432 AND ABOVE EME NEWS
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CONDITIONs: For the month of Aug there was an amazing amount of EME activity taking place. The activity started with the 9 cm Microwave Activity Weekend (MWAW) on 12/13 Aug and produced a very nice turnout for what is probably the least active of the four 13 to 3 cm MW bands. There was also an incredible amount of 10 GHz EME. All during the month **VK7MO limited sleep of stations trying not to miss another Australian grid square…** Not to mention Rex's tremendous stamina in single handedly bring it all off! And it is not over – see VK7MO's report in this newsletter (NL). 10 GHz activity also peak on the 19/20 Aug week in support of the ARRL's 10 GHz contest, which is intended to be primarily tropo. SP/OK5EME was also QRV on 3 cm on 19 Aug. The big attraction was on 20 Aug when **KN0WS put the State of NE on 1296 EME for the first time** to my knowledge – see Carl's report. The one negative was all this activity seems to have washed out the 13 cm MWAW and the 70 cm CW Activity Time Period (ATP) also scheduled for this weekend. **432 was not totally out of the lime light. DL9KR reached his 140th DXCC (CW only) on 70 cm in Aug and also his 66th year of operation!** Activity bloomed again on 9 cm the following weekend (actually 25/26 Aug) with two big dish on this band and also one on 6 cm. See the reports on GB6GHY (Goonhilly 32 m dish) and DK0SB (20 m dish). But Sept promises even more! **Coming up is the ARRL MW EME Contest for the bands 13 cm and up on 9-10 Sept.** This same weekend is also the ARRL's Sept tropo contest. Contact can count in both contests. In the tropo contest you must exchange 4 digit grid squares. So you can expect increased Moon activity on 432 and 1296. The following weekend will see more EME with the **ARI's Sept Trophy Competition (16/17 Sept)**. In Oct are two major EME dxpeditions: 3DA0MB 14-21 Oct that also will include operations from ZS6EME – see below, and CN2R on 4-10 Oct – see details later in this NL,

3DA0MB and ZS6EME: Dan (HB9Q) dan@hb9q.ch has news on microwave EME from Africa -- Last week we did test all bands, 23, thru 3 cm on the Moon in prep for our big dxpedition – [see report in the last NL]. The results are good as expected. Now we are working on optimization and packaging. From Swaziland (KG53mn), we plan to be QRV moonrise (MR) to moonset (MS) as follows: 14 Oct 23 cm, 15 Oct 13 cm - we can TX on all sub-bands, so no XB will be needed depending of course on the QRM situation. 16 Oct 9 cm - VK sub-band should be OK. 17 Oct 6 cm, 18 Oct 3 cm - we can TX on both 368 and 450, so no XB will be needed. On 19 through 21 Oct we will be QRV on the bands where there is the most need. This will be decided during the operation. We can QSY between the bands in less than 30 minutes, so we hope to accommodate all (most) requests during those 3 days. Of course it is the best to try to work us during the band-days, but in case you miss us you'll have a good chance for a second shot! We hope to have the Internet available to optimize our operation schedule. On 23, 13 and 9 cm, we will use JT65c. If there is time and the signals are strong enough, we will do some CW. On 6 and 3 cm, we will use QRA64D, which has proven to perform better than JT4. If the signals are strong enough we will try to do some CW. WSJT-X 1.8 rc2 should be available soon. I strongly recommend to use it, including Doppler-Control. It has so many advantages compared to WSJT 10. The Constant Frequency On Moon (CFOM) Doppler tracking mode is absolutely great, it is so easy to use and all stations can see/hear each other! Because ZS was never activated on 6 and 3 cm EME, we will become QRV from ZS6EME as follows: 22 Oct 6 cm for a few hours before MS, 23 Oct 6 cm MR to MS, 24 Oct 3 cm MR to MS (both 368 and 450). We will be QRV as ZS6EME from Pretoria. Modes and procedure will be the same as at 3DA0MB.

9K2YM: Yaser 9k2ym@9k2ym.com is working rapidly to get Kuwait on 432 and 1296 EME. He has a 16' solid dish already mounted and a OK1DFC style septum feed for 1296. I do not have any additional details on his system, but know that he wants to be QRV soon.

9K2YM and 16' dish & feed before mounting

CN2R: Zdenek reports that the 7 bands EME dxpedition to Morocco is on schedule. The location will Casablanca (IM63dm) and in cooperation with OK1VVT (144 operator) and thanks to the courtesy of W7EJ. Operation on 2320 will be 5/6 Oct from1800 to 0700, on 432 will be 6/7 Oct from 1900 to 0800 (ARRL EME Contest), on 1296 will be 7/8 Oct 1900 to 1000 (ARRL EME Contest), 3400 will be 8/9 Oct 2000 to 1100, 10368 will be on 9/10 Oct 2100 to 1200, and 5760 will be 10/11 Oct 2200 to 1300. The lastest details can be found at http://www.ok1dfc.com/peditions/morocco/cn_2017.htm.

DK0SB: Rob (PE1ITR) moon-net@mailman.pe1itr.com writes that the 20 m Sternwarte Bochum dish (JO31ok) was on 9 cm EME, on Saturday 26 Aug [during the Goonhilly weekend] -- Our team consisted of PA3CQE, DD5ER and me. Frans and I arrived around 0730 at the dish. At the same time, Michael also arrived. After a brief consultation on how to install the feed, we started building up the station. First, the feed and 50 W transverter were installed at feed point. I had improvised a RA3AQ septum feed and a 60 cm offset dish that we could attach to a pole. [See pictures at the end of this NL]. The transverter was attached at the feed. We measured 18 dB of sunnoise. I expected to see around the 23 or 24 dB. This was far too low, but 3 dB more than with a patch antenna that we used for tests in early June, and at least enough to make some QSOs. Cassiopeia A was 0.4 dB. We were ready for moonrise and heard beautiful SSB echoes at this time. At 1044 we made our first QSO with PA3DZL. We worked 10 stations: PA3DZL (569/569), OK1DFC (539/569), G4CCH (569/589), OF2DG (559/579) CW, P3DZL (53/53) on SSB, G4CCH (569 589), OK1KIR (569/589), PY2BS (569/569), SP3XBO (539/559), SM6PGP (559/569), G3LTF (579/579) and K2UYH (559/569). VK4CDI heard our signals (569), but we could not hear him at 3398,117. Curiously, we did not work GB6GHY either, but we had already worked on 6 June. As it appeared that we had worked everyone that was QRV, we stopped at 1730 and dismantled the station. Tnx for all the QSOs and special thanks AMSAT-DL/Sternwarte Bochum use of use the dish.

DK3WG: Jürgen dk3wg@web.de during the past month added on 432 using JT65B DL9LBH (from a new QTH) and R2DLP - who is using 2 x 26 el yagis and 50 W. On 1296, Jurgen using CW worked ON5GS, and with JT65C KN0WS in NE (EN00) and DL1SUZ.

DL1SUZ: Uwe dl1suz@t-online.de (JO53un) is now QRV on 23 cm EME -- I've prepared a small setup for 1296. I am running a 2 m mesh dish with a septum-feed, 100 W SSPA and a 0.37 dB DB6NT LNA. My first contact was on digital mode with DF2BJ and followed by NC1I, I1NDP and RA3AUB - many TNX. I have already received a QSL from Nando. My main problem is the internal transverter of my K3 is not really stable. I will fix this ASAP.

DL9KR: Jan Bruinier@t-online.de the dean of 432 CW EME is now at DXCC 140 – There has been very low activity during the 70 cm CW ATPs. However, I have found arranging skeds on the HB9Q logger is very worthwhile. Many of the following stations I work report "first EME CW" and/or having enjoyed the CW QSOs. I'm obliged to several stations who used the WSJT CW mode option (TNX K1JT) successfully; some of them after experimenting with sequence lengths and timing have had lots of fun! Since last Oct, I worked initials with DK1KW, E44CM, F6CPI, OH3LWP (new loc), EB2FJN, SM6FHZ (new loc), F8DO, N7NW, US8IGT, W4CSB, DL8FBD, KF8MY, KN0WS, DL6YBF, DK0TE, KA1GT (new loc), BV3CE CW DXCC 140, JE2UFF and DL9LBH to bring me to #1022; plus QSOs with many previous friends. On 28 Aug I completed my 66 year as DL9KR and CW EME continues to be great fun!

G3LTF: Peter's pkb100@btinternet.com EME report for Aug -- This month I managed activity on 4 bands! I worked on 9 cm CW on 12 Aug, K2UYH (and SSB), W5LUA and PY2BS, and on 13 Aug HB9Q, OK1KKD, WB2BYP for initial #61 and K2UYH again, and on 14 Aug PY2BS on SSB. I changed to 23 cm and worked on CW DF2GB for initial #438; and moved to 13 cm to QSO on 19 Aug IK5QLO, and on 20 Aug OT7K (ON4OAI contest call using his new 5 m dish) and G4RGK. I measured 1 dB of moonnoise and 18.7 dB of sunnoise (SF=66). Returning to 23 cm still on 20 Aug, I worked SP6ITF, DC9UP, NC1I and G4YTL. I was sorry to miss out on KN0WS - [it was very close], but added on 23 Aug ON5GS #439 on CW and SSB and LA3EQ. On 25 Aug, I was QRV for the GB6GHY operation and worked them on 9 cm for #62 on CW and SSB. I also QSO'd PA3DZL. I had hoped to work more of the activity generated by GB6GHY but a 12 V SMPSU that I regulate to 10.5 V and use on 6 and 9 cm began to fail intermittently. I also had a loose wire in the same circuit, and so it took hours to locate the problem… It was all up at the dish, and required me to "jury rig" a replacement PSU to feed the regulator. I was able to work GB6GHYon 6 cm for initial #71 and OK1DFC #72. Finally I changed back to 9 cm and worked DK0SB for initial #63. It was excellent operation by Brian and his team at Goonhilly covering both 6 and 9 cm with fast change-over between bands. On 6 cm, I measured 1.5 dB of moonnoise and 14.6 dB of sunnoise (SF=81) and on 9 cm 1.1 dB from the Moon and 16.1 dB from the Sun.

G4BAO: John john@g4bao.com reports on his recent microwave EME success and plans -- Unless you know better, I'm claiming the prize for the smallest station to work GB6GHY on 6 cm! I used a 1.9 m, 2.7mm mesh, prime focus dish, RA3AQ feed, 25 W SSPA and 0.9 dB NF. We exchanged (559/529) on CW. They were Q5 copy here on SSB but didn't copy me. Anyone work them with a smaller system? I am planning to be QRV on 13, 6 and 3 cm on request using CW or digital. Feed changes take me only about 15 minutes. So if you want to test your system with a really small station email me or look for me on HB9Q. I have on 13 cm OK1DFC Septum feed, 220 W and DKK VLNA, and on 3 cm G3WDG vert pol horn, 12 W and 0.7 dB waveguide preamp.

G4DDK: Sam jewell@btinternet.com has added 9, 6 and 3 cm EME to his station – I was active during the Goonhilly weekend, but had a 12V SMPSU failure. [The same happened to G3LTF]. I think it might have been due to a swarm of flying ants! The PSU is 110 V mains supplied and sits out at the dish. Before it failed, I managed to work on 9 cm using JT4 PA3DZL for mixed initial #1* and G4CCH #2*, and on CW GB6GHY #3* (and CW initial #1). I never got 6 cm sorted out before GHY closed down on Saturday. I paid the price for thinking I could set up on a new EME band at the last minute. I had a series of gottchas on 9 cm before completely rearranging the setup of the equipment. GB6GHY didn't receive anything from me, when I first tried with them. Moving to digital, I was able to work Jac and Howard. Back on CW, I found that the key plug into the back of the K3 had broken. As I had turned down the side tone, I wasn't aware I wasn't actually keying the system. The rearrangement meant I wasn't able to monitor the PA power output. I've now have a replacement SMPSU. I used my 2.3 m dish, RA3AQ feed, 45 W and VLNA9.

GB6GHY: Brian (G4NNS) brian-coleman@tiscali.co.uk reports on the 32 m Goonhilly Earth Station operations -- First of all many thanks to everyone who had a QSO with us and thanks for your patience. We had several operators, most of whom had never done EME before, so the technique might not have been perfect. 24 stations worked on 6 cm CW and 5 on SSB. The strongest report received was (599). Our own NBFM echoes were near fully quieting. 18 stations worked on 9 cm CW and 4 on SSB. Again the strongest report received was (599). The 9 cm system was lower power with only 40 dBm (10 W) on Friday but increased to 47 dBm (50 W) by mid session on Saturday. The 9 cm feed also had a bad match with a return loss (RL) of 8.2 dB – it was designed for a minimum frequency of 3.7 GHz. We had no access the feeds. On 6 cm, we believe the match was better as we were operating within the system design specification, although we did not have time to measure it. Power on 6 cm was 45 dBm (~ 30 W). I will deal with QSLs - please send to G4NNS. There will be video of the operations available on-line later, and I will provide the link when it's ready. We also made .wav files of all stations heard and when we have edited them (some are very large), we will put them on the web and publish the link. On Saturday we made a measurement of Taurus A although we did not have time to check its precision. It was 1.7 dB on 5.7 GHz. Sunnoise was 21 dB and moonnoise was 3.5 dB. We were late on the Moon on Saturday because the 30+ year old tracking system had some problems and we ran with just 2 of the 4 azimuth drive motors making the big change in azimut from Taurus to the Moon very very slow. Murphy was in the team! The whole system will be refurbished soon and re-purposed for Deep Space work so this might be the only opportunity to use this antenna for amateur EME. The team was G4NNS (myself), G8GTZ (Noel), G4LDR (Neil - soon to be QRV on MW EME from his QTH) and G4LOH (Tim).

GB6GHY team at top of the equipment room and below the dish, L - R G8GTZ, G4LDR, G4NNS, G4LOH and Matt Cosby, Chief Scientist

GB6GHY shack with the 9 cm system on the left and the 6 cm system on the right. Transverters are located above head level close to the waveguide feeds.

HB9Q: Dan dan@hb9q.ch reports: In July and Aug we worked for initials, all using JT unless indicated otherwise, on 1296 with ZL3RC, SM3KPX, DL1SUZ, KN0WS (Nebraska for WAS 38!) and HB9CRQ (dxpedition station test from JN47cd – prep for 3DA0MB, see separate report) for mixed initials #598*; on 2320 with HB9COG (test JN47cd) for mixed initial #159*; on 3400 HB9COG (test in JN47cd) and WB2BYP for mixed initial #65*; on 5760 HB9COG using QRA64d (test in JN47cd) and GB6GHY (CW) for mixed initial #66*. We also worked on 10368 VK7MO using QRA64d from Australian grids PG77, PG67, PG76, PG68, PG78, PH61, PH62, PH63, PH65, PH56, PH54, PH44, PH43, PH42, PH32, PH31, PH22, PH21, PH01, PH00, PG09, OG99, OH90, OG89, OG88, OG78, OG65, OG74 and OG73, W7COJ (CW) and HB9CRQ (test in JN47cd) for mixed initial #123*. A special thanks goes to KN0WS for activating NE on 1296! He had a great signal and a lot of success and made many of us very happy. We now need on 1296 the following 12 states to complete WAS: AL, AR, DE, KY, MS, MT, NV, OR, SD, UT, WV and WY. We can work easily stations running 1 yagi (40-70 el) and 15W or 1.5 m dish and 10 W. Any help is very much welcome! We plan to be QRV during the ARRL MW EME Contest weekend on 13, 9, 6 and 3 cm (and we can also work 70 and 23 cm). As always we are very keen to work new initials, especially QRP stations, on all bands. Please look for us on the HB9Q-loggers (we are always stand-by there when QRV) or send e-mail, we are happy to inform you about our actual or future activity.

IK3COJ: Aldo ik3coj@gmail.com was on 6 cm for the GB6GHY activity -- Great work by the GB6GHY team. Although I have very strong noise in the 6 cm band, I managed to work them on 25 Aug (539/539). The only other station heard was SM6FHZ with difficulty. I hope in the future that I can resume normal 6 cm operation after finding the source of my interference.

JA4BLC: Yoshiro ja4blc@web-sanin.co.jp sends news on EME from JA for Aug -- Murphy attacked my microwave station in Aug. On 5760, I found my 48 V power supply for my GaN SSPA went bad two hours before the operation of GB6GHY on 25 Aug. I replaced it with two 24 V power supply stacked to get 48 V, and installed them on the back of the dish. I easily worked GB6GHY (569/569) initial #46 on 6 cm. Thanks Brian and his team. On 10 GHz, I worked on 18 Aug JA1WQF (559/559), and on 19 Aug SP/OK5EME (O/O) XB for initial #40. The next moonrise I tried with K2UYH and found my echoes badly chirp. Soon after the sked, my 1.2 GHz synthesizer for 10450 would not lock with my external GPS 10 MHz reference. The manufacturer kindly repaired the synthesizer so quickly that I could be QRV in less than a week. On 27 Aug I worked JA1WQF (559/559) and DB6NT (559/559) #41 on 10450. I and JR4AEP have both completed and are using ON4BCB's moontracker-DIY system very successfully. For information see http://moonbouncers.org/Orebro2017/ON4BCB%20OE5JFL%20diy.pptx.

JA4BLC's dishes with new 2.4 m offset dish in center

K7ULS: Mike k7uls@yahoo.com was on 432 recently and wrote -- I worked NC1I and DL7APV on 432. It took me awhile to remember how the Doppler worked. Doppler is never an issue on 144. I had to QRT for while a balloon storm passed overhead – see picture. My station uses a single M2 9 WL yagi and 70 W.

Balloon storm at K7ULS

KN0WS: Carl carlhasbargen@q.com reports on his very successful 1296 Nebraska EME dxpedition -- I picked up my 80 and 89 year old parents and drove to NE on 19 Aug so they could see the 21 Aug solar eclipse with me. We stayed on the farm where my mother grew up and my father as the young vicar in town went to woo her back in 1958. This trip is likely the last time either of them will get back down to NE. My uncle was host and had found a spot on a hill for me to set up my 12' stress dish for 23 cm EME. It was behind a corner gate with an electrical fence to keep the curious cattle away. After 10 hours of driving to get there, I spent 2-3 hours setting up the mount and dish. I did not do any of the electronics that night because there was lightning and a forecast of storms over night. I got a few hours of sleep then awoke at 0100 local to find there were breaks in the clouds and was able to see the North Star. When I drove from the house to the hill, it looked like the dish had suffered quite a bit of wind damage. All of the potted plants had blown off my aunt's porch, so there had been a lot of wind. Upon closer inspection, my dish had not been tethered well enough and had spun on its axis about 10 times, wrapping the various cables from the septum feed around the shaft. The mesh had also popped off of several spokes and was distorted in places. I was quite grateful to be able to put it all back in place. I ended up having to replace the cables for the pre-amp power and relay control; and then had to struggle a bit to find an open wire along the switching path. Ultimately I got it all worked out in spite of forgetting to bring my meter along to test voltages or continuity. Based upon the North Star, I could have moved the south end of my mount one inch, but it was all staked down, so I figured good enough. My dish could only point down as low as 6 degs, but I was quickly able to work HB9Q, while the Moon was still only 1-2 degs high! My first sked was for 1200; by that time I had already completed 11 QSOs using JT65C! Things were fast and furious at the beginning, but then slowed down later. I believe my pointing got worse as the Moon rose higher. I wonder if my dish/mount system was distorting when going from horizontal to vertical. I have seen a similar pattern in the past. I was able to work HB9Q (10DB), OK1KIR (14DB), OK2DL (10DB), RA3AUB (17DB), PA3FXB (22DB), K2UYH (12DB), NC1I (14DB), DK3WG (20DB), G4CCH (12DB), PY2BS (22DB), VA6EME (17DB), DF2VJ (25DB), DC9UP (21DB), G4YTL (24DB), VE4MA (25DB), PA3DZL (16DB) and OZ4MM (12DB). I also had personal initials with ZS6JON (22DB), IK5EHI (19DB), GM4PMK (24DB), DF2GB (22DB), LA3EQ (25DB) and XE1XA (16DB) for a total of 23 QSOs in 4.5 hours - [All initials from EN00]. I copied K4EME (23DB), looked for W7MEM and hoped to see TI2AEB - but I think he may have been transmitting the same time as I. At that point, I decided to change to CW to try to work G3LTF. Peter is the one who inspired me to try to learn a bit of CW and I really wanted to complete with him, but I failed. As many of you saw, I tried adjusting my pointing, then went back to using the WSJT software to send CW but ended up just sending a carrier because I forgot to change my radio back from CW to SSB for the software. I heard him very weakly over my generators for a bit and copied my own call sign, but only got several letters from his call before I lost him altogether. I know a number of you were patiently waiting your turn to try me on CW after Peter. I am sorry that I had so much trouble. Before the ARRL contests, I plan to work out all bugs and

have a check list when I go to CW or back. In spite of my nil results on CW, I was pleased to work 23 stations and have opportunities for more. This was only my second day on the Moon in 2017. So far, I now have WAC on 23 cm. I plan to print special QSL cards for NE and get them in the mail quickly. Thank you all! PS: The weather was perfect for the eclipse the next day.

KN0WS station in NE with polar mounted 12' dish

N4PZ: Steve n4pz@live.com is now QRV on 13 cm CW with a much improved system -- I now have almost 300 W on 2304 and can RX on both 2304 and 2320. I was not happy with my sunnoise and have switched to a new feed with a 3 ring choke. It is performing way better than the old one. I also re-centered my feed. It was not on the bore site and off by about 2". I have neglected 23 cm more than I wanted to get 13 cm up and running properly. I hope it was worth it; I will be looking for QSOs during the ARRL MW contest.

N5BF: Courtney courtney.duncan.n5bf@gmail.com send news on his 23 cm operation since the beginning of July – My initials are DJ2DY for mixed initial #81*, DL7UDA #82*, W1PV #83*, VK5MC on CW #84*, VE3KRP #85*, G4YTL #86*, TI2AEB #87* and Costa Rica for DXCC 28, PY2BS on both JT65C and CW #88* and Brazil for DXCC 29, and ZS6JON #89* and South Africa for DXCC 30. South Africa was tough as the Moon was setting into his westward trees just as it was rising through my eastward ones. Reports were (26DB/26DB) and would have been perhaps 10 dB higher if we hadn't both been looking into foliage. Elevation both sides during the QSO was about 14 degs. I was W1PV's first EME QSO on 23 cm! Skip has been active on 144 and 432 EME previously. I have found that opportunistic use of the HB9Q logger is more effective than trying to make skeds via email. I am writing a paper about this for the 2017 Microwave Update. An email schedule with VK5MC did payoff. When I saw that VK5MC and G4DDK had completed a QSO after 25 years, I contacted both of them fo skeds. Sam was too busy, but Chris give it a try. We worked using CW on 21 July. During the QSO a malfunction of my sequencer ironically burned out my G4DDK LNA. While VK5MC was still calling, I put the dish into the maintenance position, swapped to the backup DB6NT preamp, and came back to complete the contact; all in about ten minutes! I plan to switch to a more fool-proof sequencer. I missed all the activity around the Aug high dec weekend to see the eclipse in Teton's National Forest, WY. The weather and viewing were perfect from 7500'. [I guess you can't have everything]!

NC1I: Frank's frank@NC1I.COM July/Aug activity report follows -- The highlight of my activity over the last two months was on 20 Aug when I completed surprisingly easy QSO with W5RZ on 432. Dennis was running a 23-element rope yagi and just 20 W. His entire station including antenna and power source/battery fit in a standard backpack and weighed less than 20 pounds. Signal report were (25DB/25DB) on both ends. Dennis has done an amazing job putting together such a compact portable EME capable station! [See all Dennis' report]. The following stations made it in my 432 log since my last report. I worked on 16 July KA1GT, FR5DN, and PA2V, on 22 July G3LGR, OH6UW, and PA2V, on 13 Aug FR5DN and PA2V, on 19 Aug PA3CSG, PA2V, K3GNC, DL6SH, DL6SH (579/579) on CW, SM4IVE (599/589), UX0FF, G4YTL, W1PV and JE2UFF, on 20 Aug DL9LBH, RA9CHL, R2DLP (2 x 26 el yagis and 50 W), G3LGR, W1PV, PD7RKZ, W5RZ, K7ULS, N4QWZ (1 x 28 el yagi and 200 W) and PA2V, and on 26 Aug PA2V and PA1BVM (2 x 17 el yagi and 75 W). On 1296, I contacted on 22 July DF2GB and N6BF, on 13 Aug F1RJ (3 m dish and 200 W), TI2AEB, DL1SUZ and I1NDP, on 20 Aug KN0WS from NE (many thanks Carl for a job well done!), G3LTF (579/589) on CW and OK1KIR. All QSO's were WSJT unless indicated as CW. I expect to be very active over the next several months, especially on 432.

OK1DFC: Zdenek ok1dfc@seznam.cz was testing his dxpedition station on 26 Aug and writes -- I made many tests and decided that changes between 3, 9 and 6 cm can be done in 10 mins, and to build up the whole station takes about 1 hour 30 mins. During the testing I worked on 9 cm DK0SB (579) on CW - very loud, PA3DZL (17DB/17DB) with WSJT-X and full Doppler and GB6GHY (579) CW – loud, and on 6 cm GB4GHY (599) on CW - very strong, G3LTF (O ~ peaking 549) with 120 Hz spread on CW, OH2DG (579) on CW - easy copy, and PY2BS (20DB) JT4F - Bruce had a tracking problem. [See CN2R report].

OK1KIR: Vlada vlada.masek@volny.cz and Tonda report on their club's Aug EME activity – We worked on 23 cm on 20 Aug using JT65C at 1050 KN0WS (14DB/O) for digital initial {#273} and NE for our 43rd US state - [Needed to complete are AL, AR, KY, MS, OR, SD and WV], 1129 DF2GB (11DB/6DB) {#274} and 1657 NC1I (5DB/3DB) and using CW at 1135 DF2GB (559/559) for initial #421, and on 26 Aug using JT65C at 1433 DL1SUZ (24DB/14DB) {#275} and 1437 SM3KPX (23DB/22DB) {#276}. We QSO'd on 9 cm on 25 Aug using CW at 1220 G6GHY (569/579) for initial #68, and on 26 Aug at 1325 DK0SB (589/559) #69. We contacted on 6 cm using CW on 25 Aug at 1431 GB6GHY (579/559). On 3 cm using QRA64D unless noted otherwise, we worked on 3 Aug at 1646 VK7MO (17DB/15DB) for digital initial {#117} in PH56, on 7 Aug at 1930 VK7MO (16DB/15DB) {#118} in PH54, on 8 Aug at 2048 VK7MO (16DB/16DB) {#119} in PH44, on 9 Aug at 2036 VK7MO (16DB/14DB) {#120} in PH43, on 10 Aug at 2049 VK7MO (17DB/14DB) {#121} in PH42, 2115 OK2AQ (17DB/13DB) and 2303 VK7MO (15DB/13DB) {#122} in PH32, on 11 Aug at 2110 VK7MO (16DB/14DB) {#123} in PH31, 2211 OH3LWP (20DB/15DB) using JT4F {#124} in KP11 - Ari used 20 W into 1.8 m tropo dish with H pol and elevation up to 30 degs at max, on 12 Aug at 2212 VK7MO (15DB/14DB) {#125} in PH22 and 2340 VK7MO (15DB/13DB) {#126} in PH21, on 13 Aug at 0033 UR5LX (17DB/14DB) using JT4F {#127} in KO70, on 14 Aug at 2246 VK7MO (15DB/13DB) {#128} in PH11, on 15 Aug at 0040 HA/G3WDG (13DB/14DB) in JN86, 0102 VK7MO (15DB/14DB) {#129} in PH12, on 17 Aug at 0226 VK7MO (14DB/13DB) {#130} in PH01, on 18 Aug at 0105 VK7MO (15DB/15DB) {#131} in PH00 and 0234 VK7MO (16DB/13DB) {#132} in PG09, on 20 Aug at 0314 VK7MO (19DB/19DB) {#133} in OH90 with the OH field the 10th in VK and 0447 VK7MO (16DB/16DB) {#134} in OG99, on 25 Aug at 0908 VK7MO (18DB/17DB) {#135} in OG89, 1046 VK7MO (17DB/16DB) {#136} in OG88, on 26 Aug at 1040 VK7MO (18DB/18DB) {#137} in OG78, 1154 VK7MO (18DB/17DB) {#138} in OG77 and 1658 PA0HRK (18DB/13DB) {#139} in JO22 - Harke used 1.1 m dish and 20 W, on 27 Aug at 1136 VK7MO (18DB/17DB) {#140} in OG76 for the 100th square grid in VK on 3 cm – measured moonnoise was only 2.6 dB with new LNA, on 28 Aug at 1240 VK7MO (19DB/19DB) {#141} in OG65 - measured moonnoise was 3.0 dB with old DB6NT, on 29 Aug at 1340 VK7MO (18DB/17DB) {#142} in OG74, and on 30 Aug at 1432 VK7MO (19DB/20DB) {#143} in OG73. On 1.2 cm using QRA64D we worked on 21 Aug at 0626 VK7MO (18DB/18DB) {#36} in OH90 and 0752 VK7MO (21DB/19DB) {#37} in OG99. Both OH and OG are new fields on 24 GHz. [The VK7MO QSOs are part of Rex's extended VK grid dxpedition. More details are given in Rex's report later in this NL].

OK2AQ: Mirek mirek@kasals.com started operation on 3 cm EME this summer on 29 July – I QSO'd G3WDG (15DB/11DB) using WSJT-X QRA64D and CFOM Doppler compensation, followed by a QSO with W3LBI QRA54D (17DB/17DB), and on 30 July OK1KIR QRA64D (13DB/13DB) and JT4F (16DB/16DB). I worked on 3 Aug G3WDG QRA64D (15DB/16DB), and on 8 Aug joined VK7MO's VK grid dxpedition. The conditions were far from optimal – degradation 2 dB and spread around 150 Hz, but I QSO'd VK7MO (23DB/23DB) for my digital initial {#19} in PH44 using QRA64D and CFOM, and continued QSOs using QRA64D unless noted otherwise on 9 Aug VK7MO (22DB/24DB) in PH43cq {#20}, on 11 Aug VK7MO (24DB/22DB) in PH31us {#21}, on 14 Aug VK7MO (22DB/23DB) in PH11gx {#22} and HA/G3WDG (18DB/19DB) with 1.2 m dish and 50 W, on 15 Aug VK7MO (21DB/23DB) in PH12ga {#23}, on 18 Aug VK7MO (22DB/24DB) in PG09ax {#24}, PA3DZL using JT4F (18DB/13DB), on 19 Aug JA1WQF JT4F (17DB/17dB) {#25} and SP/OK5EME (19DB/24DB) {#26}, G3WDG (10DB/19DB), again SP/OK5EME (18DB/16DB) with minimal spread around 10 Hz, and finally PY2BS using JT4F (18DB/18DB) {#27}. My station is a 1.2 m offset dish and a 42 W GaN SSPA.

SP/OK5EME: Zdenek (OK1DFC) ok1dfc@seznam.cz operated portable at the SP Microwave Conference to demonstrate and test his equipment to be used in his upcoming CN2R dxpedition -- During Saturday, 19 Aug using my portable 10 GHz station consisting of a 1.8 m dish, 52 W PA and 0.6 dB NF LNA, I worked JA1WQF (21DB/16DB) JT4F, OK2AQ (24DB/18DB) JT4F, JA4BLC (O/O) CW – 8 dB over noise, G3WDG (16DB/16DB) JT4F, PA3DZL (18DB/16DB) JT4F, F1PYR (O/O) CW, PA3DZL (539/559) CW and OK2AQ (16DB/18DB) spread 10 Hz - very nice signal workable on CW. I also hear UR5LX, PY2BS, DB6NT and DL0SHF beacon (14DB). [See CN2R report].

PA3DZL: Jac's pa3dzl@ziggo.nl reports on his Aug EME – On the weekend of 18-19 Aug I was QRV on 3 different bands. I worked 3 cm on 18 Aug OK2AQ and F1PYR, on 19 Aug F1PYR, SP/OK5EME for an initial (#) and DF1SR (#) and on 20 Aug UR5LX and DB6NT. On Saturday I measured 2.5 dB of moonnoise with my 3.7 m Andrew solid dish! I QSO'd on 20 Aug on 13 cm IK5QLO and on 23 cm KNØWS for a new state, NE. I also worked on 1296 on 23 Aug G4CDN on JT65C for an initial (#), VE3KRP on JT65C and IZ1AEM (559/559) on CW (#). The weekend of 25-26 Aug was made something special thanks to the GB6GHY group and the DKØSB group who put on some BIG DISHES on the Moon. It was a great show! This kind of activities gives MW EME a nice boost. Signals were very strong and both stations had little libration fading. I worked on 9 cm GB6GHY (579/569) CW and (56/53) on SSB, G3LTF (579/569) CW, PY2BS (569/569) CW, G4DDK (13DB/15DB) on JT4F for Sam's first 9 cm QSO and an initial (#), G4CCH (579/569) CW and JT4F to testing WSJT-X with auto Doppler, DKØSB (559/559) CW (#) and (53/53) on SSB, OK1DFC JT4F - test WSJT-X with COFM. On 6 cm I QSO'd on 25 Aug GB6GHY (569/569) CW for an initial (#) and (55/53) on SSB.

PY2BS: Bruce py2bs@me.com report "good" activity in Aug – All my QSOs were using CW except where noted. On 23 cm, I worked KN0WS operating portable in NE on JT65C for an new state and initial (#) and N5BF on both CW and JT65C. On 9 cm during the AW, I QSO'd OF2DG, W5LUA, K2UYH and G3LTF, and on the following Monday G3LTF on SSB. On 25/26 Aug I added on 9 cm GB6GHY (#), PA3DZL and DK0SB (#), and on 6 cm GB6GHY for an initial (#). I was on 3 cm on 19 Aug and QSO'd UR5LX on JT4F for an initial (#), F1PYR (#), DB6NT (#), IZ2DJP (#), OK2AQ (#), G3WDG on JT4F and WA6PY. Despite good signal from SK/OK1EME, I was unable to complete with Zdenek's portable setup. Many thanks to the GB6GHY and DK0SB teams for their FB effort in bringing two big dishes on EME. Do you need South America on MW EME? I am available and interest in skeds for 70 thru 3 cm, send email.

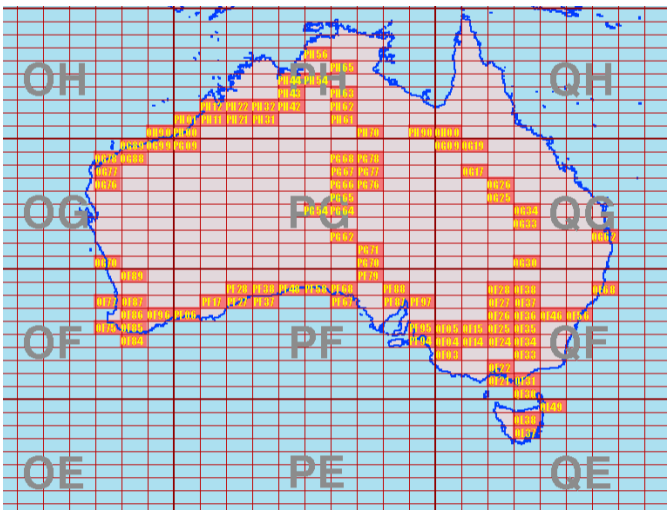
SM2CEW: Peter sm2cew@telia.com is QRV on 13 cm again after a long period of absence. I can TX/RX on 2320 and RX on 2304. I can only operate CW. I have an 8 m dish with septum feed, 100 W SSPA and 0.7dB NF DB6NT preamp.

UR5LX: Sergey ur5lx@ukr.net is now QRV on 3 cm EME – I have a 2.4 m offset dish with vert pol feed, 20 W PA and 0.7 dB NF LNA. In Aug I made my
first QSO to USA (and North America) with W5LUA for initial #14.

VE3KRP: Fast Eddie eddie@tbaytel.net sends his 23 cm activity report for Aug – I QSO'd on 1296 using JT65C on 19 Aug DL7DUA for an initial (#), VA6EME and DG0FE (#), on 20 Aug K2UYH, VE3NXK, OK2DL and TI2AEB, on 22 Aug DJ5AR (#), on 23 Aug G4CDN, DF2GB, PA3DZL and HB9Q, and on 24 Aug IK5VLS, DF2GB and W1PV (#). I am getting my dish ready for winter's cold and snow as I know they are coming soon! Speaking of snow if Houston had received snow from Hurricane Harvey instead of rain it would of been about 48 feet deep - hard to believe! I wish our radio friends in Texas that the hurricane touched, good luck and hope everyone is safe and sound.

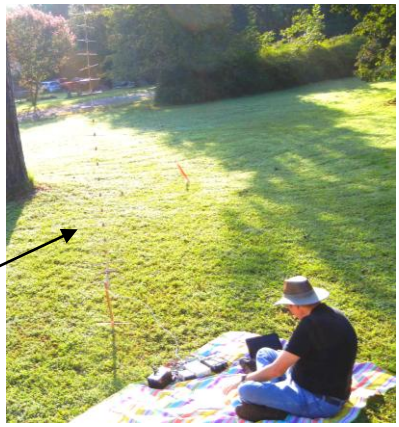
VE4MA: Barry ve4ma@shaw.ca reports on his Aug EME – I was on 10 GHz for the ARRLs 10 GHz contest on 19/20 Aug. This contest allows EME QSOs with North American stations to be counted. I was able to work W5LUA, K2UYH, WA3LBI, WA6PY and W7CJO. I also managed to work DB6NT on SSB, which is something I don't do very often. Please look for me in the ARRL MW EME Contest. I plan to be on 2.3, 3.4, 5.7 and 10 cm during the weekend.

VK7MO: Rex rmoncur@bigpond.net.au continued his record breaking 10 and 24 GHz roving Australian grid locator dxpedition in Aug -- Since last month's report I have continued with 10 GHz QRA64D activations at up-to-now non-activated grid locators of PH54, PH44, PH43, PH42, PH32, PH31, PH22, PH21, PH12, PH11, PH01, PH00, PG09, OH90, OG99, OG89, OG88, OG78, OG77 and OG76. Stations worked at most of these locators were OK1KIR, HB9Q, G3WDG and OZ1LPR. VK3NX was worked at 3 locators. W5LUA was also worked when the NA window was open. The smallest station worked was OK2AQ with a 120 cm dish and 40 W to my 77 cm dish and 50 W. The OK1KIR 10 GHz digital map now has 100 grid VK locators colored in of which 98 have been with VK7MO (so two more to go). The goal of activating the OH field was completed on 10 GHz. On 24 GHz QSO's were completed with OK1KIR and G3WDG at the previously non-activated fields of OH and OG (113 cm dish and 20 W at VK7MO). Murphy struck with a car break-in at PH21 that required a replacement window to be flown up for Perth around 2000 km away – fortunately the car alarm did its stuff and nothing was stolen – but I was delayed for 3 days. Murphy stuck again when my tripod collapsed just prior to undertaking the OH field and damaged the 10 GHz dish and feed. I learnt about the "string test" with 10 mm difference on my 77 cm dish. I had a 320 km round trip to Port Hedland to buy a replacement tripod and an electric drill to re-mount the AZ/EL mount. Fortunately, I brought a back-up 60 cm dish. The 60 cm dish and 50 W worked well enough to complete the important OH field and 6 grids despite spreading of up to 200 Hz and lunar degradation up to 2 dB. It has been established that even under poor conditions of spreading and lunar degradation, it is possible with QRA64D to work G3WDG's 3 m dish with a 60 cm dish and 50 W with around 4 dB to spare. The plan from here is to go down to Perth and replace the bent 77 cm dish with a 113 cm dish from the 24 GHz system and get a replacement feed flow over from Hobart. This system will hopefully be ready for an attempt at the 10 GHz World Record with WA3LBI portable in Delaware (9 and 10 Sept) to the very West Coast of Australia at OF76mk.



W5RZ: Dennis dennisw5rz@gmail.com reports on his truly "Backpack EME" -- I'm primarily an HF operator and probably will never have a permanent EME station. In the last few years, I've discovered that I can work a lot of stations on 432 JT65 with a small antenna on a tripod and low power. Several years ago, I worked DL7APV with 5 W at the antenna and two yagis. In 2016, I set up in a portable location for the ARRL's National Parks on the Air event and worked 4 stations in about an hour with a single yagi and 50 W on battery power. This was almost too easy, so I wondered if it would be possible to make EME contacts with only what I could carry on my back. The lightest antenna solution was a rope yagi, and DG7YBN, was very kind in corresponding with me and giving me a set of dimensions for the material I had. M0ABA/MX0CNS also helped with advice and encouragement. NC1I offered to help me test the setup. We tried on 19 Aug. My antenna twisted up and changes were obviously needed, so Frank agreed to try again the next day. On 20 Aug at 1220, we were successful with good signals both ways. This test was in my backyard, but I was careful to only use things that would fit in my small backpack. I used an FT-817, Tokyo Hy-Power amp, Signalink USB, and a netbook computer. A 12AH battery provided plenty of power. Output power was 20 W, at least at the beginning, and may have dropped some by the time we finished. I didn't have room for a wattmeter in the backpack! The modified rope yagi stayed stable this time, and proved it would be feasible to use it with just a rope over a tree limb and a tent stake in the ground. It is a GTV70-23 from the DG7YBN website. The main thing to take away from this is that the big stations are very encouraging to us who run occasional/QRP. NC1I, DL7APV, HB9Q,

OK1DFC, and many others have provided friendly advice and counsel, and enthusiastically listened for my weak signals. I appreciate their doing the "heavy lifting" that makes the QRP fun possible.



W5RZ with his string yagi

W6YX: Gary (AD6FP) ad6fp@lbachs.com updates us on his club's MW contest plans -- It's been a while our last report. Over the last 6 months we've been working on repairs to the station. The winter storms did considerable damage to out 8 m dish. We had to repair about 50% of the surface. We've also been spending a lot of time fixing the 10 GHz station. A loose metal shaving in the TWT amplifier caused a short, which destroyed the filament transformer. The repair required excising the toroid from the potted HV module, rewinding it, and repotting the module. We plan to be active on 10 GHz during the ARRL EME contest, but using a call sign of one of our members TBD.

W7CJO: Jim wa7cjo@jellico.com was QRV on 3 cm to provide some QSOs/points for the ARRL's 10 GHz contest -- It seems that I forgot how to run the station! In any case with the dish wondering off the Moon and my left foot keying I probably miss several contacts, sorry. Signals were very good, but my CW decoder is a bit rusty. I was surprised at the EU activity. I worked WA6PY, F1PYR, VE4MA, HB9Q, G3WDG and DB6NT on Saturday. [Jim planned to be on for a short time on Sunday, but I never received an updated report. To the east is limited because of a tree to evevations > 30 degs].

WA6PY: Paul pchominski@maxlinear.com reports on his EME operation in Aug during the ARRL 10 GHz contest – On 19 Aug, on 3 cm, I worked VE4MA and W7CJO. Jim had an extremely strong signal. I also QSO'd a few EU stations. I was on Sunday, but both days I had only a very short time ~ 1.5 hours for operation.

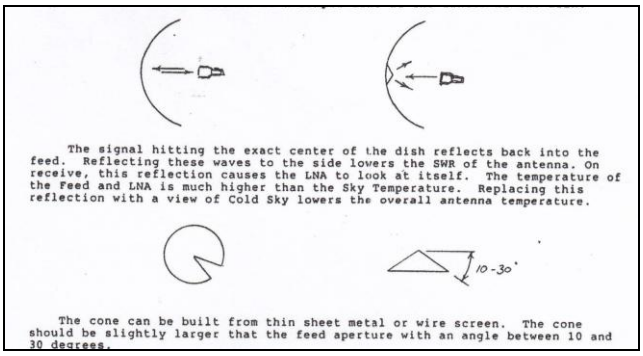
WD5AGO: Tommy wd5ago@hotmail.com sends news on his ARRL contest plans – I tried to be on for the 6 cm contest last month but ran into some equipment issues and a conflict with QRL on Friday. I should have it fixed before the ARRL MW EME contest in Sept and will be exclusively on 6 cm. We will also be sending grid squares to double up on the ARRL VHF contest that is the same weekend. Schedules are very welcome. I am still pegged by in band noise on 13 cm and will set it out this time around. The following month we will be on 23 cm and then on 70 cm.

K2UYH: I (Al) alkatz@tcnj.edu had a much better month operating wise in Aug than in July. During the 9 cm AW I QSO'd on 12 Aug at 0540 OF2DG (569/569), 0544 W5LUA (569/569), 0552 PY2BS (569/579) and 0608 G3LTF (569/579) and (55/55) on SSB – my first on 9 cm, and on 13 Aug 0616 OK1KKD (559/559) for initial #42, 0633 G3LTF (569/579), 0643 HB9Q (579/559) and 0649 WB2BYP (559/559). On 12 Aug I also switched to 432 to work at 1353 JE3UFF (21DB/13DB) on JT65B for mixed initial #936*. I was on 3 cm on 19 Aug trying to optimize my 3 cm system and worked with the feed in a less than optimum position at 1530 VE4MA (O/559) and 1609 W5LUA (559/569). I also at 1500 WA7CJO (559/?) but could not get his attention. The next day on 20 Aug I was on 1296 and worked at 1228 KN0WS (12DB/O) JT65C mixed initial #545* and NE – one of last few I still need, 1239 SM3KPX (22DD/20DB) JT65C #546*, 1246 DF3GB (9DB/7DB) JT65C #547*, 1253 LA3EQ (14BD/O) JT65C, 1301 IK1EHI (8DB/9DB) JT65C #548*, 1307 EW1AA (17DB/O) JT65C, 1316 VE3KRP (11DDB/9DB) JT65C, 1324 GM4PMK (12DB/7DB), 1330 UA9FA (15DB/11DB) JT65C #549*, 1354 DF2GB (44/54) on SSB for inital #379, 1355 DC9UP (55/55) on SSB, 1410 W7MEM (21DB/O) JT65C - Mark with 50 W, 1449 GF2GB (559/559) –on CW, 1443 SP6ITF (569/579), 1729 XE1XA (45/43) on SSB. On 25 Aug I was back on 9 cm to work the Goonhilly dish at 1800 GB6GHY (569/579) for #43 and then switched to 6 cm to QSO at 1912 VE4MA (559/449) and 1932 GB6GHY (569/569) for initial #51. The next day, 26 Aug, I back on 9 cm to contact at 1722 DK0SB (569/559) CW 1728 Rob #44. I plan to be QRV with the usual group during ARRL MW Contest. We plan the first day to start on 13 cm, switch to 6 cm later and then be back on 13 for our JA/VK window. The second day we will start on 3 cm, switch to 9 cm and then be on 6 cm and possibly also 9 during the VK/JA window.

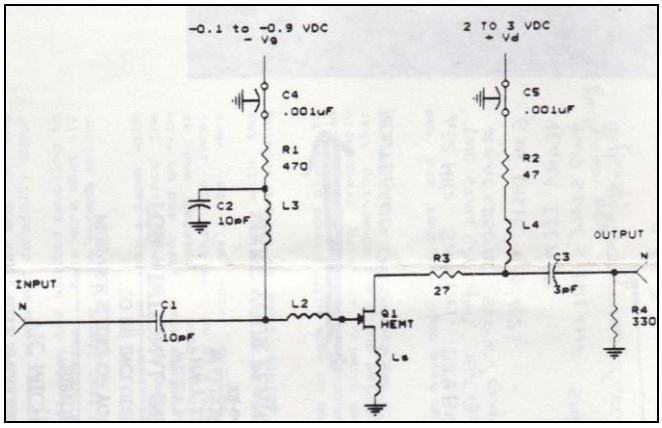
NETNEWS: **SP7DCS** is now QRV on 3 cm with a 1.8 m offset dish and 38 W. He has 12 dB of sunnoise. **DF1SR** is also on 3 cm EME. **UA9YLU** in Aug added an initial with DL1SUZ on JT65C. **K5QE** is QRV on 222 EME and on 13 Aug worked VE6TA. **ON4OAI** should be active on 13 cm during the MW EME Contest. **PA5Y** will be QRV in near future with a 3.7 m offset fed solid dish. **VK3NX** QSO'd VK7MO on 3 cm at several of Rex's grid locations including OG89 and OG88. **WA2FGK** has decided to stop EME operation on 432, but will remain active on EME on other bands.

FOR SALE: **WD5AGO** has for sale a 130 W 2304 PA (24-28 V 3W input), a new 70 cm cavity LNA (0.25 NF and 20 dB gain), 23 cm, 13 cm and 9 cm LNAs. For more info contact Tommy at wd5ago@hotmail.com. **K2BMI** has for 3 cm a dish, LNA and transverter but needs a PA for EME. If you can help, contact Jack jack.gelfand@oswego.edu. **UX3LV** produces tube sockets for the GI7B, GS9B, GI23B and GI46B. Contact http://www.ebay.com/itm/263141269240?ssPageName=STRK:MESELX:IT&_trksid=p3984.m1555.l2649 or http://www.ebay.com/itm/263143192982?ssPageName=STRK:MESELX:IT&_trksid=p3984.m1555.l2649 or http://www.ebay.com/itm/SOCKET-for-Russian-tubes-gi46b-gi23b-odel-LV-1-/263113944742?hash=item3d42d02ea6:g:gtoAAOSwQVZZfOOF or contact Zitat directly at ux3lv@kharkov.ukrtel.net. **W5FH** is in need of type SC-male connectors that fit the RG-8 size Teflon cables. Can anyone help? If so contact Byron bjtatum1@att.net or tel 281-756-0791. **W8BYA** has for sale relays and directional couplers - very clean (9.2/10) Anritsu, 12 V, SPDT, SMA, DC-13 GHz relays - asking $15 each plus shipping; some Radiall, 24-28 VDC, SP6T, SMA, DC-18 GHz rated relays rated at 240 W up to 3 GHz, and down to 100 W at 18 GHz; and used 4-port 1 - 2 GHz 10 dB directional couplers - asking $10 each. Contact Gedas w8bya@mchsi.com.

EME 25 YEARS AGO by Peter, G3LTF: In the Aug 1992 EME NL the 432 dxpeditions to CT1 and ES were in the news as well as activity from EA6/DF5JJ, and the technical section contained three interesting items. OE9PMJ (SK) described a HB X-band load for circular waveguide (dimensions in inches!) and WA5VJB described a method used in radio astronomy to lower the antenna noise temperature on prime focus dishes by reducing the noise coming from the reflection of the hot, 290K, feed - see picture, (I think my dish might be large enough to try this out on).



The third item was the description by WD5AGO of an easy to build 23 cm preamp with repeatable high performance using no PCB, just air-spaced dead-bug style construction. This circuit became the basis of many designs in use today, notably G4DDK's with its added second stage. Tommy reported 6.7 to 7.2 dB cold sky to ground and 0.32 to 0.45 dB in NF contests with a range of HEMPTs. I built one immediately using FHX35 with an integrated second stage and this gave 0.35 dB and was only retired about 5 years ago. In my opinion Tommy's contribution to EME technology with this circuit is up there with W2IMU's dual mode feed horn.



DK0SB with PA3CQE at the operating position

THE RADIOASTRONOMICAL CORNER: See http://news.berkeley. edu/2017/08/30/distant-galaxy-sends-out-15-high-energy-radio-bursts/ for info on a distant galaxy that seems to be sending out 15 high-energy radio bursts at 7 GHz. It is completely a mystery.

FINAL: Sept will be another busy month for MW EMEers with the with ARRL MW EME Contest on the 9th and 10th. On 16/17 Sept is the ARI's Sept Trophy Competition.

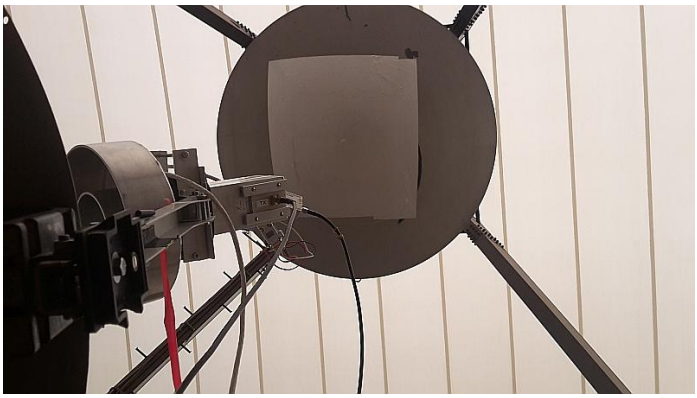
3 cm ops in the MW EME Contest please note that the 10 GHz the beacon is being repaired due to a PA problem. DK7LJ will announce when it is back in operation.

The dates for the 2018 Dubus CW/SSB EME Contest wii be on 24-25 Feb 2 m/70 cm, 24-25 March 13 cm, 21-22 April 23 cm, 9-20 May 6 cm, 16-17 June 3 cm and 14-15 July 9 cm. These are all dates with high declination and low excess loss. 2018 looks like a good EME year. [TNX to G3LTF for this information].

It is not too early to start making plans for **EME 2018 NETHERLANDS,** the 18th International EME Conference next summer. The website for 2018 is www.eme2018.nl.

We hope all EME friends in TX survived Hurricane Harry with minimal damage and that everyone is safe and sound.

Please keep the news and tech reports coming. We will be hoping to CU off the Moon especially on 13, 9, 6 and 3 cm (sorry no 1.25 cm yet) in the ARRL MW EME Contest. 73, Al - K2UYH and Matej - OK1TEH



DK0SB feed located behind reflector

More details of DK0SB's feed arrangement – the actual feed is behind the reflector (along with other feeds seen in the picture). It illuminates the sub-reflector, which illuminates the main reflector.