An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

Published by the UK Microwave Group

2009 MAY

In this issue ...

Latest News ...

- **Chuck WB6IGP now SK**
- **RAL a resounding success**
- **New IARU Region 1 76GHz record**

This unusual sign seems to indicate that EME may be done by some people operating /portable from the local park !

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From the Editor's Desk

As I write this editorial, it's raining like fury and there's quite a lot of thunder and lightning. Hurray, it's rainscatter season again! My immediate concern is for the HF gear though.. can't afford to get that struck so the microwave gear will have to remain in the garage ready for the next portable contest... which leads me to make a plea to all of you who can do portable microwaves to please do so this summer. I know the temptation is to stay at home and operate from there, often an inferior location, but the great outdoors are calling you. You ***know*** it's healthier to be on a hilltop microwaving instead of that warm shack and Sunday lunch on the table. Give portable a chance!

Thanks to all our contributors this month, especially W3HMS, OE3WOG, G3PYB and GW3JGA, not forgetting G4ALY and DF6NA for the RAL photos.

73 from Peter, G3PHO

IN NEXT MONTH'S SCATTERPOINT .....

- **10GHz Slotted Waveguide beacon antenna by G4BAO**
- **32GHz Downconverter for DSN reception by M0EYT**
- **RAL Antenna Test Range Results**
- **More photos from the RAL uW Roundtable**
- **Plus all the usual news and views from the World Above 1000MHz**

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown above. **The closing date is the Friday at the end of the first full week of the month** if you want your material to be published in the next issue.

ERRATA:
The picture on the front cover of the April 2009 Scatterpoint was "Courtesy of AMSAT-DL" not M5AKA and AMSAT-UK.

SOUTH YORKSHIRE MICROWAVE WEEKEND

11-12 July 2009

This event is getting closer and closer so you need to register as soon as possible if you are coming. Registration, while not compulsory, gives the organisers an idea of how many might attend. While the whole venue can cater for a hundred or so, the lecture room will be crowded with fifty! We also need to have some idea of how much we need to provide in the way of refreshments on both days. So please register by following the link shown on the events section at **www.microwavers.org** .

CRAWLEY MICROWAVE ROUND TABLE

In case you were not aware, this year's Crawley microwave round table will be held on **Sunday 13th September 2009** at the usual venue. As in the past, the afternoon program normally comprises of a number of talks on any microwave subjects. Please consider if you would be willing to give a talk this year. Your talk can be any duration up to 45 minutes and we can supply a digital projector if required.

Last year's request for talks initially brought precisely no offers whatsoever! Fortunately, through the efforts of Robin G8APZ, Brian G4NNS, Grant G8UBN, Sam G4DDK and David G0MRF a program was finally assembled. It would be great if I did not have to keep asking the same people to give another talk this year, and that some new offers were forthcoming. So, if you feel that you might be able to help, then please e-mail at:

chris@g0fdz.com

This round table has been a feature of microwave events for many years and it's continuation is entirely in your hands, so please support it this year by boosting the attendance and supporting the activities ... many thanks.

Regards from Chris G0FDZ

Editor's note: more information will be published in the June or July-August 2009 Scatterpoints

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Please also note the payment methods and be meticulous with Paypal and cheque details.

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*** Paypal to ukug@microwavers.org**

or

*** a cheque (drawn on a UK bank) payable to 'UK Microwave Group' and sent to the membership secretary** (or as a last resort, by cash sent to the treasurer!)

The standard membership rate for 2009 is:

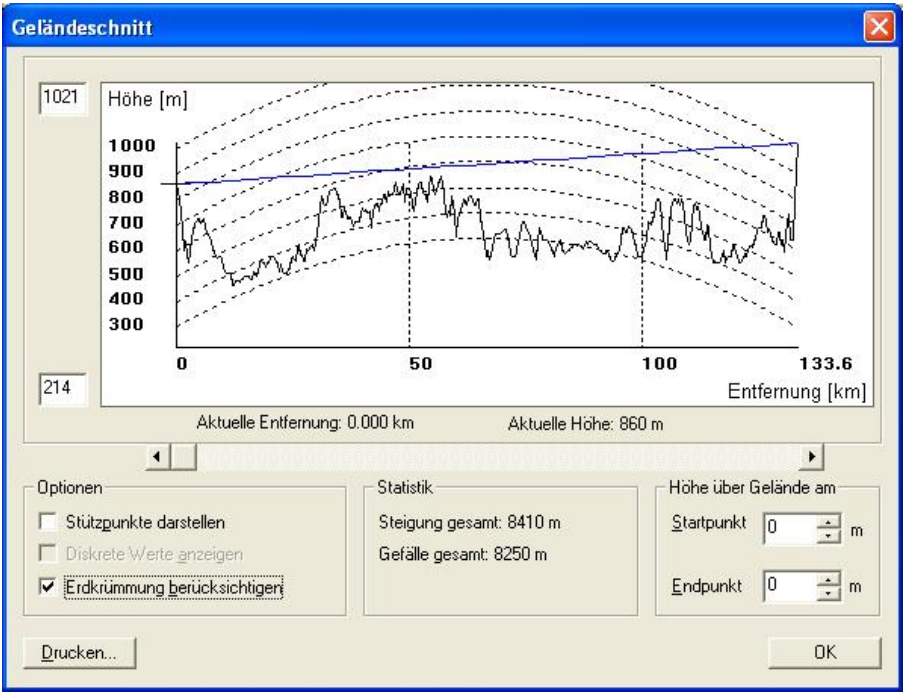
UK	**£6.00**
US	**$12.00**
Europe	**€10.00**

This basic sum is for **UKuG membership.** For this you receive Scatterpoint for FREE by email. If you want a paper copy **then the higher rates apply.**

133.6km on 76GHz

By Wolfgang Hoeth OE3WOG and
Rudi Wakolbinger OE5VRL

On Thursday, 9th April 2009, OE5VRL/5 and OE3WOG/P successfully completed a 76GHz SSB QSO over a distance of 133.6km. This QSO exceeds the 1995 IARU 1 record of 114km between HB9MIO/P and DK4GD/p.



The details:

date:	2009.04.09
time:	on Thursday, 9th April 2009 08:02 UTC
frequency:	76.032230GHz
path length:	133.6km
modulation:	SSB
reports:	53 to 54 (both)

OE3WOG/P

location:	Hocheck (OE3)
ASL:	1.037m + 15m lookout tower
locator:	JN77XX
TX output:	500microwatts (ESB)
RX NF:	15db (DSB)
antenna:	70cm Parabola, (KEPS)
IF:	FT790RII (modified)
temperature:	+12C°
visibility:	10 to 20km (ground fog)

OE3WOG/P aligned on 24 and 47GHz

OE5VRL/5

location:	Kammerschlag, (OE5)
ASL:	860m
locator:	JN78DJ
TX output:	1.2mW (DSB)
RX NF:	15db (DSB)
antenna:	47.4cm Parabola, (homemade)
IF:	FT290
temperature:	+15C°
humidity:	57%
visibility:	10 to 20km (ground fog)


OE5VRL/5 JN78DJ

Equipment Description:

Both stations use the same LO concept. The heart of these consists of a DRO from CTI which operates in the frequency range of 11.5 to 12GHz. The DRO (surplus from an outdoor microwave equipment, bought in Friedrichshafen) can be locked on harmonic frequencies generated from an crystal oscillator which operates at approximately 100MHz.


OE3WOG/P 76GHz

The OE3WOG 76GHz station (photo left) uses an external 131.250MHz G8ACE OCXO as reference. The 96th harmonic locks the DRO exactly on 11.6 GHz and fits my 432MHz IF approach. OE5VRL still uses the DRO internal reference circuitry but has replaced the original crystal to achieve the LO frequency required for 144MHz IF operation. Originally, the DRO was equipped with a +90°C heater which caused high power consumption and some difficulties in getting the proper crystals. Also, the overall thermal stability is not perfect because the heater concept is not OCXO style. The external source has the facility to lock the OCXO to a 10 MHz reference. (We are working on that issue). The DRO needs -20 to -15dBm for proper locking. Due to using an external source, the internal crystal and the heater circuitry removed, dropping power consumption and keeping the DRO much cooler. The DRO delivers a comfortable +17dbm (50mW) rf output.

The output from the DRO is fed via a 7dB attenuator to a WR28 waveguide tripler (originally a PA module from a 38GHz microwave equipment) which triples the DRO signal to 37.8GHz with an output power level of 80 to 100mW, depending on module type and tripler performances. Both the 37.8GHz and the IF signal are injected into a DB6NT 76GHz subharmonic mixer board. On the mixer board a pair of of antiparallel flip-chip diodes (MAE1218 from MA-COM) are glued from the end of the stripline to ground, exactly across a circular waveguide hole (2.7mm diameter) in the bottom of the housing. A circular tube is flanged to the housing and works as an open waveguide feed and holds the transverter in place in the front of the antenna.


OE5VRL/5
76GHz


OE5VRL 76GHz
transverter in place

The parabolic antenna at OE5VRL (see photos above) is made with a CNC tool, whereas OE3WOG's antenna is a commercial product from Keps, Italy. We assume that Rudi's antenna provides a gain of 47dBi, because of its perfect shape, whereas my antenna will not achieve the theoretical gain of 50dBi due to its imperfect shape. During the QSO, we experienced a 0.5° aperture angle for half power bandwidth, which made the antenna


OE3WOG 76GHz transverter in place

alignment quite fascinating!

We also have built CW beacon transmitters with varactor diodes. In this case we use the same boards from DB6NT, equipped with a GaAS Flip-Chip MA-COM Multiplier Varactor Diode, (M46H146) instead of the MAE1318 diode pair. As the varactor diode RF input power requirement matches perfectly with the 100mW rf output from the tripler unit, we have reached output power levels between 6 to 12mW on 76 GHz. This is typically 10dB more output power as we got from the subharmonic mixer but it limits TX operation to CW or FM. For receive, a subharmonic mixer is still required. We believe this concept is state-of-the-art for amateur radio usage in the millimetre bands, for the time being. Many amateur microwave stations are built in a similar way and we got useful information from them for our projects. Thanks to the rapid worldwide expansions of cellular systems, most of the parts and modules can be found in surplus or fleamarkets,

The QSO:

Of course, we selected a line of sight radio path with free fresnel zone but we were not completely confident if it would really work due to some unknown effects like Frequency Stability and Deviation, (multiplying 576 fold), Humidity, Antenna Alignment and the performance of the transverter.

The set up was done as follows: OE3WOG in JN77XX aligned the antenna for signal maximum from the Breitenstein 24GHz beacon in JN78DJ. Rudi, OE5VRL was located exactly 3km south of this beacon, which results in a deviation or correction factor of 1.5° from my position. Myself, OE3WOG/P in JN77XX, set up a temporary 47GHz beacon with 35mW output , equipped with a small circular horn antenna to give OE3VRL/5 on the other end the chance to align his antenna in my direction.

After completion of the one way antenna alignments on 24 and 47GHz respectively, we changed our equipment to 76GHz. OE5VRL/5 transmitted with his 12mW CW beacon and I quickly found Rudi`s signal. After correcting my antenna to 1.5° south, the signal increased to +10db above noise, measured with a audio level meter.

OE5VRL/5 replaced the CW beacon with the transverter unit and we completed the QSO on SSB. Using the transverters, the signal strength dropped by 10dB. We did not try to move to FM as the signal level was definitely too weak but it could be feasible with better propagation conditions. During the QSO, we used 2meter handhelds for talkback communications.

A video sequence of this QSO is available at:

http://www.youtube.com/watch?v=AUqXGD44FQE

Overall, it took 2hours of work to complete the QSO, including arrangements, hardware setup, antenna alignments, etc. During the QSO, the signal somtimes dropped below noise for sort periods but most of the time it was readable and above noise. As the visibilty improved with time of the day, the signal strength went up as well.

The Hocheck (JN77XX) is also home of the 70/23/13cm contest station of OE3A. The crew hads a hard time participating in the March contest because of the amount of snow. (A photo opposite shows the situation in April 09). At the beginning of March, the snow was twice as much. It was painful to tilt the tower for antenna installations after the winter break.

Currently in OE, only three radio amateurs (OE2JOM, OE5VRL, OE3WOG) are active on 76GHz. We hope we can encourage amateurs in OE, DL, HA, OK, OM to be more radio-activate on the microwave and mm bands.

Credits must be given to F1GHB, G8ACE, DL2AM, DC0DA, DB6NT, OH2AUE, just to name a few 76GHz players who provided useful hints and kinks on this topic.

73 and good DX on the microwave bands,
from Wolfgang, OE3WOG and Rudi, OE5VRL

The author can be reached at: oe3wog@oevsv.at

EDITOR'S NOTE: Scatterpoint is much indebted to Wolfgang and Rudi for this fine article

Above: OE3WOG/P FT790IIR and microwave control unit ... Front and rear views

Right: The antenna tower and alpine hut at OE3A

Below : The lookout tower on Hocheck Mountain, JN77XX

Right: The crowded shack at OA3A

Sun Noise Measurement for EMErs and Microwavers.

By John Jaminet, W3HMS

EME operators use sun noise measurements and Microwave operators do not, or so it seems! I have always been intrigued by the idea of sun noise measurement but have been "turned –off" in past by an apparent lack of detail and precise "how to do it "methods. I became active on 23 cm EME in August 2008 with a 3m/10ft dish and 120 watts. Very quickly I learned that my station is a very small QRP station and that it would take perhaps one year to get it finely tuned for maximum performance. Equally rapidly, I learned that EME ops use sun noise measurements to fine-tune their systems for the last few tenths of a dB. This is so because EME signals are weak at best and often very weak. It seems that few conventional microwave ops use sun noise measurements yet the improvements on a band like 10GHz would seem obvious given the weak signals found in DX QSOs.

What is sun noise measurement? The sun is a very dependable and constant noise source for the UHF and up bands. I do not know how low nor how high it is usable but I have seen references to measurements on 6m through 47GHz which is good enough for me. The basic reference is to cold sky which is ideally a place in the sky where there are no Celestial bodies that emit noise, nor trees, nor buildings, etc in the antenna view. The purest would note that one should indeed avoid constellations that emit noise but that it is equally not a concern to a small 3- meter dish station like mine.

The sun noise then is a measurement of the cold sky value, example –67dB compared to, example –57dB when the antenna is on the sun which yields a difference of 10dB. This is the sun noise value. If I were to log these 3 values along with the date, time, and solar flux, I would know that if I installed a new "Super –Snazzy" Model X10FV LNA from Brand X LNA, LTD and had 4 db of sun noise that I was going very much in the wrong direction! Conversely, if I replaced an LNA protection relay of unknown value and found a sun noise reading of 10.7dB, I would be happy!!

Some advantages of precise sun noise measurements:

1. No near -field distortions with a noise source only 93 million miles away, HI!!
2. Repeatability when referenced to the solar flux.
3. Precision to about one tenth of a dB to make system improvements be noticeable.
4. The same level of precision to make system degradation be evident.
5. No worries about polarization being H, V or circular.
6. No installation costs or power bills to pay for beacons.
7. No political "overrides" on your signal source location.

Most references to measuring sun noise that I have seen suggest that one must have a very wide-band amplifier connected to at least two or more expensive pieces of GR, HP, ABC equipments. As I did not work in the electronics business, I was neither a "walking catalog" of nomenclatures nor a person for whom pieces of lovely test equipment fell from unmarked trucks in front of his QTH, Hi!

Many EME ops like microwave ops are quite helpful to "newbies" into these two hobby subsets even those with gray hair!. Some are not and one just answered my question about sun noise measurement simply saying the GR-1296 is the standard with no info like, what is it called by function, where can I get one, what is the going market rate, what else do I need to use with it, etc. At this point, I was almost a retired EME op before being a working one!!

How to do it or not do it?

It seemed reasonable that my 23 cm EME IF radio, the IC 756P3 with AGC disabled, would measure sun noise and so it will with questionable precision. Is each S unit equal to 4 or 6dB? My Users Manual doesn't tell me and even if it did I could not read it by eye with sufficient accuracy for repeat measurements. I would also not know how it compared to the GR-1236 meter for comparison to other station measurements.

An option to this, not tried by me, with possibilities is a large audio dB meter on the speaker terminals or a digital VOM that can show readings to at least one decimal place.

It seemed perfectly reasonable to me that my SDR IQ at the 28 MHz EME IF frequency could be used to measure sun noise using the Spectravue software. To get more help, I posed the question to the Moon net and the WA1MBA Reflector. Ben, W4SC, kindly replied with info that he had done just as I had envisioned at Dale, W4OP's EME station and that the sun noise values were very close, within 4 tenths of a dB, to the GR-1236 standard meter. He emphasized that the SDR-IQ is thus a very good relative measure. He offered as well the complete settings as I have show below.

One could, of course, suggest that the SDR-IQ is an equally esoteric piece of gear not widely held and that my conclusions about the GR standard meter apply here. In the instant case, that is correct. However, we note with pleasure that the SDR design is here to stay with more and more radios using it so the SDR radio will be found in more and more stations as time moves along.

My steps are as follows:

- Using the camera on feed to the station video monitor, position the dish on the vertical line that extends above and below the sun.
- Switch this camera off to avoid damage caused by too much sun.
- Activate SDR IQ receiver on 28.050 MHz, CW, BW to 150kHz, DEMOD is off, S meter is RMS, AGC is OFF, FFT/BLK size at 32768 to reduce "jump", Display Peak Markers is ON, FFT Average to 1, and "Continium Mode" is the display. Set the vertical scale to 1 or 2 dB but this a function of your dish size and gain.
- Move the dish EL and AZ for maximum sun noise. Mine is often about –57dB on sun .... record value on note paper.
- Move dish in AZ and EL so the TV camera shows no trees in view nor any object and record the cold-sky value, example –67dB.
- Calculate the difference: in this case it is 10dB and this is your sun noise measurement.
- Enter these values into an EXCEL spreadsheet along with the solar flex obtainable from www.solen.info/solar/ among other sites and log the date and time. Do this every time you make an improvement or you think you do in your system.

The "Display Peak Markers", per Pete, N4ZR, will give you more precision by showing the 4 highest power peaks on a list marked by an "x" with numeric values in the INFO box.

Some EME ops have suggested that you can add date and time to an image of the above as a permanent record but I did not record the details. To me, the record in EXCEL is enough.

The next question is the obvious, I think: OK, so I have 10dB of sun noise, what should it be

for my station? The K5SO Web site ….Google this call….. has an excellent article on the topic and shows a chart of actual measurement by several most competent EME stations for different size dishes. My 3m dish fell between 2 measures so I drew in a line to represent a 3m dish. This told me I needed to find about 2dB in loss now present in my system. For info, VK3UM has developed and modified over time an excellent no cost software program in which the entry of the receive side data yields the predicted sun noise value. There are also simpler programs to do this in K1JT's WSJT4, F1EHN's EME among others.

With this as a background, I said to my Roving partner, Joe, WA3PTV, "Lets check- out our 10GHz rigs the same way". I did some planning and realized that I could power the laptop PC, the SDR-IQ receiver, and the 144MHz to 28MHz converter from an alternator in the van. The planned scenario for measurement would have Joe and I, plus MW colleagues, at a school yard about noon when the sun is overhead.

Then a seemingly mundane question hit us both: will the tripods permit looking up at 90 degrees and making minute and very precise adjustments without holding the dish and without the dish falling over?

A quick look at our two portable stations said: NO!! So before we venture forth to measure we must venture forth to our respective workshops to change the dish mountings. When ready, our objective will be to:

1. Set up the dishes on cold sky and record the value.
2. Set the dishes on the sun and record the value.
3. Subtract and record the sun noise.
4. Change the focal length + or – about 4 mm (a guess but go small) and do steps 1-3 again.
5. Repeat steps 1-4 enough times with changed focal lengths until you know that you have found the maximum value.
6. If you are using an offset dish, do the same steps 1-5 with vertical alignment of the feed until you have the maximum sun noise.

The 23cm EME test is very easy to do and I can do it in just a few minutes. One day I got my physical exercise by making 7 trips to the dish, each time making an adjustment in the focal length of the feed, then measuring and recording the sun noise again, then repeating this 6 more times !

The question can be asked: can I measure sun noise in the rain or overcast skies? Some authorities say yes and some say no. I take no sides on this issue: I just simply prefer to see the sun on camera, HI!!

WA3PTV and I look forward to trying our hand at 10GHz measuring using the procedure as above which we have NOT tried to date. We can and no doubt will learn some new points and change our methods accordingly.

Please address any questions, comments or concerns to me at W3HMS@aol.com

73, John W3HMS
17 April 2009

WB6IGP, Chuck Houghton,

SILENT KEY

The Microwave Group of San Diego is sorry to report the passing of one of our most active colleagues and a co-founder, Charles (Chuck) Houghton,WB6IGP. Chuck, 68, had been suffering from advanced effects of Parkinson's Disease and died at home, in his sleep, on April 29th. Chuck had retired a few years ago after a career of over 40 years with the phone company, as a communications toll technician in the broadcast services department handling all types of media services.

His impact on Amateur Radio vhf/uhf and microwave communications dates from the late 1960s when he was a ham radio mentor to a high-school age new ham operator named Kerry Banke, now N6IZW. Chuck at that time was also very active in the Military/Amateur Radio "MARS' communications system. He set up and maintained an important component bank to support the local MARS Program.

Chuck worked with Kerry on using surplus burgler alarm units containing Gunn diode oscillators, and converting them to usable two-way fm voice transceivers for the amateur 10 GHz band. He made and distributed printed circuit boards and parts kits, putting many of us on the air on that frequency band in the late 1980s. That was the first of many parts kits he produced for ham use.

His major impact on our hobby was through his extensive documentation of many projects in his monthly columns in 73 Magazine for many years, and later in CQ-VHF Magazine. Through these articles, hams and experimenters across and beyond the US borders were exposed to the work being done locally by he, Kerry Banke, and others. In particular he documented techniques to modify scrap RF assemblies donated for Amateur use by Qualcomm. He took the major role in distributing these units. This more modern modified gear has provided multitudes of ham operators world-wide with high performance capabilities. In recent years his articles also expanded to techniques for using laser diodes for long range optical communications.

He will most certainly be missed by all of us who knew him and benefited from his knowledge and writings. Services will be announced at a later date. Those who wish to send condolence cards can mail them to the Houghton Family at 6345 Badger Lake Avenue, San Diego, California 92119. Email condolence notes can be sent via Kerry Banke at kbanke@sbcglobal.com

73 from Ed Munn, W6OYJ
remunn@earthlink.net

EDITOR'S NOTE: One of the hobby's gentleman, Chuck's always wanted to help folk anywhere in the world. He supplied us all with information and boards for the well known Qualcom 1 watt 10GHz amplifier and numerous other modules and pcbs, often giving them for free to UK microwavers, this editor included, who met him at Microwave Update. His hotel room at MUD was sometimes crowded with people he'd invited up after the day's lecture programme to give them a pc board or two with the words, " Please takes this... and Merry Christmas" !!
We'll miss him greatly.

RAL MICROWAVE ROUNDTABLE 2009

The weekend of 25-26th April saw a large gathering of amateur microwavers, from not only the UK but from mainland Europe and North America, gather at the Rutherford Appleton Laboratory in Oxfordshire for a feast of lectures, socialising and technical activities. The following photos are just a small sample of what really happened.

Many thanks to G4ALY and DF6NA for these pictures.

Above: Moonbouncers all .... left to right are Dave WW2R, Brian G4NNS, Peter G3LTF, Sam G4DDK and Rainer DF6NA

Right: G4NNS's antenna test range was very popular on the Saturday. Robin G8APZ our Activity News editor is on the far right.

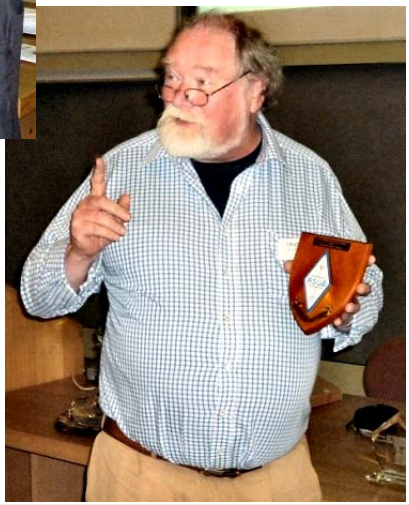
Above: Socialising and the bring & buy in the lounge all Sunday.The **Bring and Buy** saw a brisk trade in spectrum analysers (no less than 5 were up for grabs!) as well as lots of other goodies.

Right: Lehane G8KMH looking glum because no one wants to use his test gear ... yet! Later on, the bench was very busy. Thanks go to Mike Willis, G0MJW for arranging everything.

Left: An appreciative audience listened to lectures on LDMOS 23cm amplifiers by G4BAO and GW4DGU, the uWSDR transmitter projector by G8UBN and SatTV LNBs on 10GHz by G4HJW. In addition various awards were presented by the UKuG Chairman, Brian Coleman G4NNS

Right: Roy **G3FYX** (on the left of this photo) receives the G3BNL Trophy from Brian G4NNS for his technical contributions to many aspects of amateur microwaves over several decades.

Left: Ralph, **G4ALY**, is presented with a miniature of the G3EEZ Memorial Trophy which he received two years ago at Martlesham. The original trophy is of course returned after one year for reissue but Ralph gets to keep this miniature one.



Right: Everyone in the audience was amazed to hear that Chris, **GW4DGU**, had never been awarded a trophy or award before! It's very surprising that he had been overlooked for so long as his has contributed an impressive amount of technical input to amateur microwaves over past years. Finally, his efforts have been recognised and he was awarded the Fraser Shepherd Award at RAL 2009, as pictured here, for his work on low noise oscillators.

Thanks to all involved with RAL 2009 organization, especially G0MJW and the RAL authorities for the venue ... we all had a great time.
See you all next year!

West Coast Marathon ATV & Microwave Event 26th July 2009

Peter Blakeborough G3PYB and John Lawrence GW3JGA

The aim of this event is to concentrate as large a number of stations as possible in one geographical area by running a contest/activity day. The West Coast of England and the North Wales area is well suited to offer practical fixed and portable sites with reasonable radio path opportunities between EI,GI,GW,GM,GD and G stations.

ATV activity and narrow band microwave voice will be promoted by encouraging groups with suitable equipment to combine their activities. If you are an experienced operator please take along a new member and provide the opportunity for them to gain experience of ATV and or microwave equipment.

Portable operation demands a much wider set of skills, add to this the extra skills needed to produce an ATV signal, plus camera work, presentation skills for station identification and you soon need some additional pairs of hands.

We have purposely selected a summers day in July which is concurrent with a microwave contest. A separate date might have offered benefits but we are conscious that the pressure on summer hobby times is always pressing. Many ATV stations have an interest in narrow band operation and have the antennas and equipment for the microwave bands.

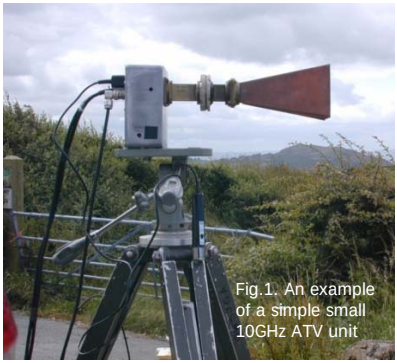


Fig.1. An example of a simple small 10GHz ATV unit

Very small stations and more complex stations will be promoted. (see Figure 1 left). If you have an older simpler 10GHz link and it could be used to link into a second station, dust it down, fire it up and teach a newcomer how to operate it and put it on the air on the 26th July.

At the other end of the scale is Fig.2 below ...

We are seeking to concentrate as many stations on the West coast above Wales as possible but the activity day and contest is open to all. We especially need stations in EI, GI and GD. The hills in Dumfries offer excellent locations for GM stations.

The 23cm band is the most popular band with 3cm and 13cm to lower extent, but we do have other bands and we would like to promote the other bands such as 3.4, 5.7 and 24Ghz. Put the thinking caps on and see how existing narrow band transmitters and receivers could be adapted to send ATV.

Streaming on the internet through the www.BATC.tv portal has been a great success enabling many more interested parties to follow the proceeding from outside the near geographical area.

GB3TM on the North East corner of Anglesey is a superbly sited repeater and will form a key station for many users. The North Wales ATV group will be streaming the output of GB3TM throughout the day, look on the “Live” streamer section on www.batc.tv

Several other repeaters also have a streamer attached, if you can provide a streamed feed from your own station please let us know and we will publish a list of active devices along with a our list of stations and sites which will be active on the day.

Fig.2. The adapted ambulance built by Phil GD1HIA on the Isle of Man

Please check the BATC forum web pages www.batc.org.uk/forum for the latest list of participants and updated news as we approach the 26th July. The lists will also be published in the June 2009 Scatterpoint.

Fig 3: the GB3TM repeater equipment

Fig 4: GB3TM Alford slots on the tower near Amlwch

Key categories for the competition:

1. Maximum number of radio path kilometres for any one station, any band, any number of hops.
2. Paths through repeaters are all valid.
3. Maximum number of hops for any one contact.
4. Maximum number of countries/prefixes.
5. Most novel caption design or station 'ident' used.
6. Largest number of newcomers at any one site.

One feature of the points system will be to transmit over as many hops as possible, that includes repeaters, and we will devise a special award for the maximum number of hops achieved.

Please take as many pictures as possible, as stills and/or video clips and we will publish a compilation after the event. This should include portable equipment, newcomers and that all important caption used for the station 'ident'.

We have three coordinators for the event, please send an indication of the location you are considering and the band(s) you plan to use, to any one of the following:-

John Lawrence GW3JGA	john.lawrence14@btinternet.com
Peter Blakeborough G3PYB	peter.blakeborough@pop3.hiway.co.uk
Peter Day G3PHO	microwaves@blueyonder.co.uk (for the UK microwave Group).

Even Simpler Simplest GPSDO Possible

Can it get even simpler? Visit http://www.g4jnt.com/EvenSimplerSimplestGpsdoPossible.htm
based on http://www.g4jnt.com/SimpleGPSDO.pdf and find out!

As this design is the biggest hitter on my website, lets see how the latest one takes off.
73 from Andy G4JNT

By Robin Lucas, G8APZ

During April, there were microwave meetings at Seigy in the Loire Valley, France (CJ2009) and the UKuG Microwave Roundtable at RAL. Many well known microwavers attend these events, and it is always a pleasure to meet so many of the faces behind the callsigns.

CONTEST and ACTIVITY REMINDER

May

19-May 1900 - 2130 1.3/2.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
30-31 May - 1296MHz and up (French JA)
31-May 0900 - 2000 1st 5.7GHz Cumulative
31-May 0900 - 2000 1st 10GHz Cumulative
31-May 0900 - 2000 1st 24GHz Cumulative

June

7-Jun 0900 - 2000 Low band 1.3/2.3/3.4GHz
Aligned with some EU events
16-Jun 1900 - 2130 1.3/2.3GHz Activity Contest
Arranged by VHFCC (RSGB Contest)
21-Jun 0900 - 2000 2nd 5.7GHz Cumulative
21-Jun 0900 - 2000 2nd 10GHz Cumulative
21-Jun 0900 - 2000 2nd 24GHz Cumulative

FRENCH JOURNEES d'ACTIVITE (JA)

20th-21st June - 1296MHz and up
12th July Sunday morning - 5.7GHz and 10GHz
Reflections from Mont Blanc
25-26 July - 1296MHz and up
29th-30th August - 1296MHz and up
26th-27th September - 1296MHz and up
24th-25th October - 1296MHz and up

Duration of all the JAs (except for 12th July) is from

HISTORIC PHOTOGRAPHS

The photo in the February Activity column of the Righi oscillator (dating from 1895) prompted an email from **OE3WOG**.

Wolfgang is editing the web site microwave page of the "Austrian Amateur Radio Society" (OEVSV). The website is all in German, and it can be found at this URL: http://www.oevsv.at/ (Follow the tab "Interessengruppen" and then "Link zum Wiki" and Kategorie: Mikrowelle).

Wolfgang will be starting with the history (Hertz, Bose, Lodge, Marconi, etc.) and will describe the developments in microwaves for industrial (briefly) and for amateur radio aspects (more detailed). The radio amateur part will cover klystrons, Gunn devices and the current usage of transverters.

Further articles will describe beacons, propagation, hints and kinks, mm-bands, measurement, MW-operators, MW-events, MW-DX records, building projects, etc. (a kind of reference to help beginners and provide some basics).

Wolfgang has asked for pictures or photos showing portable microwave stations, parts, equipment, or contest activities from the UK, both historical and recent. If you can help in any way, please contact Wolfgang by email to **<oe3wog@oevsv.at>**

BEACONSPOT ONE YEAR OLD

One year after the site was launched at the Bath RT in 2008, there are now over 470 registered users. During the past year, more facilities have been added but your suggestions for improvements or changes are always welcome.

Recordings of beacons which do not currently have a sound clip are needed in either **.wav**, or **.mp3** format. Ideally, these should include carrier either side of the full keying cycle. They will be edited to a suitable length. Please send sound clips to me, preferably with the beacon call and band in the filename, (and if possible, the date and time recorded) to **<g8apz@g8apz.org.uk>**

APRIL ACTIVITY

From: Gordon Fiander, G0EWN, IO93FK

April often produces some 'tropo' conditions for the microwave bands and so it was on the 20th and 21st of April 2009. A combination of high pressure (1023mb) with warm, sunny daytime temperatures followed by cold evenings/nights seems to do the trick.

On the 20th I noticed a number of beacons were showing including **GB3CAM** on **3cm**. On the 21st conditions were even better. I worked **DK7QX** 549 at 700km on **23cm** and Arie, **PA0EZ** who was 'end stopping'.

On **13cm** there was little activity but lots of beacons including **DB0JO** at 55dB/N (JO31), **GB3MHS** 25dB/N (JO02), **ON0GHZ** 45dB/N (JO20), **DK2MN** 40dB/N (JO32) and **GB3ANT** 40dB/N (JO02). (All dB/N in 2.5kHz bandwidth). **3cms** produced **GB3CAM**, the strongest I've heard it at 40dB/N whilst **ON0RUG** was around 20dB/N and **DB0GHZ** was 40dB/N.

I tried a few **3cm** tests with **G4HJW**, **G4BAO** and **G4EAT** but surprisingly all failed. (I think this is the first time a test with John **G4EAT** has ever failed). I have noticed conditions like this before and offer the following explanation.

The event was largely a 'North Sea' event, which is typical when **DB0GHZ** is audible. However I believe a series of ducting layers were present over the paths to the SE including **G4HJW**, **G4BAO** and **G4EAT**. **GB3CAM** was heard well; I think this was due to its lower gain antenna which would have a wider vertical radiation pattern, otherwise its hard to account for why I heard **GB3CAM** with its relatively low EIRP and not the nearby stations of **HJW**, **BAO** and **EAT**.

73, Gordon G0EWN

UK ACTIVITY CONTEST - APRIL

During the April Low Bands UKAC on 21st April, Ray, **GM4CXM** (IO75tw) found activity to be fairly well spread across most of the UK, but he noted a drop in activity from the S and SE of England. Ray worked 15 stations in 4 countries during the session, including 4 over 500, with his best DX being **G3XDY** (JO02) at 565km.

There was more activity from **GM** with at least 6 stations active, plus **GI**, **GD**, and **GW**.

John Quarmby, **G3XDY** (JO02) also took part in the UKAC on 21st April. Following the good conditions of the 20th, by the 21st April the tropo went east over the North Sea, but did not extend inland very far. Highlights on **1.3GHz** included **OZ1FF**, **OZ5BZ** and **OZ9KY** all in JO45, **OZ1CTZ**(JO46), together with **SK7MW** and **SM7ECM**(JO65)

On **2.3GHz** the best were **OZ1FF**, **OZ5BZ**, **PA3CEG** (JO33). **DF9IC** (JN48) was worked on both bands without benefiting from significant enhancement into Germany.

BEACONS

The new **24GHz ON0GHZ** beacon in JO20kv is now QRV. This should be a very useful indicator of conditions. The 500mW DDS beacon built by **ON4IY** is "state of the art" and is GPS locked on **24048.050MHz.**

Above: ON0GHZ beacon hardware on display at CJ2009. Indoor unit in the foreground, with the masthead box at the rear.
Photo by G4ALY

Conditions were up in many parts of Europe, and Beaconspot.eu notched up an incredible 68 beacon spots in a 24 hour period on 21st April.

In addition to **ON0GHZ**, several new beacons were reported, and some others reactivated. **PI7SHY** (JO22nb) on **10368.040** is one within range of the UK, as is **DB0ACU** on **1296.651**.

BEACONS (Continued)

Ted, **G8AZA** wrote to say that he has been out doing reception checks on **GB3AZA** (**3cm**). He covered the North York Moors to the west as far as Sutton Bank, east to Ravenscar, then west to the Yorkshire Wolds at Pocklington Ridge overlooking Selby/Goole, and finally East to Flambrough Head. The signals at all of the locations were 599, although Ted noted a slight chirp on the keying. Reception reports please via DXC spots.

24GHz PERKS UP

On the morning of the 21st April, **G4EAT** (JO01hr) was hearing the **3cm DB0JO** beacon (JO31) very strongly. John arranged a test on **24GHz** with Theo, **PA3AWJ** (JO21gw), and soon found Theo's signal. There was heavy QSB on the signals, and the 270km QSO was made on CW. Since the conditions were changing, it seems as if the contact was made just in time! This was a new square for John on **24GHz**.

Soon after John's contact, I went outside to wind my mast up, and I checked the **24GHz GB3MHK** beacon. The obstructed path is only 84km, but I have never heard it so strongly - it was pushing the S meter way above s9!! Strangely, although I am 25km further away from **GB3MHK** than John, on this occasion he could not hear it, but could see an inversion below him. The sun soon burned off the ducting layer, and conditions returned to normal.

MAY CONTEST REPORTS

Tony Gallagher, **EI4GHB/p** (IO63) operated from near Dublin. He had his first QSO on **3cm** with **GD0EMG**, which he was very pleased about. His first **23cm** contacts outside of **EI** included **GM4CXM**, **G3VKV**, **G4PBP**, **G4EAT**, and **G3XDY**. The best DX was **G3XDY** at @@@ km. Needless to say, Tony is looking forward to the next GHz event!

Richard Newstead, **G3CWI** decided to go out portable during the **10GHz** Trophy Contest. He took his gear to the summit of Moel Famau (554m) in the Clwydian Hills. He backpacked the equipment to the summit, arriving soon after 3pm, and in two and a half hours operating, Richard made 8 contacts in 4 countries (**G**, **GW**, **GM**, **GD**). Surprisingly strong signals from **G4RFR/p** gave him his best DX at 260km. **G4RFR/p** have a 20W SSPA at the feed of a 1.6m offset dish, and their location at Bell Hill is 265m asl.

John, **G3XDY** (JO02) noticed a degree of coastal tropo on the Saturday night, with very strong signals from **PA6NL** on all bands, but the conditions did not extend inland so benefited relatively few stations. On **1.3GHz** the highlight was **OK2KKW** (JO60) worked by aircraft reflection. This QSO took about 10 minutes waiting for a second plane to get in the right alignment and get the confirmations completed. Other good DX included **DL0GTH**(JO50), **DF0YY**(JO62), **DK6AS**(JO52), **GD0EMG**(IO74), **GM3HAM/P**(IO74), and **GM4CXM** (IO75).

On **2.3GHz** his best contacts were **GD0EMG**, **DL0GTH**, **DF0YY** and **DK6AS**, all worked by aircraft reflection. **3.4GHz** produced no real surprises, the best QSO being **DF0MU** (JO32). Signals were exchanged with **DL0GTH** but reflections were too short for a QSO. John reports **5.7GHz** activity seemingly up this year, with 14 QSOs made, although there was no real DX. **10GHz** was a similar story, with 17 QSOs but nothing exceptional to report.

John's real bonus was was the operation from IO63 by Tony **EI4GHB/p** immediately at the end of the contest. John worked him for a new square on 1.3GHz.

Jeff Easdown, G4HIZ took his **3cm** kit (see photo right) to Warden Bay on the Isle of Sheppey (JO01kj) together with a 2m beam. Here is an abridged account of his day.

"... I then pointed the beam towards the Suffolk coast and called on 2m to see if I could generate any interest in **3cm**, alas with no luck. Next, I set the receive frequency to **10368.100** and swung the dish in a Northerly direction across the sea. Our location in the car park was about 10m ASL. I heard one guy's **3cm** beacon coming in quite clear. He then went onto phone as he was already in contact with another station. Although weak I heard him say 'lets try **6cm** now' and he was off and that was the last I heard from him. I set my beacon going every now and then on **10368.100** and listened with no luck (beacon was CW callsign + QRA). I wondered if I was radiating, but I checked the power on my return home and it was still 230mW. I then tried the Martlesham beacon, **GB3MHX**, on 10368.830. This came crashing in at S9+ on **10368.833**. So no problems on receive.

Two Poles stopped to chat, one of whom was a radio amateur at home, Krzysztof, **SQ7HJG**, who was very interested in the kit. I was using a 90cm dish with a **DB6NT** barefoot at about 230mW output. The driver was an FT817ND. Frequency was locked to a Rubidium source.

Altogether, not much **3cm** activity from my viewpoint (where were they all !) but all the same an enjoyable afternoon.

My XYL Joan (**M3SIZ**) helped with assembly, support etc. and my son William provided some extra company. **73, Jeff** "

From: Chris Bartram, GW4DGU

I didn't do much operating this month. However, I went out with my **24GHz** gear for a very pleasant rove around N. Pembrokeshire and a small part of NW Carmarthenshire.

Although no formal QSO resulted, I did at least exchange **24GHz** signals with Keith, **GW3TKH/p** located at Cefn y Galchen, near Blaenafon over a spectacularly obstructed 107km path to the lower slopes of Frenni Fawr near Crymych in the NE of Pembrokeshire.

A plot of that path shows two obstructions (Fan Gyhirych, 723m and Waun Lefrith, 665m) in the Brecon Beacons. The propagation mechanism was, I suspect, diffraction as the signals were 10 - 20dB above the calculated troposcatter path loss, depending on the assumptions made about water absorption.

I also ran tests with **GD0EMG/p** (243km) and **GM8BJF/p** (325km) from a site with good sea views near Dinas Cross with negative results. The Irish Sea, like the North Sea, has the potential to support interesting propagation but it just lacks the resident amateur microwave population.

Nothing happened this time, but there's always another opportunity in the future! I was running about 2W to a 40cm dish. The receiver noise figure is around 4dB. If I'm going to make contacts from this part of the world, I clearly need to improve my system!
73, Chris, GW4DGU

EME - FIRST G - LZ ON 13cm

On 29th April, Howard **G4CCH** worked **LZ1DX** on **13cm** in what is thought to be a first contact on **2.3GHz** between England and Bulgaria. The CW exchange took place with O reports.

Ned, **LZ1DX** has a 2.4m dish, septum feed, **G4DDK** LNA and 400W, but at the time of the QSO had some problems with connectors.

G4CCH has also been steadily clocking up more firsts on **23cm**. The following firsts were made since the end of 2007 using JT65c (apart from the QSO with Uruguay which was on CW). **OA4BHY** Peru, **3A/DL3OCH** Monaco, **DL1YMK/CX** Uruguay, **UA9FAD** Asiatic Russia, **LZ1DX** Bulgaria, **T7/HB9EHJ** San Marino, **V5/KT6Q** Namibia, and **5N0EME** Nigeria

The **23cm** system at **G4CCH** is comprised of the 5.4m dish, **W2IMU** feed, 650W CW or 450W JT (PA is 6 x 2c39ba watercooled), and a **WD5AGO** LNA with 0.31dB NF.

EME DUBUS CONTEST

G4CCH was also QRV for the **13cm** Dubus EME contest on 2nd/3rd May. Howard's system on **13cm** consists of a 5.4m dish, round septum feed, 250W SSPA (150W at the feed), and a **G4DDK** LNA (0.36 dB NF).

Howard worked the following stations. Those with an asterisk (*) denote cross band to 2304:

W5LUA*, **F2TU**, **DL1YMK**, **SD3F**(**SM3AKW**), **HB0/DL1SR**, **SV3AAF**, **SM2CEW**, **G3LTF**, **F5JWF**, **G4DDK**, **OK1KIR**, **K2UYH***, **ES5PC**, **WA6PY***, **OK1DFC**, **OE9ERC**, **SP6GWN**, **IW2FZR** and **WD5AGO***.

Howard also heard **VE6TA***, **NA4N***, **OK1CA*** **W7BBM***, **DL4MEA**, **F6BKB**, **GW3XYW** and **VK3NX** (crossband to 2301).

From: Brian Coleman, G4NNS, Andover

After the long cold winter some rust had developed in the elevation drive train for the EME dish and this was causing the elevation drive to stick. After clearing this and adding suitable lubrication I was able to check the system on **10GHz**. It was showing between 2.7 and 3dB of moon noise in the cold weather, noticeably better than in the height of the summer. Echoes were good so all was ready for the **10GHz** section of the Dubus EME contest on March 28th and 29th.

I managed contacts with 5 stations on the first pass and another 5 on the second pass. Signal reports received ranged from O to 559 and those sent from O to 579 (**WA7CJO**). Viljo **ES5PC** expressed the view that (even) the small stations should call CQ more, a sentiment with which I agree as I never heard some of the small stations that were allegedly QRV. Mine is a relatively small station and even I had some replies to CQ calls.

The 4th and 5th of April saw the **5.7GHz** section of the contest, so the cassegrain sub reflector was removed from the dish and the focus box fitted. This houses the transverters and feeds for the lower bands, currently **5.7GHz** and **3.4GHz**. I was still running linear polarisation on **5.7GHz** having not had time to check out and adjust the septum feed. Nonetheless, 8 stations were worked including 5 initials bringing my total on that band to 10.

May 2nd/3rd brought the **3.4GHz** session and I was able to get the septum feed for this band tested in time although some further adjustments may be needed. Luckily I got the sense of the circular polarisation correct and was rewarded with a reply to my CQ call on the 2nd which resulted in a QSO with **OZ6OL**. As this contest included **2.3GHz** most stations with that band were on **2.3GHz** for the first pass so I had to wait 'till the second pass on Sunday 3rd before more QSOs resulted. The total was 6 stations with two initials bringing my total on this band to 8.
73 Brian

... AND FINALLY

Thanks for your input this month. **73, Robin, G8APZ**

Please send your activity news for this column to:

scatterpoint@microwavers.org

CJ2009 Seigy

Text G8APZ - Photos G4ALY

The nineteenth annual gathering at Seigy in the Loire Valley was held at the beginning of April, and this year was blessed with ideal weather and the usual excellent attendance. The construction contest was once again very popular with as many as 25 entries, most of them microwave items which were all built to a very high standard. Amongst them were no less than four beacons. F1JGP entered the F1ZUM 2.3GHz beacon which won a special award in the "Beacons" category, F6DPH showed a future 3 band beacon for 5.7GHz, 10GHz, and 24GHz, which won the "Beacon" category, ON4CDU exhibited the ON0SHF beacon and ON4IY entered the beacon for 10GHz at ON0GHZ. The latter two were GPS and DDS based beacons, and both won an award in the "Innovation" category.

Of special interest was a parabolic dish entered by F5IGK, with a well engineered system of four transverters for 23cm, 13cm, 6cm, and 3cm. These were selected from the control box, to enable band selection by rotating the transverter and feed horn! This won the "Antennas" section.

ON4IY gave a presentation on the DDS AD9912 for use in beacon applications, and F5DQK gave a talk on the use of the gain and noise analysers EATON2075A and HP 8970A. F9ZG made a two way laser demonstration, whilst F5JGY organised a workshop demonstrating ground and sky noise measurements. On the measurement front, about fifteen preamplifiers were brought along for testing. The CJ2009 Proceedings sold well, and contained some fourteen technical articles.

The President of REF-Union (the French national society) Betty Magnin, F6IOC attended the dinners, and also helped to man the REF-Union stand and the bookstall. The REF President also presented the awards to the winners of the construction contest.

The Friday evening dinner at Noyers-sur-Cher attracted 90 guests, and on the Saturday evening the dinner in nearby St Aignan attracted nearly 80 guests - A very enjoyable and convivial part of the proceedings! Finally, the open air flea-market saw very many traders doing a brisk trade with hundreds browsing for bargains. Next year's event may be the last to be held at Seigy, since there were rumours of it moving to a venue near Tours. It is certainly a very lively meeting!


F6IOC


F5IGK rotating feeds


F6DPH 3 band beacon


Traders


The dinner on Friday