

432 AND ABOVE EME NEWS

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CONDITIONS: There is only the 6 cm contest to report on this month. Weather (WX) turned out to be a major factor with scorching heat in EU the first day and wind and rain a problem for many the second day. **The top reported score is from OK1KIR with a total of 31x29;** OH2DG is at 31x28 and several others were close behind. **Coming up very soon, on 12/13 Aug is the first weekend of the ARRL Microwave (MW) EME Contest. It will be a high DEC, early morning/daytime contest. The question is which bands to operate and when. We suggest 13 and 3 cm the 1st day, switching to 9 and 6 cm later in the day; and the reverse the 2nd day. Unlike DUBUS, just about anything goes in this contest. Announcing CQs and general operation on Loggers is OK, which should help with band coordination. Remember there are separate awards for CW only. The 2nd MW Contest weekend is 9/10 Sept. Also in Sept is ARI Autum EME Contest on the 30th.**

The OJ0EME dxpedition in July was a super success! They amassed on 70 cm 35 QSOs with 33 initials and 1 CW, on 23 cm 151 QSOs with 127 initials and 15 CW, on 13 cm 21 QSOs with 17 initials and 4 CW, on 9 cm 22 QSOs with 15 initials and 9 CW, on 6 cm 36 QSOs with 25 initials and 13 CW, and 3 cm 51 QSOs with 42 initials and 10 CW. See their report later in this NL.



OJ0EME operating site on Market Reef

There is nothing new coming up dxpedition wise, but with ARRL 50-1296 Contests on 28/29 Oct and 2/26 Nov you can expect some surprises.

PA3FXB has completed both WAS and DXCC on 1296! This is quite an accomplishment with a smaller than 3 m dish. Congratulations to Jan. See his report in this Newsletter (NL).

REPORTS:

DB6NT: Michael db6nt@gmx.de reports on the DUBUS 5.7 GHz CW EME Contest -- Hello friends during the weekend 15-16 July the The weather (WX) conditions were good. I participated in the DUBUS Contest and was able to work using CW JA4BLC, OK1KIR, PA3DZL, OZ1LPR, OK1CA, OK1DFC, SQ6OPG, DL3WDG, SM6FHZ, SM6PGP, DL6SH, OH1LRY, OH2DG, UA5Y, SM6CKU, VE4MA, WA6PY, JA1WQF, 9A5AA, JA8ERE, ES5PC, IK3COJ, UA9FAD, DJ7Fj, DL4DTU, G/SM7FWZ, KL6M, G3LTF, ES5PC and SP6GWN. My total was 30x26 for a new personal record HI! A few more stations called that were too weak for me to decode - sorry. TNX for all the nice QSOs.

DJ3JJ: Andreas dj3jj@gmx.net was pleased to work K5QE on 1296 in the ARRL June VHF Contest - (tropo contest but includes EME QSOs too) on EME - I copied Marshall from (13DB) to (20DB) possibly due to track but with plenty of margin for a nice QSO with my 2.5 m dish and 150 W at the feed.

DK3WG: Jurg dk3wg@darf.de (JO72gi) keeps us informed of his recent accomplishments on EME - I worked new (initials) in June on 70 cm using Q65B with UR3VKC, TM80MAX, OJ0EME and SM6CEN; and on 23 cm using CW SM6FHZ and using Q65C with W4NH, YU1SAN for DXCC 80, ZS4TX, OJ0EME for DXCC 81 and 9H1BN for DXCC 82; and in July on 70 cm using Q65B SP2WRH, and on 23 cm using CW OK2PE and using Q65C AB6A, EA2BRI and PA3JRK.

DL1SUZ: Uwe dl1suz@darf.de sends from holiday - With out my log, this report is very marginal. I worked OJ0EME on 23, 13 and 9 cm. Many thanks for the great activity to the OJ0 team. As a consequence of their presence, it was possible to pick up some additional stations. Initials

included on 1296 YB2MDU, 2320 OH2DG and on 3400 HB9Q, OZ5G, PA3DZL, OK1CA, OK1KIR, OH2DG and DF3RU. Because 9 cm is a new band for me, I'm looking for skeds in any modes. I am using 45 W into a 3.2 m mesh dish and 0.5 dB NF DDK LNA.

F5JWF: Philippe F5jwf@wanadoo.fr brings us up to date on participation in the 2023 DUBUS EME Contests – I found the 23 cm DUBUS weekend in May well attended and contacted 29 CW stations: HB9Q, OZ4MM, PA3DZL, OK2DL, JH1KRC, G0LBK, G3LTF, LZ2US, OK1DFC, IK3MAC, SA6BUN, G4CCH, DH5CST, KL6M, SP9VFD, F6CGJ, OK1KKD, UA5Y, F5KUG, SP6ITF, OH1LRY, OZ6OL, RA4HL, K0PRT, K2UYH, WA9FWD, SM2CEW, DF3RU and K3WM. It's always a great pleasure for me to contact KL6M in Alaska *long path* at moonrise. My 23 cm station consists of a 3.7 m with ~ 100 W. My Sun/CS is ~15.2 dB and G/CS ~ 5.6 dB. I added too late for the contest, a "circular choke" on my septum feed to improve illumination. This gives me 1.1 dB more of solar noise and therefore on my echoes, which should make it easier to decode small signals. On 3 cm – just average. However, for once almost only CW stations were on. No US or Canadian stations were contacted. My total was 21x18 with OZ1LPR, SP6JLW, JA6WQF, HB9BBD, UA5Y, F5IGK, OK1KIR, IW2FZR, DB6NT, SM4DHN, HB9Q, PA3DZL, DL0EF, HB9BHU, G4NNS, JA4BLC, PA0BAT, OH1LRY, DG5CST and IK2RTI. Heard were 9A5AA and K6MG. My station on 3 cm is a 3.7 m dish and 70 W. My Sun/CS noise is ~16.5 dB, G/CS ~5.2 dB and Moon/CS ~2.2 dB. Unfortunately, I was busy for the 13 cm weekend and could not be QRV. This band is now complicated for me due to numerous WIFI hot spots appearing in my neighbor. The band is now crowded with birdies and I am wondering what I can do. **[Would a move to the JA band (2400) help. In NA we can operate on 2400?]**



F5JWF in shack; QRV on 23 cm up

F6ETI: Philippe f6eti@wanadoo.fr sends his report for the 1296 REF-Dubus - VK3UM Memorial EME Contest – Bad WX disrupted my *field day* style weekend operation. Rain and gusts of wind upset the dish positioner on Sunday until mid-afternoon. I operated random as usual and achieved 22 CW and 1 SSB QSOs, and 4 initials for a score of 23x22. Contacted on Saturday were KL6M, OK2DL, SP9VFD, IK3MAC, G3LTF, F6CGJ, SA6BUN, OH1LRY, SM6FHZ,

DG5CST, PA3DZL, HB9Q, G4CCH, OK1DFC, G0LBK for initial #100 and LZ2US, and on Sunday OZ4MM, OH2DG, DK7LJ on SSB #101, SM6CKU, K0PRT #102, IK2DDR #103 and K3WM #103. I had a few interested visitors to whom I did a little promotion of our magical hobby; and was surprised by a visit from F6DLA. My system was 3 m dish, 300 W SSPA to a septum feed, VLNA23 G4DDK with 027 dB NF. My SUN/CS noise was ~13 dB with an SFI 147; see video at https://youtu.be/UFH1I_er1I.

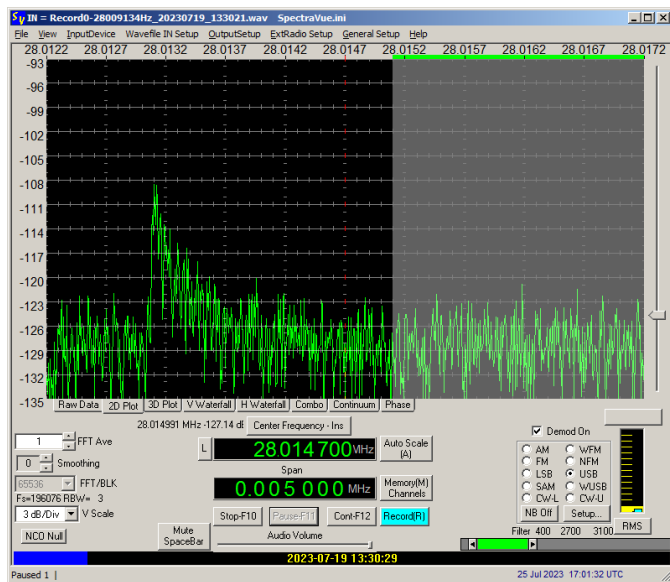
F8DO: Marius f8do@orange.fr sends news about his 432 EME activity from (JN26if) – I have improved my 432 station with a new SSPA (400 W at feed of my 2 x 21 el yagis) and cavity LNA. My last QSOs were with W2HRO, K5DOG, DL1VPL, S57Q, W7JW, EA5CJ, NC1I, DL8DAU, DG5CST, AA5C, KU4XO, PA0BAT, JA6AHB, HG5BMU, JR7PJS, PA2V, DK3WG and DL7APV (6DB). Reports were good and contacts possible with any 4 yagis stations if Faraday cooperated. **I am looking for a contact with South America to complete WAC. PSE email for a sked – TNX.**

G3LTF: Peter g3ltf@btinternet.com sends news on his June/July results -- On 19 June I was on 23 cm CW, warming up for the OJ0 dxpedition. I worked DL1AT, SP7EXY, WA6PY, VE6TA and IK2DDR. The next morning, I was delighted to work two new JAs: JH3AZC for initial #538 and JJ3HPJ #539 followed by SA6BUN, **OJ0EME #540 and DXCC 82** and JH1KRC. I then changed the feed system to 9 cm to work OJ0EME for initial #78 and **DXCC 31**. The next day, 21 June I changed the feed system to 6 cm and **QSO'd OJ0EME for initial #96 and DXCC 38 there**. Interestingly his signal was the strongest on 6 cm, (559). On 22 June I changed the feed system again to 13 cm and worked using CW OK1KIR and **then on 23 June OJ0EME for initial #161 and DXCC 50**. A great effort by the OJ0 team, many thanks. I worked back on 1296 CW on 26 June AA4MD and then on 27 June IK1FJI and 9H1BN for initial #541. We had gales for the weekend of the 6 cm DUBUS-REF Contest and I could only operate for part of the second day, on 16 July. It was very hard to keep the antenna on the Moon but managed to worked using CW UA5Y, SM6FHZ, OH1LRY, PA3DZL, DL3WWDG #97, OK1KIR, OZ1LPR, OH2DG, OK1CA, ES5PC, VE4MA, G/SM7FHZ, DB6NT, WA6PY and KL6M for a score of 15x14. **I plan to be on for the ARRL Microwave Contest on 12/13 Aug, probably starting on 13 cm.**

G4NNS: Brian brian@brcg4nns.org reports on the DUBUS 6 cm Contest -- The WX on Saturday was very bad with wind gusts recorded locally at 55 MPH and heavy rain that gave me another waterfall display off of the dish - Hi! The tracking held on to the Moon and I managed a few QSOs using my call. However, as Ronny (SM7FWZ) was visiting at the time we decided to mix things up a bit on the Sunday by having **Ronny operated as G/SM7FWZ**. We both very much enjoyed the 6 cm activity. Thanks very much to DUBUS-REF and all for the great fun.

G4RFR: Julian (G3YGF) Julian@ygf.org.uk reports on EME Group's expansion plans plus some interesting results on tests with chirp signals -- We are working on getting 6

cm and 24 GHz going with our 12' dish. So far, we have 14.6 dB of Sun/CS and 3.8 dB of ground noise on 5.7 GHz, and we are hoping to get 100 W TWT going their. On 3 cm, we worked OE5VRL, VE4MA, DL7YC, OK2AQ, CT2GUR, CX2SC, GW3TKH, DJ7FJ, IZ4BFA, **OJ0EME**, PA0MHE, G0OLX and UR3VKC. We also had a partial with G4NNS and were heard by IK1FJI. We will be on in the ARRL EME MW Contest on 12/13 Aug under the call G4RFR or GB2FRA. We have done some additional experiments with a linear chirp waveform with our 3.65 m dish and 200 W. The chirp converts time into frequency. We are using a chirp of 100 kHz/1.25 secs, which is 80 kHz/sec. So, after Spectravue despreads the signal, 80 kHz corresponds to 1 second's propagation time, and 1 kHz corresponds to 12.5 ms propagation time. This time period just about matches the total duration of the echo, which roughly corresponds to the depth of the Moon (distance from the center to the edge), which is 11.6 ms (1737 km at $C = 3 \times 10^8$ m/s = 5.8 ms x 2 = 11.6 ms). The chirp has a range resolution of 3 km. The plot is signal (3 dB/div) vs time (5 kHz span = 62.5 ms, or 6.25 ms/div). It seems that most of the echo power (-3 dB) comes from the first 1.2 ms of the echo, a depth of 180 km; (100 Hz wide on the plot). This corresponds to the central half of the Moon's dia. The echo has decayed 20 dB before you get to 11.6 ms, (2 divs) later, which is the edge of the Moon. So, it would seem you still get most of the benefit of increasing the dish size to 7 m on 10 GHz. We are comparing the results with papers reporting in the 60/70s, albeit with a smaller dish and lower power, but this is an ongoing topic, with relevant papers published in the last couple of years.



100 kHz Chirp echo on 10368 MHz

G/SM7FWZ: Ronny sm7fwz@arlembe.se visited G4NNS during the DUBUS 6 cm Contest - [see above] -- I and used Brian's equipment to provide some additional contests activity. My results were QSOs on 16 July using CW at 0800 OK1CA (539/559), 0807 OK1KIR (569/569), 0825, OH1LRY (559/559), 0835 OH2DG (579/559), 0841 UA5Y(579/579), 0851 PA3DZL (569/559), 0856 SM6FHZ (569/559), 0920 OZ1LPR (569/559), 1448 DB6NT

(569/569), 1455 SQ6OPG (539/559), 1500 G3LTF (559/569), 1507 KL6M (559/559), 1553 ES5PC (559/559) but missing G/. I ended with a total of 13x12.

IK1FJI: Valter valter_dls@yahoo.it sends his 23 cm CW/SSB report for May and June – I worked on 1296 DL1AT (559/569), DK4EE (55/56) on SSB for initial #156, DK3EE (569/559) #157, SA6BUN (569/569), SP7EXY (569/589), SM5DGX (579/579), I5YDI (559/569), PA3DZL (589/589, IK2DDR (569/579), **YB2MDU (569/569) #158**, SM5DGX (56/56) on SSB, ON4LX (559/569) #159, OK2PE (559/569), I5YDI (559/569), S59DCD S59DCD (569/569) #160, G3LTF (579/579), SA6BUM (569/569), JJ3JHP (559/569) #161, JH1KRC (569/579), DJ3JJ (O/O), DL1AT (559/569), SP7EXY (569/579), **OJ0EME (O/O) #162** and new DXCC, ON5GS (569/579), **9H1BN (O/O) #163** and new DXCC, **OZ6OL (559/569)**, XE1XA (579/579) and G3LTF (579/579). My station is 3.8 m dish with septum/choke ring, with HB9DDB LNA and 1400 W @ feed, and EA4TX tracking board. I have also been testing on 10 GHz with a 125 cm offset dish. I hear some CW stations, but need to increase performance of my tracking system. Unfortunately, I do not have much time to work on improvements.

JA4BLC: Yoshiro ja4blc@web-sanin.co.jp is now QRV again on the microwave bands – I joined the stations active in the REF/DUBUS 5760 CW EME Contest and worked on 15 July OK1CA, OH2DG, OK1KIR, PA3DZL, OZ1LPR, DB6NT and OK1DFC; and on 16 July JA1WQF, JA8ERE, UA5Y for initial #54, DL3WDG #55, OH1LRY #56 and JF3HUC for a total of 13x11. I now have my feed for 3 cm in place and will begin the ARRL Contest in Aug on 3 cm.

KA6U: Peter petervanh143@gmail.com will be on the road again – I am planning an EME roving trip from 1 to 12 Oct in the Eastern US. The plan is to operate on 432, 1296 and 902. On 902, I will use the 2.4 m dish and 250 W. I hope to have 902 checked out by the end of Aug. If there are states you need east of the Mississippi on these bands, please email me. I will also be in the Midwest (Kansas) from mid-November through early January and plan some operations assuming there are a few decent WX windows during that time.

N5BF: Courtney's courtney.duncan.n5bf@gmail.com 23 cm EME report for 29 May thru 23 July follows -- Due to an illness in the family, there has been almost no time to work on the station, but there have been a few opportunities to get on the Moon and make a few QSOs and to verify that echo performance and Sun noise haven't changed unexpectedly. Initials among the 17 QSOs I completed using Q65C were AB6A (22DB/20DB) from his OR QTH for my WAS 48, PA3JRK (18DB/17DB) and **9H1BN (23DB/21DB) in Malta for DXCC 59**. To complete WAS, I still need ND and NH.

N9LHS: Linda's straue75@gmail.com achievement of the first 1296 WAS by a YL was reported in the last NL; here is more of her story -- My 1296 WAS certificate, a quest that started on 29 Aug 2022, was completed on 14 May 2023 in

less than 8 months. 49 of those 50 states were via EME. As I understand it, I'm the first YL ham to be awarded a 1296 WAS. I want to thank my husband Dave, a long-time ham N9HF, and our new ham friend Dan WH6A for their help in making this feat possible. I also owe a *shout-out* to Peter, KA6U, the rover par-excellence, whose efforts contributed a whopping 30 states to my total, all of them off the Moon.



N9LHS (Linda) in front of dish with her 1296 WAS certificate (1st by YL, congrats!)

NC1I: Frank frank@NC1I.COM reports on his recent EME results that were enhanced by his ability to operate his station remotely -- Thanks to the ongoing work of W1QA both my 23 cm and 70 cm stations are now operational remotely. In fact all of my activity on 70 cm since 19 June has been while operating remote. On 23 cm all activity since 22 July has been while operating remote. As of the end of Aug, I have completed over 75 QSOs operating remotely. We have a couple of minor issues to work out but overall, both stations are working very well. The biggest task left is to get audio to the control location (my home) so that we can operate CW. I'm sure we can get that resolved soon. With the ability to operate from home, I expect to be far more active than I have been over the last year. The only thing holding me back some right now has been the near daily thunderstorms, or threat of thunderstorms. I have had to disconnect everything at the station very frequently over the last 6-8 weeks. Fortunately, my station is only a few kilometers away, so I have the ability to go over and reconnect everything whenever we expect a few days without the threat of thunderstorms. Unfortunately, the worst WX has coincided with good Moon days/times. Initials since my last report include on 23 cm **OJ0EME (new DXCC)**, **YU1SAN (new DXCC)**, OK2AQ, N0AKC, OE5VRL, **9H1BN (new DXCC)**, and PA3JRK, which brings my 23 cm overall initial count to #509 and digital initial count to {#402}. On 70 cm we added initials with G3YEG, JA4RED, SA5IKN, and KN2K to bring my 70 cm digital initials to {#578}. Notable QSOs on 70 cm were with G3YEG who was using a single 9-element yagi in his attic and 50 W. I completed two QSO's with Nic, the first was (23DB/27DB) and the second was (25DB/14DB). Other notable QSOs were with SA5IKN (24DB/23DB). Max was running portable

(battery power) with a single 15 el yagi and 30 W. KN2K (27DB/14DB), Ray was running a single 15 el yagi and 40 W. I would like to thank and congratulate the OJ0EME team for a job well done! They had excellent signals on both 23 and 70 cm.

OJ0EME: Norbert (DL4DTU) dl4dtu@gmx.net reports on his webpage the truly spectacular results of this dxpedition

– On 432 they made 33 initials with 1 CW (35 QSOs) with VK4EME, UT6UG, JF6CTK, UX5UL, UT5DL, JJ3JHP, UX0FF, DL1VPL, DK3WG, DL9KR (CW), OK1KIR, UA3PTW, NC1I, VE6TA, DL6SH, OH6UWE, JR7PJS, UR7DWW, S51ZO, VK2CMP, G4YTL, OH2DG, ZS4TX, OH6UW, EA5CJ, S57Q, DK3WG, UR3VKC, W5LUA, W2HRO, PA0BAT, K5DOG and N1AV. On 1296 they made 127 initials with 15 on CW (151 QSOs) with OK1DFC, RA4HL, PA3DZL, HB9Q, ON4AOI, JH3AZC, DL8FBD, DF3RU, IK2DDR, OM4XA, UA3PTW, PA9RX, ZS6JON, DL1SUZ, G4CCH, JA6AHB, IQ2DB, PA0PLY, OZ6OL, PA3FXB, RD4D, ON4QQ, ZS4TX, IK3COJ, UA9FAD, OK1KIR, OT7K, OH2DG, OK1IL, PE1CHQ, PA0BAT, G0LBK, DK3WG, OT7K, G4YTL, PE1LWT, EA8DBM, RX6AIA, SP5GDM, I7FNW, YO2LAM, LZ4OC, DJ2DY, FJ7FJ, SP7EXY, ES3RF, EA8DBM, NC1I, IK7EZM, LA3EQ, IK5EHI, OK2DL, IK3COJ, SM6CKU, W2HRO, VE3KRP, W7JW, W2ZQ, W5LUA, DL7UDA, AA4MD, N1AV, DF2VJ, DH6LS, K2UYH, DG0FE, K5DOG, SM5DGX, VE6TA, PA7JB, DK0SF, CX2SC, G4DDK, IK2CDI, LA1TN, PY2BS, KA1GT, N6RZJ, PA2DW, LU8ENU, N0AKC, OE5VRL, IONAA, K7EME, JJ3JHP, JS6UJS, VK2JDS, G3LTF (CW), SA6BUN (CW), DJ3JJ, G4CCH (CW), IK3MAC (CW), DL1AT (CW), OK1KIR (CW), IK1FJI, ZS1LS, PE1CHQ, OH2DG (CW), IK7EZN, SV8KOU, ON5GS, G4RGK, VA6EME, OK2AQ, W6TCP, DL6SH (CW), GM4PMK, N0CTR, PA3HDG, IK1FJI (CW), ON4QQ, SP7EXY, HB9Q (CW), SP7EXY (CW), SM5DGX (CW), KB2SA, K3WM, CX2SC, N5TM, N9HF, N9LHS, PA3HDG, W7JW, AA6I, VE7ZD, K6RA, JA4LJB, JS6UJS, OK1UGA, OZ4MM (CW), JJ3JHP (CW), SM5DGX (CW), SM6CKU (CW), RD9SAC, OK2PE (CW), OK1USW, DM9LSB, EA1IW, 9H1BN, F6KRK, DK0ZAB, DJ2DY, ES3RF, PA0PVW, OK1DFC, K5LA, ON4AOI, XE1XA and OZ6OL. On 2300 they made 17 initials with 4 CW (21 QSOs) with HB9Q, OK1KIR, OK1DFC, PA3DZL, PA0BAT, DL6SH, DL1SUZ, IK3COJ, DK0SF, DB6NT (CW), OH2DG, G4CCH, PE1LWT, G3LTF (CW), OK1KIR (CW), OH2DG(CW), OE5VRL, W5LUA (2400) and OZ5G. On 3400 they made 15 initials with 9 CW (22 QSOs) with OK1CA, OK1KIR, OH2DG, PA3DZL, HB9Q, DB6NT (CW), OZ5G, DF3RU, OH2DG (CW), OE5VRL, DL1SUZ, OK1KIR (CW), OK1CA (CW), DF3RU (CW), G3LTF (CW), PA3DZL (CW), W5LUA, K2UYH, G4CCH, K2UYH (CW), G4CCH (CW) and DL6SH. On 5760 they made 25 initials with 13 CW (36 QSOs). On 10368 they made 42 initials with 10 on CW (51 QSOs) with DB6NT (CW), OZ1LPR (CW), DL3WDG, OK1KIR, DL6ABC, HB9Q, OH2DG, PA0BAT, DL4KGC, OK2AQ, JA1WQF, OZ1LPR, SM0DFP (TR), SK0EN (SSB), PA3DZL, F5VKQ, OZ1FF, G4YTL, CT2GUR, DJ7FJ, SM6CKU, OK1KIR (CW), OK1CA (CW), IZ2FZR, W3SZ, OK1CA, OH2DG (CW), W5LUA, VE4MA, OH1LRY, DL7YC, LZ4OC, IU0BTM, CX2SC, OE5VRL,

F6BKB, IZ4BFA, HB9Q (CW), OK1DFC, DJ3FI, OE4WOG, SA6BUN (CW), VK7ZBX, SA6BUN, G4RFR, DL3WGD, OA0MHE, CT2GUR, IK0HWJ, UR3VKC, PY2BS (CW) and OE5VRL (CW). Postage/Donations for the dxpedition can be made via PayPal at vhf@freenet.de please note your callsign there.



1.8 m dish used for 9, 6 and 3 cm at OJ0EME

OH2DG: Eino metsamakieino@gmail.com enjoyed this year's high declination weekends and reflects on his results for the first half of 2024 -- It was nice to QSO NH6Y on 70 cm and N1V on 23 cm in Hawaii. Other dxpedition stations worked were Curacao (PJ2T) on 70 and 23 cm, Ogasawara (JD1YCC) and Okinawa (JS6UJS) both on 23 cm, and Indonesia (YB2MDU) on 23 cm. An extra special dxpedition was DL-team trip to the Market reef using call OJ0EME. I made 11 QSOs with them; 6 digital on 70 thru 3 cm and 5 CW on 23 thru 3 cm. Many thanks to the OJ0EME team. In DUBUS REF contests I was only able to operate part of the time. I scored on 9 cm 17x15 and had an initial with DL6SH. During the 6 cm Contest my total was 31x28 with initials from DL3WGD, G/SM7FWZ, UA5Y and IK0HWJ. Many thanks to all for very interesting times on the Moon.

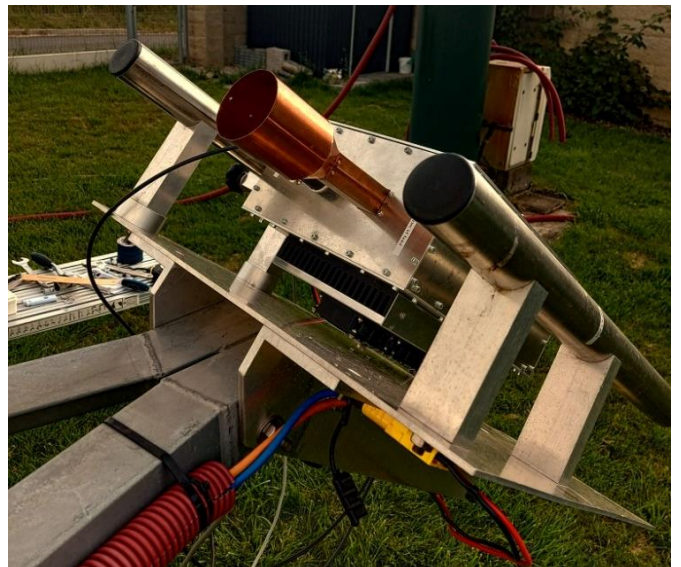
OK1CA: Franta fr.strihavka@seznam.cz enjoyed the CW in the DUBUS 6 cm Contest and had generally good success during his June/July EME -- I spent 4 days on the microwave bands for the OJ0EME dxpedition. On Sunday 18 June, in the morning I left Prague for my EME QTH and installed the 3 cm rig in great heat. The first signal I heard

was OK1KIR on CW calling OJ0EME. After OK1KIR completed, I also worked them using CW OJ0EME (559/539) for 3 cm initial #104. I then switched to Q65D mode, and successively worked OJ0EME (8DB/08DB) for digital initial {#84}, CT2GUR (8DB/12DB) {#85}, VE4MA and OK2AQ. I measured my Sun/CS noise at 18.5 dB (SF158) and Moon noise at 2.9 dB. On Monday 19 June, I moved to 9 cm and in the evening tried with OE5VRL. This test failed as Rudi was using horiz pol. He only heard me (15DB) and promised to QRV with vert pol the next day. Tuesday 20 June at around 0645 I was testing on 9 cm using Q65C and to my great surprise was called by OJ0EME (18DB/15DB) for 9 cm digital initial {#15}. It was their first QSO on 9 cm and also the first OK-OJ0 QSO on 9 cm, and followed by DL1SUZ {#16} and PA3DZL {#17}, and CW QSOs with DB6NT for initial #71 and OJ0EME #72. During the day, I tried 6 cm; but in the evening installed again my 3 cm system and worked OE5VRL first using Q65D {#86} and then using CW (559/449) #105 with no problems. With the small spread, Rudi had an excellent signal, and the contact was completed very quickly. On Wednesday 21 June, while waiting on 6 cm for OJ0EME, I QSO'd using Q65D OE5VRL for 6 cm digital initial {#20} and PA3DZL {#21}, and later OJ0EME (10DB/10DB) {#22}. At 6 cm I measured Sun/CS noise of 17.5 dB (SFU168) and Moon noise of 1.4 dB. During the 6 cm DUBUS Contest, I used a new dual mode feed, made from Cu pipes and sheet in a 4.2 m dish. Due to the high SFU levels of 180 to 190, I measured high Sun/CS noise of 18 dB and normal Moon noise of 1.5 dB. I have no WIFI interference at my QTH, so my listening was perfect; however, unfortunately my power was only 25 W. I made 18 QSOs on Saturday, mostly in the morning and afternoon; in the afternoon it was 40°C in my small ham shack! On Sunday the situation was better and I made another 9 QSOs in the contest. My total score is 27x26. New stations were DL3WGD and G/SM7FWZ to bring me to 6 cm initial #88. Outside of the Contest, I made 5 more QSOs using Q65D with PE1CKK, DJ7FJ and DL4DTU {#25}.

OK1DFC: Zdenek's ok1dfc@seznam.cz writes on the DUBUS 6 cm Contest and the OJ0EME dxpedition -- I didn't spend much time preparing for the contest as I tested the equipment during the OJ0EME dxpedition and so I just rigged the TRV to the dish on Friday. Since the 6cm band is not my favorite, there is relatively little activity here and also there has been interference from WiFi lately, I mainly wanted to experiment and improved reception. But I made a mistake. The WX tested my station in a different way. The contest started on Saturday morning and the temperature outside was still very pleasant. I decided to take a few measurements in the morning. Unfortunately, due to increased background noise from the WiFi, I was unable to find cold sky. I made an add-on in the TRV so that I could switch the RX input of the LNA to a 50 ohm load during reception. At normal temp, the noise increases by about 3 dB/CS. I experimented with the focal position and did some calculations. I found that my focal point was not where I had expected it to be based on the information supplied with my offset dish. After installing the feed in a new position, the interference dropped dramatically, which indicated that the

antenna pattern was different and that I had managed to eliminate or lower the side lobes. Sun noise measurements immediately showed that this was the way to go. I made up a jig to give me an exact measure of where to place the feedhorn. This was done in the morning, while it was still not that (hellish) hot. After lunch, it was almost impossible to keep my hand on the TRV when placed at the focal point of the dish; the temperature was over 50°C! I ended up with 13.5 dB of Sun noise. I then made some QSOs, relatively easy calls to the stations that were calling the CQ. But, I gave up calling as the thermometer in the TRV on the SSPA radiator was climbing to over 60°C after a few CQ sequences. I vacated my *container* operating position gave up for the afternoon as I felt like a "Christmas turkey" in a huge oven. The IC9100 was over 50°C. I turned everything off and turned on a big fan to cool things down at least a little. This finished my Saturday activity. On Sunday heavy rain and thunderstorms arrived. The temperature was now great and I started transmitting. I managed to make a contact with JA4BLC. Next, I worked a few more stations. Sunday was already more favorable WX wise, but the stations on the band had decreased. I experimented with the focal position and then changed bands to 3 cm. Although there was no contest, I found a station to test with. 3 cm also worked very well with the new feed position. I still need to do the feed position adjustment more carefully as soon as the WX permits. QSO'd on 6 cm using CW [in contest] unless noted otherwise were on 15 July at 0248 OK1KIR (579/569), 0305 OH2DG (559/559), 0320 OK1CA (559/559), 0324 KL6M (559/559), 0438 PA3DZL (559/569), 0524 SQ6OPG (559/559), 0533 OZ1LPR (559/549), 0548 JA4BLC (559/559), 0605 DB6NT (579/579), 0654 DL3WDG (10DB/10DB) Q65D for a digital initial {#40}, 0706 PE1CKK (12DB/13DB) Q65D {#41}, 0740 DJ7FJ (9DB/5DB) Q65D {#42}, 0747 OZ1LPR (4DB/10DB) Q65D and 0950 DL6SH (9DB/12DB) Q65D {#43}, and on 16 July at 0752 SM6FHZ (559/559), 0811 UA5Y (559/559) for initial #44, 0842, OH1LRY (559/559), 1251 DL4DTU (11DB/12DB) Q65D {#44}, 1306 DL4DTU (559/559) #45, 1329 VE4MA (8DB/14DB) Q65D, 1338 VE4MA (559/559), 1506 DF3RU (559/559) and 1539 OK1KIR (3DB/9DB) Q65D. In the contest I ended with a score of 15x14. Using digital I made an additional 8 QSOs including 5 digital and 2 CW/SSB initials. Some were also worked on CW. On 3 cm QSOs were made using Q65D on 17 July at 0753 F6BKB (4DB/9DB) and 0912 CT2GUR (1DB/11DB); and on 18 July at 0744 CT2GUR (+0DB/11DB), 0759, JA1WQF (1DB/6DB), 0817 IZ2DJP (8DB/16DB) for 3 cm digital initial {#45} and 0827 IZ4BFA (6DB/13DB). **Regarding OJ0EME:** I knew about the upcoming dxpedition from DG5CST in advance, so I could prepare for it. Most important was to make a new feed for the 2320 band. I spent two afternoons on it and the work was successful. However, on the day they were QRV on 13 cm, I found it strange that there was no sign of OJ0EME. Then came the news that their dish control in AZ and EL had gone out and they couldn't find the Moon. They asked me to be a beacon so they could find the Moon. So, I started transmitting. The SSPA in the focus was putting out its 250 W and everything was going well until I got a reading of 58°C on the temp indicator, then the protection went off and the transmission was over. I had to

let the SSPA cool down, which took time. It was 32°C outside. In the meantime, OJ0 started transmitting, and everyone who was on the band made contact while I waited for the PTT in SSPA to turn on again. I did not work OJ0EME until about the 6th or 7th; but the new DXCC was successful. The next day was for 23 cm. Since they had done a dish calibration on 13 cm, the operation on 23 cm was much easier. I was giving a call on 1296.075 and suddenly a station started answering, it was OJ0. The contact went smoothly and a new DXCC for me and the first contact on 23 cm in the log for OJ0. I echoed to HB9Q that OJ0EME was calling CQ on 075, and an incredible pile up ensued. At one point I counted 16 calling stations. OJ0EME was my #126 DXCC on 23 cm, and also the first OJ0-OK QSO. At the same time OJ0 was also QRV on 3 cm band. I put my 3 cm TRV in my 2.6 m offset dish and made a very easy contact on 10368. The next three days I was traveling in PA0; and I just spent the afternoon at the hotel watching the traffic on HB9Q. When I came back I made another OJ0EME QSO on the 6 cm band. Unfortunately, I didn't make the 9 cm band because DL4DTU was fixing my 9 cm TRV. On Friday, 23 July 9H1BN appeared on 23 cm and wanted to see if I could hear him – see my website for more info. The contact went smoothly to give me DXCC #127. We QSO'd using both Q65C and CW. All in all, it was a very nice week of activity. Lots of nice contacts and a great start to the summer.



OK1DFC's 6 cm offset dish feed

OK1KIR: Vlada vlada.masek@volny.cz and Tonda send news on their June thru July results – The OJ0EME EME dxpedition and the DUBUS 6 cm Contest was the focus of our activity -- While waiting for OJ0EME on 3 cm, we worked on 16 June using Q65D at 0651 PA0MHE (10DB/7DB) for mixed initial #324* and 0701 GW3TKH (18DB/4DB) #325* and a new digi DXCC. We were decoded at G0PEB (10DB) with 1.8 m dish. On Saturday 17 July now on 13 cm, we worked using Q65C at 0815 IK3COJ (6DB/2DB) and had partial with BG0DXC (NIL/13DB) because he was unable to switch on remotely his TX. On Sun 18 June we looked for OJ0EME on 13 cm.

They were delayed due to troubles with steering the dish. In the meantime, we QSO'd using Q65C at 0537 OK1USW (12DB/17DB). Later on, we switched to 3 cm again and using Q65D worked at 0739 OJ0EME (13DB/3DB) for DXCC, #326* and 1st OJ-OK 3 cm QSO. After this QSO we returned to 13 cm and using Q65C worked at 0954 OJ0EME (19DB/20DB) for mixed initial #227* and 1st OJ-OK 13 cm QSO. Because the signal on 13 cm was too weak for a CW QSO, we again reinstalled 3 cm and using CW worked at 1153 OJ0EME (549/569) for new CW 3 cm DXCC. We installed our 23 cm feed to work the next day, Monday 19 June using Q65C at 1353 DL8YHR (6DB/5DB) for mixed initial #820* and using CW at 1411 F5KDK (559/529) #821*, then using Q65C at 0747 JJ3JHP (12DB/5DB) #822* and 1019 OJ0EME (12DB/10DB) #823* and a new DXCC. We worked on Tuesday 20 June on 9 cm using Q65C at 0716 OJ0EME (11DB/9DB) for mixed initial #102* and new digital DXCC, 0720 DL1SUZ (11DB/14DB) #103*, using CW at 0813 DB6NT (569/579) and 0902 OJ0EME (O/539); after that we went back to 23 cm and using CW at 1032 OJ0EME (O/O) for new CW DXCC, then we returned to 9 cm using Q65D at 1805 OE5VRL (19DB/9DB) #104*. On Wednesday 21 June, we worked on 6 cm using Q65D at 0649 OE5VRL (17DB/12DB) for mixed initial #135* and 0743 PA3DZL (5DB/6DB); later using CW 0836 OJ0EME (549/549) #136* as 1st OJ-OK 6 cm QSO, and using Q65D at 0847 OJ0EME (13DB/6DB); and then installed 70 cm and using Q65B at 1052 OJ0EME (17DB/22DB). On Thursday at 22 June we installed 13 cm and worked using Q65C at 1509 OH2DG (2DB/5DB), 1720 using CW G3LTF (579/579), 1944 using Q65C OE5VRL (9DB/11DB) #228*, but only partial on CW (539/539) and 1950 G4CCH (3DB/2DB). On Friday 23 June on 13 cm we worked at 1343 finally using CW OJ0EME (O/559) - our last and 11th QSO with the OJ0 dpxpedition. We worked them on 23 cm, 13 cm, 9 cm, 6 cm and 3 cm using both digital and CW, but on 70 cm only digital. On Sunday 25 June on 23 cm we added using Q65C at 1215 9H1BN (12DB/5DB) #824* and DXCC 127, 1258 using CW JJ3JHP (579/559) and 1322 using CW 9H1BN (O/O) for all CW DXCC 87. On Sunday 9 July we worked on 13 cm using Q65C at 0031 BG0DXC (8DB/9DB) #229* and NN field - we experienced trouble with CFOM mode as the BG0 response was out of frequency scale on the waterfall display; so we used hand operated pseudo-CFOM by switching VFO A/B to complete the QSO and 0132 DL1SUZ (8DB/6DB); later switched to 23 cm using Q65C at 0713 9H1BN (10DB/3DB), 0720 N5TM (7DB/9DB), 0725 OK2AQ (11DB/11DB), 0743 LA3EQ (10DB/8DB), 0847 PA3JRK (11DB/8DB) #825* and 0857 N6RZJ (4DB/4DB). During the 6 cm part of DUBUS EME Contest we worked using CW on Saturday 15 July despite very hot WX (close to 40 degs C!), which overheated our dish's steering electronics, OK1CA, OH2DG, OK1DFC, SQ6OPG, KL6M, 9A5AA, JA4BLC, PA3DZL, JA8ERE, JA1WQF, OZ1LPR, DB6NT, DL3WDG #137, OH1LRY, SM6PGP, SM6FHZ, DL6SH, UA5Y, WA6PY, VE4MA and G4NNS for 21 QSOs in the first Moon pass, and on Sunday 16 July with cooler WX ES5PC, IK3COJ, G/SM6FWZ #138, IK0HWJ, SP6GWN, G3LTF, DL4DTU, WA9FWD, DJ7FJ and DF3RU. We heard G4CCH, but Howard disappeared in WiFi jamming. Our

overall count was 31x29. Out of the contest we worked with Q65D DL3WDG, PE1CKK, DL6SH, JA6AHB, IK0HWJ, DJ7FJ, DL4DTU and OK1DFC. Both days we suffered from annoying WiFi interference at Moon elevations below 30 degs.

OK2AQ: Mirek mirek@kasals.com sends his June/July EME activity report -- I've been at my cottage since 10 June in anticipation of the Market Reef dpxpedition. I set up my 3 cm equipment and have been QRV since June 11. The dpxpedition caused excellent EME activity, so there was always something to do. Right on June 12, I made a QSO with GW3TKH using Q65-120E for digital initial {#134} and DXCC 44. I next made a QSO with dpxpedition OJ0EME {#135} DXCC 45 on the first day my turn came up with excellent reports (13DB/11DB). I was familiar with the expedition's equipment because DL4DTU tested it with me in May, before leaving for the reef. After 3 cm, I moved to 23 cm on 19 June. The band was alive! There was a pile-up on OJ0EME and so there was no point with my QRP to increase the interference on their frequency. I did, however, make a number of initials. The next day the OJ0EME dpxpedition frequency was already clear, so I called it with an offset of 1000 Hz (they were working 1500 Hz) and we immediately made a QSO {#86} DXCC 27, which made even Sebastian DG5CST happy because he knew my little setup (1.8 m offset dish and 200 W). In total I made 40 initials and 6 new countries PY2BS, OJ0EME, LA3EQ, YB2MDU, YU1SAN and 9H1BN during June and July. Some of those QSOs took work, but after finding the optimal configuration, they were successful, and that's the best fun. So, I really enjoyed this first half of summer EME. See my log https://www.radio.feec.vutbr.cz/esl/files/EME/LOG/EME_LOG_1296M.htm.

OZ1MM: Stig gsvestergaard@gmail.com sends info on his summer activity -- Not a lot to report this summer after the DUBUS 1296 EME Contest. I was QRV on 23 cm for the OJ0EME dpxpedition - they did a great job from OJ0. I also worked during a short stay on 1296 besides OJ0EME; CT1FGW, DK0ZAB and OK2AQ. All QSOs were on CW. I have started to refurbish my 432 SSPA and X-TV amp, which had a problem during winter with faults and lower output power. I hope to be ready soon, to return to 70 cm. I also spent some time on 160 m upgrading my RX antennas.

PA3FXB: Jan jvm@netvisit.nl is very pleased to announce that he has achieved both WAS (on 25 April) and now DXCC on 1296 -- Due to the intense roving of KA6U and of course KB7Q the miracle happened! I started to believe WAS might be possible when N1AV activated Hawaii. What a ride it was! But only two months later I achieved 23 cm DXCC. After the great OJ0EME dpxpedition two new ones appeared and brought my total to 100. YU1SAN and 9H1BN thanks very much! Three new countries in one week. Amazing. To celebrate WAS I make a WAS-cake for my friends in Dwingeloo (PI9CAM); and to celebrate the DXCC I made a DXCC-cake for my friends at contest station PI4GN. To make the numbers complete I am happy to tell you my initial count is now 622. When I started 23 cm EME in 2006 I never ever thought WAS and DXCC might

be possible with a 2.91 m dish. But activity grew and grew over the years and made it possible! Thanks everyone for making 23 cm such a great band for EME!



PA3FXB's DXCC Cake!

SP9VFD: Raf rgrygorow@gmail.com is adding EME operation on 3 and 6 cm to his EME station -- I plan to be QRV on 6 and 3 cm in the near future. For this purpose, I recently obtained 3.3 m f/d 0.32 commercial Andrew dish. This dish was from GSM base station in central Poland. The bad part was that the dish is one piece and must be transported in a semi vertical position, which was a major challenge. I used a trailer with 250 kg of sand in bags for counter weight. Fortunately, after 400 km of travel my wife and I arrived safely home with the dish. I have pictures available of how this was accomplished that may be helpful to other hams in a similar situation.



SP9VFD transporting his new dish for MW bands

SM6CKU: Ben sm6cku@jockert.se (JO67ck) was active in the 6 cm DUBUS Contest -- I QSO'd on 15 July at 1018 OZ1LPR (569/549), 1033 DL6SH (559/539), 1051 SQ6OPG (569/569), 1120 PA3DZL (579/579), 1131 OH1LRY (559/559), 1138 G4NNS (559/569), 1157 VE4MA (569/559), 1205 SM6FZH (579/559), 1218 DL3WDG (O/549), 1227 UA5Y (579/579) and 1244 DB6NT (579/569) for a total of 11x11.

W5LUA: Al w5lua@sbcglobal.net sends news on his April thru July EME -- I was able to work using Q65 on 25 April KA6U in EN15 ND on both 432 and 1296, and IV4MES on 1296; on 27 April on 1296 KA6U in DN41 WY and then on

432 KA6U DN41, W4ZST EM84, S57Q JN76, and W6TCP CM97; on 28 April on 1296 KA6U in DN21 NV and DN22 in ID; on 29 April back on 432 KA6U DN06 in WA and OR; on 30 April on 432 OH4LA and KA6U in DM56, and on 1296 KA6U DM56; on 2 May 2 on 432 KA6U EN20; on 11 Jun on 902 N1AV DM43, K5DOG EM00 and W2HRO FN20; on 15 June on 902 W5AFY EM04; on 16 June on 902 VE4MA EN19 -- there are now 3 stations QRV in TX on 33 cm; on 17 June on 10368 PE1CKK JO22, IW2FZR JN46, CT2GUR IM59, F6BKB JN02, CX2SC GF25, and OK2AQ JN89; on 18 June on 10368 OJ0EME JP90, and on 2304 OK1USW JN69 [XB?]; on 19 June on 1296 YB2MDU OI53 and OJ0EME JP90; on 20 June on 3400 OJ0EME JP90, G4CCH IO93 and OE5VRL JN78, and on 5760 and 10368 OE5VRL - worked 3 bands in 30 mins; on 21 June on 5760 OJ0EME JP90 and PE1CKK JO22, and then on 432 UR3VKC KN68 and OJ0EME JP90. On 13 cm OJ0EME had a strong QRM problem on 2304 and could not receive anything. Since the US does not have access to 2320, I began to think of a way to put a signal on 2400. (The US has an allocation from 2300 to 2310 and 2390 to 2450). I had returned my Klystron years ago to put a signal on 2424 to work JA4BLC. However, I did not feel good about returning a 60 year old Klystron. It then dawned on me that my 160 watt signal on 3400 comes from a 2 to 4 GHz TWTA. I set out to build a 2400 xvtr. Using an old no tune DEMI satellite downconverter, a Chinese demo board ADF-4351 PLL set to 2256 MHz, an old mixer, power divider, and filters tuned to 2400, I came up with an xvtr. From start to finish, it was less than 24 hours. I was drive limited, but I was able to generate about 60 W at 2400 with about 35 W measured at the feed. I was able to hear my echoes and easily worked OJ0EME on 2400. I also worked G4CCH on 2400. **Should there be a move to 2400 MHz as an international allocation as it appears that many countries have that allocation?** I was happy to work the OJ0EME group from 432 through 10 GHz. I worked using Q65 on 29 June on 902 K0DSP in EN10 Nebraska for an initial - nice to have Doug on 902 EME; and on 1 July on 902 W6TCP CM97 in CA for state #32 and his first EME QSO on 902. I am back to working on 47 GHz EME TNX to VE4MA's encouragement.

WA6PY: Paul pchominski@maxlinear.com was active in the DUBUS MW CW Contests -- On 10 GHz on 20-21 May I QSO'd OZ1LPR, OK1KIR, UA5Y, HB9BHU, SP6JLW, VE4MA, OH2DG, HB9BBD, 9A5AA, IW2FZR, OH1LRY, K6MG, PA3DZL and G4NNS. I also heard quite well SM6PGP in QSO, but couldn't find him later. My total was 14x13. I was also QRV for the DUBUS 6 cm Contest on 15-16 July. I QSO'd PA3DZL, OH2DG, SM6FZH, DB6NT, OK1KIR, VE6TA, OK1CA, UA5Y, OH1LRY, IK0HWJ, OZ1LPR, SQ6OPG, ES5PC and G3LTF. My total was also 14x13. Heard were WA9FWD, VE4MA, SP6GWN and a few more stations but I was unable to put together call signs due to the external interferences and high libration. I am sorry for my many QRZs. I had difficult time to copy weaker signals due to an elevated and unstable noise floor from a digital modulated pulsed signal centered at 5760 and 5 MHz wide. Additionally, this weekend a new kind of

interference appeared with about 1 kHz spaced slowly drifting carriers at signal level 53 to 57.

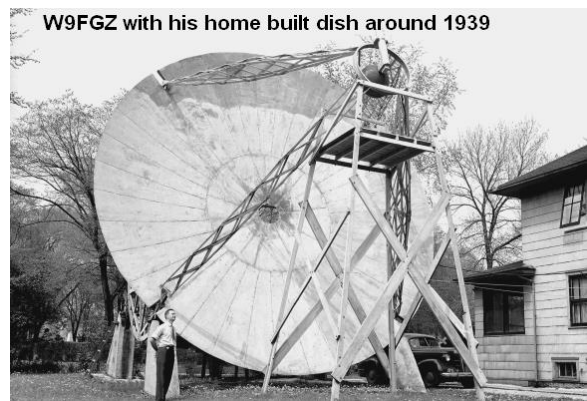
K2UYH: I (Al) alkatz@tcnj.edu had another even worse disaster than last month – Lightning is not supposed to strike twice! Just a few weeks after my last lightning strike, I had another. This one was much more destructive than anything I have experienced in all my years of amateur radio. All my transceivers, my computer, my dish tracking system, US Digital position transducers (including the one I just replaced) and more were fried. I am still working on getting QRV again. Before the 2nd strike, I was back in operation (enough) for the OJ0EME dxpedition. On 19 June I was on 1296 using Q65C and worked at **1416 OJ0EME (16DB/11DB) Q65C for mixed initial #758* and DXCC 126** – at the time they seemed too busy to try CW and was not able to get their attention later, 1455 LA1TN (10DB/8DB) #759*, 1500 IK2DDR (9DB/4DB), 1508 IK5EHI (15DB/19DB), 1516 N6RJZ (11DB/7DB) #760* and later on 20 June at 0054 **YB2MDU (12DB/16DB) #761* and DXCC 127**. Also on 20 June during the next moonpass I QSO'd on 3400 using Q65C at 1620 OJ0EME (12DB/3DB) **mixed initial #70*, CW (O/O) initial #56 for DXCC 35**, 1630 G4CCH (569/569) CW as a check on system, 1849 G4CCH (4DB/3DB) and **1902 OE5VRL (16DB/6DB) #71* and DXCC 36**. On 21 June, I was on 5760 using Q65D to work at 1804 OJ0EME (13DB/8DB) for mixed initial #79* and DXCC 38. I was pleased to make this QSO as my dish calibration had not been checked on 6 cm since the loss of my tracking system. On 22 June, I was on 70 cm, but my luck appears to have run out on this band. I worked using Q65B at 1742 RD3FD (17DB/20DB), 1753 VE6TA (14DB/17DB), 1801 S57Q (13DB/10DB) for mixed initial #1097*, 1858 K2DOG (21DB/7DB), 1926 VE6TA (14DB/15DB), 1939 TM80MAX (19DB/24DB), 2114 DK0TL (25DB/24DB) #1098* and 2151 N9XG (8DB/12DB), but was unable to copy OJ0EME. I found my pol rotator was not working and believe we must have been cross polarized at the time. The next day I fixed my pol rotator, but was never able to find them on 70 cm again. On 13 cm, they were not able to RX on 2304. I had the idea of operating on 2400, but never had the time to complete a TX converter. I did not try on 3 cm because I did not believe my tracking system was adequate to find them. About a week later, I had the second lightning strike and am still working on a recovery. With luck I will be QRV for the ARRL MW Contest. I will most likely start on 13 and 9 cm where I do not need as good tracking.

LOGGER/NET NEWS: N1AV and W2HRO are teaming up for another Hawaii dxpedition for 902,1296, 2304/2320 and 10 GHz on 11- 16 March. **DL3WDG** has added 10450 receive to his 3 cm system and is looking for stations to test with. **VP9NO** is interested in setting up for 23 cm EME from Bermuda. Dom has a 1296 32 el yagi, LNA and SDR. He can be reached a sunday.weaver@gmail.com, **DL7APV** is back on air on 70 cm with his big 128 x yagi array.

FOR SALE: DL6SH has several dishes for sale including 2.4 m offset and 3.2 m mesh dishes. Contact Slawek for details if interested at dl6sh@online.de. **K7XQ** is seeking

information and schematics for a GS35B VHF/UHF PA. Contact Jeff at k7xq@elite.net. **PA7JB** is looking for a DB6NT crystal oscillator on 124.5 MHz to be locked with a 10 MHz. These oscillators are not made anymore. If have, please email John at pa7jb@ziggo.nl. **OK1TEH** together with OK1FPC still offer 3 and 6 cm transverters with IF on 2 m or 70 cm (on demand) as well as a 4.5 W cheap 3 cm SSPA for it. Just please note that this isn't regular business, all transverters have to be manufactured by Ales himself and so every piece takes some longer time... So please be patience as well as for delayed email communication due to busy QRL stuff; we are trying to do our best! More via ok1tehlist@seznam.cz. And by the way I still have for free or symbolic price (pickup only) a 3 m solid robust dish.

RADIO-ASTRONOMY CORNER: Hello readers, for the summer edition I have info on *NANOGrav*, pulsars and gravitational waves. The first human observation of electromagnetic signals from space started at optical-wavelengths; later came measurements thanks to Jansky and Grote Reber (W9FGZ) at radio-wavelengths, and still later by work at infrared, ultraviolet, and roentgen wavelengths. Another unexpected breakthrough came on 2 July, 1967, when the Vela satellites were sent into orbit to detect gamma-ray bursts from ground-based nuclear tests; they discovered the so-called GBR - Gamma-ray bursts, which are gigantic explosions in distant galaxies, actually the most energetic and brilliant electromagnetic phenomena since the Big Bang.

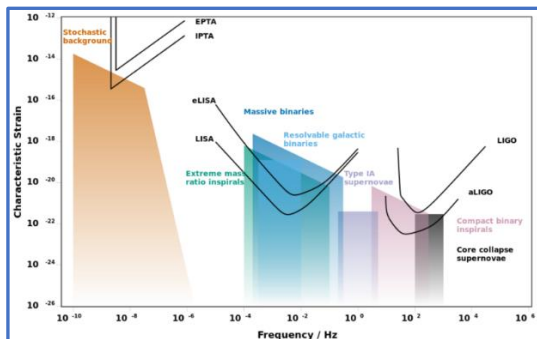


See “**Signals from Space (Grote Reber Story)**” by **K2UYH and K2ZSQ** in March 1967 *CQ Magazine*

However, electromagnetic science does not yet know how to adequately detect neutrinos and cosmic radiation. The detectors do not have the needed sensitivity and resolution. So, there may be sources we do not know about. Astronomers have long dreamed of having another means of exploring the universe that would allow them to look deeper into the extremes and energies of, for example, supernova explosions, neutron star collisions, black hole mergers and similar phenomena. It had been clear since the publication of Einstein's general theory of relativity in 1915 that gravitational waves should exist, but capturing them was long thought to be impossible. Then Joe Weber (may have been W9JHA) from the University of Maryland came along and attempted the first direct detection of gravitational waves using the deformation.

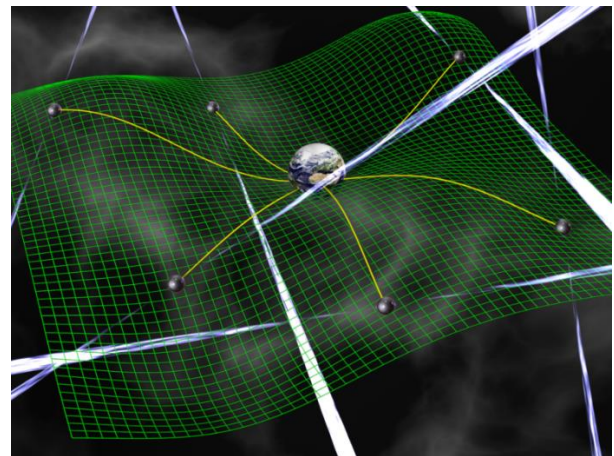


(He is often unjustly neglected in the history of science, having been involved in the birth of microwave spectrometry, co-inventor of the maser and laser, and a radar expert, among other accomplishments). Weber was the first to attempt to detect gravitational waves using resonant cylinders made of aluminum back in 1966. However, the sensitivity of the device was not sufficient. He carried out experiments for over 10 years, constructing two cylinders at a distance of 1000 km to eliminate random vibrations. Once he detected a signal on both cylinders, but it was probably an accidental coincidence and not conclusive. In 1972, the Apollo 17 mission included a gravitational wave detector that Weber designed; however, later it was found that its sensitivity was too low. Despite the failure, Weber aroused great interest by the scientific world in the study of gravitational waves, which was reinforced in the 70s by Joe Taylor (K1JT). Taylor together with Hulse, discovered the first binary pulsar, PSR B1913+16, at Arecibo in 1974. This pulsar was confirmed to emit gravitational radiation in accordance with General Relativity through precise analysis of its orbit. This result was followed by a major effort to develop detectors that were several orders of magnitude more sensitive. These detectors were based on a laser interferometer with arms many kilometers long. This effort resulted in the construction of the LIGO and VIRGO detectors. They finally, in 2015, were the first to confirm the detection of gravitational waves. (Incidentally this was exactly 100 years after Einstein published his General Theory of Relativity). If you are interested in a more detailed history of gravitational wave research, see the excellent book "Black Hole Blues and Other Songs from Outer Space" by Levin & the obituary of Weber <https://www.nytimes.com/2000/10/09/us/joseph-weber-dies-at-81-a-pioneer-in-laser-theory.html>.



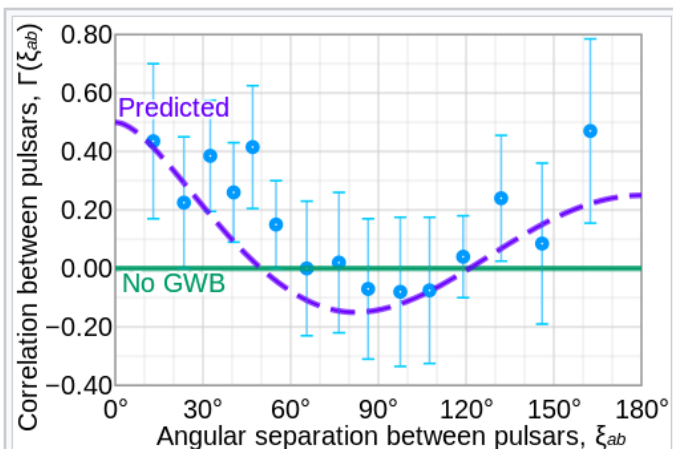
Noise curves for a selection of gravitational-wave detectors as a function of frequency. At low frequencies pulsars are used as arrays of space-borne gravity wave detectors, while at higher frequencies ground-based detectors are used.

You want to know that: 1) Gravitational waves propagate at the speed of light (confirmed by the LIGO Observatory). 2) Are only produced by objects that have so-called quadrupole asymmetry (the distribution of matter is less symmetrical than that of an ellipsoid), for example in two mutually orbiting stars. 3) Gravitational waves are extremely weak - the first detected waves came from two merging black holes, and the relative distance change on the Earth were on the order of 10^{21} , which means a meter bar changes its length by only 10^{21} m when a gravitational wave passes through it - corresponding to a change in the distance of the Earth to the Sun of the size of a single atom (!). And 4) the LIGO and Virgo detectors with their two perpendicular arms have the highest sensitivity at a wavelength of about 200 Hz, but gravitational waves of other wavelengths also occur in space, and unfortunately we cannot yet detect these directly, although plans are underway to launch a trio of LISA space interferometry satellites after 2030 with laser-arms 2.5 million kilometers long - but even this length is not enough if we want to get into the nanohertz region, where the wavelength is in the tens of light-years.



Another approach is to use millisecond pulsars, which are spread across the Galaxy as detectors to create a detector the size of an entire galaxy. If a gravitational wave crosses the path of a pulsar signal, its distance will change, which causes some pulses to arrive a little later and others a little earlier, so that they are phase modulated. Tracking these small shifts in the periodicity of incoming pulses **is the basis of the PTA (Pulsar Timing Array) method**, which was first published on the eastern side of the Iron Curtain in 1978 by Soviet scientist Mikhail Sazhi and in the West in 1979 by American physicist Steven Detweiler at Yale University. This idea was refined in 1983 by Ronald Hellings and George Downs at the Jet Propulsion Laboratory (JPL), who showed that the signature of a gravitational wave could be found by statistically processing signals from pairs of pulsars located in different directions from us. And why pairs? – The trick is the same as with two-arm interferometric detectors, only instead of two arms we have the directions to the two pulsars. The gravitational wave stretches space and time in one direction and shrinks it in the other; if a gravitational wave passes near the Earth and we observe the signal from two pairs of pulsars whose

distances in the sky are at a 90 degs angle (perpendicular), then when the time sequence of pulses is increased in one direction, it will be decreased in the other direction. Statistical methods of processing the data from a given pair of pulsars determine the so-called correlation coefficient, which is negative for the two perpendicular directions; the exact correlation coefficient versus the angular distance of the pulsar pair is referred to as the Hellings-Downs curve, and demonstrates that for a large amount of measured data for different pairs of pulsars when gravitational waves are present. If the correlations do not match the Hellings-Downs curve, they are not gravitational waves but only noise; it is thus necessary to evaluate measurements from different pairs of pulsars to determine their correlation, ξ_{ab} in detail.



Plot of correlation between pulsars observed by NANOGrav vs angular separation between pulsars, compared with a theoretical *Hellings-Downs* model (dashed purple) and if there were no gravitational wave background (solid green)

A great advantage of PTA is the larger number of available radio telescopes, which are grouped in 3 main clusters. Measurements have now been consistently performed for more than 18 years. There are three main observatories (EPTA, NANOGrav and PPTA) collaborating; and an IPTA (International PTA) platform has been established to share data. China (CPTA, Chinese PTA), whose main instrument is the FAST radio telescope also operates a PTA observatory. **Results of pulsar observations:** At the end of June, the IPTA announced that the time pulse shifts for observed pulsar pairs are not random with a very high probability and are correlated according to the Hellings-Down curve. This means that it is not random noise, but a kind of cosmic background of gravitational waves from a variety of sources, which we expect to be dominated by pairs of very massive black holes at the centers of far off galaxies, formed by the merger of two precursor galaxies. However, the detection of gravitational waves cannot yet be considered definitive. The limit of discovery is considered to be a statistical significance of 5σ (a probability of 1 in 3.5 million that it is a random fluctuation), and none of the observatories have this yet. The closest is the Chinese

CPTA, where they have a statistical significance of 4.6σ (a 2 in a million probability that it is a coincidence). In second place is the European EPTA with a 3σ value (99.7% probability of detection). These numbers mean that a background gravitational wave in the nanohertz region has almost certainly been detected in the Earth's vicinity. But according to strict scientific criteria, the 5σ value must be exceeded. For this purpose, the collected data for all observatories will now be evaluated together (data from 115 different pulsars processed within the IPTA multinational structure) and the 5σ value can be expected to be definitely exceeded in 2025. The next step will undoubtedly be to try to distinguish the different sources of gravitational waves, and also to explain why the signal intensity has been stronger in the last ten years than it was in the previous period. It is not clear whether this is due to advances in technology, or whether the background gravitational waves are time-varying. In any case, another window for human understanding has been opened. Interestingly, in the electromagnetic domain, it is possible to look back in the history of the Universe to at most about 379,000 years after the Big Bang, when the Universe became transparent to radiation. This is the famous relic radiation (CMB). However, this constraint does not apply to gravitational waves, and if humanity manages to extend the wavelengths and sensitivity to the point where the relic gravitational radiation of the Big Bang can be observed, the implications for science are not fully understood yet. In any case, we live in very exciting times!

For more info see:

<https://iopscience.iop.org/article/10.3847/2041-8213/acdac6> and <https://nanograv.org/news/15yrRelease>.

[Credits: excerpt from Prof. P. Kulhanek's lectures at CVUT FEL].

FINAL: Plans for EME2024 are moving along well. G4RGK and W1GHZ have agreed to respectively Chair and Vice Chair the Program. Talk/paper ideas should be sent to Dave at zen70432@zen.co.uk. There will be no published book, but the talks will be available on the Internet. A mystery is who register the conference URL <EME2024.ORG> and started setting up the conference webpage. Unfortunately, we cannot figure out who did it; and the site is password protected. W2HRO has <EME2024TRENTON.ORG> now registered; and with N2UO, OK1TEH and N1AV (our publicity committee) is working on the webpage/social media and publicity.

► Long time EMEer WD5AGO has received the 2023 John Chambers award from the Central States VHF Society. Tommy has been particularly active on 1296 and the microwave bands. His contributions include experiments with cooled LNAs and more recently with horn antennas on 1296. Congratulations to Tommy – very much deserved!

► **The 2023 Friedrichshafen Ham radio gathering**, the biggest EU ham radio meeting/flea market was held in late June, and attracted many EMEers from all over the World. This year the WX was sunny and the whole event a big success. The classical QSL wall was the meeting place for EME operators. OK1TEH took the following picture and was pleased to see so many EMEers.



Among the EMEers at Ham radio 2023 were JH5FOQ, JH5LUZ, OK1DIX, OK1TEH, I5WBE, I2FAK, DL7APV, VK5KK, G4HGI, F6GRB, DL6SH, DK3EE, PA4VHF, PA3DZL, OZ5TG, DL3IAE, PA2DW, DU3T, OE3FVU, IW3HWT, DK5EW, DL1SUZ, GM4ZUK, G3SEK, PA0PLY and more.



DU3T was at Friedrichshafen. Ron is shown with OK1DFC ringfeed for 70cm. We can look forward to work him on 70 cm EME very soon! [More pictures at <https://www.rajce.idnes.cz/ok1teh/album/friedrichshafen-hamradio-2023>].

► **BEACONS** - DK7LJ reports that the 10/24 GHz beacon is back in operation but that the PA is sick. Per is expecting parts from DL4DTU and that it should be back to normal by the time you read this. [Per also finished an 80 m beam project].

► **I5WBE** reminds us of the **very popular ARI Autumn Trophy EME Contest is on the Sept 30th weekend.**

► Interested in 70 cm EME see https://ntms.org/files/W5LUA_902MHz_CS2023.pdf

► **SP6 EME/SHF meeting in Zieleniec on 18/20 Aug:**
This meeting, which attracts many EMEers will be hold by SP6GWB together with SP6JLW at Hotel AGAL Zieleniec, locator **JO80EI60TJ**. It is almost right at SP6/OK1 border. This time the meeting will focus on 24 GHz EME and demos of 2.3 and 24 GHz EME by OK1DFC. The SP6JLW group is inviting visitors to their EME station. A BBQ and outside

beer party is also planned, and great flea Market. More at: https://www.ok2kkw.com/info/info_zieleniec_2023_en.htm.

► There has been a lot of discussion of where (which band) and when to operate the MW EME Contest weekend. The most popular band is 3 cm, so I would expect activity on this band all the time there is a good Moon window. The second most popular band is 13 cm. The problem there is the multiple TX bands that vary depending on your location. The use of the Internet should help a little with this issue. Active on 9 and 6 cm is also growing. Tjere should activity there as well. **The best answer is to be sure to operate on one of the bands whenever possible!**

► Both Matej and me have had a difficult time this past couple of months. I as a result of being struck by lightning a second time that was much more destructive than the first. I hope to be QRV for the 12/13 Aug ARRL MW Contest. In any case, I hope there will be a big turnout for the contest. Matej has been slowed by a very heavy QRL work load. We both want to be more active and will be looking for you off of the Moon. Let's all have a terrific time on EME. **73, AI – K2UYH and Matej – OK1TEH**



G4RGK's 4.5 m dish with 13 cm feed in place – getting ready for ARRL MW Contest