 o'clock is a jet of intensely hot material, emanating from near the black hole which you might just be able to make out in the brightest area of the picture. The centre of M87 is a Quasar, an active galactic centre powered by the black hole, but that is another story.

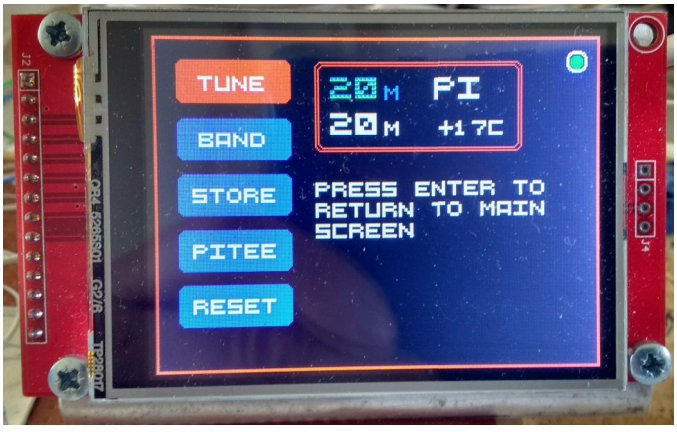
[A light year is the distance travelled by light in one year and is approximately 5,878,612,843,200 or 5.8786 x 10^{12} miles so the 1000 light year long plume in the above photo is actually 5,878,612,843,200,000 or 5.8786 x 10^{15} miles long - Ed].

Members News

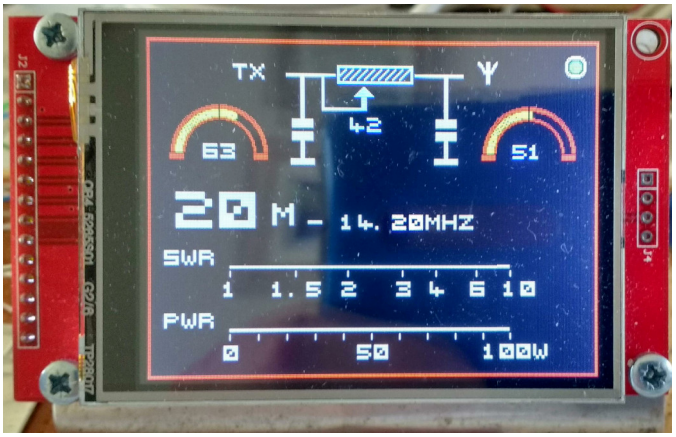
a) Our Secretary Alan G8NKM is developing a remotely controled aerial matching unit (AMU). It consists of a control and display unit located in the shack and the matching unit located at the end of the aerial and connected back to the control unit with a four wire cable - two for power and two for I2C control signals.

The AMU uses a matching circuit that may be switched between Pi or Tee formats, an Arduino processor for communications and control, two stepper motors for control of the two variable capacitors and a set of relays for inductor and matching format selection.

The control unit uses an ARM processor and backlit graphical LCD, three rotary encoder tuning controls and an extra control to select the various tuning functions.



The prototype units are working and Alan is now designing in some protection functions, screening and general mechanics. The display unit screen views are shown below. The first one shows the operational screen containing an image represnting the T or Pi in use, the band, transmit SWR and power.



The second shows the configuration screen where you can select the Tee/Pi format and a number of command functions.

The Tee or Pi matching networks are unbalanced so if open wire feeders are to be employed then a wideband balun (balanced to unbalanced transformer) will be required rated for the chosen transmitter power.

Technical Snippets

a) TSMC: Taiwan Semiconductor Manufacturing Co. Ltd. (Hsinchu, Taiwan) has announced the completion of the process design of its 5nm FinFET infrastructure within its so called Open Innovation Platform and that process is now available for customer protypes." [Source eeNews].

5nm is 5 X 10^{-9} or 5 thousand millionths of a metre. A human hair is approximately 80,000 - 100,000nm (nanometers) wide.

b) Icom have just announced the IC9700 multimode SDR VHF/UHF transceiver that uses direct digital sampling on the 144 and 432MHz bands and an internal transverter for 1296MHz. The transmitter provides 100W output on 144MHz, 75W on 432MHz and 10W on 1296MHz bands. A real time spectrum scope and waterfall display are provided and it can receive on two different bands and modes simultaneously. Full details on the Icom website. Typical UK price is in the region of £1795.

c) Yaesu: Many years ago our club owned a venerable FT101 which had worked well but required some TLC every now and then. The latest incarnation is the

FTDx101D which bears little resemblance to the original and covers 30KHz - 75MHz on receive and 1.8 - 70MHz (amateur bands only) on transmit. It features as standard SDR, waterfall display and a selection of roofing filters to improve the receiver performance on crowded bands.

The typical UK price is around £3150.

d) Kenwood: Their recent offerings include the TS-990S multimode HF to 6m 200W output transceiver. The receiver uses down conversion on all amateur bands and has five roofing filters as standard with space for an optional sixth filter. The claimed IP3 for the receiver is +40dBm.The transmitter has two 50V FET (VRF150MP) devices in a pushpull power amplifier for low distortion

and intermodulation products. The common internal frequency standard is a 0.1ppm TCXO. More information on the Kenwood website.

e) NiCad Batteries: Older types of these nickel cadmium cells can suffer from a number of problems including inability to hold a charge and loss of capacity, sometimes called the memory effect. It is difficult to determine the point at which these cells are fully charged because the parameters are dependant on a number of variables. Nickel metal hydride (NiMH) cells do suffer from the memory effect and internal self discharge but very much less than Nicad cells and they are generally more rugged.

As a rule any rechargable cell should not be regularly over-charged and most manufacturers will specify a long term maximum permanent charge current. A good check on the end of charge point is to measure the temperature of the cell which will increase when it is fully charged - the energy has to go somewhere!

The NiCad charging cycle is about 70% efficient so the recommended protocol is to charge at one tenth of the cell capacity for 14 hours. Therefore a typical AA cell rated at 700mA/hr would be charged at 70mA.

Over a period of time large dendrite crystals can grow inside the NiCad cell structure which can increase the self discharge rate and in the worst case cause an internal short circuit. It is claimed that NiCad cells can be rejuventated with regular cycling and a short high current pulse but the solution does not guarantee 100% success and is not risk free so proceed with extreme caution.

Some more advanced chargers can provide charge/discharge cycling and a current pulse cycle automatically. There is also a risk that unvented cells may generate significant amounts of gas within the cell and swell or possibly explode. If a cell looks like there is a leakage, is swollen or has a growth on the outside it should be discarded - most council tips will accept old batteries. Cadmium is toxic so do not just throw it in the waste.

The reader should research the topic carefully with the cell manufacture before proceeding with this process.

NiMH cells have a reduced memory effect compared to NiCad cells. It was thought that Lithium-ion batteries did not exhibit the memory effect but recent research suggests that this is not the case. Research is ongoing.

f) Solar Cycle 24 peaked in early 2014 and is expected to finish in early 2020 but there is no concensus yet on the maximum value of cycle 25. Each cycle is about 11 years long and the sunspot count has a significant effect on HF communications. Current HF conditions are extremely poor with the higher bands often completely quiet.

You can see a plot of sunspot numbers from 1913 to date down the page at:

https://earthsky.org/space/solar-cycle-24-25-sunspot-predictions

And a longer term historic record of sunspt counts at:

https://www.spaceweatherlive.com/en/solar-activity/solar-cycle/historical-solar-cycles

Cycle 18 recorded a smoothed average count of about 260 sunspots and cycle 22 recorded about 220 spots.

Cycle 24 has been a very weak cycle with a smoothed peak of under 100 sun spots and HF conditions have been poor as a result. However, as the summer approaches keep a watch on 6m (50MHz) where sporadic E is expected to commence. When this occurs, communications over 1500-2000km is possible with low power and simple aerials.

g) Power Supplies: If you are going to make a 13.5v DC power supply for your amateur radio equipment you have a wide choice of power devices. The very well known 2N3055 or one of its equivalents as shown in a recent newsletter is good for at least 4A current per device but the current gain reduces significantly above this current. The equally old 2N3771 has a higher current rating and is somewhat move expensive.

Another possibility is a power MOSFET and there are many to choose frrom with maximum current ratings from 5A to 20A per device at reasonable prices. Most of these are enhancement devices which means that they need a bias voltage applied to the gate to make the device conduct. Examples are the IRF510 at 43W dissipation and 5.6A max or the IRF530 at 88W and 14A max, both at 25^{o}C and derated at higher temperatures. If you do decide to use a power MOSFET you may need to

provide a greater headroom voltage to cate for the increased gate bias.

Multiple output devices require low value current sharing resistors, typically 0.1ohms at 3-5W to ensure that the devices take almost equal currents. Low value aluminium clad resistors are easily available and may be mounted on the same heatsink as the output devices. A thermostatically controlled fan should be used to keep the heat sink at a reasonable temperature - there is a simple design on the technical website.

Miscellaneous

a) Your scribe attended the Kempton Park rally on Sunday 14th April and sat in on the talk on the changes to the amateur radio licence sylabus that are being implemented this summer.

The changes are not major and generally reflect the ongoing technology developments that are taking place, mostly to do with software defined radio.

The rally was a little smaller than in provious years as there were some unsold trader tables. Nevertheless a number of useful components were purchsed at reasonable prices. One trader was trying to sell B7G valveholders at £2 each with little success! Other stands had them for 50p or a little more.

b) Training: As of writing this newsletter there are four places remaining on the Foundation course being run by North Kent Radio Society - see the last page for more information.

Notice Board – Wanted and For Sale

The Notice Board is for all club members to use so if you have one or more items that you wish to buy or sell then please send in the details. Some of the current list of items may be viewed at:
http://cprec.btck.co.uk/SaleofClubEquipment
All excl P&P.

For Sale

CPREC has a large bank of fundamental and overtone quartz crystals, from 1.0 – 99.91MHz. The list, which is on the club website as a downloadable PDF file. Prices are £1 each to club members and £2 each to non members, excluding P&P. Contact Bob on 01737 552170 or g3oou(at)aol.com.

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G3OOU

Diary of External Events

27 Apr 2019 - International Marconi Day

International Marconi Day 2019 will take place on the 27th of April. Last year 74 stations were registered, all operating from a site that Marconi operated from or had a personal connection with. To see the stations involved this year, go to www.gb4imd.co.uk [Source RSGB]

28 Apr 2019 Andover RAC Spring Car Boot Sale

Wildhern Village Hall, Nr Andover, SP11 0JE Opens 10am, entry £2.00. Indoor tables £10.00, outdoor £8.00. Refreshments avvailable available all day. On site parking and indoor shelter should it rain. Contact Paul G4KZY 07775 738 200, arac@arac.org.uk. http://www.arac.org.uk event.

11/12 May 2019 - Mills On The Air

This UK wide activity will take place during the weekend of 11/12 May and a considerable number of stations are expected to be active.

17-19 May 2019 - Dayton Hamvention

Greene County Fairgrounds and Expo Center, Dayton, Ohio.

19 May 2019 - Dunstable Downs National Amateur Radio Car Boot Sale

Stockwood Park, Luton LU1 4BQ. Web: www.ddrcbootsale.org

9 Jun 2019 - East Suffolk Wireless Revival (Ipswich Radio Rally)

Kirton Recreation Ground, Back Road, Kirton IP10 0PW (just off the A14). Open 9.30am, entry fee £2. Free car parking. Trade tables are from £10. Trade stands, car boot sale, Bring & Buy, SIGs, GB4SWR HF station and an RSGB bookstall. Catering on site. Contact Kevin G8MXV, 07710 046 846. [www.eswr.org.uk].

23 Jun 2019 - Newbury Radio Rally and Boot Sale

Newbury Showground, next to M4 J13. Talk-in on S22 (V44). Free car parking. Traders access at 8am, visitors at 9am. Admission £2.50. Car boot sale pitches £12.50. Huge radio, electronics & computing boot sale, demonstration marquee with display of amateur radio on air, clubs and national society stands. Catering on site. Contact Phill, G6EES on 07771 504738 or by email to NewburyRally(At)nadars.org.uk Web www.nadars.org.uk

14 Jul 2019 - McMichael Radio Rally and Boot Sale

Reading Rugby Football Club, Sonning Lane, Sonning on Thames. RG4 6ST. Open 9.30am to 3.30pm, admission £3. Car boot sale pitches £10 (setup from 7:30). Trade stands and exhibition displays. Catering and bar onsite. More from Min, G0JMS on 07917 830 410 or by email to G0JMS@RADARC.ORG. Web: www.mcmichaelrally.org.uk

25 Aug 2019 - Milton Keynes ARS Rally

Irish Centre, Manor Fields, Watling Street, Bletchley MK2 2HX. Entrance £3. Trader options available with extra indoor pitches available for 2019. Free parking and on-site catering. Open to traders 7am, public from 9am. Additional information at www.mkars.org.uk/rally or contact Francis Hennigan, M0UKF rally@mkars.org.uk or 07563 498 156

27-28 Sep 2019 - National Hamfest

Newark & Nottinghamshire Showground, Lincoln Road, Winthorpe, Newark, Nottinghamshire NG24 2NY.

11-13 Oct 2019 - RSGB Convention

Kent's Hill Park Training and Conference Centre, Swallow House, Timbold Drive, Kent's Hill Park, Milton Keynes, Buckinghamshire MK7 6BZ.

19 Oct 2019 CW Convention and CW Boot Camp

3rd Witham Scout & Guide HQ, Rear of Spring Lodge Community Centre, Powers Hall End, Witham, Essex CM8 2HE. Registration at 8.30am for a 9am start. Due to finish at around 4.30pm. Pre-register as places are limited to G0IBN: g0ibn1@yahoo.com or 0745 342 60 87 Previous events have welcomed visitors from all over the UK.

News from other Clubs

Club Secretaries – please ensure that your future meeting details are present in your newsletters, on your websites or sent to our newsletter editor Bob G3OOU. Palace Pulse is published about ten days before our club meeting which is on the first Friday of each month and closes for editorial contributions a few days before publication. Due to differing publication dates and short lead times it is getting increasingly difficult to include other clubs' events although we will endeavor to do so if advised in time. **If we are regularly unable to obtain the information then that club entry will be removed from this newsletter.**

Readers - If you plan to visit one of these club meetings please check with the club concerned in case of any last minute changes.

Bredhurst Receiving and Transmitting Society
Meet on Thursday night from 8:30pm at the Parkwood Community Centre, Long Catlis Road, Rainham, Kent, ME8 9PN. Contact secretary@brats-qth.org or http://www.brats-qth.org/brats/

09 May	AGM
06 Jun	Unexplained Mysteries and Cover Ups by Andy Thomas
25 Jul	Spectrum Matters Talk by Barry Lewis G4SJH

Bromley & District Amateur Radio Society
Meets at 19:30 on the third Tuesday of each month at the Victory Social Club, Kechill Gardens, Hayes, Bromley, BR2 7NH. Contact Andy G4WGZ on 01689 878089 or enquiries(at)bdars.co.uk. Web: www.bdars.co.uk

21 May	Compact HF Aerials by Bob G3OOU
18 Jun	Direction Finding by Steve M0PEL
16 Jul	Mini HF Antennas Construction
20 Aug	Operating and Social Evening

Chelmsford Amateur Radio Society (CARS)
19:30 on the first Tuesday of each month at Oaklands Museum, Moulsham Street, Chelmsford, Essex, CM2 9AQ. Contact: secretary(at)g0mwt.org.uk Web: www.g0mwt.org.uk

07 May	TV history and the Museum's Collection by Andy Fremont
04 Jun	Beam Building by Dave Cutts M0TAZ
02 Jul	Three Short Talks including OFDM and All That by Phil Pearson G0UIB and Marine Radio by Tony Gilbey G4YTG
06 Aug	Constructors Competition

Coulsdon Amateur Transmitting Society (CATS)
8:15pm on 2nd Monday each month. Contact: Andy Briers G0KZT on 07729 866600 or secretary(at)catsradio.org. Web site: http://www.catsradio.org/

13 May	Construction Evening
10 Jun	Annual DF Hunt
08 Jul	Operating Evening
12 Aug	Club Annual BBQ

Crawley Amateur Radio Club (CARC)
Every Wednesday 20:00 – 22:00, every Sunday 11:00 – 13:00. Formal events are on the fourth Wednesday of the month, 7-30pm for 8pm. Phil M0TZZ on 07557 735265 or secretary(at)carc.org.uk or Web: http://www.carc.org.uk/

24 Apr	The Drake R4C Receiver by Keith G3VKW

Cray Valley Radio Society (CVRS)
Meets at 8pm on the 1st and 3rd Thursday of each month at 1st Royal Eltham Scouts HQ, Rear of 61 - 71 Southend Crescent, Eltham, London, SE9 2SD. Contact: Richard on secretary[at]cvrs.org .Web www.cvrs.org

02 May	Date modes for all occasions – Dave M0TAZ
11 May	GB6MW – Windmills on the Air, Meopham
16 May	Aspidistra – Mike M0FCD
31/5 - 2/6	GB19KO (Cricket World Cup Special Event Station)

Dorking & District Radio Society
Meetings at 7.45pm. Contact: David Browning (M6DJB) at djb.abraxas(at)btinternet.com. Web site: http://www.ddrs.org.uk

28 May	Protecting Earth from the ravages of the sun by Colin Forsyth
25 Jun	Morse code by Mary Ashdown
24 Sep	Small loop antennas by Colin Berry
22 Oct	Hermes Lite SDR by Alan Hopper
26 Nov	AGM & film

Echelford Amateur Radio Society
Meetings on 2nd and 4th Thursdays of each month at the Weybridge Vandals Rugby Football Club. Enquiries to Phil at m1gwz(at)icloud(dot)com. Web site: http://www.qsl.net/g3ues/index.htm

25 Apr	Annual General Meeting

Hastings Electronics & Radio Club
Meetings held at the Taplin Centre, Upper Maze Hill, St Leonards on sea, TN38 0LQ, 7pm for 7:30 on the fourth Wednesday of each month. Information from Gordon Sweet M3YXH on 01424 431909, email: sionet3344(at)hotmail.co.uk
Web: http://herc-hastings.org.uk/

26 Jun	Video Presentation
28 Aug	Construction Contest
25 Sep	Photos Presentation by Alan Harding

Horsham Amateur Radio Club
meets on the first Thursday of each month at the Guide Hall, 20 Denne Road, Horsham, West Sussex, RH12 1JF. NRQ TQ172304 at 20.00hrs local time. Contact Alister Watt G3ZBU at g3zbu(at)hotmail.com or http://www.harc.org.uk/

09 May	Thursday Evening Fox Hunt
23 May	Social - The Fountain - Ashurst - BN44 3AP

Mid-Sussex Amateur Radio Society (MSARS)
Meet most Fridays in the Millfield Suite, Cyprus Hall, Burgess Hill, RH15 8DX from 7.30pm till 10.00. Contact Stella on 01273 844511, M6ZRJ(at)msars.org.uk or www.msars.org.uk

03 May	HF Propagation by John G8JBJ
31 May	Table Top Sale & Radio Night
14 Jun	Foxhunt
21 Jun	Windmills Evening

North Kent Radio Society
Meets at the Hurst Community Centre, Room 15, Hurst Place, Bexley, Kent, DA5 3LH. Doors open at 8PM. More information from Stephen G8JZT on secretary@nkrs.info or 07985 753370 evenings or weekends.
Web: http://www.nkrs.org.uk/

21 May	Morse Practice Night (TBC)
18 Jun	The AOR DV1 by Ian G7PHD
16 Jul	Members talk on their favourite software

South East Essex Amateur Radio Society (SEARS)
Contact Mark Callow 2E0RMT on 07842 336444 or secretary(at)southessex-ars.co.uk or http://www.southessex-ars.co.uk/
Meetings: 7pm 2nd Tuesday each month at The White House, Kiln Road, Benfleet, Essex, SS7 1BU.

14 May	Radio night live on the air station. Hamtronics will also be having a table of goodies at the meeting
11 Jun	All things Micro by Andrew Brown M0ONH
09 Jul	Club Night

Surrey Radio Contact Club (SRCC)
7.30 for 7.45pm on 1st. and 3rd. Mondays every Month. Contact John Kennedy G3MCX on 020 8688 3322 or secretary(at)g3src.org.uk. Web: http://g3src.org.uk/

13 May	Radio Contesting: Using Latest Minos Logging Software including Rotator Control - Peter G3ZPB
17 Jun	SRCC Club Construction Project - TBC
15 Jul	Setting up and Using N1MM Contest Logging Software; RSGB HF Contest Adjudication Process - Quin G3WRR
12 Aug	SRCC Annual Barbecue - TBC
07 Oct	Autumn Surplus Equipment Sale

Sutton & Cheam Radio Society
8pm on 3rd Thursday every month. Contact Chris Howard at info(at)scrs.org.uk Web: http://scrs.org.uk/. SCRS run a practical group most Monday evenings at the Bandstead Scout Hut.

09 May	Annual General Meeting and construction competition
20 Jun	Highlights of Dayton 2019 by Chris Howard M0CTH
15 Aug	Heil Sound by Bob Heil, K9EID
19 Sep	Introduction to Oscilloscopes, Martin Butler, M1MRB
17 Oct	HMS Belfast Radio Volunteers, Jorgen Faxholm, M0AXP
12 Dec	Christmas social and friendly quiz

Please replace the (at) with @ when using any email addresses shown in this newsletter.

Crystal Palace Radio & Electronics Club is a member of the South East Tutors training group.

Local Training Courses

Licence Level	Dates	Location	Club Provider	Format	Further details
Foundation	8 & 22 June 4 places left	Crockenhill Village Hall	Darenth Valley	2 days (Sat)	http://www.darenthvalleyrs.org
Please note that a new syllabus will apply for all exams from July 2019.					
Foundation	22 Sep - 6 Oct	Bromley BR2 7NH	Bromley & District ARS	2 days (Sun)	www.bdars.org
Full	07 Oct - 30 Nov	Eltham, SE9 2SD	Cray Valley RS	TBA	www.cvrs.org
	= course commenced				

CPREC Committee Information

Officers:		
Chairman:	**Secretary:**	**Treasurer:**
Damien Nolan 2E0EUI	Alan O'Donovan G8NKM	Ian Skeggs M6FZC
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