

Deep Space Exploration Society Science Meeting

Getting Ready for EME 2



November 23, 2020

Dr. Richard Russel

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DSES.science

Information

- 9 ft Dish – serial port issue
- SuperSID – Down again – no signal
- Radio Jupiter – still need to get a new receiver and setup at site
- Pulsar – 1296 MHz pulsar effort
 - Attempted B0329+54 (203 mJy @1400 MHz) for 30 minutes and B1933+16 (57.8 mJy @1400 MHz) for 1 hour. No detection noted
 - Plan is to go back to 408 MHz feed until a higher bandwidth solution is developed.
- Fast Radio Bursts:
 - Observe FRB 121102 located at: RA: 05h31m58s DEC: +33d08m04s
 - No attempts yet
- Hydrogen
 - Shifting plan to utilize Ray's and Rich's 9 ft dishes for any HI measurements

2020/21 Observation/ Feed Schedule

- November
 - Week 1-3: 1296 MHz – Pulsar Observations
 - Week 4: Moonbounce (1296 MHz)
 - Nov 28-29 Moonbounce (1296 MHz): <http://www.arrl.org/contest-calendar>
- December
 - Week 1-4 408 MHz – Pulsar/FRB observations
- January 2021
 - Week 1-4 408 MHz Pulsar Observations
 - (Note: the feeds can be varied based on science interests from 408/1296/1420 MHz)
 - 4 GHz Calibration feed

11/20 Site Trip

Rich Russel, Ray Uberecken, and me (Gary Agranat) were at the Plishner site in Haswell yesterday.

Ray was there to troubleshoot and set us up for the EME contest operation next weekend. Rich came to try pulsar observing with the 1296 MHz feed. I came to help with both.

Ray retrieved the amplifier at the feed and troubleshooted, testing the voltages in the circuit. He found that the amplifier again had gotten stuck in transmit mode. He found that the circuit had a failed transistor. A transistor had failed previously, but this failure had a different cause. Ray replaced the transistor, and he also changed a resistor in series to one with a higher value (I think 2+ K ohms), to mitigate a similar failure.

Ray has a 1296.2 MHz 1 W beacon transmitting from his home. We slew the dish antenna and received the signal.

We later tried sending test signals (mostly in CW) to the Moon, once the Moon was at a high enough elevation (above 10 degrees), but we did not hear our signals come back. I doublechecked the Doppler shift offset we needed. That offset needed about 1.6 KHz difference (higher frequency on receive side). The Moon's orbit was such that right now its elevation is low, so that when it is visible and high enough, the Moon is no longer visible at the Belgium beacon, so we couldn't verify our set-up with that. For the EME contest, the Moon will be higher earlier, and then we expect we will be able to hear it. At first also, we thought the 18 Watt amplifier at the transceiver end wasn't working, but that was resolved. Rich played around a lot with the antenna pointing, to try to verify that our indicated pointing angles are accurate, and apparently those are. And so we are not sure why we didn't hear ourselves from the Moon. Later in the testing, the Yaesu FT-736R stopped transmitting, and Ray will next troubleshoot that.

Rich tried observing two pulsars with the 1296 MHz feed. He tried twice the B0239+54, our standard reference with its highest signal flux (at 408 MHz), but the software analysis showed we didn't have data. He also tried B1933+16 for one hour, but again no result. I think Rich concluded that for 1296 MHz we would need to take much longer observations, at least 5 hours, with our current setup. And so Rich and Ray decided that after the EME contest, we should go back to the 408 MHz feed for pulsar work.

Ray showed and discussed his new setup with the medical amplifier and SDR. We should have wider bandwidth and much finer dB sensitivity.

I should mention, Rich showed me the setup he explained that we can share with science fair students, for detecting the 21 cm hydrogen with the 2 GHz antenna, from SARA. I am interested to try and test that out from my home. I could probably help with additional documentation or learning aids. This kind of tool I think can help any of us with learning curve experience.

During late afternoon I went to the bunker to test out the Vertical ham radio antenna we repaired earlier in the fall. (That is we restored it to its earlier configuration, but we haven't yet buried the the radials). I noticed there was was one long radial that had been severed that I missed repairing last time, but left that for now. I used my transceiver. I tried sending FT-8 signals on 40 meters, 15 meters, and 10 meters. SWR was nominal (well within acceptable limits), so that was good. I didn't get to checking 20 meters or 80 meters. I didn't hear anyone respond back on 40 or 10. 10 meters was probably dead. Later I checked the PSK reporter website, and that showed we were heard in California and Texas. In late afternoon that might be normal. The 15 meter band was booming though. I responded to some CQs, then sent our own. I got some domestic US stations (WA and FL). And then I got almost non-stop pileups from Japan. At one point I took a break and had a CW (Morse Code) DX contact with a ham in Fukushima, Japan on 15 meters. He was running 1 KW and I was running 100 W. We gave each other 559 signal reports. So the vertical is definitely working OK on 15 meters. I went back to FT-8 on 15 meters, and switched to using the Yagi (and sometimes switched between that and the vertical to test them both). We again had pileups from Japan. We also had one contact from South Korea and one from Brazil. And I made a contact with a station in the Philippines. In all I logged 26 contacts for us on 15 meters. I also checked PSK reporter to see where we were heard. I attached the results map for 15 and 40 meters. We got some eQSLs right away when I checked after I got home. I attached those also. -- And so our vertical and Yagi are still working OK -- quite good enough for DX. :)

We left a little before 5 PM.

Gary

Observation/Work Trip November 21, 2020



JE1JIM
 YUTAKA SAITO
 622-24 Shimatsuruma
 Yamato-City, 242-0001
 JAPAN
 Loc:PM95m ITU:45 CQ:25
 IOTA:AS-007 JCC:1114
 (QTH:1986-21-20 Totsuka-ku, Yokohama-City
 ETDX1200, FT897DM, FT817, No
 Tele (20/15/10m), 7ele (6m), Mobile

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 23:21 UTC
 Band: 15M UR Sigs: -01



W7RIT
 Scott Hamilton
 PO Box 243
 Oysterville, WA 98641
 USA
 Pacific County - CN76

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 22:34 UTC
 Band: 15M UR Sigs: +04



eQSL PU2VAV
 VALDIR ANARECIDO VICENTE
 EDÉLIO GUIMARÃES 426
 Salto de Pirajó, 18160-000
 BRASIL
 Loc:CG60f ITU:15 CQ:11
 YAESU FT 857D
 ANTENA VERTICAL V350CAMP
 ANTENA DIPOLO D1EX 10/80 METROS

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 22:50 UTC
 Band: 15M UR Sigs: -11
 TNX 73 GOOD DX



ITU:45 CQ:25 Grid:PM86SW IOTA:AS-007 JCG:28003
JA9LX Kenji Nozue
 Toyama JAPAN
 ICOM IC-7300
 Dipole

Gold Member

To: KØPRT Confirming 2-way FT8 QSO, Band: 15M
 Date: November 21, 2020 Time: 23:36Z, RST: -04



JA4JKO
 kana iita
 Matusima
 Kurashiki
 Japan
 Loc:PM64vp ITU:45 CQ:25
 IOTA:AS-007 JCC:3102
 HF,VHF IC-7300+LAP&VHF UHF,IC-7100
 HF,25mH_DP,HB9CV& 0mH_GP
 VHF/UHF 25mH_Yagi&GP

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 23:33 UTC
 Band: 15M UR Sigs: -18



HL3GOB
 Top of Korea

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 23:21 UTC
 Band: 15M UR Sigs: -05
 GOOD QSO! RR73

Observation/Work Trip November 21, 2020

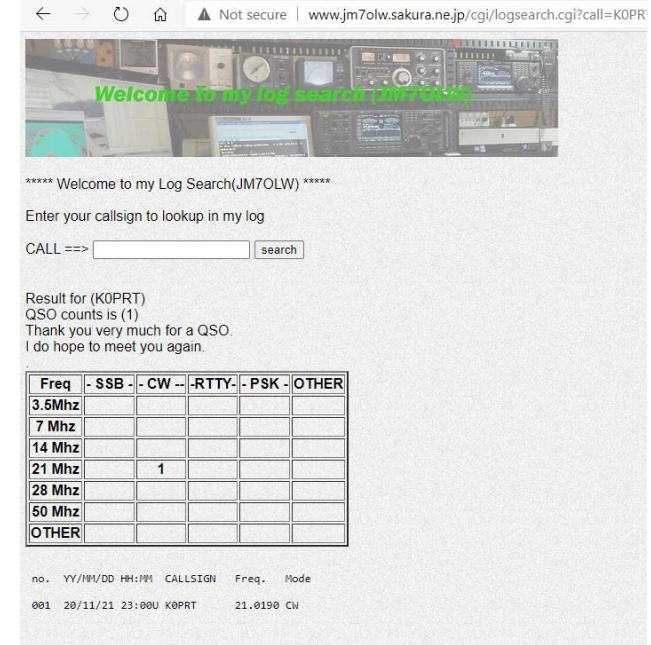
AIR MOBILE



4E1FNS

MASATOSHI OTA
BRGY LAMOT-2
CALAUAN, 4012
LAGUNA-Province
 Loc:PK04PD ITU:50 CQ:27
 ICOM IC-7300 100W(FT8 FT4 etc...)
 ANT: Max Only 12mH Full Size Dipole
 also JH1FNS GOCEO ex9V1WE,VR2IB etc..
 .Former callsign DU1/JH1FNS

To: KØPRT This confirms our 2-way FT8 QSO
 Date: November 21, 2020 Time: 23:17 UTC
 Band: 15M UR Sigs: -03
 [Thank You for the QSOed today. also JH1FNS GOCEO ex DU/JH1FNS
 9V1WE VR2IB E14VAN JH1FNS/CEO Easter Is & Guest OP CE3ESS



Not secure | www.jm70lw.sakura.ne.jp/cgi/logsearch.cgi?call=KØPRT

Welcome to my log search (JM70LW)

***** Welcome to my Log Search(JM70LW) *****

Enter your callsign to lookup in my log

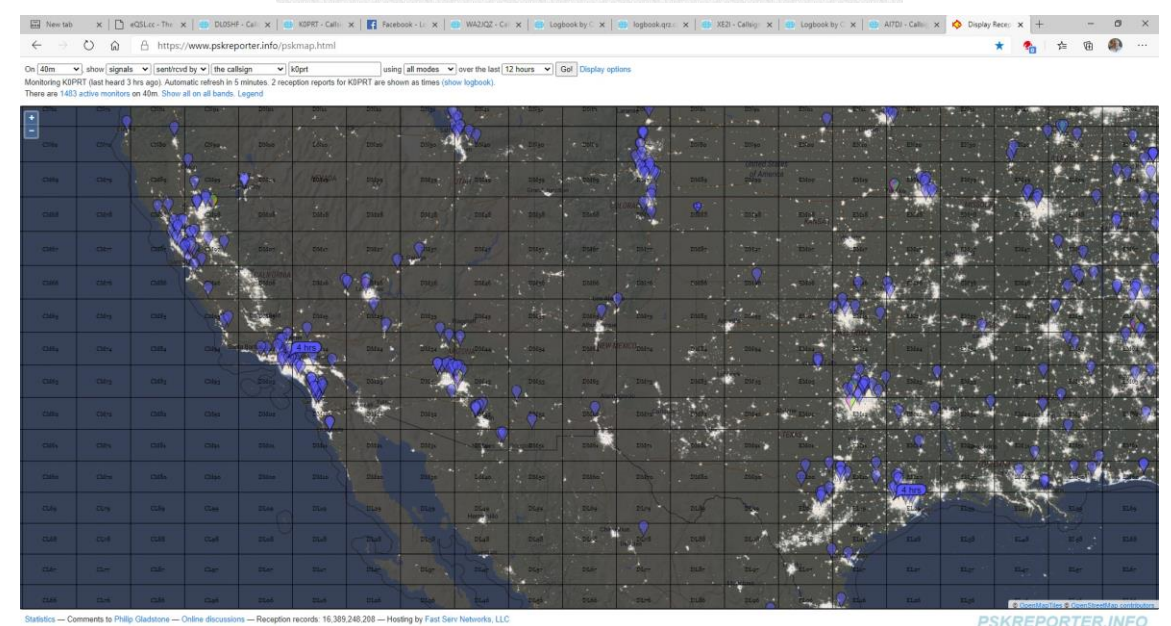
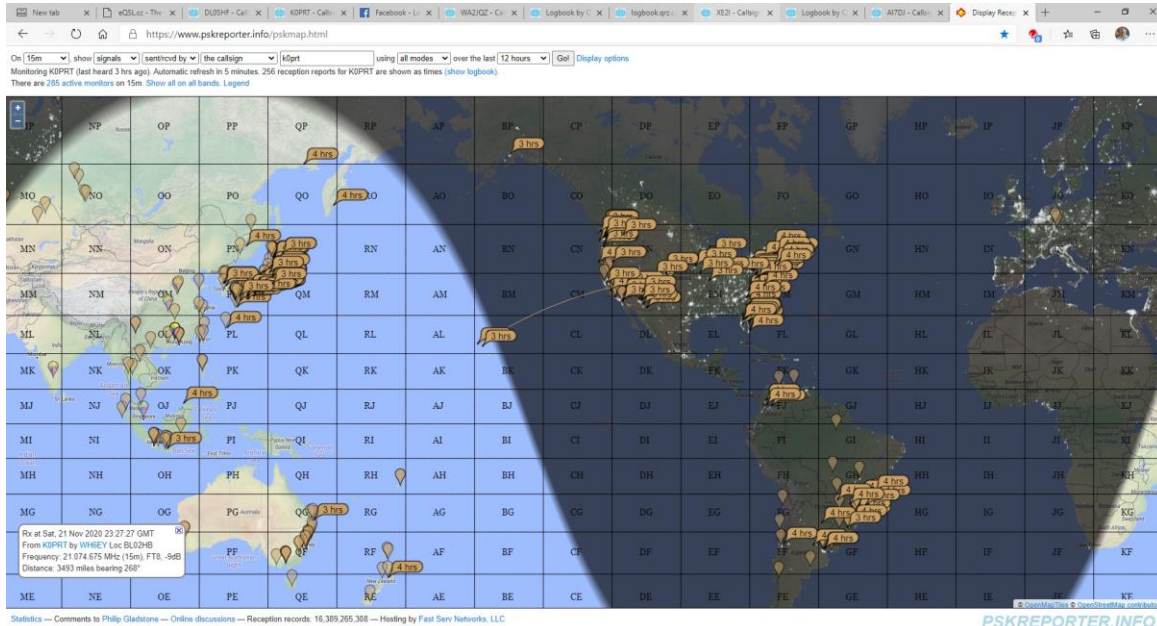
CALL ==> search

Result for (KØPRT)
 QSO counts is (1)
 Thank you very much for a QSO.
 I do hope to meet you again.

Freq	-SSB-	-CW-	-RTTY-	-PSK-	-OTHER
3.5Mhz					
7 Mhz					
14 Mhz					
21 Mhz			1		
28 Mhz					
50 Mhz					
OTHER					

no. YY/MM/DD HH:MM CALLSIGN Freq. Mode

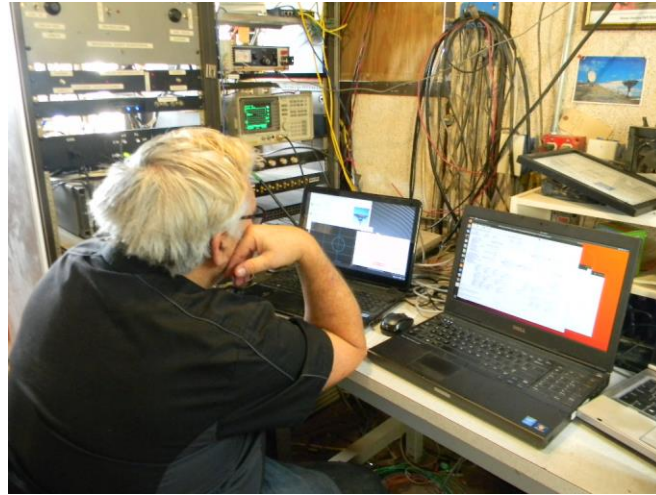
001 20/11/21 23:00U KØPRT 21.0190 CW



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Ray's 1296 MHz Beacon

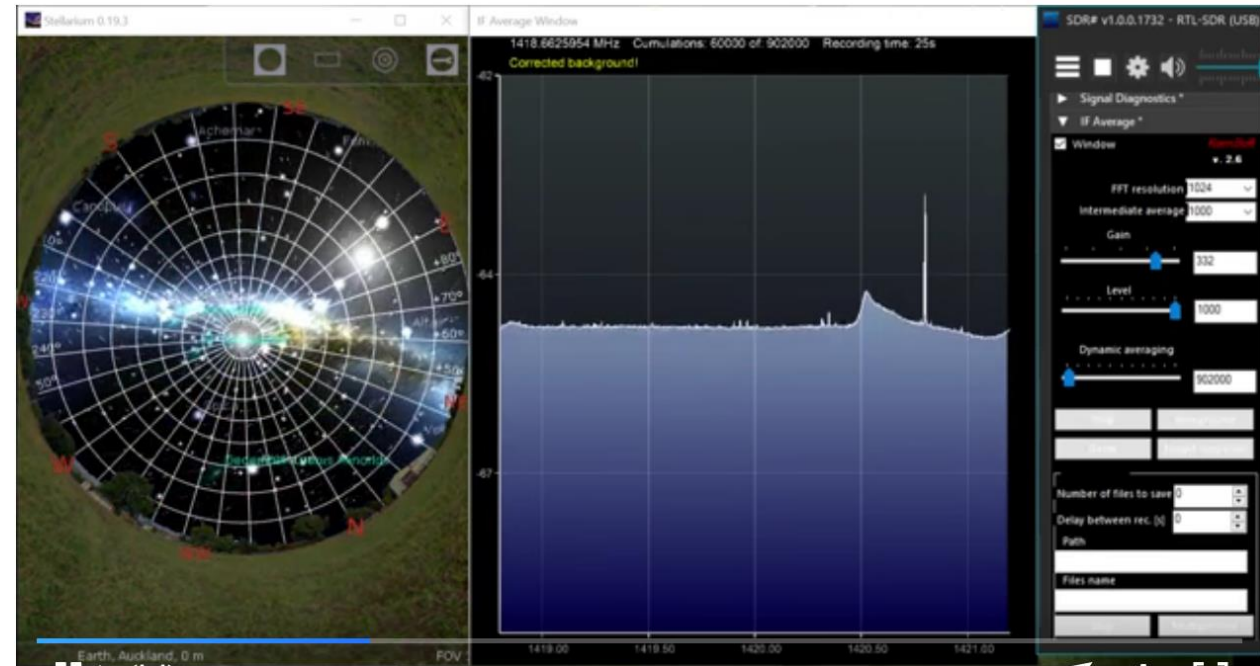
- Conducted observation on Ray's 1296 MHz beacon
- Pointing within 0.5 degrees of predicted azimuth

Gary Published DSES EME Results

- <http://www.nitehawk.com/rasmit/em70cm.html>

KOPRT: Gary (WA2JQZ) gca7sky@aol.com reports on his group's first attempt at EME with their refurbished 60' dish during the Oct ARRL Contest weekend -- Our first EME trial was successful! We have been working towards this goal for several years. Prior to the moonrise, we successfully tested our system with several tropospheric scatter contacts, over a hundred miles distance. We operated just for the first moon pass on 10 Oct. We made 30 contacts, 24 initials in total, 25 on CW and 5 on SSB. 4 were to EU, 2 to Japan, and the rest were with NA. We only made our first contact about 2 hours after moonrise, after we troubleshooted our antenna azimuth pointing offset. We found we needed to adjust the offset by 1.5 degs. QSO'd were DL0SHF, OH2DG, G3LTF, I5MPK, SP6JLW, DL4DTU, SM4IVE, DG5CST, VE6BGT (SSB), W4OP (SSB), OK1KKD, OE5JFL, W6YX, IK2MMB, OZ4MM, OK1CS, OK2DL, VE6TA, JH1KRC, AA4MD, WA9FWD, W5LUA (SSB), VA7MM, XE1XA, VE6TA (SSB), K2UYH, JA6AHB and W6YX (SSB). We operated with our club callsign KOPRT. Our team was Gary WA2JQZ, Myron KL7YY, Ray AA0L, Bill KC0FHN, and Glenn Davis, our lead software engineer who led the design of our new automatic tracking system. We used a 1296 septum feed built by KL6M to the specifications provided by KL7IZW. We plan to operate again during the EME contest in Nov. We had problems with our 200 W SSPA located at the antenna feed. A relay control on the amplifier had failed that kept the unit continuously in transmit mode. We believe we had about 180 W at the feed. We have added an 18 W amplifier to our FT-735R transceiver to help boost our signal over the 180 feet of half-inch hardline that feeds to our antenna. We also added a laptop and interface to do some JT65. We plan to operate CW, SSB, and JT65 digital. For the first pass in Nov, the Moon will already be above the horizon at the start of the contest, and will set at 1203. For the second pass, the Moon will be above our horizon from 2247 on 28 Nov to 1303 on 29 Nov. We will at least operate during the first pass. We will have information posted at our website, <http://dses.science/our-1st-dses-earth-moon-earth-ememoon-bounce-communications>. This was definitely exciting for me. This was my first EME experience. (I have had a taste of meteor scatter and satellite QSOs.) And I think it was exciting for our whole team. Some have done EME in the past on lower frequency bands. Much has had to come together for us, to restore the 60-foot antenna and the site, and bring the antenna back to life again with more modern features. EME has been a long term goal for us. I think we're all excited and proud. I think we're all pleased that we're a group that works this well together, and that we can continue to do more. The EME itself is exciting too, especially with the capability we have. I am still taking in the experience of hearing my voice or CW coming back from the Moon a couple of seconds later.

SARA Radio Astronomy in a Box



<https://www.rtl-sdr.com/cheap-and-easy-hydrogen-line-radio-astronomy-with-a-rtl-sdr-wifi-parabolic-grid-dish-lna-and-sdrsharp/>

NOTE: There was a virus on the RTLSharp software download link referenced in this article !!!!!

Plan after November Moon Bounce Event

- Start taking 408 MHz pulsar measurements
- Research interfacing GNU software with higher bandwidth receivers
- Do 4 GHz pointing calibration

- Engineering
 - Get Ray's Radio Astronomy receiver hooked to GNU software for pulsars
 - Get the B210 online – this may increase BW to 20 MHz
 - Consider getting an X310 (\$5800) – will allow 100MHz

Questions?