

432 AND ABOVE EME NEWS JANUARY 2020 VOL 49 #01

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HAPPY NEWS YEARS – TO ALL THE VERY BEST EME AND DX IN 2020

CONDITIONS: Dec was quite compared to Nov with **no** contests or **dxpeditions**. The ARRL finished receiving logs from EME Contest and it's now working on their evaluation. **There are also no dxpeditions announced for Jan; there will be dxpedition activity in Feb – see below. The full story of the A21EME dxpedition can be found toward the end of this newsletter (NL).** PA2CHR produced a wonderful movie on A21EME: <https://www.youtube.com/watch?v=nVrPtUbnbU>.

Don't miss the SSB FUNTEST (Contest) for 23 cm on 11 Jan, and for 13 cm on 12 Jan. See the last NL for the full rules; however, the objective is to get on the Moon and make SSB QSOs. **The 432 CW Activity Time Period (ATP) is also on 11/12 Jan from 0400-0600 and 2000-2200.** The first DUBUS CW EME Contest Weekend will be on 8/9 Feb for 432 (and 144). The rules can be found at DUBUS WEB: <http://www.marsport.org.uk/dubus/EMContest2020web.pdf>.



NC11's big 432 array lifted off the mount by a 140' crane for repair – see Frank's report later in this NL

OE6V MICROWAVE EME DXPEDITION IN FEB: Dan (HB9Q) announces that the Q-Team is going to team with the OE6V contest group to put Austria on microwave EME between 2 and 8 Feb -- Thanks to OE6FNG, we will use the OE6V shack/QTH located at the vineyards of the Reichmann family in Kühnegg, Steiermark, Austria (JN76vt). OE6V is very active on 50 and 144 EME. We plan put 5 microwave bands on the Moon. On 2 Feb we will drive the 840 km to Mureck. On 3 Feb we will build the station and hope to be QRV by moonrise at 1200 on 1296.100 using JT65C (TX 1st and RX on own echo) until 0130 (4

Feb). On 4 Feb we will be on 2320.100 using JT65C from 1230 to 0100 (5 Feb). We will switch to other sub-bands on request only. Please send e-mail to <dan@hb9q.ch>. QSYs will be announced on the HB9Q logger. On 5 Feb we will be 3400.100 using JT65C from 13.00 to 0000. We can be 3399.990 on request only. On 6 Feb we will be on 5760.100 using QRA64D CFOM from 1330 to 0100 (7Feb). On 7 Feb we will be 10368.100 using QRA64D CFOM from 1430 to 0115 (8 Feb); and can be on 10450.100 on request. On 8 Feb we will dismantle and pack the station and on 9 Feb drive back to HB9. We will work CW on all bands; however, only with big-guns and after the pile-ups on JT/QRA have died down. We will have our usual dxpedition equipment: 1.5 m dish mesh with auto AZ/EL control and LNA at horn with on 23 cm 100 W at circular pol feed, on 13 cm 90 W at circular feed, on 9 cm 80 W at circular feed, on 6 cm 80 W at circular pol feed, and on 3 cm 50 W at V-pol linear feed. Besides JT65C and QRA64D we will use if necessary JT4F, with Constant Frequency On Moon (CFOM). Hopefully more people take advantage of automated Doppler control. Especially on 6 and 3 cm where it is a MUST for successful QRP operations. We will have Internet access and during our activities we will be stand-by on the HB9Q band loggers. We also will check our e-mails several times a day. Please QSL only direct including SAE to HB9Q, PO Box 133, CH-5737 Menziken. If you wish to sponsor our activity, you are welcome to do so by using PayPal dan@hb9q.ch (please mention your call). We are looking forward to our OE6V dxpedition and hope to work many of you!

PJ2T: Gene (KB7Q) announces that he will put Curacao (FK52kg) on 70 cm EME in both Feb and March as PJ2T – I will be on the island caretaking the HF contest station. I will use on the moon my 9 wl yagi with 525 W and IC9700 and AGO preamp. Specific operating dates and times to follow.

REPORTS:

DJ3JJ: Andreas dj3jj@gmx.net is coming on 3400 – I hope to work many of you soon on 9 cm. If all works as planned, I will have 100 W at the feed of my 2.5 m dish from an NXP LD MOS PA to start off 2020.

DK1KW: Werner wkraus@wkraus.de reports on his activity on **70 cm** during the ARRL EME Contest -- I wanted to

improve on my result last year; and built a second 17 el YU7EF yagi to be combine with the one I used last year. After some tuning, the SWR was down to around 1.1. But, when I looked for Sun noise, I realized that the background noise level with 2 yagis was about 3 dB higher than I had with only one. I don't know why. Fact is that my antenna is very close to house, roof and rain sink. I decided to work with just 1 antenna as I did last year. The first weekend was not very good, activity was low and I decoded but missed stations such as W7MEM and K4EME. The second weekend was much better. I ended with 29 QSOs, 6 more than last year. I also tried a little CW and managed 3 QSOs. I was very happy this result. However, I will continue to work on getting the 2 yagi system running. I also want to add 23 cm EME.

DL9KR: Jan Bruinier@t-online.de updates us on his recent activity on 432 CW -- I worked on 12 April R1NW for initial #1067, followed later in the year by **VP2EMB #1068 and DXCC 146**, W4NH #1069, K5DOG, **VE2TWO #1070 - FB dxpedition to zone 2**, DL9DBJ #1071, RD3FD #1072, K7CA #1073, **KB7Q in DN74 #1074, KB7Q in DN83 #1075**, on 20 Oct DL8UCC, SM6FHZ, OK1TEH, G0JLO and **KB7Q in DN82** - Gene did a splendid job with his roving dxpeditions in spite of weird partially one-way conditions, on 22 Oct **A21EME #1077**, on 23 Oct PH100KLM, on 17 Nov with only 2.5 hours available in ARRL Contest, DK5OZ (same DL7APV), SP9VFD #1078, I2FHW, UB4UAA, UY5HF, LZ1DX, PA2V, SP6JLW, DF3RU, S51LF, K2UYH, RD3FD, UA3PTW, DK1KW, W5RZ #1079 and VE6TA. **Clearly CW is definitely alive on 70 cm!**

F2CT: Guy f2ct@wanadoo.fr reports that due to very bad weather (wind 140 km/h), I was sorry to not be able to QRV during the ARRL Contest in Nov on 1296 or 432. My 432 EME system consisting of 8 x 27 el yagis is now ready, but I am wait for better conditions to QRV on the Moon. During Dec I did test on tropo and worked many long contacts (> 1500 km); so the new system seems to be working very well. I am also completing arrangements to attend EME2020 in Prague.

G3LTF: Peter pkb100@btinternet.com has no QSOs to report this month -- The WX in Dec was a continual mix of heavy rain and wind; there was no chance to operate during the weekend when 13 and 9 cm activity was planned. We had one calm day on 17 Dec and I put the 1296 feed in; although I was getting big echoes on CW and SSB, there were no takers. I did receive an email report the next day from W4OP. Dale reported that I was the loudest he had ever heard me! One piece of interesting news is that **GM3SEK set a new world record on 432 tropo. On 28 Dec he QSO'd D41CV at 4,556 km. Ian is now in the unique position of holding both EME and tropo distance records for 432** as he worked ZL3AAD back in March 1989 at a distance of 18,970 km. I hope to get some EME in between now and the Funtests.

G4RGK: Dave zen70432@zen.co.uk reports on his recent Moon time -- I was not on very long for the Nov leg of the ARRL Contest as I had just returned from Florida and was badly jet lagged. I did make QSOs on both 70 and 23

cm. In Jan I will be in EA8 for the EME weekend and looking for QSOs on 70 cm with my single long yagi. If you are looking for EA8 and have at least two yagis, you have a good chance of working me.

I1NDP: Nando i1ndp.nando@gmail.com has not been active on EME recently – I have been doing maintenance on my 10 m dish, but expect to be soon QRV again. I will definitely be more active in 2020. I am also making plans to be at the EME Conference in Prague in Aug.

IK1FJI: Valter valter_dls@yahoo.it was active on 1296 in Dec – I worked using CW on 6 Dec HB9Q (569/569) and on SSB, RA4HL (559/569) and K5DOG (569/579), on 7 Dec IK3MAC (559/ 579), on 9 Dec JH6AHB (579/579), on 13 Dec DG5CST (589/ 599) for initial #130, on 13 Dec SM5DGX (559/579) #131, on 15 Dec VK4CDI (569/ 559), 29 Dec PA3DZL (569/569), and on 31 Dec SM5DGX (579/ 589). I also QSO'd some stations on JT65C IN Dec. I plan to be QRV for the SSB Funtest in Jan and hope conditions will be OK. My station is a 3.2 m dish, TH327 PA and <0.3 NF LNA with 34 dB gain.

NA1V: Jay whereisjay@gmail.com (DM43) is preparing to make his entrance on 23 cm EME -- I should have 100% RX ability by the 4/5 Jan weekend with my 10' dish and septum feed. I also have a PQL 600 W SSPA (about 400 W at the dish). VE4MA/7 is keeping me on the right path while at his winter QTH in AZ. He is just 8 miles north of me.

N5BF: Courtney courtney.duncan.n5bf@gmail.com has sent a large report about his 23 cm activity – I have only added a couple of QSOs since the Nov Contest weekend. One was a nice CW QSO. I also tried a different IF rig to see if it would make a difference. All of my 23 cm EME since Aug 2016 used a Yaesu FT-817 as the 2 m IF rig with two possible filters: an SSB 2500 Hz wide centered at 1500 Hz, and a mechanical CW 600 Hz wide centered at 750 Hz. For CW contacts I usually tune the audio tone to about 900 Hz to get a little help from the "grating" filter edge, but I find that sometimes the CW filter doesn't help all that much. I can often copy better at a higher audio frequency in the SSB filter. Maybe this is just due to the response of my ears, the speaker, or the headphones. On a notion that a higher class IF rig might help, I hooked up a nearby IC-7000 as the 2 meter IF receiver. It has three DSP-based, tunable filters and, opposite to the FT-817, uses an LSB convention for the CW mode. It also has a lower offset frequency (600 Hz vs. 750 Hz). The three filters are SSB 2700 Hz centered at 1500 Hz, CW 600 Hz centered at 575 Hz, and CW narrow 300 Hz centered at 575 Hz. These widths and centers are based on my measurements with a beacon. A test EME QSO with K7CA (549/549) did not show any difference between IF rigs – basically inconclusive. I did note that the 300 Hz filter was much less helpful than the 600 Hz one, due to apparent ringing. In general, I'm trying to reconcile reports that JT65C signals at (18DB to 20DB) can be easily copied on CW. My own observations indicate that nothing below (14DB) is easy copy. Maybe this discrepancy is the result of the difference between WSJT's V-10 and V-X reports, or my IF rig's high

frontend NF, or other setup differences, or personal skill level. More research and practice are forthcoming. As part of this investigation I posted on U-Tube a minute of CW copy in my FT-817 narrow CW filter of a (15DB) signal to see how well others can do. See <https://www.youtube.com/watch?v=UcJDfCmOrHo>. [I cannot hear as well as when I was younger, but my experience has been that JT signals stronger than (20 dB) are generally workable on CW. Easy is a relative term. A lot has to do with the librations and the fist of the CW sender – AI].

NC1I: Frank frank@NC1I.COM writes -- My time operating EME has been limited over the last six months. My wife has been battling cancer since the summer. This put us in Phoenix (Mayo Clinic) for six weeks in Aug/Sept where she underwent major surgery. She has since begun a six month chemotherapy program, which requires many visits to Mass General Hospital in Boston. The outlook is very good, but there are still difficult days ahead, and EME has obviously taken a back seat to all of this. Depending on how things go W1QA and I will try and reschedule our planned 2019 dpxpeditions (US States) for some time in 2020. Due to the problems with my 432 array, I was only able to complete with A21EME on 1296, where they had a great signal. We (W1QA and I) were able to get on 1296 for the last pass in the ARRL EME Contest and complete with about 40 stations (all JT65C). I apologize to those that asked us to switch to CW, we were trying out a new IF radio and also using WSJT-X for the first time and wanted to keep things simple. I still enjoy CW and will try and be more active on CW again in the future. After a year of intermittent RX problems on 1296, I believe we finally found the problem. The supply voltage to the isolation relay on the septum feed was fluctuating. The power supply has been replaced and all seems good now. We had a significant ice storm just before New Year's and the dish is currently loaded with ice and not looking good. Hopefully once the ice melts all will be ok. As noted in the last NL, my 432 array is down for repairs. I will be rebuilding both the mount and the array itself. After more than 25-years the weather has taken its toll on both. The primary issue with the mount is the polarity bearing and unfortunately everything needed to come down to repair/replace it. Many other pieces of the mount also need work. After getting the array on the ground and looking it over, its pretty amazing that it had been working as well as it had. Sun noise dropped 4-5 dB a little over a year ago and now I can see why. There are many issues with the phasing lines (open wire & coaxial) as well as the baluns where the coax connects to the open wire at each of the four-bays. One of the coaxial power dividers also looks suspicious. This project will take some time and much of it will need to wait for warmer weather. Optimistically, I will have the array back up and operating by July, but it could be as late as early fall. Once back up, it should be working as good or better than ever and likely outlast me!

OK1IL: Ivan ivaknn@gmail.com sends news about his activity on 23 cm with his 3 m dish -- Since my last report in Aug, I didn't participate in the ARRL, nor the ARI contests this fall. I did pick up initials with SK0CT on CW, and GM0PJD, ZS4A, RA4HL, ON4BCV, OH1LRY, OZ9KY, SK0UX and W8MQW all using JT65C. I am now up to

mixed initial #202* and with MI to WAS state 23. When trying to work A21EME, I was frustrated by QRM, which produced horizontal traces across both my MAP65 and WSJT waterfalls. These traces repeated about every 12 sec; and in spite of a clearly visible trace from A21EME, WSJT10 refused to decode it. After several hours of trying I was successful. TNX to Gary for the beautiful K6MG QSL card confirming QSOs in 5 states.

OK1KIR: Vlada and Tonna vlada.masek@volny.cz sent us the following info about their activities in Dec – They were only activity on 13 cm on Saint Nicolas day (25 Dec) during which they succeeded at 1904 using JT6C to QSO 4X1AJ (O/O) for digital initial {#74} and the 1st 4X-OK 13 cm QSO. This QSO was completed using shorthand (SH) reports. We repeated at 1918 with full reports (23DB/17DB). Andrey used 3 m homemade mesh dish with only 20 W! This was highly probably our last EME QSO in 2019. Overall in 2019 we added on all the bands from 432 thru 24 GHz a total of 19 DXCC. Remarkably almost all (17 of the 19) were logged thanks to 6 EME dpxpeditions! We express our sincere appreciation of the outstanding effort of these groups! Furthermore, in early Dec we received from ARRL a new DXCC award certificate issued with the corrected number #6 (our original award shows #8). There were also enclosed two tables of issued numbered DXCC awards for 70 cm and 23 cm. (Unfortunately, in the 70 cm table OZ4MM's DXCC made in 2017 is missing. Also, the order does not match the dates as 3 and 4 are out of place).

Nr.	CAWARD	CTYPE	CCALLSIGN	DEFFDATE
#10	70CM	A	G4RGK	11.8.2019
#9	70CM	A	OK1DFC	9.11.2016
#8	70CM	A	DL7APV	12.7.2016
#7	70CM	A	DF3RU	5.7.2016
#6	70CM	A	OK1KIR	13.8.2014
#5	70CM	A	DK3WG	12.3.2012
#4	70CM	A	K2UYH	5.4.2011
#3	70CM	A	PA3CSG	22.9.2011
#2	70CM	A	HB9Q	22.6.2009
#1	70CM	A	DL9KR	29.7.2008

Award #	Band	Callsign	Date Award Issued
1	23cm	HB9Q	October 12, 2014
2	23cm	DJ9YW	February 15, 2015
3	23cm	OK1KIR	March 23, 2015
4	23cm	K2UYH	September 9, 2015
5	23cm	OK1DFC	November 9, 2017
6	23cm	PA3CSG	September 6, 2018
7	23cm	W5LUA	June 6, 2019

OZ4MM: Stig vestergaard@os.dk sends a late report on his ARRL Contest operation – I could not be QRV in Dec as we had very high winds. In the contest I operated only CW on 432 and 1296, and was only sporadically active, but did have lots of fun when QRV. On 432, I ended with 34 stations and initials with UB4UAA, SP9VFN, ZS4TX and

DK1KW. Condx the last weekend seems OK as I worked DK1KW with his single 17 el yagi on random. I am surprised that more stations do not try the low end for CW contacts. On 1296, I ended with 88 stations and initials with RA4HL, WB8HRW, BD4SY, ON4QQ, WK9P and VE4MA/K7. I used up lots of time asking WSJT stations on the HB9Q logger to try CW during weekend. I plan to be QRV in the SSB contest, but I am quite busy with other projects too.

PA3DZL: Jac pa3dzl@icloud.com wrote – I finally finished installing my 3.7 m dish at the new QTH. My goal was to become QRV off the Moon again this year. I made it! It was a lot of work, but I am glad to be on again. The first band I operated on was 23 cm. I worked on 28 Dec using JT65C with only 20 W @ the feed SP5GDM and DG5CST, and later after increasing my power to 300 W I5YDI, on 29 Dec using JT65C UA6LCN, IK1FJI and UA6LCN for a 2nd time (my power now 400 W) and on CW IK1FJI (569/569) and SM4GGC (559/559) (my power at 700 W), on 30 Dec using JT65C PA0PLY(16DB) and W2T (22DB) - special event station at W2ZQ, and on 31 Dec on CW SM5DGX (559/569), using JT65C RA4HL (13DB), on CW RA4HL (559/559), and using JT65C DJ2DY (17DB), IZ4VSS (25DB) and W2P (26DB) - special event station at W2HRO. My PAs are in my garage, which is close to the dish. I still have to build readouts to monitor fwd/refl power and current in my shack. My shack is about 15 m from the garage. I expect to be soon back on 70, 13, 9, 6 and 3 cm.



PA3DZL's 3.7 m Andrew dish with 1296 VE4MA feed



Sunslew Slew Drive ZE12A-78-RC-24H50200 & Linear Actuator SS-15000-800-2.8-24 used to point dish

SK0UX: Chris (SM0NCL) sm0ncl@sk0ct.se reports about his club's activity during ARRL EME Contest on 23 cm with their 6 m dish -- We were QRV on best effort basis during Saturday morning and evening and Sunday until noon of both weekends. In total we completed 102 QSOs including 10 DUPs in 40 mults, which is an improvement over last year. We switched between CW and JT65C depending on stations that were QRV at the time. It was quite common to work the same station on two modes, which explains the number of DUPs. Many of us like CW a lot, and we tried to find as many CW stations as possible. We used only a horiz pol with a Ring Dipole Feed and a 0.4 dB NF LNA located ~7 m below the feedpoint. On TX we had 800 W on CW and 400 W on JT from an SSPA to an IC970 and IC-9700 on RX. The 9700 DSP waterfall, noise reduction and filter functions are nice; and seemed to help our operator's ears last a bit longer during all the activity. The operators were SM0ERR, SM0KAK, SM0NCL, SM0BSO, SA0CAN and SM0RJV. Logged were in Oct on CW SP6JLW, 9A5AA, SP7DCS, DL3EBJ, UA3PTW, OK2DL, OZ4MM, SP6ITF, SM4GGC, F5KUG, G3TLF, W4OP, G4CCH, DL7YC, DJ8FR, IK5VLS, K6MG, W5LUA, WA6PY, OE5JFL, IK1FJI, OH1LRY, RA3EME, VK4CDI, RA4HL, OK1CA, SP6ITF, KL6M, JH1KRC, YL2GD, SM4IVE and VE6TA; and on JT K6MG (DUP), SP5GDM, YO2LEL, PA3FXB, JA8SZW, DK5YA, VK2JDS, RA4HL (DUP), DF2VJ, RN6MA, ES3RF, JA6AHB, EA8DBM, DF3RU, ON4QQ, OK1DFC, FR5DN, KA1GT, DK3WG, OK1YK, DF2GB, DK0ZAB, N5BF, KN0WS, G4FQI, F1RJ, PE1CHQ, PA0PLY, PA2DW, VA7MM, K5DOG, GOLBK, ES6FX, OK1IL, K4EME, OZ9KY and K2YUH; and in Nov on CW SM6PGP, G4RGK, ON5GS, F6ETI, LZ2US, VE4SA, W7JM, WA6PY (DUP), OK2ULQ, K6MG (DUP), N4PZ, OH2DG, DL0SHF, SM4DHN, DL6SH, RA3EC, DL7UDA (DUP), IK3COJ, OK1KIR and HB9Q; and on JT DL7UDA, K5DOG (DUP), W2HRO, VA7MM (DUP), F1RJ, VK2JDS, WA6HTP, LU1C, VE2UG, VE4MA/K7 and W3CJK.

SM4GGC: Stig stig.ake.larsson@gmail.com was active on 23 cm in Dec -- I was not as active as during the last few months, but added QSOs on 23 cm CW, on 14 Dec at 2000 SM5DGX (559/559) and 2026 SP6ITF (559/559), on 17 Dec at 0832 SM2CEW (559/559), on 20 Dec at 0819 OH2DG (569/569), and 29 Dec at 1225 PA3DZL (559/559). I had a problem with my SPID BIG RAS rotor. It timed out in AZ several times. I suspected that there was water in the motor for AZ as I have had same issue with the EL motor some year ago. So I dismantled the motor and found that the small feather spring that pushes the carbon brush on one side was totally broken in several places (it had corroded). I replaced it with an eraser from a pencil. Now with both the AZ and EL motors secured from water all is fine. My rig is a 3.9 m dish with 500 W at the feed.

VE3KRP: Fast Eddie eddie@tbaytel.net writes -- I haven't been able to be on the Moon since last mid-Nov. The Moon's position and terrible weather here (ice, snow and wind storms) prevented any air time. My only activity has been making a path to the dish with the snowblower and brushing off the accumulated snow – HI. Wishing all many EME contacts in 2020.

VK6EME: Keith (VK6KB) and the VK6 μ W group [keith at vk6eme.com](mailto:keith_at_vk6eme.com) report on the status of their EME efforts -- We recently spend several hours at the big (28 m) dish. Things did not go as planned at all. First, we removed the power from the 4 GHz LNA's up in the feed chamber to make sure that they were not the source of our high noise levels – [see the Aug NL]. We checked polarity and can confirm all is good at feed. The noise levels have not changed and remain minimum S7 max S9 on RX. We decided to do some echo tests with the TWT set at 400 W on SSB. No problems, echoes were loud and clear S9 + 40-60dB. We then dropped the power levels in steps down to 11 W output with virtually no discernible drop in echo signal strength. It's nice to have a dish with 60 dB of gain. We then looked for the source of our noise, having eliminated the TWT itself previously. After a few hours, we decided the noise must be locally produced from all the other equipment transmitting on the site. There are about of 50 to 60 dishes operating most of the time on frequencies from 2 to 35 GHz. The only conclusion we can come to is we have to move site. However, at a cost of probably tens of millions of dollars to move the dish, that isn't going to happen. We have the possibility of a donated 7 m dish, but it lacks the ability to be made easily steerable. The next best option is a 3.8 m offset dish of good quality and profile that could be relocated to our club site (NCRG.org, <http://ncrg.org/>). This could be made steerable, so we will look into it further. We haven't given up on the 28 m dish, and will be back to try any ideas that anyone comes up with. We will also try out a modified Codan 40 W SSPA and the transverter I've acquired from OK1DFC. If we come up with good enough filtering to remove the local noise at 5760 then that would be the winner! All suggestions will be gratefully received and tried. It is possible this dish could be removed from service, and we would then loose access to it, so we need to keep trying for now.

UA3PTW: Dmitry ua3ptw@inbox.ru was QRV on 1296 in Dec – I added on 8 Dec mixed initials #499* at 1620 IK3MAC (569/579) on CW and #500* 2043 W2ZQ (O/O) on JT65C, on 9 Dec #501* at 1813 IZ4VSS (O/O) on JT65C, and on 14 Dec #502* at 1821 SM5DGX (579/559). [TNX to DK3WG for forwarding this report].

UR5LX: Sergey ur5lx@ukr.net is ready for 24 GHz with a QRO TWTA and a 2.4 m offset dish – I am now waiting only for PA0PLY's DU3BC KLNA to start activity!

W2HRO: Paul w2hro.fn20@gmail.com is presently concentrating on 70 cm EME – I have a new Beko 1100 W SSPA for 432 and am ready to make some QSOs. I am using my 4 m dish (20 dB) with a loop feed (linear). Please email me for skeds. This same station completed 432 JT65B WAC this year with only 180 W, so the 1100 W should make QSOs a little easier!

W2ZQ: Paul w2hro.fn20@gmail.com writes the Delaware Valley Radio Association (DVRA) www.W2ZQ.com was chartered in 1931 and is one of the oldest ARRL clubs in the USA. In Dec, W2ZQ became active on 1296 EME using a 3 m - see picture and my report in the last NL. We believe this is W2ZQ's first EME station on any band. The

3 m station uses a SM6PGP patch feed and PE1RKI 250 W SSPA. The 3 m (0.38 f/d) dish is moved with a Sub-Lunar SDD3 slew drive (0.1 deg pointing) and Green Heron RT-21 controller. During late Dec, W2ZQ will use the special event call W2T to commemorate the Battle of Trenton and W2P, the Battle of Princeton. See <https://www.w2zq.com/w2t-w2p-special-events-2020/> for more info. [The Washington crossing site is line-of-sight from the W2ZQ shack]. W2ZQ should be a 1296 initial for many stations. You can email w2hro.fn20@gmail.com to arrange a sked.

OK1TEH: Matej ok1tehlist@seznam.cz is working on his "lightweight" 1296 system – I put at my mini dish a new LNA using a SKY67151 MMIC from US4ICI with PE1RKI BPF on its input. This LNA (together with BPF and CZX3500 TR relay) was measured and NF was about 0,45 dB. So far, I have only been QRV on 23 cm EME with my 1 m dish; however, in the process of extending it to 1.6 m. It will still be only linear hor. pol as its main purpose is to work tropo DX. I'm preparing a bigger dish at my countryside QTH for EME. With the new improved system, I am hoping to make a few more 23 cm EME QSOs with bigger stations. Thus far I up to initial #17 with my 17dBd dish!



SKY67151 LNA for 23cm, PE1RKI's BPF was too large to be mounted directly to the relay due to close 2nd relay's N-port. The LNA has to be 1 stage. DDK's VLNA would be overloaded by strong HF field from high power DVB-T2 transmitter that is only 300 m away.

K2UYH: Al alkatz@tcnj.edu was not that active in Dec because of travel – I did QRV on 15 Dec on 1296 to catch at 0445 RA4HL (559/559) for initial #415 on CW, 0450 AA4MD (559/539) on CW, 0501 NC1I (579/579) on CW, 0522 RA4HL (4DB/6DB) on JT65C and 0545 partial with VE4MA/7 (25DB/7DB) on JT65C – for some unknown reason Barry would not decode, and on 16 Dec on 432 at 0520 K7ULS (19DB/O) on JT65B for mixed initial 1006*, 0530 DK4RC (12DB/19DB) on JT65B #1007* and 0620 LU1HKO (13DB/14DB) on JT65B #1008*. I believe this was Fernando's initial 432 EME QSO. I neglected last month to note the milestone achievement of my 1000th EME mixed initial QSO on 432. I still have away to go on CW/SSB (#746). I plan to be QRV for the SSB EME Funtests coming up very soon. I have also started planning for EME2020 in Prague.

NET/CHAT/LOGGER NEWS: **K7ULS** reports working on 432 K5QE using JT65B twice in the last month. Once with ground gain and the second time without. **W1SMS** is looking for any 222 MHz EME skeds, if you are interested in, PSE write him at ssimons@manitousys.com. **G4RFR** will be QRV on 10368.2 with his group's 3.4 m dish and 200 W on 2 Jan. [From G3YGF of the FRARS Club]. **AA4MD** worked W2T on 1296 and will be requesting a W2T QSL. Jim has set up a sked for W2P. [See the W2ZQ report]. **UB4UAA** is now QRV on 70 cm EME with 8 x 29 el long yagis from LO24og.



UB4UAA after completion of new 432 EME array

THE A21EME STORY: Dan, HB9Q, writes – It all started in 2018. After the very nice and successful 3DA0MB dpxpedition the team-members decided to do the next 8 band EME dpxpedition to Botswana. So ZS6JON and his XYL Louisa started the QTH-search and the licensing process. To get the license and find a suitable place for the operation, they had to drive to Botswana several times and many many e-mails were necessary to get everything ready. Without their expertise, endurance and huge effort, it would not have been possible to do this dpxpedition! MANY THANKS LOUISA AND JOHN! Unfortunately HB9COG our Chief Engineer had to cancel his participation due to a too heavy workload at his business. We all were very sorry for him. We really missed him... not only as engineer! But luckily my YL, Sue, was willing to join the team and support me on the microwaves. In May 2019 she joined our SV9 dpxpedition for a week. She saw what we are doing and liked it! So she was ready to become a team member of the A21EME dpxpedition.



A21EME Team from left: PA2CHR, ZS6NK, ZS6JON, ZS6ALV, ZS4TX, Sue, HB9CRQ and PA3CMC

We (Sue and Dan) left HB9 in the late evening of 17 Oct with 220 kg luggage in 7 transport-boxes and 1 suitcase. All went well and we had a smooth flight to Johannesburg. At 10 AM of the 18th John came to pick us up at the airport. PA2CHR and LiPA3CMC arrived in Johannesburg the day before and were also part of our welcome-team at the airport. All luggage arrived well, although several boxes were opened and not locked/secured again. Luckily nothing was missing and all equipment looked well. But for one box we had to go the airport police office. They told us that the box was confiscated because they suspected there was a gun in it. Hmmm... This was our tripod-box, which of course looks like a box for a huge fire-weapon... Luckily the police officers were friendly and relaxed. They asked me about the weapon inside and I told them there is only a aluminum tripod inside. I had to open the box for them, they had a look and they immediately told me to close it again and take it with me. So we didn't lose much time and went all together to the car rental desk to pick-up our VW T6 Van. Our luggage had just about enough room to fit in. In the evening we had a great African Dinner with all team members and some of the XYLs at John's and Louisa's home!

On 19th October at John's home all the tech-equipment was prepared, packed and loaded to the 4 vehicles of our convoy. For Lunch we all went to a very nice place close to John's home for the traditional spareribs-feast. It was delicious!

On the 20 Oct at 5.30 AM, the team gathered at John's home and after a coffee or two, our convoy of 4 vehicles left in the direction of Gaborone, Botswana. It was a very nice drive and we were on schedule. Even immigration and customs went smooth and in less time than expected. So, we arrived at about 1 PM in Gaborone where we stopped lunch. After buying cell airtime and some other supplies, we drove for an other 30 minutes to the north to get to our QTH in Mmopane at the Camel's Inn Lodge (KG25wk). We arrived at 2.30 PM and immediately started to build our stations (6 m, 2 m, 70 cm and microwave). We had great sunshine, gusty winds with the thermometer was showing 40° C (in the shade)! It was tough, but we made it. We drink one liter of water after the other. By 6 PM (sunset) all was ready for moonrise. The ladies of the lodge prepared a nice dinner for us. Unfortunately they were running late, and we only finished dinner until after 10 PM. Moonrise was at 2 AM. It was a very short night with outside temperatures of almost 30° C.

On 21 Oct, we were QRV on 1296 for our moonrise at 4°. The temperature was 27° C, no wind and no clouds. As usual we started with a pile-up, which kept us busy for about 2 hours. Then we had only occasional callers. From about 6 AM, we were again nicely busy until moonset. The temperature went up to 38° C at moonset. Since we knew that it will be hot, we built a sun-protection-cover for the TRX-equipment. We are very happy that it worked perfectly, we could run full power all the time! We worked a total of 66 QSOs, 3 CW and 62 JT65C, for a total of 63 initials in 24 DXCC on 5 continents.

The 22 Oct was again a very hot day, peaking 40° C in the afternoon. 13 cm had no problems with the heat, full power all the time. After the small pile-up at moonrise, we called CQ for hours with only very few callers. The signals were great, we could have worked many more stations if they were QRV! At the end of the window, we had a total of 24 QSOs, 5 CW and 19 JT65C, for a total of 20 initials in 13 DXCC on 4 continents.



1296 dish at moonset

On 23 Oct it was again hot with only a few clouds and gusty winds. We were QRV 3400 with the same pattern as the day before. We had a pile-up at moonrise then hours of CQing with almost no takers. This was too bad as we could have worked many more! We were TXing again at full power with no heat problems at all. We worked a total of 19 QSOs, 8 CW and 11 JT65C, for a total of 12 initials in 8 DXCC on 3 continents. After moonset, we checked our azimuth system because we experienced a few glitches (during daylight operation) following the Moon. We found, that the friction clutch was not working; the heat must have enlarged the rings enough that the clutch released at much less torque. Once found, we could fix it and re-calibrate the system.



Chris, PA2CHR at 432 station

24 Oct was hot again too with less wind and a lot of clouds. There was no visual Moon. As the Moon-window starts later and later, our operating time in the full Sun was growing daily. Fortunately, there was still no thermal problems; full power all the time on 5760 as well! As usual, pile-up at moonrise followed by hours of CQ with only few takers. We had a lot of time to work many more! We worked a total of

29 QSOs, 11 CW and 18 digital, for a total of 18 initials in 14 DXCC on 4 continents.



The dish in the park position on 10 GHz

25 Oct was again very hot, overcast and no Moon not visibility. Imagine, in the shack we had PA'a for 50, 144 and 432, with a total dissipation of a few kW, running all the time with some 8 screens/monitors and a fridge. Thanks to the traditional roof cover and 2 huge fans, we never got over 40° C inside. We were active on 3 cm. Again all the equipment worked with no problem at full power. And the Moon tracking with no glitches! Again, we began with a pile-up followed by only few takers spread over the full moon-window. We don't want to complain, but it is really a pity not to have worked more stations. Never the less, we had great fun giving away a new DXCC, and for several customers a new continent. We also made some 10 GHz history by working ZS1LS for the first Africa to Africa 10 GHz EME QSO! Congrats Allan! With our QSO with PY2BS, we completed the 1st WAC on 10 GHz from the continent of Africa! Many thanks Bruce. We worked him on 23 thru 3 cm. And thanks to VK7ZBX and JA1WQF for the WAC. We finished with a total of 32 QSOs, 6 CW and 26 digital for a total of 27 initials in 17 DXCC on 6 continents! The 26th was the final day for the 50, 144 and 432 team. They ended operation before noon and left in the early afternoon. We missed our friends but enjoying less heat in the shack!

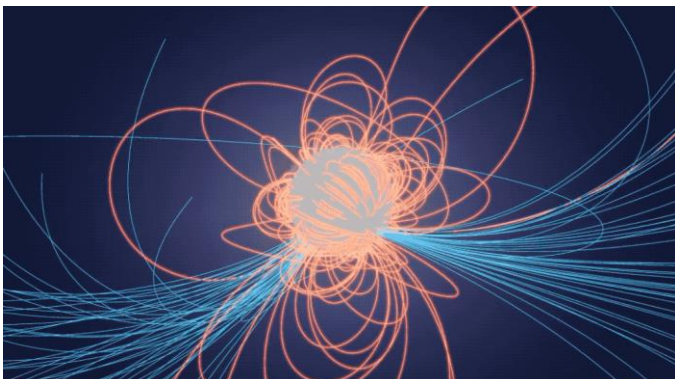
26 Oct was our final day of operation. We were QRV on 1296. It was overcast until late afternoon with a very nice sunset. Again, there were no tech-problems with a lot of time for more QSOs. We worked 32 more initials on 1296. This gives us a total of 107 QSOs, 8 CW and 99 JT65C, with a total of 95 initials in 28 DXCC on 6 continents. After moonset, Sue and I dismantled and packed the station. The next day, 27 Oct, we drove back to Krugerstop (ZS6JON's QTH). To celebrate our successful dxpedition, we had a together for a very nice dinner at a famous Sushiplace. We stayed overnight at Lisa's and John's home.

On 28 Oct, my daughter, Emily, arrived at the airport and the three of us went to Madikwe for 5 fabulous days of safari. On 5 Nov, we arrived back at the Zurich airport and 2 hours later, we were back home. Unfortunately two of our 7 transport boxes were damaged. They must have been dropped out of the plane. We suffered some damage of the 10 GHz station and the control-station. All will be fixed and ready for our next dxpedition - no problem!

It was a great experience to join our friends for the second 8 band EME dxpedition! Although the 4 antennas were very close to each other, we had no problems. Wonderful teamwork and friend-ship made it a pleasure to work together. Many thanks John, Andrew, Bernie, Paul, Chris and Lins! And of course, many thanks to all who worked us or tried to work us, and last but not least many thanks to all supporters, we very much appreciate your help! QSLs for 23 – 3 cm please send direct with SAE to HB9Q, PO Box 133, CH-5737 Menziken, Sitzerland. QSL information for lower bands go to PA3CMC, Lins Berben, Simonshoek 2, 5768 CS Meijel, Netherlands. And don't forget that *after a dxpedition is before a dxpedition!* More pictures can be seen at: https://hb9q.ch/2018/?page_id=1659.

RADIOASTRONOMICAL CORNER BY OK1TEH: On 12 Dec the US National Radio Astronomy Observatory (NRAO) (<https://public.nrao.edu/news/antenna-design-for-the-next-generation-very-large-array>) has awarded three contracts for the conceptual design of the 18 m antenna for the next-generation Very Large Array (ngVLA). The ngVLA is an astronomical observatory planned to operate at centimeter wavelengths. The observatory will be a synthesis radio telescope constituted of approximately 214 reflector antennas each of 18 m diameter, spanning North America, and operating in a phased or interferometric mode. A very interesting study can be seen at <https://ngvla.nrao.edu/download/MediaFile/220/original> & <http://cnastronomia.unam.mx/pdfs/beasley.pdf>.

First map of Pulsar's surface - Astrophysicists are redrawing the textbook image of pulsars, the dense, whirling remains of exploded stars, thanks to NASA's Neutron star Interior Composition Explorer (NICER), and the X-ray telescope aboard the International Space Station. Specifically, the observed pulsar has the name J0030+0451 (shortened as J0030) and it's some 1,100 light-years away in the constellation Pisces. From the NICER on board the ISS, it is very remarkable that it was able to detect any points on the surface of the pulsar, but even though it has a mass of about 1.3 to 1.4 Sun, its diameter will be only about 25 kilometers. However, due to the high density of matter, this star is able to bend light so that from our point of view it appears much larger than it actually is. In a report very well commented by Paul Hertz of NASA, the pulsar J0030 rotates at 205 revolves per second, which corresponds to the frequency of incoming pulses.

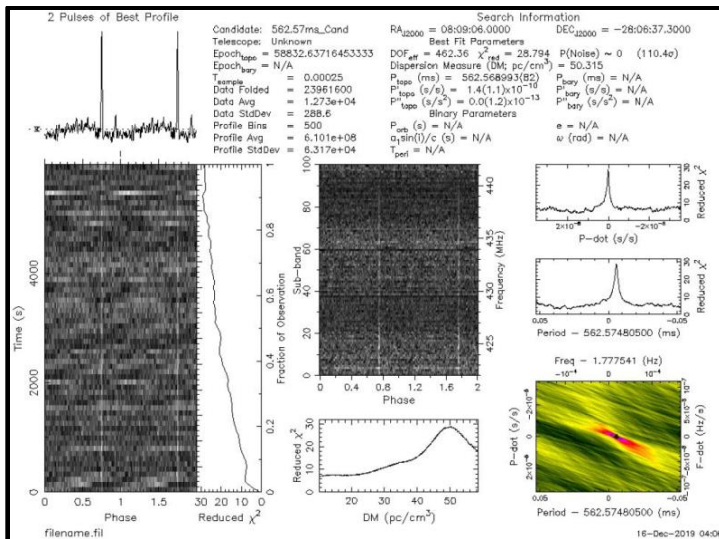


What the astronomers did not expect; however, is the location and number of hot spots on the star's face, which will change our basic awareness of what they should look like. These extremely hot spots were, of course, full of meteria as expected, but only two or more were at opposite locations corresponding to the position of the magnetic poles from where accelerated particles flow out into space. Some of these particles are supposed to follow the curvature of the magnetic field to arrive at the other pole, where it hits the star again, increasing the temperature at that point. According to simple models, the Pulsar should resemble a beacon. All of this would fit, but NICER found three spots, one regular circular and two elongated, and all in the southern hemisphere of the star, which was determined using two independent methods for processing the NICER data from 2017 and 2018. It was the work of Thomas Riley, who found that J0030 had a mass of 1.3 Suns and a diameter of 25.4 km, and Coler Miller reported 1.4 Suns and a diameter of 26 km. Above all, however, they match the results showing spotting in the southern hemisphere, which was achieved by analyzes conducted on the Dutch supercomputer Cartesius and then at Deepthought2 (University of Maryland). There is no consensus on the existence of the third spot, but it is clear that the pulsars will hardly match the "neat" imaginations so far - see the possible form of the magnetic field of J0030. Now astronomers are trying to figure out why the spots are placed and shaped as they were captured by NICER. See <https://www.nasa.gov/feature/goddard/2019/nasa-s-nicer-delivers-best-ever-pulsar-measurements-1st-surface-map/> and <https://www.youtube.com/watch?v=zukBXehGHas> Are you looking for really good book about Pulsars? Try: <https://www.cambridge.org/cz/academic/subjects/physics/astrophysics/handbook-pulsar-astronomy?format=HB&isbn=9780521828239> and <https://www.cambridge.org/cz/academic/subjects/physics/astrophysics/pulsar-astrophysics-iau-s337-next-50-years?format=HB>

Pulsar detection by K2UYH's student: I was happy to hear that Al led a Bachelor's Senior Project of his student Jacob Levine with name "Pulsar Detection Utilizing Radio Astronomy Techniques". Jake detected Pulsar BB1133+16 and B1748-28 on 70 cm thank to using Al's 28' Kennedy and the help of IONAA's (Mario) Murmur software, Al's LNA and simple RTL-SDR. Such a project could be a good model of how EMEers could attract new blood to radio astronomy and perhaps EME too. Congrats to both!



Jacob Levine, TCNJ, with K2UYH's dish



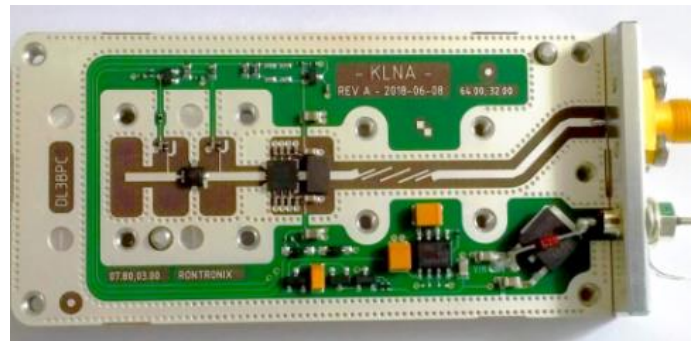
Final Results of B1748-28 @ 432 MHz. This result exhibits all of the characteristics described in the project goals and was confirmed even from the initial results by Mario (<http://i0naa.altevista.org>)

FOR SALE: UZ5DX has many items for sale: A 3 cm transverter MKU 10G3 1368/144 for EU537. PE1RKI band pass filters for 9 cm and 13 cm EU100 each.

Three band SSPA by ITALAB for 144, 432 & 1296. It has on 144 in 8 W, out 1 kW; on 432 in 46 W, out 500 W; and on 1296 in 16 W out 200 W for EU2200. A complete 24 GHz system in a waterproof box, PE1RKI horn, adapter WR47, transverter MKU 24/144 with LO 12PLL, SMA relay and 2 SSPA by DG0VE for EU1550. A complete 23 cm system, MKU 23G3 1296/28 transverter, 30 W MKU PA1330A SSPA, HB9BBD LNA and PE1RKI bandpass filter for EU1200. 24 GHz system, transverter MKU24GA, LO12 11952 MHz, bandpass filter with WR42, WR42 adapter 2 pcs, WR42 adapter for antenna, horn antenna for EU550. 24 GHz system, transverter MKU24GC, LO12 11952 MHz, bandpass filter in-out SMA, horn antenna out SMA for EU450. All prices include shipping for Europe. Email questions to uz5dx@ukr.net. **PC5Q** is selling his two GS35 PAs for 2 m and 70 cm. Available are two GS35b EME PAs for 144 and 432. Both have been built by PA7TA with solid construction. The 144 PA is equipped with a RF Hamdesign low pass filter. The PAs come with a 4 kV/1 A power supply and variac. G3SEK triode control boards can be added upon request. Two spare tubes are available as well. Any reasonable offer will be considered. Pick-up at Wageningen, The Netherlands. If interested please contact eldert.vanhenten@outlook.com. **CHEAP 432 LNA** with a 0.3 dB NF is available at <http://ha8et.hu/VLNA-432/vlna-432.htm>. A soldered and pretuned PCB without a box can be bought by only EU50 and full box for EU80.

Info on the status of DU3BC LNAs for 10/24 GHz from PA0PLY: 10 GHz XLNA, for the existing model we have no electronic parts anymore. Thus, no units can be produced anymore. We have seen a need for this XLNA and a new compact design is being prepared. Planned for production are 30 pcs to be available somewhere in March 2020. 24 GHz – 1dB NF KLNA, of the pilot units delivered at the 2018 EME conference, 4 of the 6 units has been modified because there were out of band oscillations affecting the performance. This problem could be eliminated by using an

isolator, but we aimed to have a unit with good performance without the need of an isolator. We are awaiting response of those hams using this model with the modification. In the meanwhile, revB is designed with a new PCB layout and housing. The plan is to have approx 25 units available around March 2020.



KLNA – Rev A

We have had far more inquiries than anticipated and are looking into the possibility to enlarge the production for March 2020 to fulfill more inquiries. We feel very sorry for the delays, but are now in a good shape.



Now in production

DF0EME on history of 13 cm EME: Jan (DL9KR) has been trying document the history of 13 cm operation from DF0EME, a famous German EME club. The home community of DJ4AU (SK), owner of DF0EME's 10 m dish, is looking for historical details of Jürgen's and his group's (DJ4UR, DL5FAU and DJ8QL) EME results on 2.3 GHz. Jan writes -- It was not possible for me to obtain the logs of the stations involved; thus, the info had to be pieced together from secondary sources. I have checked all the newsletters from 1982 to 1984. Surprisingly, the Internet contains practically nothing. I checked all the NLS from 1982 thru 1985. I found that on 12/13 Mar 1981: First tests with their 10 m solid dish and a 150 W ring amplifier were conducted, but with no reports of hearing their own echoes. On 12/13 Dec 1982: A 500 W klystron was installed; probably borrowed from DJ8QL. (I remember seeing this huge "engine" in Franz's basement). On 17 Dec 1983: They made their first 13 cm QSO with OE9XXI. On 5 May 1984: They QSO'd LX1DB. On 21 July 1984: They added OK1KIR. On 22 Sep 1984: They made their first transatlantic QSO with WA4HGN. Other contacts can only be speculated at this point. It would be interesting to learn about contacts if any with G3LTF, PA0SSB, K2UYH, W5LUA, G3WDG, W6YFK and others. [Anyone having information to add, please contact DL9KR].

FINAL: We have not included in the reports all the many good wishes for the New Year and thanks for the many FB QSOs. We wish to express them here from all who contribute to the NL and to all.

► For the New Year we have F1EHN's Moon Charts at the end of this NL. TNX JJ.

► **EME2020 in Prague:** OK1DFC announces that as promised registration is now open for EME2020. The main web site is <https://www.eme2020.cz/> and connects to registration (also direct at [https://www.eme2020.cz/registration/\(https://www.eme2020.cz/registration/\)](https://www.eme2020.cz/registration/(https://www.eme2020.cz/registration/))). The first to register was DL1YMK (Monika and Michael). Register early and miss the rush! G3WDG is organizing the speakers' program and is looking for additional talks. Contact Charlie directly or via <https://www.eme2020.cz/dokumenty/28/>. Zdenek and his EME conference team are looking forward to see you in Prague.

► There was troubling news this month that 9 cm operation in the US maybe eliminated as a result of pressure on the FCC from commercial interests. The ARRL is trying to fight

this action, but there are powerful commercial interests that want these frequencies. The situation in Sweden has improved slightly with news the frequency auction for 2.3 and 3.4 GHz have been postponed and SM stations with a high power license can use the bands until 30 June 2020.

► PSE send G4RGK any WAC news you have. Dave also needs you to update your CW initial and DXCC numbers to include the webpage he maintains. See <http://www.zen70432.zen.co.uk/Initials/WAC.htm>.

You can find the results of ARI EME TROPHY Autumn Section and Trophy 2019 at <http://www.eme2008.org/ari-eme/contest.html>. The next ARI EME Contests are 4/5 April and 19/20 Sept – TNX I5WBE.

► We hope everyone that can, will try to be QRV for the SSB Contests. It would be nice have a big showing on 13 cm! We hope that you enjoyed the current issue and that you send in your reports, news and tech info in 2020. 73, AI – K2UYH and Matej – OK1TEH

MOON EPHEMERIS OVERVIEW FOR THE YEAR 2020, BY JJ F1EHN

