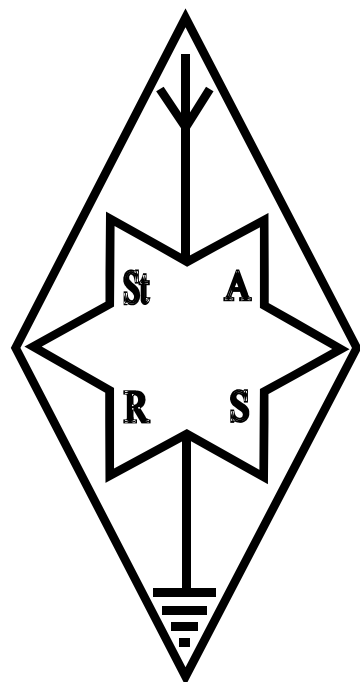


STARLITE

G6OI
1938

The Newsletter for Members and Friends of
Stourbridge and District
Amateur Radio Society
incorporating
Old Swinford Hospital School Radio Club

G6SRS
1938



G4CVK

1969

ISSUE
06/2011



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Visitors always welcome

MEETINGS

The Society holds its full meetings on the
1st and 3rd Monday of each Month at

Old Swinford Hospital School

Heath Lane

Stourbridge

(8.00pm – 10.00pm)

Additionally the shack is open during the same times on the
intermediate Monday's

*All correspondence/enquiries should be addressed to the
Hon. Secretary:*

John Clarke M1EJG
(01562) 700513

honsec@g6oi.org.uk

STARS Web Site

WAP enabled ??

STARS

C/O The Mill House

21 Mill Lane

Blakedown

Kidderminster

DY10 3ND

www.g6oi.org.uk

www.g6oi.org.uk/wap/index.wml

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EDITORIAL

Dear Readers,

Please note the change in the Calendar of Events. Due to work commitments, the talk by Karl Truby - "Soldering in the Aircraft Industry" will now take place on Monday 13th June (previously it was on 20th June) and the Sheepworks Club BBQ will now take place on Monday 20th June (previously it was on 13th June).

Congratulations to Malcolm Palmer on winning the first prize in the senior section of the second annual Wordsley's Got Talent competition - held at the Richardson Hall, Wordsley.

Welcome to the June edition of Starlite for 2011. During May we were given a detailed and interesting talk on PICS chip and in particular the PIC16F628A micro controller by Mike Ferriday (G1NQW). Over 6 billion PICS chips have come off the production line and the chip is available at a cost of around one pound sterling! The chip is a versatile building block and Mike gave us an overview on programming the chip with examples of its implementation in both a ham radio and robotic implementations. Mike showed us PC software that provides PIC16F628A simulation, debugging and program development facilities. Mike has kindly provided us with his e-mail address if you have anything further you would like to ask him regarding PICs - mike.ferriday@softhome.net

I realise that some of the club members have already seen photographs on the aerial maintenance day, but I thought it may be of interest to users who are accessing the club web site to give them an idea of the range of aerials in use at the club.

As always I would be interested to receive contributions and feedback on any of the articles. I aim to make Starlite available for the first day of each month, so please can you submit any articles in time for this deadline. There may be a few more errors in Starlite this month as the head proof reader (my wife) is away on holiday this week.

Regards

Adrian Bryan (G0NLA)



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INTRO to EARTH-MOON-EARTH

Introduction

During my time in Amateur Radio I never cease to be amazed by how wide ranging the subject of Amateur Radio is. It is a generalisation, but a large number of amateurs seem to have operated on 2 meters at some point, but other than this I do not think there is a single area of interest that unites all radio amateurs. Interests vary from electronic construction, dabbling in aerial construction to a greater or lesser degree of complexity. Operating with balloons to gain greater height with aerials, interest in repeaters, CW operation, chasing DX, direction finding, collecting radios old and new, amateur television, PSK31 and data modes, operating on specific parts of the radio spectrum, passing on experience to those hoping to take up amateur radio, satellite operation ... the list seems endless and this I believe is one of the strengths of the hobby that give it such a wide appeal. This month's article is about one of the lesser explored areas of amateur radio – Earth-Moon-Earth working.

Background

At its most basic EME is the transmission of signals from one earth based station via the moon's surface to another earth based station. EME was proposed as a possibility in 1940 by a GPO (the forerunner of British Telecom) communications engineer by the name of William John Bray. Wartime can spawn a lot of creativity and technical advances and EME was developed by the US military for communication after WW2 and was used as a means of secure transmission between Churchill and Roosevelt during the war years, according to Bray's Times obituary. EME pre-dates and I suppose to a large extent was superseded by the advent of communications satellites.

What challenges does EME present?

As you would imagine there is a lot of scope for signal attenuation over the path involved. The moon does not have a circular orbit around the earth and the earth to moon distance varies between 406,700 km to 356,400km with a mean distance of 384,400 km. Let's look at the signal path for the round trip from earth to moon and back and see where the signal gets attenuated.

The first decision is the frequency that is used for EME. All signals between 50 metres and 47GHz amateur bands have been used for EME. The gain required for the transmitter and receiver both need to be high however one needs to factor in the greater signal losses above 1 GHz into this decision. In practice 2 metres, 70 cms and 23 cms seem to be the bands of choice and construction of high gain aerials is for amateur radio purposes is most practical at these frequencies. The choice of frequency is also affected by albedo or reflectivity of the moon to radio waves, which changes adversely with a higher transmitter frequency.

The feeder cable will introduce some minor loss of signal and this can be minimised by selection of a suitable feeder and by minimising cable runs where practical. The largest element of signal loss is the free space loss from earth to moon and the return journey back to earth. As mentioned above the albedo of the moon introduces loss and a workable figure for the moon indicates that a surprisingly high 7% of our signal will be reflected back to earth. The next component in the signals path is the antenna used. Opinion seems to indicate that at least 15dB gain is required for our antenna. To achieve this with a single antenna requires a boom length of around 10 metres using 144 MHz. For practical purposes stacking and baying of aerials are required and a 2 x 2 configuration with a 4.5



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metre boom will provide the required gain. At this point you have probably decided that this feels more like a club project than something which is practical for the average suburban home, however it is possible to make contact using moon bounce when the moon is just rising over the horizon and dispense with the need for an azimuth/elevation control for your aerial. Note also that the object you are aiming at occupies roughly 0.5 of a degree in the sky and it needs to be pointed as accurately as possible to avoid your signal missing the moon and whizzing off into the cosmos. Before leaving the subject of aerials there is complication with EME working called Faraday Rotation whereby the polarisation of the signal is changed by 90 degrees. To accommodate this situation a crossed yagi may be required. An unfortunate consequence for users of stacked and bayed yagis is that switching arrangements are more complex and extra weight and wind resistance is added to the aerial configuration. Parabolic dishes can be considered, but are probably only practical for the keen amateur at 23 cms and here dish diameter of 2.5 meters could be expected.

Having bounced off the moon the signal returns to our receiving antenna possibly via a masthead pre-amp and back down the suitable low loss coax back to our receiver. Overall the signal loss from a well constructed set-up is around 250db. To visualise this sort of loss; you could make a 250db attenuator for 2 metres with just over 3 miles of ultra low loss coax.

JT65B Mode of Propagation

This mode of propagation was developed to allow signal detection under very exacting signal reception conditions. Redundant information is added to the signal such that if the signal arrives at the receiver with some information missing, the missing information can be recovered from the redundant information. The technique used is called Forward Error Correction and is deserving of a future article in its own right. To listen to, the signal sounds somewhat like a piccolo. Data rates are around 20 baud and allowing for signal overhead data a usable rate of two characters per second is achievable. Although not its intended purpose JT65 has been adopted by QRP groups on the HF bands.

So What is an EME QSO Like?

Often an EME QSO will take place using JT65B mode of propagation and involve the use of the program WSJT. Visualise WSJT as similar to a PSK31 program in that a signal can be selected by pointing to a chosen part of the screen to select the area of interest, although unlike PSK31 there is only likely to be one signal of interest amongst the noise. Note that WSJT6 is available for free download.

A typical CQ sequence would be as below with G0NLA calling CQ. Often calls are made on a schedule arranged over the Internet. I suppose the situation is similar to Amateur TV although this may be different during special activity events.

CQ G0NLA ZZ99

where optionally ZZ99 is G0NLA's location

G0NLA G7DFL YY77

G7DFL comes back to the CQ call at location YY77

G0NLA G7DFL OOO

G0NLA acknowledges G7DFLs call

RO

G7DFL acknowledges G0NLA's call



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RRR

G0NLA acknowledges G0NLAs signal rpt

73

Thanks for contact QSO is over

Conclusion

EME is not totally beyond the range of the average amateur radio operator, but it would not appear to be for the faint hearted. Reading around on the subject it seems that the signal to noise ratio for an EME set-up is particularly important in achieving good results. JT65 helps extract the weakest of signals from amongst large amounts of noise. EME does not seem to be the sort of project one would embark on as a solo venture and looks to be at the special interest end of the spectrum. In my opinion an EME project would be most likely to succeed as a club or group project.

Further viewing and demonstrations can be seen at

<http://www.youtube.com/watch?v=leh3HQhoScw> A 1000 acre site in Kansas with an understanding wife and a large bank balance have helped Pete considerably with his EME reception

[http://en.wikipedia.org/wiki/EME_\(communications\)](http://en.wikipedia.org/wiki/EME_(communications)) etc.

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FROM OUR ROVING REPORTER

Because of space I was unable to include my final memory of 50 years ago which could have resulted in serious injury or even death at 109 Longfellow Rd [plot 501 in that time] As I recall it was on the 23 Oct and was My Mothers Birthday. Having moved into the house on the Saturday 19th Oct 1961 after the long wait for completion and the first time Glenys had moved into the area from Leominster Herefordshire My Mother had come over with her to get her familiar with doctors etc. It was the events of the night of the 23rd. I had been out to Gornal Wood to the barbers on my way back I had just entered Longfellow Rd and there had been slight rain & thunder & being evening it was not full daylight. Suddenly there was a most brilliant flash of lightning which for a few seconds made everything stand out in the road like houses on the other side of the road half constructed & further up the road [the estate was still under construction] I have never seen anything like it since, I had been having trouble with the vacuum windscreen wipers on the Ford Thames Van I had then so was trying to get them working when I stopped outside the house [I could not get on to the drive which was just a dirt surface at that time. My mother & Glenys were at the door asking me to get into the house quickly [You have guessed by now, the house had been struck by lightning]. All the electrical power had gone off & there was water in the kitchen below the bathroom, so I turned the outside stop tap off & had a look up stairs in the bathroom & what a sight! The low flush toilet system was all in pieces scattered around the bathroom & the water feed pipe going in to it was bent back & water from that had seeped through into the kitchen & taken out all the lights & in the bedroom next to the bathroom plaster & breeze blocking & bricks from either side of the lintel above the window where scattered over our new bedroom furniture & even embedded in the opposite wall [If anyone had been in either of the two rooms they would not have been here today!

The shock from the lightning even had effect on our next door neighbours house but nothing like 109 [plot 501] the building society had not formally completed the insurance when I contacted them. I had to get an estimate from the builder who was still on site & get the repairs done quickly. That was on Thursday 24th. A local plumber assisted on the night by sealing the input pipe off so that water could be back on & the MEB checked the wiring so power could be restored on the Thursday & the bill was £83, a lot of money then that was covered by insurance & damage to bedroom suite that neither Glenys [who was expecting at the time] or I will ever forget that night & could not say it was my aerials long wires etc. there were not any then, the open coke fire even ceased & the alarm clock on the fire grate, that's the end of My memories of 50 yrs ago.-

Moving on to present time Len's G4HCZ funeral was at Gornal Crematorium on 11th May Glenys & myself attended along with Ron G4NME at the end of the service the minister paid tribute by saying G4HCZ were receiving You loud & Clear 73s. Len, Ron, Peter G3WWR who passed away 25 yrs ago & myself always got together on a Friday night & Stan G8SR to go out for a drink at a local Pub, Ron Len Ron & myself continued with the Friday nights up 12 yrs ago if Len had lived another four days. he would have been 86. I was at another funeral on the 16th May at the same place this time it was a member of the West Midlands Amateur Computer Club [our membership with the club is getting less so if there is anyone interested it meets on the 2nd & 4th Tuesday of every month at the Quarry Bank Community at 8pm.

Well as most know by now I was the winner in Wordsley Got Talent finals were on Sat. 21st May at The Richardson Hall Wordsley. The following week I was featured in The Stourbridge News –The Kidderminster Shuttle-The Express & Star that was for the Contactor Switchgear Re-union which I have been organising now for 15yrs & the Severn Valley Railway News which featured our 50th Wedding Anniversary which was held on SVR. I will be taking part in Wordsley Festival in



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Above Congratulations to Malcolm with Ukulele and Trophy

Wordsley Park on Sat 18 June and hope to see some of you there & likewise the SVR 1940's event at the end of June & this clashes with 2m field day first week end in July SVR 1940s .- On Monday 23thd May Glenys & myself were at the Merry Hill Centre & I came in contact with another Malcolm & Ex STARS member G3VHA. I was hoping he would have been at the meeting on the same night. He expressed an interest as been out of touch for some time with Amateur Radio. I said "You are always welcome at any time at the club".

I enjoyed the talk about PIC chips on Monday & it is amazing to see what can be done with a item that only costs £1 very. Many thanks to Mike for the talk. On the following Day I was at The NEC & I came in contact with Russell G3V DX who is a reporter for Sky News. Russell used to do the commentary at The Droitwich rally way back in time [14 yrs ago] the week before I came into contact again at NEC a friend of Bob Eagans [if you read this Bob, does the name Phil Vanes mean anything to you? Phil was on one of the stands at the NEC.

Well That's All For Now and Best 73s

Your Roving Reporter Malcolm G8BOP



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UP ON THE ROOF

On 10 May 2011 a visit was made to the shack roof to look at and carry out aerial maintenance. I have enclosed a selection of the photographs taken by Andrew, James and Adrian to record the event. I have been a member of the club for several years and was surprised at the variety of aerals available. One unexpected bonus was the variety of balls that had found their way on to the roof since the last club visit!



On the way up



Unexpected bonus



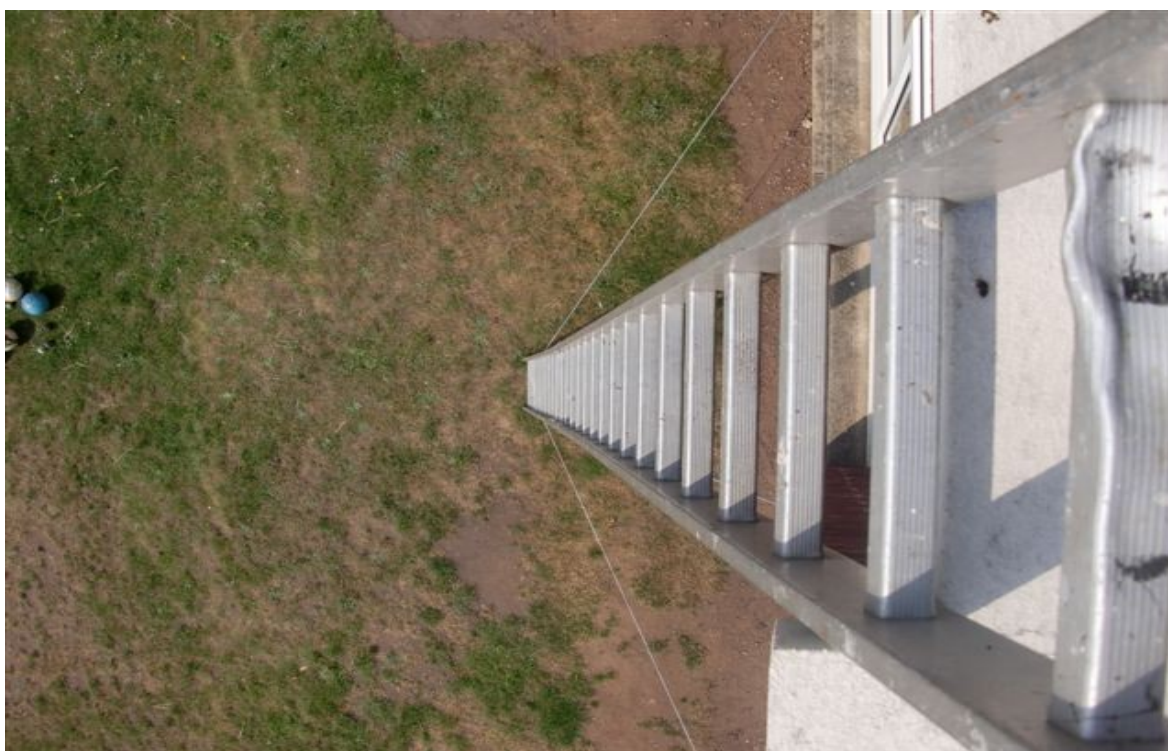
HF Aerial with newly replaced rotator thanks to John



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Bayed 2 metre with crossed yagi with azimuth control and rotator



View from the top – (how's your stomach by the way?)

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The working party minus James (the photographer)



Re-fixing the G5RV



