432 AND ABOVE EME NEWS
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CONDITIONS: The big news this month is EME2012 Cambridge. As predicted, this conference set a new record with 195 registered EMEers in attendance (and 73 spouses)! The organizing team scored a true "hole in one" – TNX for a great job! The hospitality, talks, camaraderie, facilities could not have been better. A group from BATC provided video of the conference via the Internet. A remote controlled 2 m EME station, GB2EME, made 122 QSOs of the Moon during the conference. The next conference to be hosted in Brittney (Lannion, France) in 2014, will have a difficult time matching this one.

The record crowd at Cambridge EME2013 (195 EMEers!)

Because of the EME2012's success there is not a lot of EME activity to report. But the situation will change dramatically during the coming month. There are already two dxpedition scheduled in the next month. The Channel Islands, GU and GJ, will be QRV on EME TNX to DL2NUD and DJ4TC between 29 Sept and 9 Oct. Hermann and Peter's focus will be on 70 and 23 cm this time. They will have on 432 a 21 el horz yagi with 120 W (400 W sometimes) and on 1296 a 62 el horz yagi with 200 W (400 W sometimes). SV9/DF8DX will put Crete on 1296 EME on 2/3 Oct – see Bodo's report later in this newsletter (NL). Coming up immediately is the 10 GHz Activity Weekend (AW) on 8/9 Sept. This AW will be a good warm up for the ARRL's Microwave EME Contest that will take place on 6/7 Oct. The ARI has also scheduled their CW EME Contest for 29/30 Sept.

TNX for the award celebrating 40 years of the EME NL

A highlight of the EME Conference was the presentation by Eddy, ON7UN on the ON0EME 1296 EME Beacon. It is a truly impressive installation. A website with information about the Moon beacon can be found at http://users.skynet.be/on0eme/. In the future they plan to also add a beacon on 3 cm!

G3LTF: Peter's pkb100@btinternet.com Aug report -- The Moon's position before the EME Conference was ideal for early morning QSOs and I was able to have some nice ones on 23 and 13 cm. On 4 Aug, I was on 1296 and worked SM7FHZ, and on 8 Aug I5MPK. I failed with DJ5AR, whose signals were much weaker than expected for his set up. I worked on 9 Aug ZS5Y for initial #360 and the first ZS for many years on EME, followed by OK1MS, on 10 Aug I5MPK and a nice SSB QSO with I1NDP, and on 11 Aug OK1MS again followed by SP7DCS on SSB. On 12 Aug, I was on 2320 and worked DL1YMK/A, SP6OPN and YO2BCT for initial #108 and the first YO-G QSO. I enjoyed the conference immensely although because of my involvement with its running, I missed greeting a lot of people. The emails on the reflectors and personal ones indicate that it was very successful. As usual I came away with some ideas for improving my systems!

N4PZ: Steve n4pz@live.com writes about his experiences at EME2012 -- I am back from the EME conference in Cambridge. I have attended dozens of conferences over the last 50 years, and I have to say this one was better than all the others combined. I have NEVER seen one so well organized. Everyone was made to feel that he or she was VERY special. Please send thanks to the guys and their wives for doing an UNFORGETABLE job! Since my return, I have actively try to encourage VK/JA contacts with North America with some success. On Saturday 1 Sept at moonset I worked VK4CDI. Reliable Phil was (449). VE3KRP was also in there (449). JH6AHB produced strong echoes at (569). Nothing was heard from any other station. VE5KKZ was unable to find the Moon. I plan to continue concentrating on VK/JA activity, as well as Europe and North America during future weekends.

SV1CAL: Michael michael_margaras@yahoo.gr writes -- I reported in the Aug NL that when my 23 cm N2UO IMU feed was placed at the focal point of my 2 m dish, the TX/RX isolation dropped from 45 dB when aimed at open sky to about 13 dB. This loss of isolation contributed about 15 K to the total noise temperature. I was looking around for solutions to improve TX/RX isolation and found RW3BP's excellent idea to use a metal disk placed inside the feed. Doing some experimentation with the diameter and position of this metal disk, I finally was able to get almost 60 dB TX/RX isolation. For my feed and dish, the optimum diameter was found to be 73 mm with a position about 45 mm inside the dual mode section. Of course, to reach such an isolation, fine tuning of both the position and diameter in about 1 mm steps is necessary. The metal disk is kept in place by a long plastic screw and a pair of nuts allowing for some adjustment. Sun noise without the metal disk was measured at 9 dB, while with the disk in place it was 10.2 dB (SFU=94 at 10.7 cm). These numbers are inline with VK3UM's EME calculator. With this high isolation, the LNA's protection switch could be removed to further increase sensitivity. However, for the time being I decided not to remove it because the TX/RX isolation seems to change (down to 35 dB) when moving the dish. This wouldn't be enough to protect the LNA during transmission. I think this happens because the feed support isn't very stiff and the open end of the feed is made of 0.4 mm copper sheet that is vibrating slightly. But even with 35 dB of isolation (worst case) the problem of TX port noise coupling into the LNA is solved as my Sun noise measurements confirm. All in all, I think with some experimentation of the metal disk diameter

and position, in cases of poor isolation, the sensitivity could easily be increased. This seems to be true, especially in cases where the focal distance is less than a couple of meters, which means the feed is physically closer to a large metal surface. On the other hand, how much improvement in sensitivity can be achieved using a metal disk depends on antenna and receiver noise temperature. The next step is to try to remove the LNA protection switch by making the whole structure more robust to avoid vibration or relative motion.

SV9/DF8DX: Bodo (x-DL3OCH) df8dx@gmx.de is about to hit the road again -- Its about time for me to show some activity on 23cm EME. My last activity dates back to Dec 2010/Jan 2011 at BV2A and DU8/DL3OCH. This time I will enjoy some vacation with my wife on Island of Crete. I will take the IC7000 and transverter with 59 el yagi used from so many other locations. The call will be SV9/DF8DX From grid KM25 (exact locator will be given later) and also IOTA: EU-015. I will be activity on 23 cm EME on 2 Oct from 2000 to 2130 for EU and on 3 Oct from 0400 to 0600 for NA. Backup dates will be on 3/4 Oct respectively starting 30 minutes later. TX will be on 1296.090, first period, with RX on my own echo frequency (just like in CW). I will be on SV9 from 1 to 6 Oct, but also plan to do some vacationing and HF CW. I could be QRV on 23 cm on other dates, if necessary. If you have a problem, write me.

TM8POR: Franck (F5SE) kozton@free.fr announces a 16 Sept 23 cm EME demonstration -- Together with FØDTB, who helped greatly during the construction of my dish, and the F8KGY ATV radio-club (in Thionville), we have again organized an EME/ATV demonstration. For EME we will use my 10.5 m dish (a show by itself, hi!). The ATV activity will use a 2300 duplex "live" ATV link between my location and the city where the show will take place, some 80 km away from the dish. We will use the special callsign TM8POR. My EME station will be remotely controlled by an operator located in the show hall. TM8POR operate on Sunday, Sept 16th from 0900 to 1600 on1296.040. Echoes will be run most of the time, but a few "real time" QSO's would very much be appreciated. So, if a couple of the "big" 1296 MHz EME stations scattered all over the world could be QRV, this would be welcome. During the show, the Moon will be 7° away from the Sun, far away enough to avoid sun noise interference, I hope! This date was established one year ago, and already at that time, this was the one and only possibility.

VE6TA: Grant ve6ta@clearwave.ca sends a note regarding his 5760 EME activity -- I have been working on getting on this band since Dallas 2 years ago. It has been a struggle to say the least to build and find the needed equipment. Then I discovered that my dish worked more like a 2.5 m than a 5.5 m dish on 6 cm. I added a 3rd ring, and brought the sun noise up from 6.5 dB to 9 dB. Still not spectacular, but better. After hearing nil from the TM8 station, (really a combination of errors), I arranged a few schedules with stations that I had heard in the past. My first initial was K5GW due to his super station, good ears, and patience. Then I worked W5LUA with a bit more of a struggle, but it was great to have Al in the log. Recently, I arranged a sked with F2TU. Philippe, after a very patient schedule waiting for me to find the Moon and get a window without trees, was put in the log for initial #3. I am very excited and good to see the struggle finally pay off. Many have helped along the way with tips and encouragement such as VE4MA, K5GW and G3LTF. I am not sure that I can stretch many more tenths of a dB out of a homebrew dish that was really designed for 1296, but it's been fun.

WA2FGK: Herb (K2LNS) wa2fgk@yahoo.com that in addition to 70 cm, that he and Andy (WA2FGK) will be QRV on 23 cm with a 12' dish and 500 W DB6NT SSPA. They are also near QRV on 13 cm with about 150 W.

WA2FGK's 12' dish to be used on 23 and 13 cm EME

WB7ABP: Lynn wb7abp@gmail.com is now active on 23 cm EME -- My old friend W7IUV got me interested in EME. Larry and I worked together 40 years ago, when I first got out of school. Always enthusiastic, he told me how with JT65 and my little antenna I could find a lot activity. It's taken about a year to get the motor drives working and build the output amplifier. Most everything is homebrew. I didn't have to start from scratch. Many years ago, I was interested in the mountain topping here in California and would try and work all the bands I could until it became too much work to drag everything in and out every year. But this gear provided a base from which to build my EME station. My 1296 setup consists of a 3.7 m TVRO dish with an OK1DFC feed, 4 x XRF286 SSPA at ~ 250 W and 0.6 dB NF LNA. I start Moon operation and have worked thus far W7IUV, RD3DA, W3HMS, JA6AHB, JA1WQF, PA3FXB and K2UYH. I am interested in skeds.

WA7ABP's 3.7 m dish used on 1296

WW2R: Dave ww2r2@g4fre.com after completing EME QSOs on 7 bands from TX, has decided to head home and will be moving back to the UK. He hopes to be quickly QRV off the Moon again as G4FRE.

K2UYH: I a.katz@ieee.org have little to report this month because of attendance of EME2012 and associated vacation activities. Cambridge's organizers and volunteers deserve our thanks for a truly great job. After my return, on 23 cm I had a near QSO on 2 Sept at 0455 with WB7ABP (18DB/O) JT65C - Lynn disappeared and later learned that he had RX problems. I did work at 1028 VK2CDB (6DB/12DB) JT65C for mixed initial #402* and 1035 VK4CDI (6DB/16DB) JT65C. I also tried on CW with VK2CDB (O/-), but Brett never copied me. I may have had a TX feedline problem at the time. The following day, 3 Sept on 1296, I added at 0445 N4PZ (579/589) on CW, 0500 RD3DA (12DB/10DB) JT65C and 0525 WB7ABP (13DB/7DB) JT65C #403*, and on 4 Sept at 0415 RD3DA (559/539) CW and partial 0445 YO8RHI (-/18DB) JT65C. YO8RHI was running 4 x 35 el yagis and 55 W. I again will be operating ARRL EME Contest teamed with K1JT and be using the call K1JT during the contest.

NETNEWS: **DJ8FR** is building a new 5 m dish to replace his stressed dish. **VE4MA** is getting ready for his winter stay in Arizona and is building SSPAs to use on EME from VE4MA/W7. Barry will be QRV in the ARRL EME Contest. **VE5KKZ** is listening on 1296 EME. Kees hoped to TX soon. **WA0ARM** is rebuilding the support structure for his 432 antenna system. **KL6M** plans to be QRZ for the ARRL EME Contest. **NA4N** is putting all his gear in top condition fin preparation for the upcoming EME contests.

FOR SALE: **AA6EG** is looking to build a 23 cm EME station as part of a program to bring Moonbounce to science/technology education programs and space sciences curricula. Pat recently acquired 3.7 m trailered dish and needs equipment to use with it. A complete station would be idea. He is looking particularly interested in a high power SSPA or tube amplifier. He would also like to hear from EMEers who are educators from Middle school through Graduate School and are interested in EME as a space sciences educational tool. You can reach Pat at apolloeme@gmail.com or Skype: Sparky599.

TECHNICAL: Circular Polarization and Solid-State Power Amplifiers by W1GHZ -- At the EME2012 Conference in Cambridge there were several papers using solid-state power amplifiers (SSPAs). To generate more power for EME, two SSPAs are combined with 90-degree hybrid couplers. I noticed that

all of these couplers were small printed-circuit board types, either commercial or homebrew. These PCB couplers are lossy and get hot – the ON7EME beacon had one burn up after a few hours of operation. Even if they don't burn up, they are turning hard-earned RF into heat. I was listening to the papers, but thinking about making better couplers with air dielectric and almost no loss. W2IMU had described one years ago in the Crawford Hill EME Notes, and there are other ways to make them as well. Then the light bulb went on! With two SSPAs, we have two amplifiers 90 degrees out of phase. We are combining them into one signal, then going to the antenna and breaking the signal into two components phased 90 degrees apart, either in a hybrid coupler or septum feed, to generate circular polarization. Why not eliminate everything after the amplifiers, and just run each amplifier to a separate orthogonal probe or antenna? The feedhorn would simply have two orthogonal probes the way it did before septum feeds. At lower frequencies, crossed yagis would do the same. What about receive? Some folks are already going to two-channel SDR with a separate receiver for each polarization component – this just makes it easier. Of course, two relays are required, one for each polarization, but each must only carry half as much power, so they are smaller and less expensive. Having two receive channels, each with an I and Q component, also provides opportunities for diversity reception to the smart software guys. Installations where it is possible to mount the SSPAs near the feed provide more opportunity to reduce loss. Eliminating couplers, connectors, feedlines, and polarizers can get more signal on the Moon.

Notes from the open session EME2012 Chaired by Ian, GM3SEK, supported by Al, K2UYH and Peter, G3LTF: 1) Graham, G3VZV, noted that as most CW EME activity on 144 took place above 144.035, would the EME community be disturbed if the satellite community applied to use this segment for satellite communications? Comments were that for many people this segment was essentially unusable due to birdies from computers/domestic equipment. G3VZV was advised to pursue this through IARU. 2) Joe, K1JT, pointed out that the current 1 minute periods for JT operation meant that when big stations were working in contests, they were limited to about 20 QSOs per hour. Experiments had shown that 30 second periods were quite feasible, but at the expense of about 3 dB in sensitivity. Issues were QRM when stations close to each other might be operating different periods and sensitivity loss for smaller stations. Joe invited inputs and a debate before this facility was included as an option in the software. A shorter sequence could be an advantage for beacon use where power dissipation was an issue. 3) Doug, VK3UM, referring to his EMECalc, highlighted the uncertainty in the value of the Moon's effective temperature variation with Moon phase at frequencies of 10 GHz and above. Currently available data dates back to the mid 60's. Stations with larger dishes who can make useful measurements should co-ordinate with Doug to make sure that that everybody is using consistent methods. 4) Activity Periods on 144 and 432 CW -- Information on these can be found at http://www.sm2cew.com/dubus-aw.html and http://www.sm2cew.com/dubus-aw-70.html. A request was made for time slots to Asia to be scheduled and also that stations should call CQ further up the band away from the 432.010 area, which in many cases is full of birdies, rather like 144. 5) Peter, G3LTF spoke about Activity Weekends on the microwave bands, which have contributed to a significant increase in activity. It is important to set the dates well in advance, at the start of the year, so that stations who are planning and building gear know when they are aiming for. So, join the discussion on the best weekends at the start of the year and then hold to the results. With the Moon position at present, it will not be possible to find really favourable weekends for the N hemisphere for some years. The panel appealed for the EME contest organizers, ARRL, DUBUS, REF and ARI to communicate more in order to avoid clashes of dates. Unfortunately there were no representatives of those organizations present in the session.

FINAL: It is not often I have this kind of good news to report. Back in the March 2010 NL, I reported that W0PW/W0EYE was a silent key. This same information is shown on <http://www.moonbounce.info>. At EME2013 we learned the happy news that Don is very much alive. TNX to W5VJB and the TX contingent for correcting this misinformation.

The 2013 Swedish 432 & UP EME Meeting will be held the weekend 24-26 May. The location will probably be at the same hotel as this year. Anyone interested in giving a talk or sharing ideas should contact Lars, SM4IVE, sm4ive@telia.com.

The answer to the question of TM8PB's circular polarization sense discussed in the last NL is that everyone who worked them on 6 cm did it cross polarized!

We have the results of the EME2013 NF measurements. See table at end of NL.

As you can see, there is still plenty of news despite the conference. Please keep the info coming. I will be looking for all of you off the Moon, especially during the microwave bands part of the ARRL EME Contests (using the call K1JT). 73, Al – K2UYH

CALL	Band	Preamp	NF dB	Gain dB
CT1HZE	432	WA2ODO	0.21	20.23
GM4JJJ	432	MGF1302	0.48	13.99
DL9KR	432	Short Box #1	0.56	40.3
DL9KR	432	Long Box with 7/16 F-F and M-NF adapters	0.43	52.2
DL9KR	432	Long Box with 7/16 to N adpt.	0.41	52.2
G4DZU	432	G4DDK	0.56	28.1
DJ3FI	432	Cavity preamp	0.66	17.1
G4RGK	432	G4DDK	0.65	28.2
G4RGK	432	Cavity preamp	0.72	18.1
SM3JQU	1.3		0.87	27.2
DJ8FR	1.3	DDK#1	0.23	36.9
DJ8FR	1.3	DDK#2	0.33	38.7
WA8RJF	1.3	AD6IW LS01	0.46	21.9
WA8RJF	1.3	AD6IW VU03	0.68	14.1
WA8RJF	1.3	AD6IW	0.37	43.5
WB2BYP	1.3	AGO-2-23 ATF36077	0.38	26.9
CT1HZE	1.3	WA2ODO	0.37	19
G3LTF	1.3	G4DDK with UT141/adapter	0.228	40.1
JA4BLC	1.3	G4DDK	0.28	33.7
F6AJW	1.3	G4DDK	0.56	36.4
HB9BBD	1.3	2-105	0.14	40.6
HB9BBD	1.3	2-071 for KL7M inc adpt.	0.19	42.7