432 AND ABOVE EME NEWS
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THE NL WEB VERSION IS PRODUCED BY W6/PA0ZN AND AVAILABLE AT <http://www.nitehawk.com/rasmit/em70cm.html>

CONDITIONS: Everyone and his brother appear to be headed for Prague the conference, but this has not diminished activity on the moon. Excellent conditions were present on 1296 during the July SW and a good turn out present during the Eur/NA window. 70 cm is somewhat of a different story. 432 reports are down. There was a new country available, 4L/ZL1RS – see HB9Q's report. This should have stirred up lots of 432 activity, but no one bothered to pass the word! One hope is JT44. Interest in JT44 appears to be growing. This mode makes possible QSOs with very marginal portable stations – see my report and may be away to generate more 70 cm and above dxpeditions.

I2COR A SILENT KEY: IK5WJD has sent news that Luigi, I2COR passed away recently from heart disease. Luigi is best remembered for his 10 m stainless steel dish with rotating shack. He was a great EMEer and builder, who was always disposed to help others. He was active on 23 cm and 70 cm, and would not let his illness beat him. In 2000, despite his heart problem, Luigi moved his whole dish and EME station to a new location to allow others access to his equipment. Thanks to this effort a new EME multi-operator team (IK4UQT, I2TFI, IK2TLA and I2YID) was formed. His EME signal will not only be remembered, but also heard off the moon. What could be a better memorial!

G3LTF: Peter's 100633.1656@compuserve.com status -- At present I'm not QRV as the 6 m dish is completely dismantled. The hub is nearly rebuilt with much stronger material and the ribs are all rechecked in the original jig. When reassembled, it should have much with better accuracy than original. It will be covered with 6 mm mesh to a 4.5 m diameter to enable operation to at least 9 cm, and hopefully 6 cm. I should be back on by the beginning of August.

HB9BBD: Dominique dfaessler@bluewin.ch passes on his thought on this year's Eur Contest -- I finished with 52 x 26 and a score of 1,352 on 23 cm. Again, I found that on the first day I made 46 QSOs and on the second day only 6! I got the feeling that only a very few stations are selecting just one day for operation. Those who participate seem to do this on the 2 days and not just one. I had 4 initials: JH0YSO, F6KHM, KL6M and K9KFR, to pull my counter to #178. I enjoyed the contest, but Sunday was boring. I am very busy in preamp work for 23 cm. I measured the effect of an SMA relay used for isolation between the feed and the preamp. If the length of semi rigid cable and SMA relay is a multiple of an electrical half wavelength, the best case for additional noise or attenuation is -.15 dB. I am using various SMA relays. The best has a loss of 0.08 dB, and the worst 0.21 dB. Things become seriously degraded, if the length of the overall line between the feed and the preamp is off by a quarter wavelength. Then the added attenuation seems to go up by almost 0.25 dB. These and other technical topics are discussed at http://www.hb9bbd.ch. [I recommend keeping any line between your feed horn, relay and preamp as short as possible - ideally none. There is nothing magic about multiple half-wavelength line lengths. Small mismatch errors affect loss measurements and sometimes can give mis leading results. Since preamp noise figure is dependent on turning and match, it is best to adjust your preamp for maximum cold sky to ground noise with the isolation relay in place.]

KO7N's 8 x 24 el K1FO yagis at 140' – see report on page 2

HB9Q: Dan hb9crq@hb9q.ch reports working 4L/ZL1RS on 432 15th June at 1800. He has 4 yagis and 60 W. Dan says it was not an easy QSO, but that he completed after 20 minutes. They were only there until mid July, and focused on 144 MHz. [I have no further information on this dxpedition.] Dan also reports that he and Mark will attend the EME Conference in Prague.

K0YW: Bruce k0yw@frontier.net reports on his July moon activity -- I snuck out of some domestic chores and was able to get on for an hour. Echoes were good, and tracking was perfect

under zero moon visibility conditions. I worked 11 stations in a little over an hour including F6KHM (55/57) on SSB for initial #123. He said he was using 100 W to a 10 m dish and an IC-746 as an IF for a good QSO. I also worked WA6PY (549/449), F1ANH (539/559), N2UO (539/559), DL1YMK (548/559), W2UHI (569/589), DF4PV (579/579), K9BCT (569/579), W7SZ (549/559), OE9ERC (589/599) and F2TU at 1800 (56/56) on SSB. Heard were K5JL, K2UYH, and IK3COJ, but had to go QRT or get a big stick!

K5JL: Jay was active on 23 cm in July and worked G4CCH, KU4F for an initial and F6KHM. He thinks that KU4F may have some receiver problems. Jay reports that F6KHM was extremely loud.

KO7N: Richard rewing@teleport.com sends info on his system, near future plans, and June/July activity -- During Feb western central Oregon was hit HARD by a storm. Winds peaked at 90+ mph and my original 432 4 x yagi array required major repairs. So much so that it was decided to go with a new design. The new array is 8 x K1FO -24 elements at 140 feet! I live in a pine tree forest, so mounting the array high in the air is critical. Also I wanted a good tropo array. I added a counter-balancing arm to correct for any possible weight balance issues during the construction. 2100-pound Dacron rope with turnbuckles was used to make a three-way support for the horizontal boom. After tensioning the whole system it became very strong. I also wanted to be able to add a four-yagi array for 1296 in the future. With all the aluminum tubing on the 432 array, this presented a real problem for 1296. So I use EXTREN, a very strong composite, non-conduction tubing to construct a very strong bridge center support for the whole array and as mounting masts for the 1296 antennas. EXTREN is very stable and far superior to standard fiberglass tubing, which will break down after so many years. I used 2" OD x 0.25" W/T EXTREN for the vertical supports in the center bridge support and 0.5" T X 3" wide EXTREN for the center portion of the bride assembly. This was to keep as much metal out of the field of the 1296 antennas area as possible. Eventually 23 cm will be fed with LDF7 Heliax. The AZ rotor is a heavy RC-5 Create, the EL rotor is HD Emoto EV-700. Remote T/R and enclosed ARR LNA (0.6 dB NF) is fed with a single run of Andrew LDF-6. By the end of July I plan to replace the present LNA with a cavity LNA of 0.18 dB NF and add RX hardline. In the shack I use an FT-736R (Mutek mod'd) and FT-847 mod'd for separate TX and RX lines. I use AA9Y and Spectrum waterfall programs. The PA is a LZ2US design using a single GS-23b and will do easily 1.5 kW output. June was a total surprise with over 20 initial QSOs, 6 new countries, 5 new states, and about 40 percent of my activity on random. July has been slower with only 6 initials, 3 new states and one new country. [Richard also discovered a parallax problem in reading his antenna position that may explain why signals were not always as strong as expected.]

KU4F: Thornton is now QRV on 23 cm with is big 14.6 m dish. He has only 75 W on TX at the feed, but still has a good signal. He has worked K5JL, G4CCH and others. Thornton feels his receive performance needs improvement.

N2IQ: Mark reports that he has the encoders working on the 28' dish he is now using on 23 cm, and that he is now QRV on this band. During the July SW he worked OH2DG and G4CCH on 1296. Mark also reports that he is now proces sing QSL cards.

N2UO: Marc lu6dw@yahoo.com reports -- On 23 cm during the last SW, I worked on July 13th W2UHI, G4CCH, K5JL and K0YW. I also heard F6KHM, DF4PV, DL1YMK, WA6PY, F1ANH and IK3COJ. On SSB I heard K5JL, K0YW and F2TU. On July 14th I worked N2IQ, OE9ERC, OZ4MM and LX1DB. Also heard were IK2MMB and many others. I called OZ6OL and he came back QRZ? many times, but no QSO (yet). Nil was heard from OH2DG during our sked, though I was able to hear my own echoes. Right now I have 300 watts at the feed of my 10' dish. Echoes are weak, but readable. I exchanged a lot of information on preamps with Paul WA6PY. He kindly sent me some schematics, too. I plan to improve my NF in the near future following his advice. Please email me if you want to set up a sked.

N9AB: Andy andrew_bachler@msn.com is interested in trying JT44 on 70 cm -- I still have not completed a JT44 QSO, but will continue to test in the evenings. A few people responded to my request for tests. I prefer random operation and will call CQ on JT44 (1st period) on 432.014. I'd like to establish a contact, and then sequentially reduce transmit power. I suggest that standard JT44 frequencies be established on 70 cm. Perhaps something like: 432.004, 432.014, 432.024, 432.034, 432.044, 432.054, etc, or simply 432.044 +/- 5 KHz.

OH2DG: Eino Eino.Metsamaki@fortum.com is looking for skeds on 23 cm for Aug. His station is 8 m dish with automatic tracking, 300 W output PA and FT736 with HB LNA.

OH1FF/p Field Day station – 1.8 m dish and 50 W

OZ4MM: Stig vestergaard@os.dk notes that another activity weekend has passed -- I had good success on 13 cm and found good activity on 1296. At 432 the was little activity and I thus spent only a little time there. On 13 cm, I was asked to give a test signal to a new OZ station, OZ3FCK. I arranged some skeds via email for him with other 13 cm stations. He worked 2 initials and DXCCs. During the SW, I started on 1296 and worked on 12 July DJ9YW (559/559) and KU4F (0/549) for initial #199, and on 13 July OH1FF/P (M/O) #200 -(this was a special event station in KP21qv). I then changed to 2304, but nil in skeds with PA3DZL and OZ3FCK. I had to QRT after 1500 due a family visit. On 14 July still on 2304, I worked finally OZ3FCK (429/M) for initial #39 and the first OZ-OZ EME on 13 cm. I then worked S59DCD (439/O) #40 and DXCC 20. Later I switched back to 1296 and worked F1ANH (43/43) on SSB, N2UO (439/559) #201, W2UHI (559/559), DL1YMK

(549/559), K5JL (579/589), F2TU (44/55) on SSB, IK3COJ (539/559), K9BCT (549/569), G4CCH (569/579) and W7SZ (559/579). At 1920 I switched to 432 and worked WA4NJP (559/559) and KO7N (559/559) #245. OZ3FCK is preparing his setup for operation on both 13 cm and 3 cm. He has a 3 m dish mounted on a trailer. At 13 cm he is running about 120 W SS at feedhorn. He still have some things to be optimized, but appears to be making good progress. He plans to be QRV again in Oct on 13 cm. Later he will change for 3 cm. I'm looking forward to the EME conference in Prague and expect to be at the hotel on Thursday afternoon and play Tourists on Friday.

PA3DZL: Jac Jac.de.Bruyn@12move.nl is QRV on 13cm EME -- Last month on June 18th I worked OE9XXI on 2320 EME. Signals both sides (O/O) for initial #2 on this band. I'm interested in skeds. The rig is 2.5 m dish, VE4MA feed with built-in polarizer, 30 W at the feed and 0.6 dB NF Preamp. I can TX on 2320 and RX on 2304, 2320 and 2424.

S59DCD: Ray's s54xray@volja.net group remain active on 13 cm -- On July 13th, we made our 2nd QSO on 13 cm. We were successful with OE9ERC (579/559). The next day we made it with OZ4MM (O/O) – it was a nice QSO, because we both tried so hard.

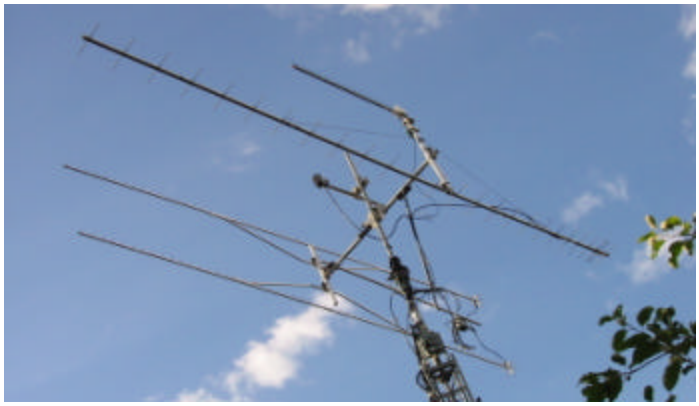
SK0CC: Sven sven.o.nordin@telia.com reports on 16th July SW activity by his group –- We worked during the July preSW on 70 cm KO7N (sked), UA3PTW and DJ5NV on random. Our skeds with UA9FAD was one way, with EA3DXU was (M/M) but did not finish, and with KJ7F was nil. 70 cm activity seemed low. We are working on a project to "zerorize" our LNA-to-antenna cable loss - it is now 0.25 dB.

VK4AFL: Trevor benton@acenet.net.au QG62oj reports – Excellent conditions on 432 this SW, but very little activity. However I did work on the Saturday DJ5NV, K9SLQ and JH4JLV. All had very good signals.

W2UHI: Frank found condx excellent during the July SW. He worked N2UO on random with a very good signal from initial #159. Frank also QSO'd K5JL on SSB, F6KHM on SSB, OE9ERC, K0YW, WA6PY, DL1YMK, W7SZ, F2TU on SSB, N2IQ, IK3COJ, DF5PV, OZ6OL, KU4F, W7BBM and K5JL.

WA6PY: Paul pch@us.ibm.com was active on 1296 during the SW – I QSO'd on July 11 DL8OBU (I could not find him in the two first sequences, but when I found him, I copied almost all) and KU4F, on July 13 K5JL, K0YW, W2UHI and OE9ERC, and on July 14 LX1DB, OZ6OL, DL1YMK, IK2MMB and W7SZ. I am planning to be QRV in Aug prior to leaving for the EME Conference in Prague.

K2UYH: I had a good month. It started on our Independence Day, July 4th with an e-mail arranged QSO at 1000 with DL8OBU (549/559) for initial #203. Jurgen had a good signal for 100 W and a 10' dish. On 9 July I completed my 1st JT44 QSO at 1300 with OH3MCK (O/O) on 1296. Petri is running about 40 W and 2 yagis. We still seem to have a frequency discrepancy of about 800 Hz that we can't explain. But I found it is quite easy to tune using JT44. It is much the same as rotating polarization. During the SW my operating time was limited because of summertime family activities – afternoon moon widows are not the best during the summer. Nevertheless, I was QRV and worked on 23 cm on 13 July at 1827 F2TU (55/54) on SSB – Philippe was giving an EME demo, 1835 F6KHM (56/56) on SSB and 1900 OH1FF/p (O/O) #204 on JT44. OH1FF/p was a portable (OH Field Day) station using a 1.8 m dish and 50 W. Their JT44 signal was audible and we might have QSO'd via conventional CW, but JT44 definitely helped. On 14 July, on 432, I connected at 2000 with KO7N (549/559) for initial #653. I am interested in trying JT44 skeds with other marginal EME stations on both 432 and 1296.



OH3MCK's antenna – 2 yagis on 1296

TECHNICAL I: With successful moonbounce on 24 GHz, interest is now moving to 47 GHz. VE4MA sends the following notes on his 47 GHz sun noise results in which he tries to compare the performance of different antenna types. I have been busy performing 47 GHz Sun Noise Tests in recent weeks and comparing notes with Al W5LUA, Gary AD6FP and Will W0EOM. There is a real shortage of large antennas rated for this frequency. The measurements were taken using 1, 2, 3, 4, 6, 8 and 10 ft dishes and all receivers are believed to have a NF of about 4.5 dB. Cold sky to ground measurements are about 1.3 dB using the feedhorns alone. Here are the Sun Noise results: W5LUA 15" prime focus 39 GHz Dish = 1.4 dB, VE4MA 30" offset metal dish = 2.4 dB, W5LUA 24" prime focus 39 GHz dish = 2.5 dB, VE4MA 4' offset plastic dish = 3.6 dB, W0EOM 2'dish = 4.1 dB, VE4MA 6' offset Fiberglass dish = 5.0 dB, AD6FP 3' Precision (95 GHz) dish = 5.2 dB, W5LUA 10' (24 GHZ EME dish) 5.7 dB (0.4 dB moon noise), VE4MA same 4' offset plastic dish with Aluminum foil on surface = 6.4 dB, and VE4MA 8' (24 GHz EME dish) = 6.9 dB. The remarkable thing is the 3.3 dB gain improvement in the 4 ft offset dish performance with the addition of aluminum foil. The plastic/fiberglass offset dishes seem to be reasonably accurate, but the reflecting material imbedded in the surface is not very effective at this frequency (designed for 14 GHz). The 30" metal offset dish does not seem to be efficient, nor are the 39 GHz dishes. The 4' dish I was using was part of a General Instrument 12 GHz receiving system and has 8 large 5/16 bolt heads sitting on the surface. After I replaced the hex headed bolts with round headed 5/16" bolts, took a few bubbles out of the surface mounted aluminum foil, I measured sun noise at 7.1 dB or an increase of 0.7 dB. The foil was attached with wallpaper cement (temporary) and subsequently painted with white latex paint to reduce the heating of the feedhorn! A good 4 ft dish is expected to be the minimum required for 47 GHz EME. It appears that it is now possible to get one. It looks like I should do a similar foil job to the 6' (borrowed) and my 8' 24 GHz dish. I will have to look for some really good weatherproof adhesive.

TECHNICAL II: As you operate EME higher in frequency, understanding Doppler becomes increasingly import. Also for JT44, where the receive window is +/- 600 Hz, understanding Doppler is essential for operation at 432 and above. W2UHI has written a Doppler Primer for new comers to EME. Unfortunately there is not universal agreement on how to set your transmit (TX) frequency for skeds. The long held rule was that you always TX on the skeds frequency, irrespective of the Doppler shift. As EME activity has moved from primarily scheduled operation to more and more random activity, some stations have set their TX frequency so that their echoes fall on the sked frequency. If you hear a station calling CQ and set your TX frequency so that your echoes are on the same frequency, the station calling CQ will hear your reply on the same frequency as he hears his own echoes. This is the procedure almost all stations attempt to follow during random operation. In the case of a sked, if both stations follow this procedure, then each station will hear the other on the same

frequency as they hear their echoes. This is the procedure recommended by W2UHI in the following notes. New comers should be aware that not all stations follow this procedure for skeds. At present JT44 skeds follow the older rule. If possible, you should check to make sure the station you are skedding is following the same procedure as you are following.

W2UHI's Notes on Setting Frequency on 1296 for Doppler Shift: 1. When the Moon is approaching, the reported Doppler shift by your computer will be +xx, and -xx when it is receding at your location. 2. You must adjust your transmit frequency accordingly, eg., if the reported Doppler is +2 kHz you set your transmit frequency –2 kHz (relative to your dial setting). Doppler will shift your frequency +2 kHz, so your echo will be on your dial setting. 3. You can use split operation to do this. Most rigs have two VFO's. Use the A VFO for receive and the B VFO for transmit. Remember when you start the procedure to select the button A=B, so both VFOs will be on the same frequency initially. Remember too, that when you move to a new dial setting you will have to hit A=B again as the B VFO does not track. This is a useful feature. Lets say you call a CQ and a station calls you off your dial setting, don't reset your transmit frequency. He is listening where he heard you. In this case you and he will not be on the same frequency, but you are all set to continue the contact. Now if you are answering a CQ you will have to use the A=B button, and reprogram the Doppler shift into the B VFO. This will put your signal zero beat with his. 4. The above procedures require that you are familiar with your transceiver operating features. I am using a TS-870. I use the XIT feature on VFO B. This lets me program the Doppler shift into VFO B. Now when I tune around and find a CQ, I can hit A=B to realign the VFOs, but the B VFO remembers the Doppler offset so I don't have to reprogram the offset when I QSY.

NET NOTES BY G4RGK: **NU7Z** now has a 1 kW amp on 222 MHz. He also has 8 yagis up and ready to go on 903 MHz. Rick needs update information for microwave bands stations directory. **K5PJR** is working to optimising his EME system [believed for 23 cm] He presently has no transmit, but has copied many stations. He will be QRV in about a month. **W4SC** is making progress on his18' dish project for 1296. **NA4N** is working on the HV power supply for his PA and will be on 23 cm soon. **K5UGM** has found a 12' mesh dish he plans to use on 23 cm EME. **N4PU** reports that his dish is currently down. He hopes to have it back up with some modifications very soon. **LX1DB** was QRV 23 cm during the July SW. **W4SC** says it has been too hot (105 degs) to make much progress on his 12' dish. He hopes to have it on a polar mount very soon. **WA4NJP** asks about the SETI beacon: Is it operational and what is the status? [Yes, it is fully operational and always seems to be activated when the moon is above its horizon. It is not very strong, but I can detect its echoes using Spectrium. It is an excellent indicator of system receive performance. It is also a good frequency check. The SETI League reports that they are maintaining its frequency accuracy with in a few Hz. They are also sending out attractive QSL cards for reports of its reception.] Ray reports that he was on 70 cm for a couple of weekends with JT44. **WA9FWD** is trying to get his new 23 cm PA working properly. **K9BCT** has been working on his 23 cm feedhorn. He found a mechanical problem and 2 wasp's nests. He now has 17 dB of sun noise. **DK3WG** will be in Prague for the conference on Friday to Sunday. He will ill be on for the next SW.

FORSALE: **W7CNK,** Lucky w7cnk@worldnet.att.net is not giving up, just changing direction and has the following for sale: Lunar-Link System LA-70, 1500 W rack mount 70 cm PA with PS-70 power supply and spare 3CX800A7, all in excellent condition for $US1950; Yaesu FT-847 with CW filter in excellent condition for $US975; complete 4 x K1FO 33 element 70 cm EME array with stacking frame, 1/2" LDF phase lines, elevation drive and power divider for $US400; 5 m dish of 24 peddle, all Aluminum with mount, disassembled and ready to for pick up at $US400. Kenwood TS-711A, 2 meter all mode 25 W transceiver in good condition for $US325; and Kenwood TS-811A, 70 cm all mode 25 W transceiver in good condition for $325. Tel is (405) 691-2265. **NU7Z** has a power supply for a 2135 TWT, 2 TWTs, preamp, waveguide switch and feed horn for 10 GHz for sale. Contact Rick at nu7z@aol.com or phone 425-775-9196 for more details. **WA9FWD** has extra 6"x6"x2' lengths of the square Aluminium tube needed for the K9BCT diagonal feed horn project available. Get in touch with John for details.

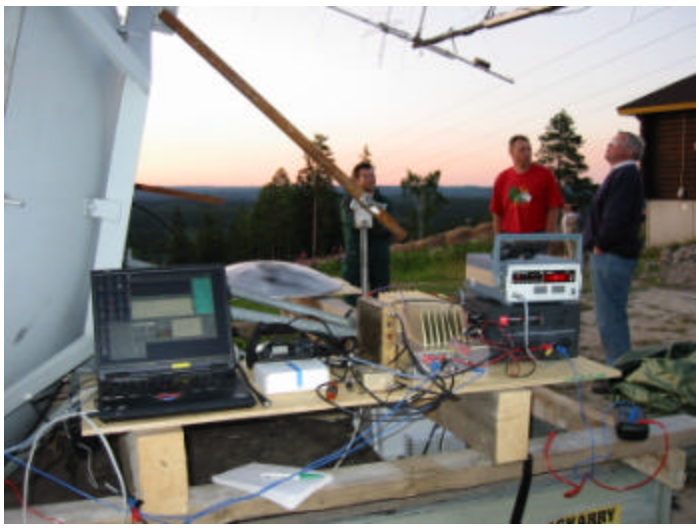
FINAL: The turn around this month between SWs is only 3 weeks. The next official SW is 3/4 Aug. Thus this NL is running a week behind schedule. However, the choice of moon weekends this month is a real toss up. The weekend of 10/11 Aug could equally have been selected. Both weekends have good and bad points and there will be activity on both. There are no skeds either. I know that K1RQG is having time problems and is looking for someone to help with skeds coordination. **Are there any volunteers for this job?**

The latest updated e-mail list for the 432+ EME Group is available from Warren Butler, W2WD at wbutler@comcast.net .

Interest in digital modes and particularly JT44 is growing on 70 cm and above EME. As discussed by N9AB earlier in this NL, there is a need for standards. This has also been recognized by the Prague Conference Organizers. At past EME Conferences, EME procedures and rules have been reviewed and voted upon. The Prague group is working on documenting the rules and will include a section on digital modes. They has broken the overall documentation task into parts and assigned different members different parts. Dan, OK1DIG dan@dig.skylink.cz has been assigned the section on digital modes, and is asking for you assistance. It is important that you get you thoughts to him before the conference date.

Regarding JT44, I propose that at least for the present we designate 432.024 and 1296.024 (etc. for higher EME bands) as the JT44 CQ calling frequency. This frequency should be used only for calling JT44 CQs. JT44 skeds should not be run on this frequency. The station calling CQ should always transmit in the 1st period on the calling frequency (no Doppler correction), but listen where he would expect to hear his echoes. The responding station should reply such that his echoes fall on the same frequency as the station he has heard. (This is the same procedure as presently used for CW). For skeds this procedure will not work. As the sked stations must receive their partner's echoes in order to know when to transmit. For skeds, the best procedure is to always transmit on the skeds frequency and listen at the mutual Doppler offset frequency, which must be calculated using the locations of both stations. If JT44 active grows, it may be appropriate to designate specific frequencies for JT44 skeds.

I expect to be active during the skeds and post skeds weekends and then be off to Eur for the Prague Conference. I will be in Ulm, Germany on the 15th and arrive in Prague on Friday the 16th. I hope to see most of you there. Please keep the reports and technical info coming. I know there will be a lot to discuss in Prague. 73, Al – K2UYH



Operating position at OH1FF/p