



Llais Y Ddraig The Dragon's Voice

Cylchlythyr Clwb Radio Amatur Y Ddraig
Newsletter of the Dragon Amateur Radio Club

Gorffennaf/July 2015. Rhif/No. 107

Rhaglen Clwb / Club Programme

- 20th July** Club Business / Discussion Night.
- 3rd August** Handling Portable Antenna Masts (A presentation by Stewart GW0ETF).
- 17th August** Marine Communications (A Presentation by George MW3MEY)
- 7th September** Discussion Night & Film (TBA)
- 21st September** The Development of 10cm Radar in WW2 (A Presentation by Les MW0SEC)

From the Editor ...

Hello everyone and welcome to the July 2015 issue of Llais Y Ddraig / The Dragon's Voice. As you are all aware this is my first time in the editorial chair, so hopefully you will all be kind when you spot any obvious errors. I would like to start by thanking John Brimmecombe GW3GUX for his fabulous effort as my predecessor in the editor's chair, you will be a hard act to follow!

This issue has plenty to read and I must thank the following for their contributions: John GW3GUX, Dafydd MW5DJO, Stewart GW0ETF, Chris MW0LLK, Peter GW7BZY and Danny GW7BZR. I hope the format is to your liking, but I value all feedback whether it is positive or negative and will use this to alter the appearance of future editions if needed. Hopefully as I learn to use the computer software better, I shall be able to enhance the readers experience by making the newsletter more attractive.

I would like to finish this editorial with this thought. Dragon Amateur Radio Club has many members who are interested in all facets of the hobby from Digital TV, contesting, rag chewing on HF, construction and even using equipment containing the wonderful thermionic valve! I hope that in future issues of Llais Y Ddraig we can reflect the huge diversity of interest that club members have. This can only be achieved by members writing articles for inclusion, sending photo's, emails to the editor etc. I am only too happy to help you develop ideas and articles for inclusion.

I look forward to hearing from you with your ideas. The next issue of Llais Y Ddraig will hopefully be with you in October 2015.

'73 Simon Taylor 2W0CHV.

International Marconi Day 2015

Every year the Dragon Amateur Radio Club celebrate the birth of Marconi on this special day. The place chosen every year is the old long wave transmitting station on the hill above Ceunant near Caernarfon. Planning was done before and all NOVs and permissions were obtained. The plan was to run two radio stations GB4MD and GB0MUU, the MUU being the former callsign of the station. This was met with a bit of resistance but the boss got his way and so it was to be.

On the Friday before the event a few of us were there to set up two stations, erect antennae, clean the caravan and lay mains cables etc. Everything that was done has to be made horse proof there on the mountain and sometimes we win and sometimes we loose, but this time was a winning year. Everything was set up in a clean caravan and upstairs in the main building with internet for the cluster on both sites and logging using N1MM. There was also going to be an ATV station operating on the Saturday.

Because people were staying up there overnight there was no need to dismantle anything as they would be secure so this would save time and ensure there would be a station in operation for 24 hours. Plenty of provisions were left and both stations were started up one using GB0MUU and the other using the club call sign GW4TTA until midnight. It was a cold night but I was sure they would survive

The following morning on the Saturday everything was going well and contacts were being made and people who had never used N1MM logging programme were using it. For a special event this is easy to use and it also benefited by having the cluster available. Propagation was not brilliant but there was a very steady stream of stations calling us especially when we were posted on the cluster when quite a few pileups occurred. During the afternoon and evening it started to snow and eventually there was a blanket of about half an inch. Whether that helped or not but we started to get contacts further afield especially Japan , USA, Canada, Mali and much to one amateurs delight the Falklands and some of these were on the small club vertical which shows it does work. 2m was used a great deal to ensure the radios were not used on the same frequencies together and this helped avoid any mishaps. By the end of the night there were over 600 contacts in both log. A quite satisfying result and also the Atv Station was working and showed what can be achieved with quite simple equipment. One can only wonder what Marconi would have thought of it all if he were to pay a visit. I do get an uncanny feeling up there sometimes that he is watching us from above and does approve!!.

Sunday is generally for anybody who wants to have a go and perhaps experiment if they want to, but this year there were no takers at all and the station was dismantled with the help of available personnel. It was all packed up, parked up and I was home by dinner time.

When one organises an event it is done without knowing how many will participate and whilst we did have enough operators there was always room for more. It is always the elder members who seem to do these things and at a guess the average age was about 60!! Young people are allowed to do it as well or are we old folk a bit boring for them!!

I would like to thank all that turned out whether to operate, make tea, clean or whatever necessary, without you it would never happen. Let us look forward to next year and we might see a few youngsters doing it!!

Many Thanks!! Danny GW7BZR.

Weird Connections

Stuart Rolfe GW0ETF

I think everyone in the club knows I'm not a 'Cymro go iawn' but it's 43 years now since I first lived here, and so by now I feel more Wales than Wolverhampton. I spent most weekends in my later teenage years on the hills and cliffs of Snowdonia and Anglesey but first became a proper resident when I came to the University in Bangor to do a one year postgraduate teaching course in 1972; in truth it was an excuse to do more climbing, and during the week too when the crags were less crowded.

My shared student pad then was a tiny end of terrace cottage behind the Royal Oak in Rachub above Bethesda. Stanley Terrace was idyllic and we soon got into a daily evening routine of working (occasionally) and/or listening to Pink Floyd or King Crimson on the stereo before grabbing our personal pint mugs at around 9.30 to shuffle off round the corner in our slippers to the Oak for a couple of pints of Guinness which we would finish off in front of the open fire after last orders. This would normally be accompanied by the remains of the chips from the chippie just up the road as they prepared to close – we never normally had to pay. The only downside was the shower which was in the outhouse opposite the front door and which would be freezing cold in the winter, just the job to harden up these soft English types.

The other 2 'knocked together' cottages in the terrace were occupied by a local Welsh family. 'Mrs' seemed to take pity on us scrawny students and plied us with cakes, biscuits and panads on a regular basis. She was quite a small lady and was dwarfed by 'Mr' who must have been nearly 7 foot tall and built like a brick ****house. He was a bit like a big Sumo wrestler without the fat and he even had that lolloping gait. 'Tiny', as he was known seemed to spend most winter evenings out in the front yard with a hissing Tilley lamp yielding the most enormous axe with which he would split huge logs with hardly any effort. Naturally we would gain the benefit of a supply of logs to supplement the open fire which was the only source of heat. Tiny was a bit dour but he had a nice dry sense of humour and I liked him a lot. He was what I would call a ganger on building sites and even gave me a job for a couple of months after the course finished building houses by the school in Bethesda.

I can't remember how many kids they had but I do remember one lad called Danny although he wasn't normally in the forefront of our attentions behind Tiny with his axe and all those cakes and biscuits from 'Mrs'. My memories of him are quite hazy but I seem to remember an impression of him being like a miniature version of his Dad. He probably treated us with a mixture of curiosity and amusement and kept his distance. But what's all this got to do with amateur radio and the Dragon Amateur Radio Club? It's true I played around with radios and electronics while at secondary school and was an avid SWL until I found girls and mountains, but it wasn't until I finally bought a house in Gerlan some years later that I rediscovered my interest in all things radio; and this because I found I was living next door to Ken McCoy GW8CMY who at the time was an electronics technician in the C&A hospital in Bangor.

If I tell you that the 'cake lady' next door in Stanley Terrace who I've been rather rudely referring to as 'Mrs' was actually Mrs Shurmer you'll realise that their boy called Danny was no less than our very own Danny 'lludw' aka GW7BZR! It took me a while to make the connection at the club and it was several meetings after he first appeared before I plucked up the courage to ask him if he was the 'lad next door' in Stanley Terrace all those years ago. Initially it was that unforgettable likeness to Tiny that caught my attention, and when I found out he was a Shurmer I realised it had to be him. Yes, Danny and me go back a very long way but I never thought all those years ago I'd end up in a caravan at Holyhead or Red Wharf Bay operating some contest and being yelled at by Danny because the rate wasn't up to scratch. I've had some amazing coincidences in my life but this has to be one of the strangest....

QSL Buro

(From Stewart Rolfe GW0ETF)

Just had an email from the QSL Buro manager for MW and 2W calls, Simon Smith, about uncollected cards. Here's a bit of what he wrote...

"I have now had my third batch of cards and unfortunately there are a lot which are uncollected and will be disposed of soon. The cards are for members and non-members of the RSGB. I would like to see if I can get a lot of these cards to their intended recipients.

Due to changes in the Buro in 2012 only members are allowed to receive cards from the Buro, I have had a couple of requests from clubs and individuals that I forward their cards to their local club but because they are not members it seems a bit unfair to those who pay for the service.

Please, all I ask is that is that you can ask your members with MW and 2W calls that if they want their cards and are members please put them in touch with me so that we can discuss getting these cards delivered and if they are not members for a small fee they will be able to receive them"

Have a look at <http://rsgb.org/main/operating/qs1-bureau/receiving-cards-from-the-bureau/> for information on receiving cards and what you need to do if you're not an RSGB member. Simon's contact details are...

golfmk1@hotmail.co.uk

01443 422130

07876 630397



John GW3GUX has asked me to bring to your attention the fascinating East Anglian Film Archive, which is full of many different documentaries and historical public information films. This most fascinating resource is available at:

www.eafa.org.uk/browse.aspx

Of particular interest is a documentary about War Time Radio: The Secret Listeners. This film is well worth a look on one of those rather inclement afternoons that we appear to have in abundance here in the British Isles! The film can be found at:

<http://www.eafa.org.uk/search.aspx#&&page=1&navid=&psize=10&text=the+secret+listeners>

DATV Developments in North Wales

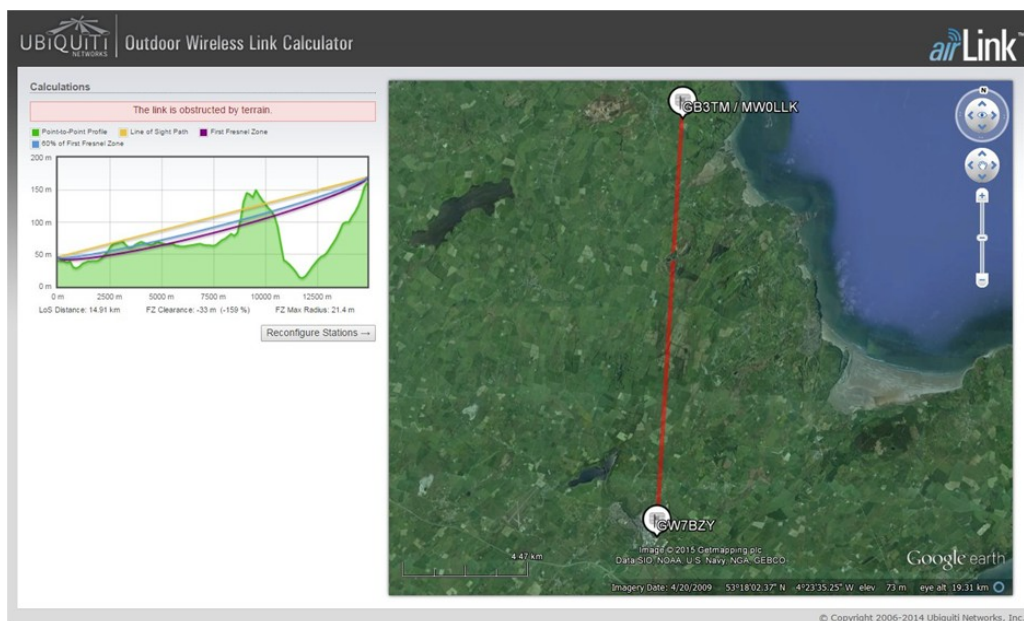
Written January 2015 by Chris MW0LLK working in collaboration with Peter GW7BZY

A small but active group of enthusiasts meet every week on GB3TM amateur television repeater. Recently some of us have been evaluating the use of DVB-T using the recently released, low cost transmitter and receiver from HiDes. This has lead us to some very interesting activity evenings with multiple modes in use, both by different participants and in combinations by some of the group.

North Wales is well known for having fairly mountainous terrain and getting direct paths can prove challenging however we do benefit from having an ATV repeater located on the Isle of Anglesey. This is situated in the North East of the island at Nebo at an elevation of about 150m.

The repeater is relatively visible from many parts of North Wales as well as from much of the island so our activity nights regularly include participants from Prestatyn (GW3JGA), Caernarfon (GW4KAZ) and Holyhead (MW0AQZ) as well as points in between. A number of contacts from as far away as Lancashire and Ireland are able to get into the repeater when conditions are right although it seems to be harder for them to receive.

One of our group, Peter GW7BZY is located in Llangefni and, as luck(?) would have it, has one of the island's larger features: Mynydd Bodafon, between his QTH and GB3TM. Getting into the repeater has always been challenging from this location even using DVB-S with 40W power. This works in good conditions, albeit with regular drop outs as soon as things change. Another amateur who used to be active on analogue and who has his QTH along a similar bearing, albeit a few miles closer, reported that he could not get into the repeater - which is (sadly) why he is no longer active on ATV. Peter was very keen to test DVB-T modes as soon as the equipment became available - in the hope that this would improve his signal into the repeater.



Later analysis using Ubiquiti's link calculator (albeit at 2.4GHz) suggests that it should not be possible to achieve a link as we don't have line of sight.

DATV Developments in North Wales ctd:

Conveniently another of our group: Chris MW0LLK has his QTH located only 300 meters from TM so we were able to work on setting up and testing the equipment at odd moments when convenient rather than having to set aside time to make site visits.

The setup:

The HiDes HV-102E transmitter was set up with an existing 70cm PA and antenna (usually used for dvb-s) at 6m agl. pointing towards TM. The UT100d dongle was set up with a 7 element 70cm ZL special yagi antenna at 8m agl. pointing towards the transmitter. No preamp or filtering was employed.

Initial testing:

On receipt of the equipment from HiDes some basic functional testing across the room was done, with no PA and the manufacturer supplied antennas. This was sufficient to determine what software worked (and what didn't) so the supplied "digital television" application was fairly quickly disposed of! We found that Videolan player or VLC worked well with the receiver dongle.

With 14 miles distance and half a hillside and a mountain between transmitter and receiver things were a little more challenging - however early success was achieved with 720x576 pictures being received as soon as everything was configured correctly. Much tinkering with parameters to see what could be achieved ensued and on 2 November 2014 full HD pictures were transmitted and received successfully between Llangefni and Nebo.



DATV Developments in North Wales ctd:

During GB3TM activity night the following week the group, together with viewers on the BATC stream were treated to a bit of fun and games.

MW0LLK's station at Nebo set up a virtual studio using Vmix and "introduced" GW7BZY. This took the form of a _huge_ television studio with presenter desk occupied by MW0LLK and a wall mounted "screen" on which GW7BZY appeared. During the course of activity nights the "mic" is usually passed around the active participants in the usual way when group working. On this occasion GW7BZY was visible on screen behind MW0LLK when transmission commenced and while MW0LLK speaking, and then - when "introduced" - GW7BZY alternately spoke from the virtual screen in the studio or was seen full-screen. The different shots or views were selected using Vmix to transition between them. Subsequently we reversed roles, with GW7BZY sending a green-screen image which was rendered into the virtual set after reception by MW0LLK.



Multi-mode relaying

So what - in technical terms - was going on? GW7BZY was using a local copy of Vmix to generate an hdmi video feed with him either against a green screen or locally inserted into a very smart radio room. This was transmitted to MW0LLK using dvb-t on 70cm.

DATV Developments in North Wales ctd:

The received picture and audio was re-streamed via VLC into vMix where it was combined with local camera (again using green screen) and virtual set to generate a final digital HDMI feed for the combined stations. After conversion to analogue video this was transmitted to GB3TM on 23cm fm from where it was retransmitted on 23cm dvb-s to the rest of the group.

Local members of the group were able to view this directly, with others viewing on the BATC stream thanks to John GW3JGA who was streaming received pictures and audio via the internet.

It was only after activity night was over that it was realised that GW7BZY hadn't once transmitted directly into GB3TM. His dvb-t signal held up for the entire duration of the session not having dropped at all - although sound was lost for the last few minutes (more on this later). This contrasts with his overs usually being punctuated by regular drop outs on dvb-s.

Another interesting comparison was the power being used to achieve the link. On dvb-s 70cm GW7BZY usually uses around 40W to open the repeater, on dvb-t 70cm only around 4W was required to maintain a steady signal. In fact when more power was applied (by reducing the transmitter output attenuation) the received signal was found to be harder to decode - probably due to nonlinearities in the "linear" PA.

There is a significant gain difference between the repeater receive antenna (crossed dipole) and the antenna used at MW0LLK station (7 element ZL Special 11.5dB) which accounts for this difference in power however on dvb-s signal is lost at regular intervals so we believe there is some benefit.

In subsequent tests with a more powerful PA (an ex-Tetra site 80W Nokia unit) we found, surprisingly, it was impossible to decode a signal. More work is being done to test this combination - it is suspected that PA non-linearities were again the issue.

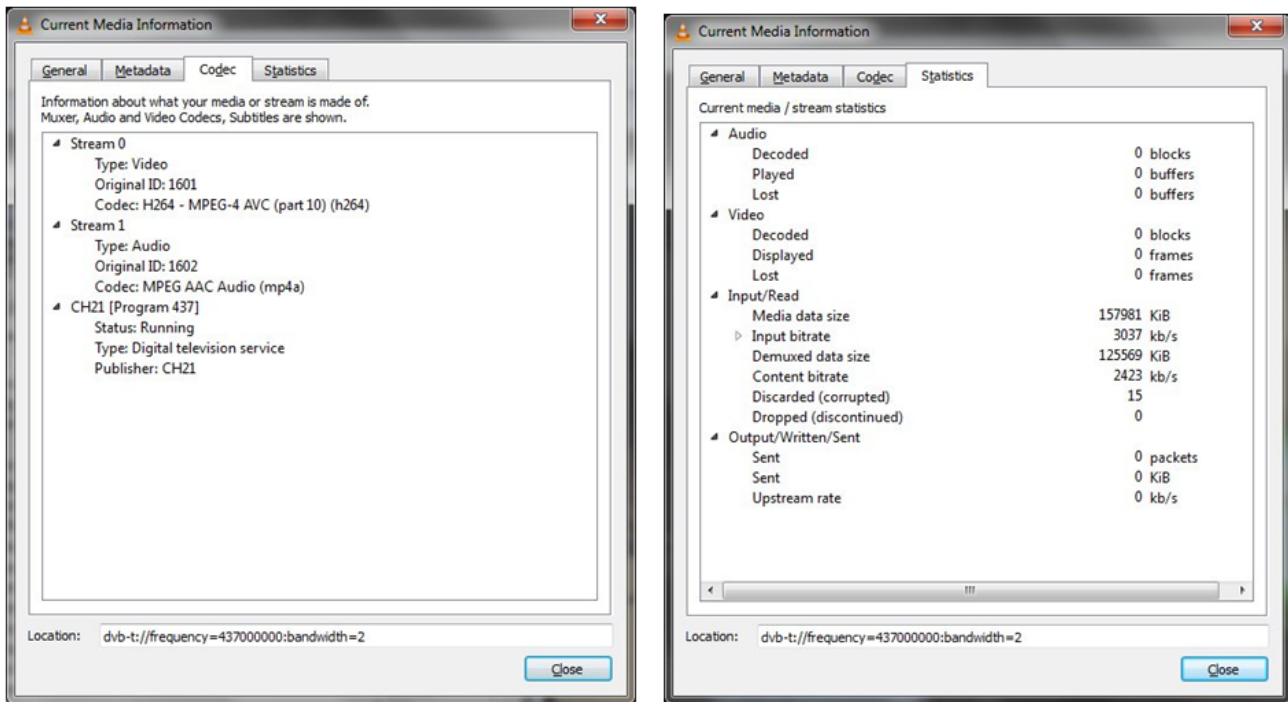
More work is required to carry out a direct comparison between DVB-S and DVB-T however initial results are certainly encouraging.

Data rates and DVB-T vs DVB-S

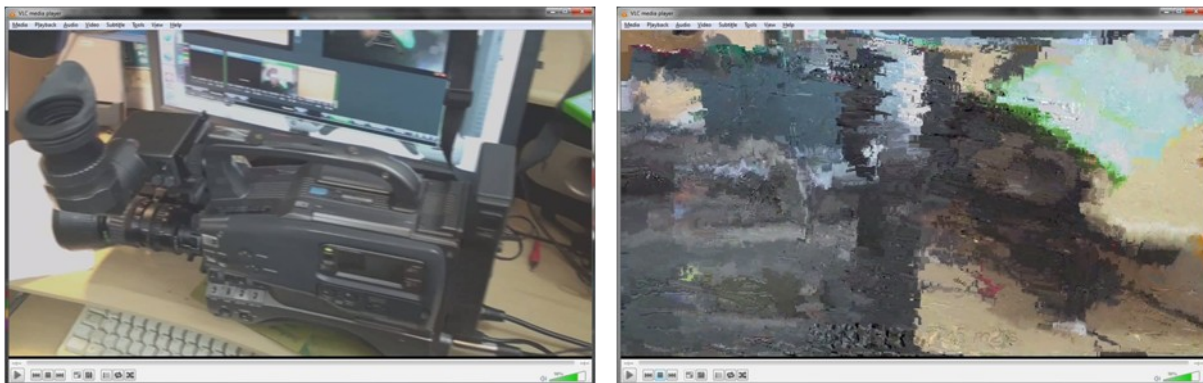
One major benefit of DVB-T over DVB-S is its ability to work in different modes. QPSK carries 2 bits per symbol which limits the bitrate on a 2MHz DVB-S link to around 3mb/s depending upon error correction settings. DVB-T supports QAM16 and QAM64 giving 4 and 6 bits per symbol respectively. This proportionally increases the bitrate for a given bandwidth allowing much higher resolution pictures or multiple channel operation - the addition of a guard band reduces the bitrate a little but the overall effect is a much increased data rate.

In our SD tests on DVB-T with H264 encoding compressing the HD video to around 2500 kb/s and the link giving 3000kb/s so there was a reasonable margin although some picture breakup and pixelation was seen when large movements were made.

DATV Developments in North Wales ctd:



Using 16QAM or 64QAM and lower forward error correction ratios it is possible to achieve much higher bitrates however the tradeoff is that you need much better signal to noise ratios to successfully receive these signals. We managed a link on 64QAM at 7/8 FEC giving a bit rate around 7.9mb/s which is more than enough for full HD. We did struggle to maintain this link due to interference / inadequate signal to noise ratio.



This does however demonstrate that with digital television modes it is possible to adjust the transmission parameters to suit a wide range of conditions - sending fantastic quality high definition pictures when conditions are good and progressively reducing the bitrate as conditions worsen. In this regard DVB-T does give a great deal more flexibility as there are many more parameters that may be adjusted as well as supporting several modes of operation.

DATV Developments in North Wales ctd:

Prior experience and licensing concerns:

Our somewhat unorthodox method of working the repeater at GB3TM had its origins a few weeks earlier in experimenting with Vmix. MW0LLK linked to GW7BZY using Skype. This feed was inserted into a virtual set using Vmix and the combined signal sent to the repeater on 70cm dvb-s. This was partly just trying out Vmix capabilities, but was done mainly so that MW0LLK could appear on the repeater in digital mode for comparison with his own, analogue FM, signal. It was a pretty convincing argument for MW0LLK to make some investment in DATV equipment!

The reverse setup was also tested with MW0LLK transmitting live a Skype feed from GW7BZY which gave us the idea for the work with DVB-T links.

Much debate was had about the situation regarding licenses: We concluded that we were working within the amateur radio license conditions since all participants were licensed radio amateurs and gave their call signs either on-screen or verbally at start, end and periodically during transmissions.



Limitations:

One of the major limiting factors with the setup was the lack of look-through at GW7BZY station. When transmitting, his 70cm output signal has the effect of desensitising his 23cm receiver. This meant that he was reliant on seeing the streamed output via the BATC stream which meant we had some very long pauses while waiting for him to respond to a hand-over. An attempt to provide a Skype feed from MW0LLK to GW7BZY towards the end of the session resulted in the audio from GW7BZY being muted - little did we know!

On a subsequent activity night we attempted to mitigate this problem by using Skype to provide a reverse talkback/picture channel from MW0LLK to GW7BZY. This appeared to work well in tests prior to the activity session however on the night we were beset by audio problems. GW7BZY could only occasionally be heard, and MW0LLK audio disappeared a couple of times too. It appears that Skype and Windows between them are very good at grabbing audio devices and/or muting whatever is currently playing so we are going to have to work on this.

DATV Developments in North Wales ctd:

Next steps:

We continue testing and improving the set-up. GW7BZY is able to send full HD pictures and audio although the computer at MW0LLK sometimes struggles to do the necessary processing to handle pictures at this resolution - let alone mix them into a combined programme output! Given that the station output at MW0LLK is currently SD this is an academic nicety in any case.

June 2015 update:

We have also tested a HiDes HV-110 DVB-T receiver recently purchased by GW7BZY and found this to be both easier to set up, and much more sensitive than the receiver dongle.

MW0LLK has invested in a DATV Express board and is working on different ways to generate transport streams to drive it.

Equipment used:

GW7BZY Station

Green screen: Wall hung photographic cloth

Lighting: Daylight bulbs in desk lamps

Camera: JVC GY-DV500

Video capture: Firewire direct connection

Computer: Generic Intel Q6600 Quad core running vMix and Open Broadcast

Transmitter DVB-S: SR Systems

Transmitter DVB-T: HiDes HV-102E

P.A. 70cm: Nokia Dolphin modified for amateur use 70W

P.A. 70cm: DG0VE PA70 40W

Tx Antenna 70cm: 19 Element Yagi

Rx Antenna 23cm: 23 Element loop Yagi

Signal Monitoring Generic Satfinder 7" screen (70cm DVB-S)

Signal Monitoring: HiDes UT100 dongle (70cm DVB-T)

MW0LLK Station

Green screen: 6' lime green roller blind (yes really)

Lighting: Overhead Fluorescent and LED strips

Camera: Budget domestic DV camera - composite output

Video capture: UVC USB Dongle (£7 ebay)

Computer: i3 laptop approx 4 years old running vMix

Signal output: HDMI to composite converter (£11 ebay)

23cm FM 18W Transmitter: Homebrew FM transmitter (loaned from GW7BZY)

Tx Antenna: Homebrew double quad loop

Rx Antenna 70cm: Moonraker 7 element ZL Special

Rx Antenna 23cm: Homebrew double quad loop (physically separated from Tx antenna)

Signal monitoring: (23cm FM) LMW Electronics VR3M-2400

DVB-S receiver: (23cm) Ross HD DVB-S2 1203

DVB-T receiver: (70cm) HiDes UT100D (loaned from GW7BZY)

Visit to Llandonna TV Repeater Site

On Monday 15th June 2015, several members spent a most interesting couple of hours being given a guided tour around the Llandonna TV and radio repeater site. The site is now owned and maintained by Arqiva and our guide for the evening was a fellow amateur who just happens to work for the company (my apologies I cannot remember his name, but am happy to publish it in the next newsletter if the information is forthcoming).



The station was built by the BBC in 1958 to provide 405 Line Band 1 VHF TV service and later VHF FM radio services for north west Wales, including the Llyn Peninsula Anglesey and the north Wales coast. ITV's service was provided from the Arfon transmitting station approximately 20 miles to the south on the mainland.

In 1967 the site became the area's main station for 625 line colour UHF TV, starting with just BBC Two in June of that year. By this time, it was policy to co-site all UHF TV services at the same site, and by 1973 Llanddona was broadcasting BBC One, BBC Two and ITV on UHF. S4C was added later in 1982 in time for its launch.

Though 405-line TV was discontinued in the UK in 1985, it seems that Llanddona shut down its VHF TV a year early.

In the late 1990s, digital TV transmitters were added, carrying all six national multiplexes.

In 2006, digital radio transmitters were added for the BBC's national multiplex.

On Wednesday 21 October 2009, the Llanddona group of transmitters underwent the first stage of the Digital switchover and on Wednesday 18 November 2009, analogue television was finally turned off from Llanddona and its group of transmitters as it underwent the second stage of the Digital Switchover. Freeview HD started transmitting using the BBC B multiplex on channel 53 in July 2010.

One thing I noticed was just how compact the modern equipment is, with all digital TV transmitters being housed in a single room, which previously has housed just one half of the transmitting equipment required for just BBC1!

Derek Roberts GW0CSR Remembered

A Report from John Brimmecombe GW3GUX

As reported in the previous newsletter, Derek Roberts GW0CSR recently became a Silent Key. I have received the following from Dafydd Owen MW5DJO, who knew him well for a number of years.

Derek Roberts GW0CSR

It was with sadness that I learned on the morning of the 25th of September 2014 that Derek had passed away late the previous evening. He had been admitted to Ysbyty Gwynedd on the 3rd of July where he remained until his death.

A native of Llanllyfni he had moved to Caernarfon where he and his partner Myrtle lived at 7 Llys Meirion.

After leaving school he worked as an administrator on the railways before moving to Peblig Mills and finally retiring from Ferodo Ltd.

Although not of a technical background he was an accomplished motor mechanic able to service and carry out repairs to his friends and colleagues cars in his garage at the rear of his home at Rhyd-yw Road, Llanllyfni. His speciality being the Mini, 1100 and 1300 series of cars, testimony to his mechanical ability being the care and maintenance he lavished on his beloved two tone green Riley 1300 car, which by the time he retired, had clocked up far in excess of 200,000 miles.

Derek was a keen and enthusiastic radio amateur having entered the hobby via the citizen band route where his handle was Riley Man.

He was always prepared to encourage and help new entrants into the hobby and was a dedicated and charitable member of the Dragon Amateur Radio Club, participating in events as he could. A stalwart of the RSGB news on 2 meters on Sunday evenings rarely missing the opportunity to reply to the news reader.

He will be sadly missed.

Myrtle would like to thank everyone for their concerns during his illness and their condolences after his passing.

‘CSR - R.I.P

Thank you for that Dafydd.

I would also like to add, that thanks to the donation to the club of much of Derek's equipment by Myrtle, a considerable sum has been raised for club funds.



Gwybodaeth am y Clwb / Club Information

- Cynhelir cyfarfodydd y clwb yn Neuadd Ebeneser Lon Foel y Graig, Llanfairpwll ar Nos Lun y cyntaf a'r trydydd yn y mis am 7.30 ar gyfer 8.00 o'r gloch. Croeso I ymwelwyr ac aelodau newydd.
- Club meetings held at Ebeneser Hall, Lon Foel y Graig, Llanfairpwll on the evening of the first and third Monday in each month at 7.30 for 8.00. Visitors and new members always welcome.
- Pob gohebiaeth at yr ysgrifennydd. All communications to the Secretary, Stewart Rolfe GW0ETF QTHR. Tel 07833620733. email: gw0etf@btinternet.com

Cylchlythyr Golygydd / Newsletter Editor

Simon Taylor 2W0CHV. QTHR: Email: m3set@yahoo.co.uk
Tel: 07791 963814

Pwyllgor / Committee

Cadeirydd / Chairman: Chris Tanner MW0LLK.

Is-Cadeirydd / Vice-Chairman: Danny Shurmer GW7BZR.

Ysgrifennydd / Secretary: Stewart Rolfe GW0ETF.

Trysorydd / Treasurer: John L Brimmecombe GW3GUX

Aelodau / Members: Neil Adam 2W0CZU, Allan Doyle 2W0YLE, Cliff Nicholls 2W0CBZ and Simon Taylor 2W0CHV.

We are on the web...

<http://www.radioclubs.net/dragonarc/>

<http://www.dragonarc.org.uk>

Issue number 108, will be issued in Hydref / October 2015. Any material for inclusion to be sent to the editor.