TCDXA
TWIN CITY DX ASSOCIATION
Minnesota

Newsletter of the
Twin City DX Association
www.tcdxa.org

Volume 16, Issue 4
December, 2019

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DXpedition and Remote Control Issue

The VP6R DXpedition

From a Rookie's Point of View

By Mike Cizek, WØVTT

Most DXers probably dream about going on a DXpedition some day. I know I did, but never thought I'd get the chance to actually do it. For me, the next best thing was going to Dayton and the DX conventions where I could rub elbows with the "Big Boys" who go to all of these strange far away places. I enjoyed getting to know a number of the guys who went to top ten countries, and really enjoyed the rare occasion when one would call me by name in a big pile up. After chasing DX for 30 years, I was content with my place in the DX game and had stopped thinking about ever operating from someplace rare or exotic.

The VP6R Expedition Team

Receiving an email from Ralph Fedor KØIR in September of 2018 inviting me to the VP6R team was quite a shock. Ralph explained that he wanted to do a trip to someplace fun with a team that combined some seasoned DXpeditioners with some new folks like me. I emailed back immediately expressing my thanks, but also expressing my doubt that the plan would be approved by the family comptroller. The shock

from receiving Ralph's email was nothing compared to my wife giving her blessing to the trip: "I think you should go." After a few emails and phone calls, I was added to the team. Learning who the other team members were impressed me to no end. These were the guys I had worked from all over the world; the guys I looked up to and respected. Now I was going to go out to play radio with them. The experienced team members were mainly from the previous year's 3YØZ operation and they wanted to go some place a little nicer than Bouvet. Almost every email Ralph sent out ended with "...let's have some fun", and that became the motto of our DXpedition. Our team email reflector was named "No-Ice Island". The wheels were turning.

We were soon trading planning messages on our team email reflector. I always knew there was a lot of preparation required, but for the first time was getting an inside look at the details. I had little or no experience in most of the requisite subject areas, but found one place where I felt able to contribute: fund raising. I know how to type and send emails so with a little direction from Ralph, I took on this task. If you are reading this in your DX club newsletter, your club was one of our contributors. Thank you!

Other team members contributed in their areas of expertise. KØIR kept contact with the folks on Pitcairn, Nigel Jolly of the RV Braveheart, the licensing authorities in New Zealand, and kept tabs on the rest of us. Craig K9CT took care of assembling, testing, and networking the radios, computers, and amplifiers. He was also our treasurer and QSL manager. George N4GRN runs a construction company and knows about international shipping and customs. He handled this area and calculated that we would need to have all of our gear ready and packed in a sea container by 1 June. We all had plenty to do, and it was still over a year before we would leave. I kept typing emails and sending them to every DX club I could find.

Most of our equipment was from the 3YØZ operation. It was still packed in the sea container from Bouvet and was sitting in K9CT's company parking lot in Peoria, Ill. Some of the team gathered there in December 2018 to do a quick inventory and a few of us went in March 2019 to assemble and test the EME antennas. The weekend before Dayton most of the US team members assembled in Peoria to load the container. Our task was to unload

Container Loading

the 40' container from the Bouvet trip, do a complete inventory and assessment of everything, decide what we needed to take to Pitcairn, and pack it properly in a 20' container. We also needed a comprehensive itemized listing of what equipment was in each box in the container. Two days later we were finished. George almost wore out his laptop typing in every item as we packed and loaded it. The container was sealed and would be picked up in a few days to begin its journey. More than a few cold 807s were hoisted in celebration that evening. I was getting my first taste of DXpedition team fellowship. This is going to be a fun trip.

All of our equipment was on its way, but we still had plenty to do in preparation. Ralph was still finalizing details of our stay on the island and trying to get permission to operate 60 meters; a first from VP6. He found amazing accommodations for us; one of the islanders agreed to house and feed us for a very reasonable fee. Check out Pitcairn on Google maps, look for Andy's Pizzeria, and you can see where we stayed. Look at the terrain view and you can see our take off angle to NA, EU (both NE) and JA (NNW). It was an amazing site. We also received permission to operate from the old commercial radio station ZBP, just a short walk from Andy's house. We would be operating from what were probably the best two locations on the island. Glenn W0GJ was coordinating our travel and lodgings en route. We were getting close to departure.

There were a few changes to the team during the year from initial planning to departure due to work, family, or medical issues. Real life has a nasty habit of interfering with our ham radio plans. The real shock came just a few days before our departure when our team leader KØIR told us he had a medical issue and would not be able to go with us. Ralph immediately named Glenn W0GJ our new team leader. Glenn picked up the reins, kept us moving ahead, and we hardly missed a beat. Our final team was now EA3HSO, EY8MM, JR4OZR, KØPC, K9CT, K9NW, N4GRN, N6HC, SM5AQD, WØGJ, WØVTT, W6IZT, and W8HC. It was time to go.

Did I mention that this was my first DXpedition? I'm not a seasoned traveler, and was more than a little nervous about the trip. Fortunately, I had company every step of the way. On Saturday afternoon 12 October, WØGJ and I met in Rochester MN to take the shuttle bus to the Minneapolis airport. There we met KØPC and K9CT; the four of us Midwest boys were all on the same flight to Los Angeles. In LA, we met most of the rest of the team and were all on the same flight to Tahiti. We landed early Sunday morning and walked across the street to the Tahiti Airport Motel where we met the remaining two team members. JR4OZR and SM5AQD were waiting for us in the motel lobby. Since there is only one

Tahiti Airport Motel

flight a week from Tahiti to the Gambier Islands where we meet the Braveheart, we allowed an extra day, just in case there were any delays. We now had an extra day to play tourist in Tahiti and everyone headed in to town for the day.

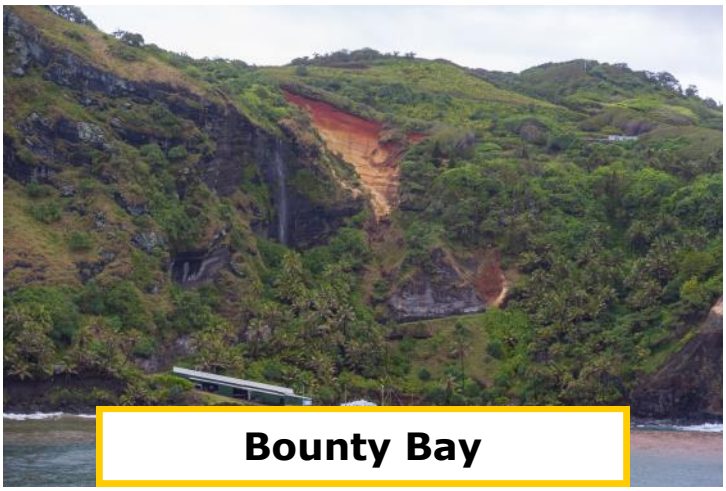
Glenn called a team meeting for Monday morning at the motel so we could discuss our arrival and set up plans. He stressed the need to get set up quickly since we were arriving on Thursday morning and there was a large rain storm forecast for the weekend. Tuesday morning we left Tahiti on the four hour flight to Totegegie in the Gambier Islands. After landing at the VERY small airport (one gate, one plane), we took a short ferry boat ride to Mangareva Island where we boarded the Braveheart.

RV Braveheart

The legendary RV Braveheart! This ship had been there and done that, all over the southern hemisphere. I had seen the pictures and read & heard the stories, and now I was finally getting a chance to board her. Matthew Jolly, the captain, welcomed us aboard. He knew many of the team members from their earlier voyages with him; the greetings were warm and heartfelt. Matt introduced us to the crew, and to his wife Rachel and their son Finn, who were along for the ride. Three year-old Finn wasn't quite sure about these crazy ham operators at first, but he finally decided we were OK. I asked him if he was going to be the next captain of the Braveheart, and he very confidently said no, he was going to be four. After a quick safety briefing, plates of sandwiches from the galley appeared and we had a nice mid-afternoon snack. A short time later, we cast off and were underway. I spent a while exploring the ship, then settled down on one of the upper decks to enjoy the view and the fresh sea air.

Underway

We arrived off of Pitcairn Island early Thursday morning and sat offshore waiting for the islanders to come out in one of their longboats to bring us to shore. We were all pretty excited now and eager to get ashore and get started. We were very fortunate that because of the Braveheart's schedule with other charters, our equipment had been placed on to the island a month earlier. ALL of our radio gear was there waiting for us. After a short welcome at the dock on Bounty Bay, some of the islanders loaded us on to their ATVs and we headed up the "Hill of Difficulty" to Andy's house.



Bounty Bay

Once we all arrived at Andy's house, station setup started directly. We had our plan, formulated in our Monday morning meeting, and everyone got right to work. Once again, I was impressed at how quickly things happened.

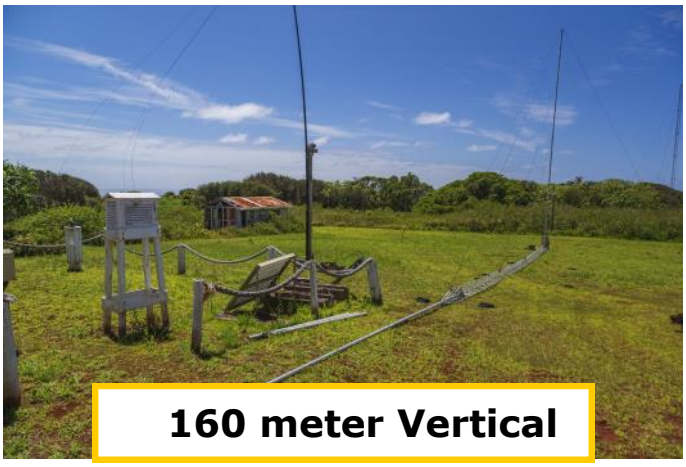
Longboat

Everybody seemed to know what they were doing and by supper time, we had set up five Yagis for 10-20m, two verticals for 30 and 40m, and four complete, networked stations. K9CT made our first QSO on 30m CW with N7XM at 0200z (6pm local time). VP6R was on the air.

The next day we set up our low band antennas at ZBP, the old commercial radio station site. Our main project was erecting a 90' (27m) tall vertical for 160 meters; 70' of aluminum tower with 20' of mast tubing and top loading wires. This required the entire team working together. The antenna is mounted on a hinged base and we used a 40' falling derrick to raise it. The biggest folks handled the pull up ropes and pushed up the tower; the rest of us held the guy ropes to guide it up straight; W0GJ directed everyone, telling us when to pull or when to let up. The antenna went up in just a few minutes.

On the Air

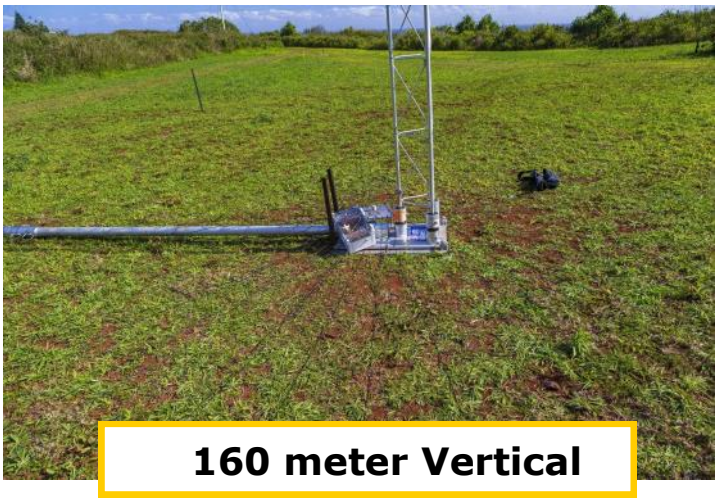
We also installed verticals for 30, 40 & 80 meters and a second 20m Yagi. That first night on 160 meters Nodir EY8MM made over 700 contacts. He came back to Andy's house shortly after sunrise with a big smile on his face, and promptly went to sleep.



160 meter Vertical

A number of people had told me "you won't believe the pileups" on the DXpedition. I've been a DXer for 30 years and have

been in plenty of big pileups, but never from the DX side. I had been practicing from home mostly by listening in the big pileups on other DX stations and picking out callsigns, and thought I was ready. I wasn't! I like to think I'm a pretty good CW operator, but the pileups on the first few days were just too much for me. I retreated to FT8 and let the more experienced ops handle CW. After a few days, things slowed down a bit and I was able to do better. I now have an even greater respect for the ops who have the ability to pick out callsigns quickly and consistently in these huge pileups.



160 meter Vertical

Once I got going, operating from the DX side was a real blast. It was nice to get a good rhythm of steady QSOs going and especially rewarding to work friends from around the world and call them by name in the pileups. It was fascinating to experience propagation from another part of the world. Naturally, we had propagation predictions and most of the team had operated from the south Pacific before, but there were still plenty of surprises. 30 meters was open all over the world most of the night. We would often work all continents within a five minute period. We had a regular path on 10 and 12 meters to CT, CN, D4, EA, and EA8 for a few hours almost every day. Sometimes these signals were surprisingly loud.

The most interesting opening I experienced was on 12 meters one morning. I was calling CQ on what appeared to be an empty band. Around 1730z (0930 local) I heard a very weak and watery SM2 station. I worked him and was called by a second SM2. The opening spread into OH and southern SM, but not into LA or UA. A little later some North Americans appeared, then some stations from southern EU, then more and more USA until at 1800z the Europeans had disappeared completely. This one wasn't on our propagation prediction charts!

Remember the storm that was forecast for the weekend? It rained sideways for four whole days with wind gusts up to 50 mph. We were pleasantly surprised that our 160m vertical survived, but we lost both 20m beams and an element off of the 15m beam. Fortunately, only a few pieces of tubing were bent and we had spares. Once the storm had passed we had everything repaired and back in the air in short order. Once again, it was amazing how quickly and efficiently the team worked together.

VP6R was a multi-multi entrant in the CQWW SSB contest. We shut down our N1MM DXpedition mode logs a few hours before the contest and were ready to start in contest mode right at 0000z. Since I'm mainly a CW DXer, I asked to do 10 meters during the contest. I thought it would be interesting just to see what propagation we would have over the course of the contest. The contest started at 1600 local time and 10m was pretty slow at first. After only

three QSOs in the first hour, the band finally opened up with a nice JA run that lasted almost two hours. I was up bright and early Saturday morning calling CQ, but the band didn't open until 1600z (0800 local). We had a strong opening into Zone 33 and I got a good start on my "Worked All EA8" award. I had no idea there were so many stations in the Canary Islands! After a handful of Zone 33, it was all North & South America, all day long, until around 0000z when the opening shifted to JA. It was almost like someone throwing a switch; propagation changed that quickly. By the end of the contest, we had 1050 QSOs on ten meters. I never had so much fun operating sideband before! The final numbers haven't been published yet, but I'm pretty sure we took first place for multi-multi in VP6.

All too soon it was time to put our toys away and go home. We took down the low band site on Thursday 31 Oct. Our last QSO was with Jerry WB9Z, our chief pilot station, on 17m SSB at 1800z on Friday 1 Nov, after which we took down the antennas at Andy's house. Everything was packed up and ready to go by lunch time that day. Once again, we had allowed extra time, just in case, but everything went very quickly. We now had some time to play tourist and do a few good deeds for some of the local hams.

Meralda, VP6MW

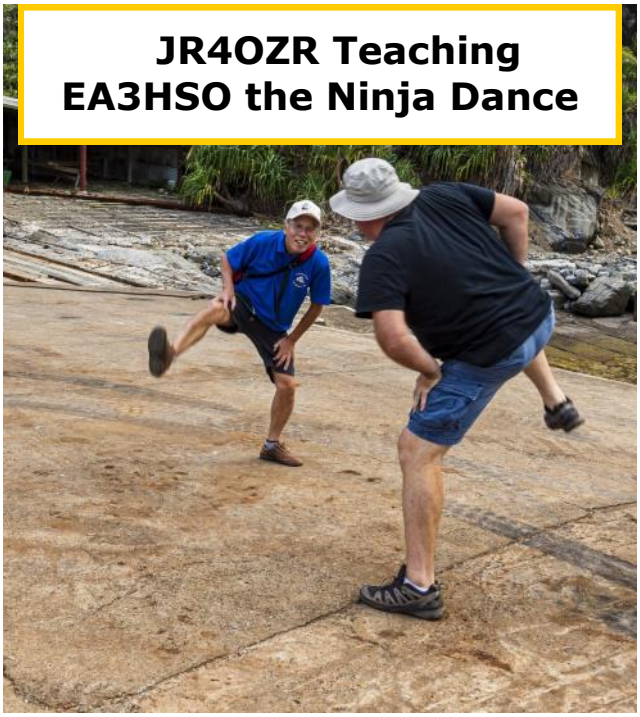
We helped Meralda VP6MW and Mike VP6AZ get back on the air by providing antenna parts, supplies, and some technical assistance. Meralda was already active before we left the island, and let's hope that Mike is on soon. I was especially happy to help Meralda because she was my very first Pitcairn Island QSO back in 1989.

This trip would not have been possible without a lot of help from a lot of people. First and foremost, thanks to ACOM, DX Engineering, and Flex Radio. These three companies were VERY generous with their support. We also had other corporate sponsors, 38 different DX clubs and, hundreds of individual DXers who helped us out. Thanks to all of you on behalf of the entire VP6R team.

No DXpedition report would be complete without some numbers. We made over 82,000 QSOs on all bands 160 through 6 meters. We were pleased to have 21% of our QSOs come from Europe, a very difficult path from the South Pacific. We were also happy to make nearly 900 QSOs on 60 meters and 36 EME QSOs on 6 meters; both were firsts from Pitcairn. For a complete analysis of our operation please see the statistics page on our Clublog DXpedition Chart.

The trip back home was remarkably similar to the trip out to Pitcairn, but with greatly different feelings. Going out was filled with anticipation, excitement, and more than a little trepidation; I really didn't know what to expect. Going home was mostly gratitude for having such a wonderful experience. There was also a bit of regret at having to leave such a beautiful place, but it was mixed with the desire to return home and resume my "normal" life. This was truly a once in a lifetime experience for me. It was wonderful to visit a strange far away corner of the world, to meet new people, and to finally experience the radio conditions on the "other" side of the pileups.

JR4OZR Teaching EA3HSO the Ninja Dance



The travel and radio experiences were wonderful, but for me the most rewarding aspect of the trip was experiencing the wonderful fellowship among our team members. Being a part of this team was an honor and a pleasure I will remember for the rest of my days. From the very beginning of planning, KØIR kept saying "let's have some fun", and that's exactly what we did. We hope you had fun, too.

Dollars for DX Report

Mike Cizek WØVTT
DX Grant Manager

We had four requests for DXpedition funding this quarter but only funded one of them. Funding for E44C Palestine (#129) and HU1DL El Salvador (#154) were not even considered. We gave a $250 donation to a multi-national team led by DL6JGN going to Swain's Island to operate as W8S.

We also had a request from Z32ZM for a one man one week trip to Kosovo to operate as Z68MA. I was surprised to find Kosovo listed as #70 on the Clublog global list and asked for more information on the operation. After learning that many of our club members travel farther to attend TCDXA meetings than he would be travelling to his hotel in Kosovo, your board of directors decided not to fund this operation.

73, Mike WØVTT

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The Daily DX - is a text DX bulletin that can be sent via email to your home or office Monday through Friday, and includes DX news, IOTA news, QSN reports, QSL information, a DX Calendar, propagation forecast and much, much more. With a subscription to The Daily DX, you will also receive DX news flashes and other interesting DX tidbits. *Subscriptions are $49.00 for one year or $28.00 for 6 mos*.

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Should I Lease or Own My Station?

By Craig Anderson, W9CLA

There comes a point in every ham's life when the decision to downsize and move to a smaller residence that is more age-appropriate has to be made. In my case, that decision came earlier this year with some serious health issues and surgery that forced me to make the difficult decision to begin the process of selling our home and moving to a place that I can more easily maintain.

We live in a 5 bedroom, four bath home on 2.5 acres with a lot of lawn and a 200 ft. three-car wide driveway with RV pad. Over the years I have accumulated all the requisite toys to maintain this beast…twin cylinder ATV with a Meyers 5 ft. snow blade, Toro 52" twin cylinder 23 hp Zero Turn mower, big Sears snowblower and a myriad of other gasoline-powered toys like chain saws, power washers, cultivators, etc. that would fill a three-car garage.

I guess the point I am trying to make is I want to simplify my life at this age but don't want to give up my hobby of 60 years. I know that we will end up buying a townhome in the area which will have deed restrictions preventing me from having any antennas except a stealth flag pole vertical. I have done enough remote operation using both RemoteRig boxes and Icom's remote software that I feel comfortable using a remote station as an alternative to having a station in my house. The problem is I would have to find a small lot somewhere that I could purchase and erect a tower and building for the radio equipment.

Cost Comparisons - Lease vs Own (Remote Station)

I did some scenarios on cost and if I could find a small lot in the country I would need electric brought in along with the internet and I would need to erect a small 12x16 secure building with heat and cooling. My calculations for this kind of project had me in the $15K -20K ballpark and that was a non-starter. So I began to research the alternatives and about three years ago came across HamRadioRemote.com. At the time this was a startup venture offering remote access to a handful of sites primarily in the NE. I signed up for a trial membership to give it a try and was impressed at what they had done. Fast forward to 2019 and now there are twenty-one remote sites many of which are running solid-state 1500 watt amps. An excellent overview of their offerings is on YouTube. The current client hardware is an Elecraft K3/0, a relatively inexpensive control head that accesses the K3's that are located at the remote sites. That hardware is now being replaced by Flex 6300's at the remote sites and a Flex Maestro control head at the user's location. I am one of the beta testers for the Flex Maestro and I must say it gives you the same tactile feeling of having a full-blown radio.

Why I Chose to Lease ?

My decision to go this route and sell all of my radio equipment except for a Drake C-Line and Icom IC-7100 was a simple financial decision. I had recently upgraded my station two

years ago and purchased an Icom 7610 and SPE 2K-FA solid-state linear, a new US tower crank-up, TH11DX, and M2 2800 rotator. The cost was about $19,000 and that doesn't count all of the other associated equipment found in most shacks these days. So, I figured I had an easy $12,000-$15,000 worth of equipment at current market prices that I could bank for use with RemoteHams.

Their fees are based upon a two-tier system. Entry-level is $99/year and a fee schedule based on a per-minute basis for use of the station. That fee goes up based upon the level of sophistication of the station being accessed. Some stations have rotating Big Bertha Poles with multi-stacked yagis and either SPE 1.3K or KPA1500 linear and cost is $0.99/minute to only $0.09/minute for some if you only listen and don't enable transmit. And the rest range between about $0.29 - $0.79/minute. What you get is a station that typically is either overlooking the ocean, in the mountains or other quiet areas. From 7/7/7/7 yagis to 160 four squares and everything in between. The stations are scattered across the country from Maine to Georgia to California to Colorado, Haiti to Oregon and more coming on board every year.

Is this for everyone? Certainly not but if you are antenna restricted it's an alternative that should be considered. For me, it will be my only access to ham radio and I will have a bank account that should last for quite a while. I estimate I will spend about $2,500/year. Since getting Honor Roll this summer my interest has diminished but I still want to chase the rare ones for band slots so my activity will be rather minimal and I will only be paying for what I use instead of investing a lot of money in equipment that just sits there gathering dust.

I hear stations on their system that I can't hear at all from my station running a TH11DX at 1134ft MSL. I was able to easily work Europe on 6M on a multi-stack of 6M antennas and 1500 watts from Fundy Bay in Maine, an impossible feat from my location in the Midwest. You can switch locations in a heartbeat to see which location gives you the best signal path.

The question I get asked most often is, "How busy are these stations?" I have never seen more than half the stations being used at one time and that is during a contest. I got on last night and only three of the stations were being used so access has not been a problem. You can reserve slots ahead of time to use in contests. Since I don't run contests this is not an issue for me. It's worth consideration if you are apartment-bound, deed-restricted, or travel. The Maestro provides an excellent user experience and provided me the flexibility and portability that I have been looking for.

73, Craig , W9CLA

DECEMBER QSO MEMORIES FROM THE PAST

WAØMHJ

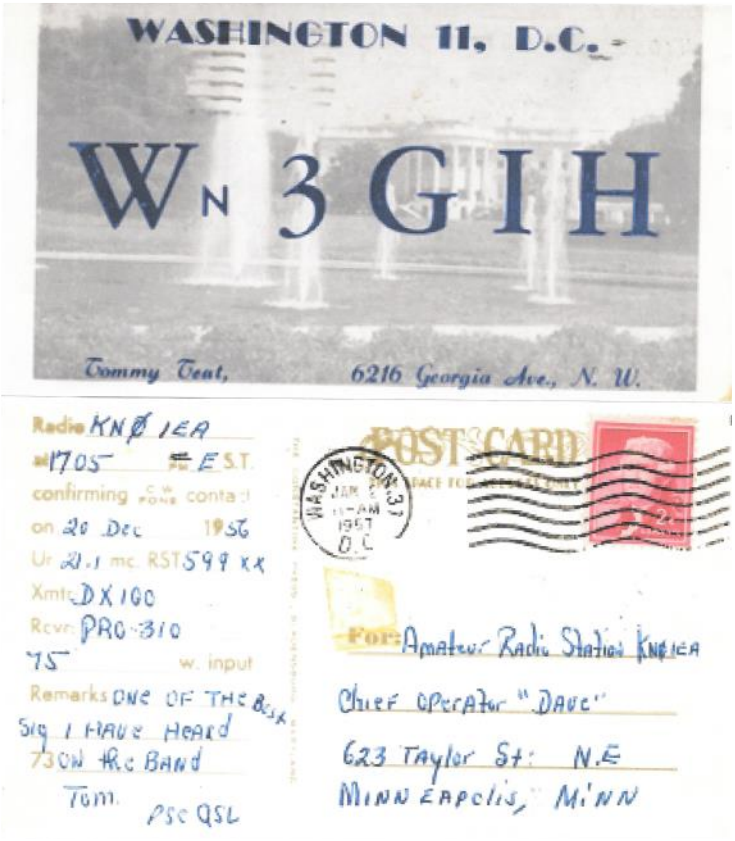
Fifty years ago this month, December 20,1969, I had a QSO with ZM1AAT/K on Kermadec Island on 15m CW for my country # 40 in the quest for DXCC. It was "Nice to bank that one" so early on in my DXCC endeavors! Little did I know, it would not get any easier.

WØGJ

1966, 53 years ago, my General Class license arrived the day after I had worked all 50 states as a Novice. On December 24, 2004, I worked VU4RBI in the Andaman Islands for my last country to make Top of the Honor Roll. A few hours later was the massive Andaman 9.3 earthquake / tsunami that killed an estimated 260,000 people. VU4RBI stopped being a DX station and became an emergency communications center for the Andamans. I have had two opportunities to operate from the Andamans since then, as DX.

KØIEA

I remember December because it was the month of my first ham radio contact. I took the novice test in October 1956, but didn't receive my license until December. That was typical in those days of snail mail and no computers. My first QSO was on 20 December 1956. My rig was a DX-35, NC-173 and a 15 meter folded dipole. I'd have to say, radio was more magic then, than it is now. We were truly amazed by what we accomplished with crystal controlled low power and simple antennas.



WØXG

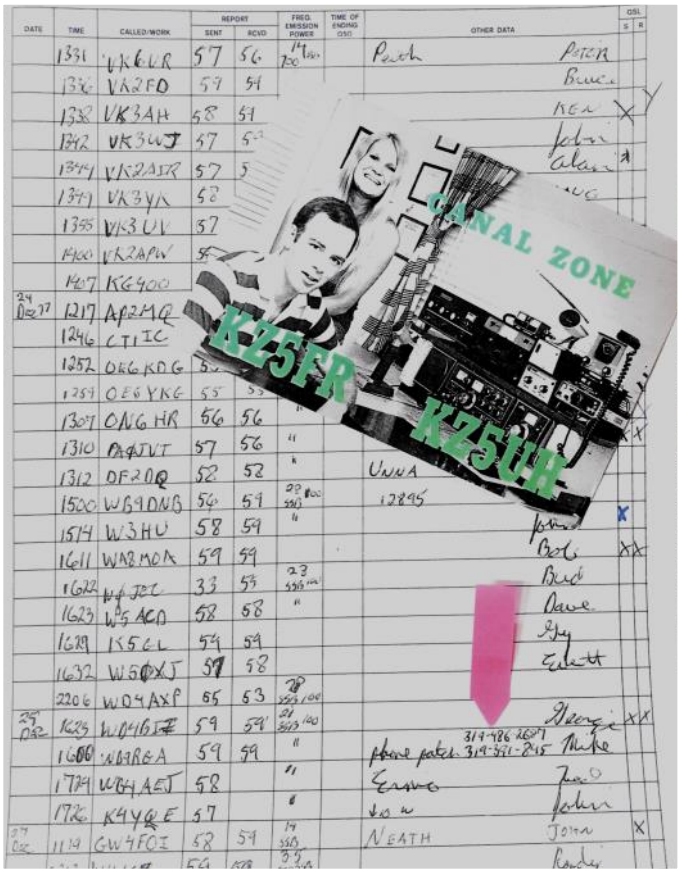
I thought I would relay something which happened only yesterday, Dec 1, 2019. I was browsing through old logs to see if I had anything of interest for the newsletter and came upon an entry for a QSO I had on 6m in 1981 with EL2FY (Saito, JA1XAF). Back in those days I was more interested in making QSOs than obtaining QSLs so I had never sent a card and LoTW did not exist at that time. On a whim I decided to chase down what information I could find on EL2FY. The search led me to the web page of Hiyo, JR2HCB. The page showed a QSL card for a 6m contact which Hiyo had with Saito about a year before mine.

I e-mailed JR2HCB explaining that I was trying to see if there was any way to get a confirmation a mere 38 years after the QSO! Hiyo replied immediately with the following email which I found very moving. " JA1XAF which played an active part as EL2FY and Mr Eiichi Saito passed away on May 11, 1995 from Liberia. I'll thank Mr. Saito who gave a dream to many 6m men as well as wish for rest in peace. He is silent key. Please QSL ask JA1RJU"

I have emailed JA1RJU explaining the story. No reply yet. It will be a minor miracle if he can come up with anything but I found it very poignant that Hiyo was still in "contact" with SK JA1XAF.

KØJUH

In 1987 I renewed my acquaintance with Jim Smith VK9NS(SK), when I asked him if he'd listen for KØJUH on 80 and 160. I needed Norfolk Island on both bands for ATNO's. Several of us from the TCDXA got through on both bands thanks to Jim accommodating my request. Both of us were in Germany at the same time back in the mid 50's. Jim, G3HSR/DL2TH was stationed in the British zone, and KØJUH/DL4WN was at Herzo Base in the US zone. We didn't meet in person until many years later in the crowded flea market at Dayton. I happened to look up, and here comes VK9NS. Chances of this happening are one in a million. After a long and at times an emotional chat, we said our farewells.



KØQC

A QSO from Dec 2, 1979 with a cousin of my mothers. His call was W7TLA (SK). QSO was on 10m SSB 28.750 khz. In those days, if I wanted to get him on the air to rag chew, we had it set up that I would call his house, person to person on the telephone and ask for my mother. Of course she was not there, but that was the clue to get on 28.750 Khz.

K4IU / KØUH

Christmas 1977, 42 years ago, in the Canal Zone. WB9RGA, (now NA9Q), provided a phone patch home to our families in Iowa on Christmas Day. This is one of the first of many years overseas that ham radio made us feel a little closer to home for the holidays! The sun also had sunspots that year. Fred - KZ5FR, Judy - KZ5UH

KØAD

When Mark issued his challenge, I thought back to the first year I was licensed as KN9DHN in Munster, IN in 1961. I dug out my paper logs from that year and discovered I was into my third log book by December. In those days, I logged everything – even unanswered CQs! I paged back to December and scanned the calls wondering if I would find anything I still recognize today. Sure enough, the call WN9AVT jumped out at me on December 9th of that year. It was a CW QSO on 7170. His name was Carl and he lived just a couple miles from me in Hammond, IN. Carl went on to become K9LA. As many of you probably know, Carl Luetzelschwab then went on to become one of our hobby's most knowledgeable propagation experts and preceded me as editor of the National Contest Journal. It was fun to find out that a guy who I am still in contact today was in my log the first year I was licensed nearly sixty years ago.

A Tower Story - My Experiences in the Age of Increasing Regulation and Escalating Tower Prices

By Mike Sell, KØCOM

There is no big David vs. Goliath story to be told. Getting the project done was just a series of actions once I had a clear goal in mind. I can't speak for all of you but I didn't start out to install a tower with a clear plan, I did however start with a lot of big dreams! Primary considerations were the usual How, What, Where, When, and Why.

Why? I knew why.... I had two towers before and I wanted one again. I have come to believe in the axiom of antennas before all else. Some of us work with what we have available in our surroundings - trees, the house, a couple of poles and even the attic. I did that for many years after moving and selling my towers and antennas each time. So my dream was to have another.

Where? If you are married and live with someone who has different criteria in where you live, then you know that finding the right location can be a challenge. I have had both good and poor locations. The current Bloomington house is not a good location for a tower. A better place was needed to make my dream come true. Along came retirement and a series of events that led my wife and me to acquire a lake home in northern Minnesota. The "where" fell into place with a 110 ft by 330 ft lot with good elevation. Being on a lake created some challenges with the "How"; and I'll get to that. February 2018 we planned to find a cabin to rent for a month that summer. We did not plan to buy a lake place. By March 30th we were property owners. I know, who does that - right? Things just fell into place. We decided that we're not getting any younger and time will fly by so why not create some memories. With the "Where" figured out, I share my tower dream with Diana and she says go for it. I jump to turning my dream into some kind of plan on What and How.

Denny bolts the Optibeam in place @ 80 feet

What? I start to think about how I'm going to afford to bring my dream into reality. I cobble together a simple budget, based on spending as little as possible. My rationale is that if I keep the costs low enough I'll be able to cash flow this and not dip deeper into our retirement savings. How did that turn out? In 2018 I research both new and used towers. As you all know the price of new has jumped up astronomically. I wanted to use a couple of beams I already had but also wanted a beam for both the 30 and 40 meter bands. A crank up tower has some merit. Prices ranged from $35,000 for a new one down to $12,000 for a used one. I decided to focus on a free standing tower. My first purchase was 70 ft of used 45G and some parts for $1000. A cost effective way to get the height and strength I was looking for. My plan crashed

Cass County Construction digs the hole, careful not to damage the fiber cable!

and burned when I discovered that the spousal permission came with certain caveats. No guy wires! It's now spring of 2019 and I decide a better plan, a realistic budget and funds in the bank will guide me this year.

After lots of research I set a $20,000 budget for the entire project, and a meeting with our financial advisor provides me the funding. I begin the search for the key elements I will need. A 70 ft free standing tower capable of 40 sq feet of wind load at 100 mph. AN Wireless makes just such a tower. Price for a new one... $7500 plus shipping. I email the DX club looking for a used one. That led to a guy offering a new never installed HD 70ft tower for sale in Texas. We agree on a price, $3200. Wow, I'll have money left over! Diana and I take a March vacation to San Antonio, Austin and Waco. On our way home we rent a box truck in Dallas and pick up the tower on the way out of Texas. So now I have a 2000 lb pile of steel and boxes of nuts and bolts in the pole barn.

Base is backfilled and landscaping rocks back in

Rebar cage completed

I'm down to two antenna choices for the 30/40 meter beam. It's between the JK and the Optibeam. Well I don't need to decide just yet as I won't go any further on spending any of my budget until I get the next part of HOW done... a permit to install the tower.

I decide that as I have lots of neighbors along the lake and many will see the tower from it, I best go with permission vs. asking for forgiveness. The property is located in Cass county 3 miles NE of Outing. The building permit will need to come from the county.

I check with the ARRL on volunteer legal

help and find Brian, NØBM willing to assist. I also receive some timely advice from other hams on how to proceed. The plan is to first find out what the county's position will be before I file for a permit. The second part of the plan is to make it casual and develop a relationship with the people I will be working with. Up in Walker I meet Jessica, the person who issues building permits. I go in with nothing more than a general outline of a tower on my lake property and ask Jessica what ordinances apply. The county has not had anyone request a permit to install a personal radio type tower for many years. The only ordinances they can go by are written for commercial telecommunications towers. They include a 100% setback from property lines and a 30 ft height limit within a quarter mile of any lakeshore. All good to know and Brian tells me not to panic... we move to the next step, pulling the PRB-1 card and educating the county. A carefully worded letter from Brian to the county attorney in Walker brings a very carefully worded response. This leads to my second visit to Walker and another friendly chat with Jessica.

Up goes the bottom 40 ft

Jessica recommends I change my plans and install a crank up tower so that I will meet the setback and lake zone requirements when it's down, then crank it up when I use it. Sounds reasonable, no? Well I make two key points with Jessica. First the only accommodation that I see in this plan is on my part, not on the part of the county. Second point is that the tower cost for the crank-up is $32,000 (I have a quote a friend recently received with me) vs. the $3200 for a free standing tower. She gets my point and will talk to her team. They respond that I will be required to gain a variance and a conditional use permit. The application fee will be $580. If I fail to gain these from the county land planning board, I get my money back. I make my 3rd visit to Walker and file my application. From there things move very quickly and I'm very pleased with the progress. Letters are sent to land owners within three miles and a site visit is scheduled. I am not present during the visit but Diana handles the eight county people and the one neighbor who show up. I do a follow up visit with the interested neighbor and start a friendly relationship with them. The hearing day arrives and I drive over to Bacus, Minn. to the land planning office for Cass county. The planning committee consisted of eight people, seven men and one woman. Jessica outlines my permit request and reads the two written responses the county got after sending the notification. Both are negative. My interested neighbor also attends the meeting and asks the board if in their experience towers affect property values. They all answer no they do not. I read a very short statement. They vote and I win both the variance and the conditional use 6 to 2.

When? - Crunch time and it's now early August in northern MN. After deciding on the

two element Optibeam 30/40, I place a large order with DX engineering as well as three or four other vendors for all the equipment, antennas and cable I will need. I call the excavation company and schedule the hole dig. I arrange for help building the rebar cage. I have a company in Brainerd cut and bend the rebar and they deliver it to site. I find a crane truck available out of Nisswa and a cement truck out of Crosby. I arrange for Denny KØTT to do the tower and antenna work. UPS, Fedex and freight companies start showing up with box after box. I build all the antennas, cut and terminate coax and control cables. As the tower will be located just to the side of the pole barn, I plan to build the tower over two days in two parts. The top 30 feet with the rotor, thrust bearing and mast installed. The bottom 40 feet next to the base along side the barn and all is ready to go up. A real tinker toy set for sure!

The hole is dug the third week of August and we build the rebar cage and upper form with a bit of a rain delay. A large tarp is used to cover the hole. The base is a pedestal type. 10 x 10 x 1.5 ft base with a 6 x 6 x 3.5 ft pedestal that includes the five foot base section of the tower in the center. The cement truck shows up with 11 sq yards and the pour begins. The base goes just fine and we begin to fill the upper form. We are within two yards of being done when a loud crack is heard. One corner of the upper form blows out. Luckily no one is hurt. We assess the damage and check the antenna base. It's still in the right place and square. We luck out and leave the cement to set up. We plan a fix to the form so we can finish the pour. A few days later the last two yards of concrete are poured and the base is done. An excavator comes and back fills the base hole. The tower build is completed. The install is set for the third week of September.

Install day arrives and, believe it or not, it's not raining and the winds are mild out of the south! Denny and the ground crew are on site and the crane shows up promptly at 9 am.

The tower is lifted into place in two pieces and bolted together. Denny installs climbing steps on the mast while the rest of us on the ground complete the element install on the 30/40 Optibeam. Denny climbs to the top of the mast 12 feet above the tower top. The crane lifts the 30/40 up to the top and onto the mast it goes. After that is done we let the crane truck go as it costs $120 an hour portal

The top 30 feet up next

to portal and won't be needed to complete the rest of the antenna install. A four element six meter beam and a Force 12 C3ss finish out a 10 hour day.

Denny stays for an extra half a day and we finish with the dipole lanyard and the dual band vhf/uhf stick for local repeaters.

The intrepid ground crew, must be quite a sight!

After all is said and done, how did this work out? Did I stay within budget? Yes for the most part. I'd hoped to end up with $$ left over so I could afford to upgrade the radio and amplifier in the bunkhouse radio room. That didn't happen because I spent it all on the tower and antennas. I spent more on the Optibeam than the JK. The excavator also resurfaced the driveway in crushed granite when he was done. Lastly the concrete blow out blew the budget there. Can one put up an effective system for $20,000? Yes, with careful planning you can. Could you do one for less? I suppose you could if you have fewer restraints than I had and you were a few years younger and could do most of the heavy work yourself. But don't let that stop you from reaching your dreams. None of us are getting any younger and the prices of everything will only keep going up. Make some memories now before it's too late.

I'd like to thank the following individuals for helping make my project happen:

KØTT - Denny for his excellent tower work. A real pro and fun to work with.

KØEOO - Dennis for building the wide band resonator matched dipole that covers the 75/80 meter band. Also for his excellent technical advice on all things ham radio and his super skills at holding a limp rope.

KØKCY - Tony for helping build the tower, ground crew work and great pictures/ video from his drone.

WØLS - for fabricating the perfect ground buss plate

Desmo Don - metal fabrication work on rotor/bearing plates and custom lanyard for dipoles.

KØYR - Tom for the lead on the AN Wireless tower

NØBM - Brian Mc Inerny, ARRL Volunteer Legal Counsel - now retired

73, Mike Sell, KØCOM

Ready to rock and roll, job complete

Choosing the Most Suitable Remote Station Set-up to Exploit and Enjoy "Remote Operation Capabilities"

By Kari Gustafsson, SMØHRP

Author Kari, SMØHRP, Operating Remote

Today remote operation is close to becoming an established and proven technology. Does this change the way we do ham radio? If so, what type of remote concept should I choose and on what grounds? What are the pros and cons with the different concepts?
This article will summarize my last six years' experiences with entering the remote operation path and going 100% remote as of today. There are several great speeches and articles on this subject like the recent one by Chris Hurlbut, KL9A, from Contest University 2019 (ref.1). So, I will try to focus on the issues that are not always "fully revealed" or can be read in-between the lines of the text. With remote operation the idiom "the devil is in the details" is really true. For contesters the know-how to build a remote station with 100% up time is clearly a major competitive edge.

Background

I remember that when I started my ham career, I always went down to the basement and spent some 10 minutes to turn on all the equipment via some large rocker switches. Boy this took time! This procedure continued until the beginning of 2010. And there was no other way to operate than from this physical location in suburban Stockholm where my home QTH is. Outside my window was a HD 70 foot crank-up tower with a 40-20 meter yagi antenna stack that now is always nested at the bottom position. New plasma TV sets and cheap Chinese lamps started also to enter the RFI scene and our Swedish FCC had no clue on how to act on this.

However, I was fortunate to have another remote QTH in the archipelago way beyond neighbors, HOA rulings, and suburban-RFI. What if I started to work ham radio from there? Since 2012 I have mostly worked ham radio remotely from my remote QTH. Both DX-ing and, in the last two years, serious contesting. Today, I do not do anything else than work contesting from there and I still try to exploit the world of remote operating. Here are my experiences while still trying to develop the means to do fast and reliable remote ham radio operating a´ la 2019.

As in all sports the chosen method depends on your needs and your starting point (including competence).

Remote operating is more than connecting to a far, remote, located radio

Even though remote operating is associated with connecting to a remote located radio, the new possibilities that opens up with remote operation are far from evident at the start. But really soon a new world of operating emerges. I think of that when I operate remotely from my couch, sitting beside my wife and we watch late evening TV shows, or in the morning at breakfast when I open the iPad and, at a flick of a switch, connect to my remote station and check what is going on on the bands. I also think of this when I am sitting in the car on my way to the countryside and work rare-DX in the back seat. In other words, you do not need to sit at the radio to work DX anymore! With remote ham radio you may allow members of the local radio club, that cannot do ham radio for various reasons, to log into the radio from their homes and do ham radio. With the new Flex software (version three) you can even allow a friend to log into your radio and use it while you are on the radio. Isn´t that great!

Legacy or SDR-radios does it matter?

All radios with a modern CAT-interface can be remote operated. So if you have a IC-7600, an Elecraft K3, a Kenwood TS-480, or a similar generation radio you may use them for remote operation. Most SDR-transceivers can be remote operated but some SDRs have a better platform of the graphical user interface (GUI) that do not require a so called "thick pipe" (an internet connection with a large bandwidth) between the GUI and the SDR-core radio. At least a couple of years ago both ANAN and SunSDR were SDRs that consumed a lot of bandwidth which is far too much at least for those of us with a limited amount of data allowance from the internet service provider. This may have changed the last year.

So going "remote" is clearly feasible for most of us with a fairly modest and modern ham shack. Let´s look on the technical requirements for remote operation.

Requirements

The following are mandatory:

1. Internet access to the radio QTH. Minimum speed: ~ 500 kbit/s uplink
2. Internet latency no more than 125 ms and a public ip-address (see below)
3. CAT controlled radio transceiver and amplifier
4. Basic understanding of computer networking, IP/TCP-protocol and router port forwarding.

The following are good to have:

1. Web controlled antenna switch and other accessories
2. IP-camera
3. Internet controlled AC or DC line supply.

The importance of latency comes from the need for having the radio and the audio following your manual control of the radio without a considerable lag. This is becoming less of a problem today with internet access technologies like "fiber to the house" (see later about MTU issue) or 4G. Older DSL access internet lines can be tricky if the tele-

phone wire is up in the air or the modem is close to antennas, as the DSL transmission protocol uses the 1-10 MHz spectrum to provide the service and it may be susceptible to RFI.

The issue to pay attention to with 4G cellular service for internet access is double NAT (ref.2-3). In brief, cellular providers with double NAT do not provide a public IP-address to you (but via an IP-proxy or another modem) and you cannot remotely access your radio with the correct IP-address that your local router is receiving from the internet service provider. In some cases this can be overcome by bridging of the "extra modem" to make the modem transparent for your internet traffic.

Another issue that may be problematic with SDR radios is the MTU size of the transmitted UDP packets (ref.4) from the radio. When your SDR radio sends the UDP packets (VITA-49 protocol), they traverse the internet and pass through hardware such as modems that may not accept the size of the packets. The packets then start to fragment with some serious latency introduced and a missing spectrum. I myself has encountered this problem with my ISP and I have no solution yet for it other than to use a VPN line to my radio. The MTU issue makes the SDR radios look like it is lacking waterfall and spectrum. Among Flex users this is also known as the "black square of death" (ref.3).

The Gold Standard of Remote Radio Set-ups

Figure 2 depicts the most used remote set-up today. The concept is based on the Remote Rig boxes developed by Mike, SM2O, (ref.2) in the beginning of year 2010. He came up with a smart technology to compress the audio and to that add controlling signals for the CAT-control of the radio and two more control channels for accessory equipment like rotor control, amplifiers, antenna switches.
The system can be used with most radios on the market today. You may even use radios with a detachable front panel or use one radio (e g K3/K3- mini or Yaesu FT-5000) as the "front panel."

The RemoteRig system is rock-solid and robust! It does not require a PC (unless you use it for logging) and the bandwidth requirement can be as low as 200 kbit/s for the

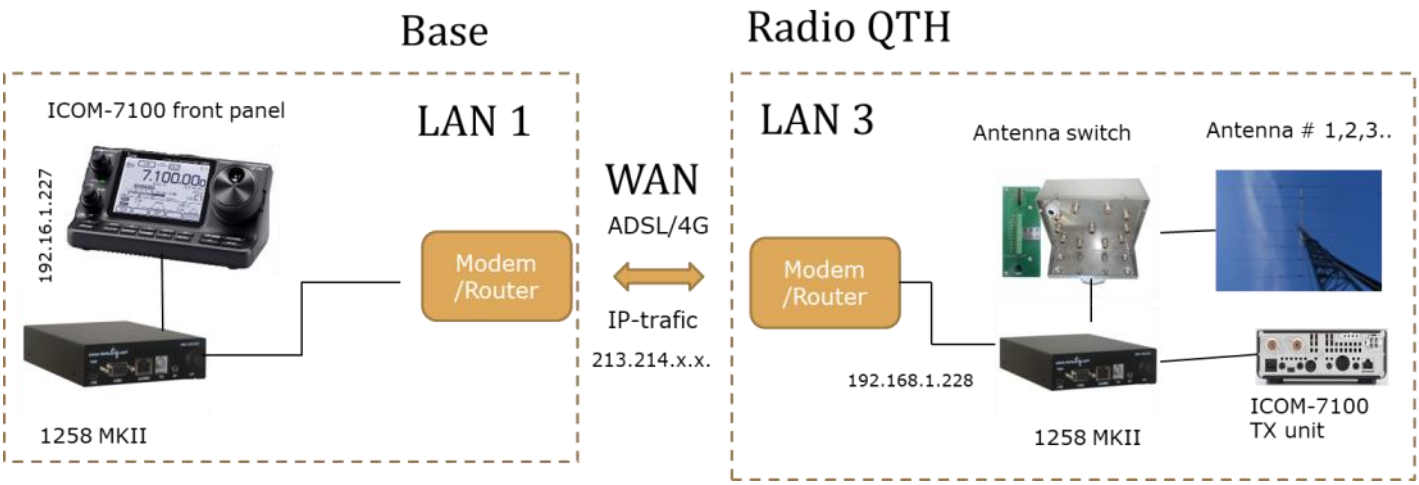


Figure 2 - The most simple, cheap and robust remote set-up around today for the newbie as well as the advanced operator. It can be used for CW, SSB, RTTY and FT8. Even contesting with PC at the base is possible. This set-up is well proven!

radio audio. The cost for a set of RemoteRig boxes is within reach for most of us.

What makes this set-up so good?

1. You may use it for remote DX-ing or serious contesting with CW/SSB/RTTY.
2. It is robust and a proven concept. It has been around for more than five years and many big contesters have proven it in several contests (ref. 1). I myself have used it for more than seven years with over 10 000 QSOs and with, perhaps, only a few hiccups per quarter (due to other matters beyond the RemoteRig boxes).
3. In contrast to SDR set-ups (see later section) the RemoteRig system itself very seldom needs software updates. You may be QRT for six months and come back to the system and it will work to 99% certainty. This is not the case with SDR-systems.
4. No PC is required for the operation of the system other than the configuration of the boxes for your particular type of radio and equipment to be controlled.
5. The system has a built in WinKeyer which allows you to work CW in a smart way without introducing any noticeable latency. It also has a built in DNS server to keep track of your public address that the ISP may change (or at re-boot) every now and then.
6. You may use a PC with logging program at "the base" location and the system takes care of the CAT-controlling of the radio from the logger.

What are the drawbacks? Well, not too many

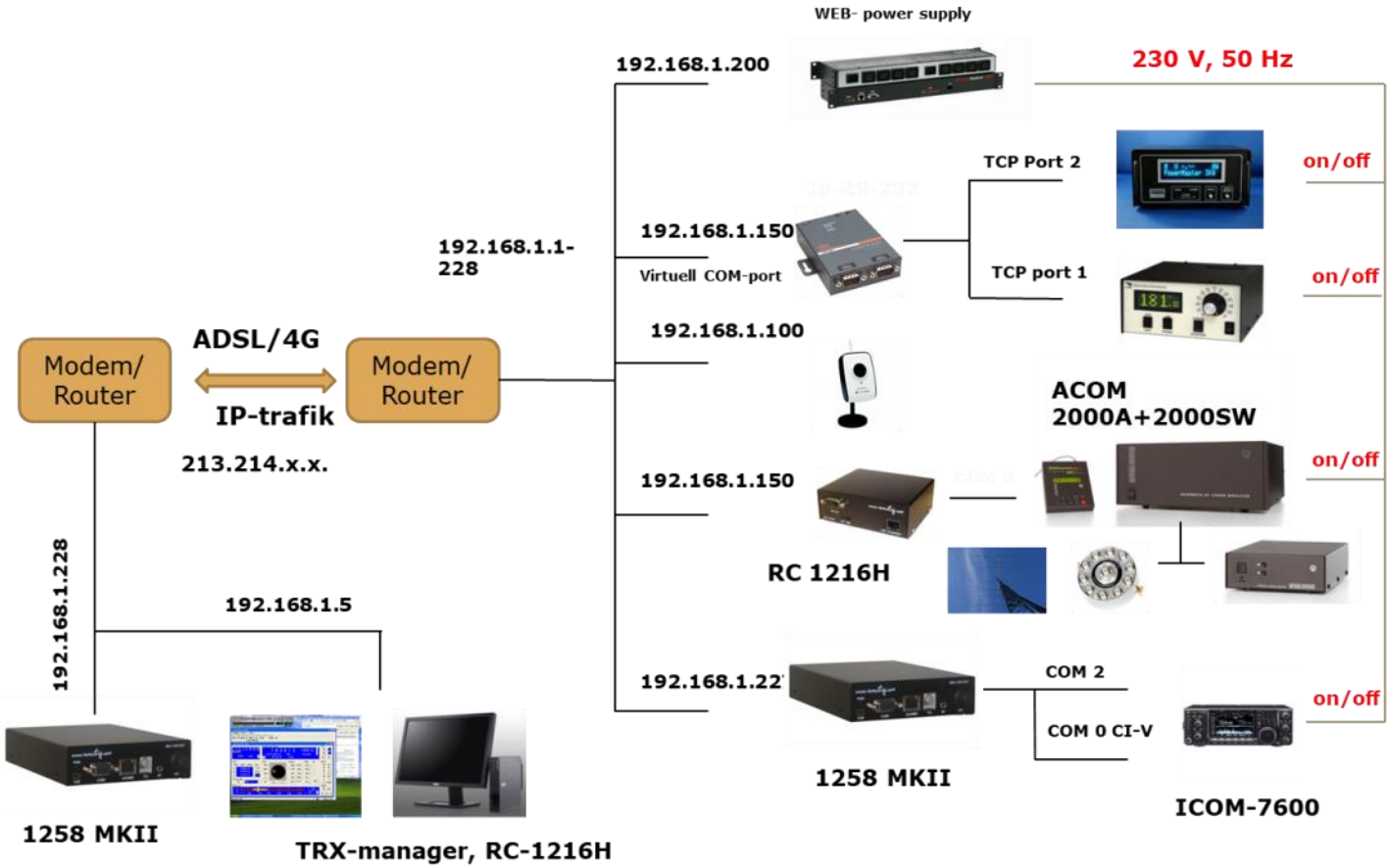


Figure 3. The basic set-up in Figure 2 can easily be expanded as you add HW. Here with ICOM-7600 controlled with a SW as TRX-manager (HRD another option) at the base.

if your needs are fulfilled with the limited set-up like in Figure 1. However, as you start to add equipment such as amplifiers, rotor controllers, web switches, IP-cameras, etc., things start to get a little bit complex. This is mostly due to the fact that much HW (*hardware*) is still RS-232 controlled and some even uses CI-V (ICOM) and they do not always play well together or may be tricky to configure. Modern new HW is becoming more and more Ethernet controlled and this is a big relief. Choosing Ethernet controlled devices will sure be both cheaper (USB-RS232 adapters are typically $100-150 per device) and easier to use. [*While this may be the author's experience in Sweden, USB-RS232 adapters may be found in the U.S. today at prices considerably lower than quoted here – Ed.*]

As seen in Figure 3 it shows an IP-camera. Why? Is it really needed? Yes, as with all equipment controlled over internet you will run into hiccups and you really want to see or confirm the status of some equipment. An amplifier is one such item and you do not want to "mistreat" it. To be able to turn on and off some equipment like routers, switches, USB-RS232 adapters, etc., is also a must if they seem not to work the way you expect. An Ethernet controlled power line is also a good thing. Both for re-boot and to turn off the HW. Most HW is less susceptible to lightning strikes when in the off state.

A killer set-up with knobs and wheels!

An Elecraft K3 with a K3mini front panel, together with the RemoteRig boxes, makes a very functional, easy to operate, and competitive remote set-up for all needs from casual DX-ing to serious contesting. It's like sitting in front of a real radio.

I used this set-up for over three years and it worked flawlessly with only minor hiccups. A real plug and play set-up with knobs and wheels. The new K4 will probably provide

The author, sitting at a hotel and "killing" time with working DX from a laptop with TRX-manager and the RemoteRig boxes.

the same joy. A great asset with the boxes is the forum for RemoteRig which is full of solutions for technical issues you may encounter. It also provides lots of helpful hams ready to help out almost a second after you posted a question.

What about ICOM and their software RS-BA1?

ICOM has had a remote software out on the market for some five years now. Their new version (v.2) works very well and there is even a remote encoder VFO-knob (RC-28) that can be used together with it. The configuration of it is a little tricky, though. ICOM suggests using a remote PC for the software but this is really not needed. I did use this set-up three years ago (v.1) and the only drawback I found was that it was somewhat bandwidth demanding since it has no compression algorithms (to my knowledge) built-into the software like RemoteRig has. Version one of the software also had some bugs.

A major disadvantage with ICOM is that their radios and PAs are CI-V controlled. That protocol is not compatible with the common RS232 protocol and you will need adapters (CI-V to RS-232) to control them

over the internet. In a remote system with both CI-V and RS-232 HW you may eventually run into problems when one vendor updates their protocol and the other does not. This was one reason why I stopped using ICOM for remote operation.

What PAs to use for remote?

Even though some hams use manually operated PAs when operating remote, an automatically tuned PA is the obvious answer. Popular PAs are the automatic PAs by SPE, OM Power, ACOM, Alpha Power and Elecraft. Solid-state PAs are very attractive as they are Ethernet controlled and have a modern GUI panel. Yaesu´s PAs are not commonly used. One reason is their lack of easy CAT control and integration with other HW. Earlier Quadras could not even be remotely tuned, as I remember. Clearly not plug and go!

With tube PAs the thing to remember is that some PAs, like OM Power, are only semi-automatic tune where you store the tune and load settings in the PA while doing the manual tuning of the PA for all antennas. If the SWR of an antenna happens to change over time (e.g., snow) you need to go to the remote site and do the tuning again. With an ACOM 2000A you can do it remotely.

What about a PC at radio QTH?

Some prefer a PC at the radio QTH and use it to control different HW devices including the radio over CAT. In the USA, it is much more common than in EU. Why? I do not know. My personal view is that I avoid a PC at the radio QTH simply because it is too much of a risk factor. PCs can easily "get stuck" and power outages and re-boots do happen. This can of course be dealt with but why add more risks to a reliable remote operation? In my opinion, running remote operations is a reliable way to operate a 48-hour contest or to chase serious DX for a week when a DX-pedition is on. Both of these operations call for as few risk factors as possible. To my knowledge the leading U.S. remote rental stations do not use remote PCs for this reason.

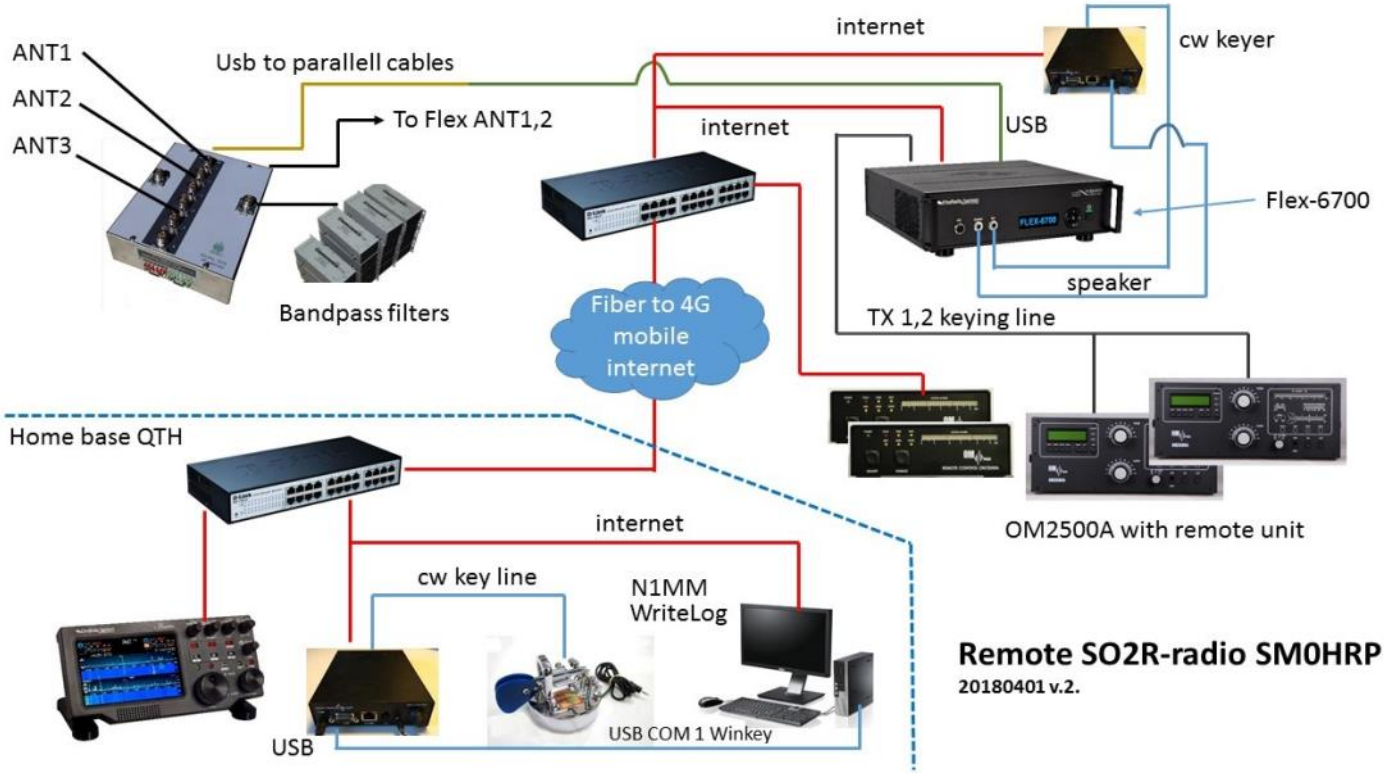


Figure 7. Kari's present SDR remote set-up for SO2R

K3 GUI and Software K3 GUI from TRX-manager

Do SDR radios make it easier to do remote operation?

Three years ago I decided to take on the challenge with SDR remote operation. The obvious alternative from a technical perspective was FlexRadio. Today I do remote operating with Flex radios and Ethernet controlled equipment and only a few RS-232 controlled devices.

What is the biggest difference?
Pros:

- a low required bandwidth for the internet connection - as low as 300 kbit/s per slice
- a much simplified connection set-up over software and software ports
- a simpler protocol and no extra HW to hook up to a remote station
- simple procedures for setting up digital modes and voice keying
- much less cables and clutter.

Cons:

- vulnerability to regular software updates, some chosen, some mandatory
- basic TCP/IP competence is a must!
- working CW remotely can be challenging due to latency issues.
- RFI and/or Ethernet packet issues become more of a problem due to all low signal level signal cables and a large number of "long" Ethernet cables
- less robust over time than the "remote gold standard" unless you keep the station up to date at regular intervals at least on a bi-monthly basis.

I use a local PC (at home QTH) for the contest logger. For regular CW when DX-ing I can use the Maestro to generate the CW. The Flex 6700 allows you to use two independent receivers with their own antenna. This way I can run with full duplex on e.g. 20m and 40m at the same time. This is cool! I can also use diversity reception when working top band to pull out the weak DX.

Using the K3-mini panel is like sitting in front of your K3

In my set-up, shown in Figure 7, I use the RemoteRig boxes for the generation of the local CW side tone at the home base QTH when I use the PC as logger in contests. The reason for this is that the CW side tone Flex produces is not rerouted back to the home base due to (potential) latency issues. This may be solved in a future software release by FlexRadio. However, Matt, NQ6N, has come up with a brilliant solution to use the Flex protocol to send CW locally at base with a WinKeyer connected to the PC (ref.6). A new software update was just recently released by Matt.

The obvious SDR advantage – digital modes

Figure 8 shows the GUI needed to run FT8 remotely with FlexRadio. In the middle, the

Figure 8. The GUI needed to run FT8 remotely with FlexRadio

DAX GUI is used to connect the virtual audio channels to WSJT-X (lower left). At the top right the Flex CAT GUI is connected to the virtual CAT port to WSJT-X. At the top left is the GUI of the OM Power OM2500A. Below the CAT GUI is the GUI for the AS-SAL-30 RX antenna. To the left of the Flex CAT is the GUI of the Antenna Genius 2 x 8 antenna switch, which automatically follows your FlexRadio when changing bands.

The big advantage with SDR remote radio is obvious in Figure 8. It shows my PC screen during the VP6R DX-pedition at my home base. My PC screen shows the windows for WSJT-X FT8H, my AS-SAL-30, the GUI of the amplifier (OM2500A) and the SSDR to run the Flex-6700 at my remote QTH. No special cables or audio cards are needed -- just the WSJT-X application! The process to configure is quite straight forward. The only drawback is for those with limited data allowance for their internet connection (like myself with 60 GB per month). Unfortunately, doing FT8 with my Flex consumes some 2 GB per hour!! Yes, I worked VP6R on FT8 five minutes after I turned off everything.

So for whom is SDR remote operation not a good idea?

If you do not have the basic TCP/IP skills to do basic configuring of routers and Ethernet equipment and knowledge dealing with software updates from Windows or other vendors you will soon run into trouble with a modern SDR remote set-up. If you follow a SDR forum like FlexRadio´s you will see that a large majority of issues are related to software updates. So why bother with the updates? Well, the updates solve old problem issues and introduce new attractive functions that you really are in need of. It would be foolish to decline to this.

So, for the casual DX-er and serious contester that lack some of the above listed skills, the “golden standard” of remote is the way to go. It will work just great, be relia-

ble, and satisfy all your needs and provide a lot of new enjoyment, I can assure you!

What if you want to go remote but you do not want to invest in the equipment?

Today there are at least two major US rental remote stations. These are RemoteHamRadio (ref.7) and BeLoud (ref.8). In addition to several other U.S. rental locations, both offer rental stations abroad (Haiti and Cape Verde). They are equipped with awesome hardware (120 feet towers with stacked yagis, 4-squares for 80 meters, etc.) that will allow you to have a tremendous signal on the band. The drawback? Well, you need to allocate about a dollar per minute in your wallet for renting a station with an amplifier. Obviously, renting one such station allows you to instantly operate remotely without too much investment. And with an impressive flexibility. Is not this great?

Conclusion

Remote operation is here to stay! As when smart mobile phones came out, most of us thought that we only needed a regular, simple mobile phone. Today we take smart phones for granted and we have adopted a new way of life using the smart mobile phones. The same is happening to ham radio. Remote operation opens up a new world of ham radio. In my blog (ref.9) I regularly post new technical matters of my remote activities.

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Backscatter

By Mark D. Johns, KØJM

WELCOME ABOARD
John Simmons, NIØK
Shevlin, Minn.

and

Reid Maertz, WØFVR
Brooklyn Park, Minn.

From DX World -
Monk Iakovos, SV2RSG/A should be on the air starting around the first of December, activating Mt. Athos with some additional antennas.

Suriname Revisited

By Bill Dean, WØOR

For nearly two decades a group of TCDXA/MWA members has headed south--usually every second year-- to activate a contest-rare location for the CQWW CW contest.

The whole gang in our new polos: Left to right, K6RB, NØAT,N6XI, PZ5RA, KØTG, KMØO, WØOR

The group's makeup has changed from time to time, but the goals have remained pretty much the same: 1. Go to a location that usually produces little or no activity for this "biggest of all" DX contest. 2. Strive to put in a serious effort and perhaps to set a multi operator record for the country. 3. Provide a warm weather DX get-away for the operators. 4. Just enjoy the fun working large pile-ups and enhance our contest skills.

A secondary goal was, at least up until this year, to pick a different place each time to experience a new culture and put that entity on the air with a CW contest effort. The first of our operations was in Guatemala, in 2003. The call was TGØAA. Subsequently we visited Bolivia as CP6CW, San Andres as 5JØA, El Salvador as YS4U, Montserrat as VP2MWG, Ecuador as HC1WDT, and Suriname as PZ5W. In each case we set aside a little time to do some sightseeing and learn something of the geography and culture of the country.

Two members who have been a part of the group on each occasion are Bill, WØOR, and Ron, NØAT. Others who have been on one or more of these sojourns, but not all, are Vlad, NØSTL, Gregor, DF7AT, Tom, K3WT, Al, KØAD, Tony, KMØO, Tom, WØZR, and Iowan, Dave, WØFLS.

The shack house now has a covered patio where we were served a hot dinner every evening by Ramon

This year we broke tradition and returned to the site of one of our favorite past locales: the superb shack offered for rent to contesters in Suriname by Ramon, PZ5RA.

What Ramon provides has to be one of the all time great rental shacks. Not only do we get to work from an entity that gives contestants a multiplier they probably can't duplicate by working another station, but his set-up is very comfortable and his hospitality is unmatched.

The deal is this: For a flat rate of $6,000 ($1,000 each for 6 operators) for a full week, he offers lodging in a specially built rental shack that contains three bedrooms, each with two single beds,

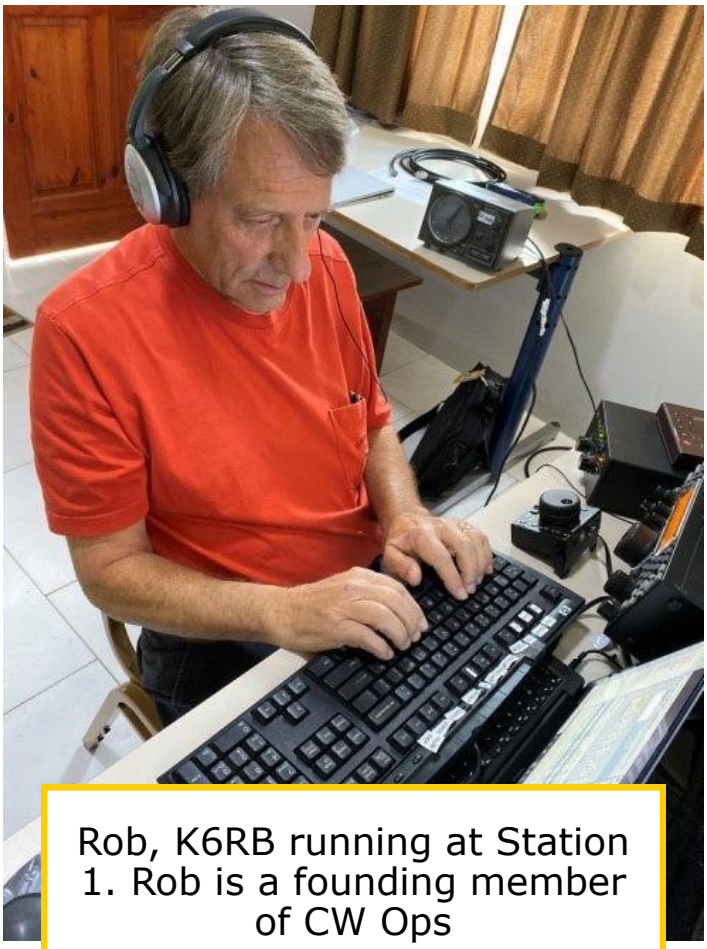
two bathrooms, a shower, a kitchenette, and a spacious operating room. There's a water cooler, a refrigerator/freezer, a microwave oven, a toaster, a hot plate, and sink. There's even a washer/dryer available.

Radio equipment provided includes two amplifiers, at least two antennas for every contest band, internet, and food and drink for the week. He also arranges the license with a call that you can specify (if it isn't already assigned), picks up the group on arrival in the capital city of Paramaribo and drops us off at the airport upon departure. His location is about 15 miles south of the city near a small town called Lelydorp.

The core group began planning early in the year with a breakfast meeting at Perkins. We

The "monster" used by run station #1 Antenna Depot AD-3446

all

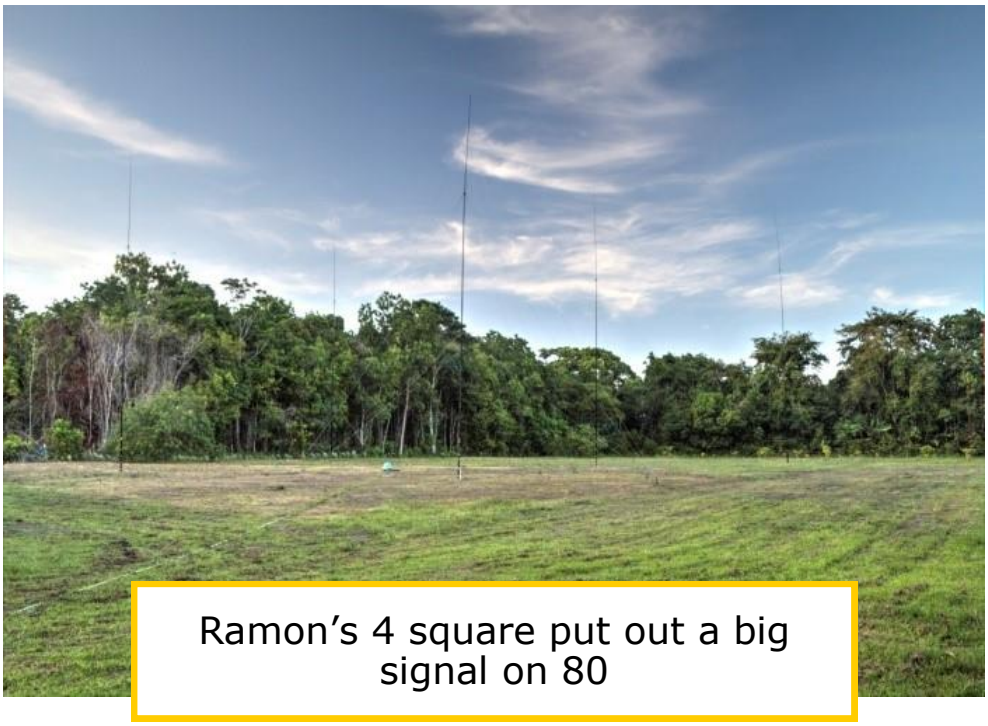


Rob, K6RB running at Station 1. Rob is a founding member of CW Ops

agreed that this would be a particularly good year to do another operation, as CQWW did not fall on Thanksgiving weekend. That only happens every seven years, so it would presumably make it a little easier to get "kitchen passes." Vlad, N0STL, who had been on almost all the previous trips, bowed out of this one due to anticipated work requirements. Somewhat later K3WT decided he couldn't go. That left openings for up to four more operators. As it turned out, we ended up with a total of six. All were excellent contest guys. Returning to the group was Tony, KMØO. Tony was with us on the Bolivia operation, so this was his second time as a participant. Another TCDXA member, John Desmond, KØTG, decided he would like to go. That added up to four Minnesotans. We wanted to fill out the team with two more, if possible.

Thanks to Tony's efforts through CW Ops, we recruited a couple of Left Coasters,

K6RB, Rob Brownstein, and N6XI, Rick Tavan. Both are seasoned contest guys. This was the first time the group included non-Midwesterners. Some of us weren't sure how it would work. Obviously it wasn't practical to arrange meetings in person. But Rob, one of the founding members of CW Ops, encouraged us to use his Zoom capability to meet face-to-face on line. That worked well, and we held a couple of planning sessions with all members of the group getting together in cyber space.

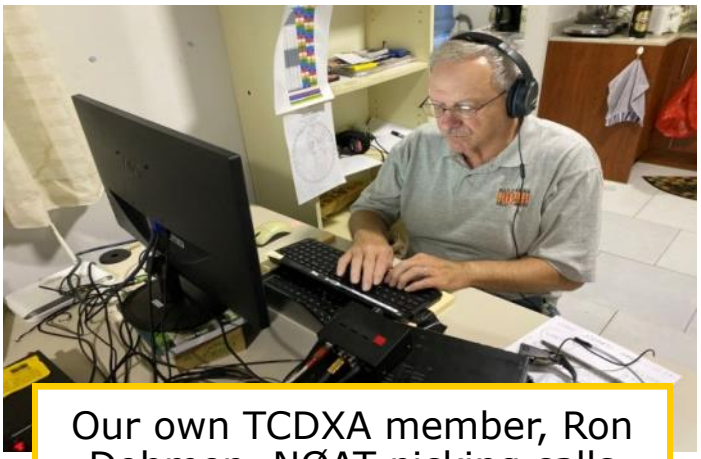


Ramon's 4 square put out a big signal on 80

During our on-line sessions we parceled out responsibilities for the necessary tasks. Bill took on the job of finding and coordinating flight information. There are not many options for flying to Suriname on a single airline. KLM provides that service, but one would have to fly to Amsterdam and back-track at very high cost in both time and money. The best option turned out to require flying into Miami on one airline, then changing to Suriname Airways for the trip to Paramaribo. We all settled on that option, with the guys from 6 land coming in overnight on the 19th of November, and the Minnesota guys coming via American Airlines in the early morning of the 19th. We were lucky not to experience any flight delays and so we all were in Miami in time to catch the afternoon flight to Suriname. It's a fairly long flight, with a stop in Georgetown, Guyana. But the plan worked, and we actually arrived at the Paramaribo airport a bit early...We were ready to depart for our eventual QTH even before Ramon arrived with his vans to transport us.

John, KØTG, captures a shot of the operating room.. WØOR is in the foreground on run station #1 as K6RB works station#2. KMØO and NØAT watch from the lunch table.

One of our other decisions during our planning was to select the contest software we would utilize. Past operations had always used Write Log. Half the guys were famil-



Our own TCDXA member, Ron Dohmen, NØAT picking calls out of the pileups

iar with it, but the other half preferred N1MM+. After some discussion we decided to go with N1MM+. Those of us who had not used it in the past got a crash course from Rick, N6XI, in the days leading up to the start of the contest. His knowledge of the software was invaluable.

After arriving late on the 19th, we were especially grateful to find our bedrooms ready and waiting. But first Ramon had ice cold beer and some midnight snacks. He thinks of just about everything. The next morning we found the refrigerator packed with plenty of breakfast goodies. The coffee maker was put to work, and we all slept in a bit. Later, Ramon took us all to a supermarket, where he encouraged us to pick out the foods we wanted. He supplies the groceries for breakfast and lunch. We are on our own to prepare those meals. But Ramon arranges for a hot dinner each night, which he provides as part of the package. Most often it was take-out food from a local restaurant, and always very tasty.

The days preceding the contest found us setting everything up for the event. We operated Multi-Two, with a K3 at each station. One K3 would drive an ACOM 2000, the other would drive a Kenwood amp. We couldn't get the Kenwood amp to work, so we were forced to use our backup, an Elecraft KPA500. That was a spare amp that Ramon rarely used. Bill brought along an Elecraft supplied cable that provides an easy interface between the K3 and the KPA500. That worked well, and that's the set-up we ended up using during the test. There were 3 K3s available. Bill brought his, Rick brought one, and Tony carried his. Bill's did not have a sub-receiver, so we used the two so equipped for the run stations. Bill's was used as a back-up and a spotting station. Rob supplied us with a pair of band pass filters, which made it much easier to run simultaneously on two stations in close proximity.

Ron's responsibilities included creating an operating schedule, which he did superbly. Each operator would get 16 hours on and 32 hours off. All would have some nighttime and some daytime hours. We decided that if people didn't like their assignments, they could trade. As it turned out, nobody traded. Everybody stuck with their agreed upon schedules. Ron also volunteered to create the appropriate Cabrillo file and submit the logs.

A word about the antennas that Ramon supplies: He has two towers, one is 23 meters high (75.45 feet) and other 21 meters (68.89 feet). Each features multi-band Yagis, 40-10. The higher of the two contains a 17 element array. It's an Antenna Depot AD-3446. This

N6XI, Rick, setting up run station #1 before the contest

The 21 meter high tower with the Mosley is behind the shack house and was used on run station

monster has 3 elements on 40, 4 elements each on 20 and 15 and 6 elements on 10 meters. The other is a Mosley Pro 67-C (3) with 7 elements. Between the two towers a 160 meter Tee is strung. That was actually installed back in 2015 when we were there the last time. Since then Ramon has put up a 160 meter vertical and also a full size 160 meter dipole. For 80 there is a four square that was used by a British group that rented the station for the SSB contest. There is also an 80 meter inverted vee. The spotting station used an all band doublet that wasn't used for transmitting on any band. He also has a small tower with a 6 meter array not used in this contest.

For receiving on the top bands, Ramon has Beverages that can be switched. During the contest we found the NW direction to work well, but there may have been something wrong in the NE direction, as it didn't do as good a job.

Suriname is two time zones to the east of EST, or three hours west of Zulu time. That meant that the contest started at 9 p.m. on Friday. 20 meters was still open and we opted to start on 20 and 40. Run station one, with the KW amp, higher tower and better antenna ran on 20, which worked well for the first two hours. That station then switched to 80 while run station #2 stayed on 40 for the first seven hours.

Following is the Band Summary and score information:

Band	QSOs	Pts	ZN	Cty	Pt/Q
1.8	302	888	18	51	2.9
3.5	1492	4445	23	94	3.0
7	2029	6002	35	117	3.0
14	3398	10055	34	131	3.0
21	1848	5359	26	106	2.9
28	324	913	17	38	2.8
Totals	9393	27662	153	537	2.9

Score: 19,086,780

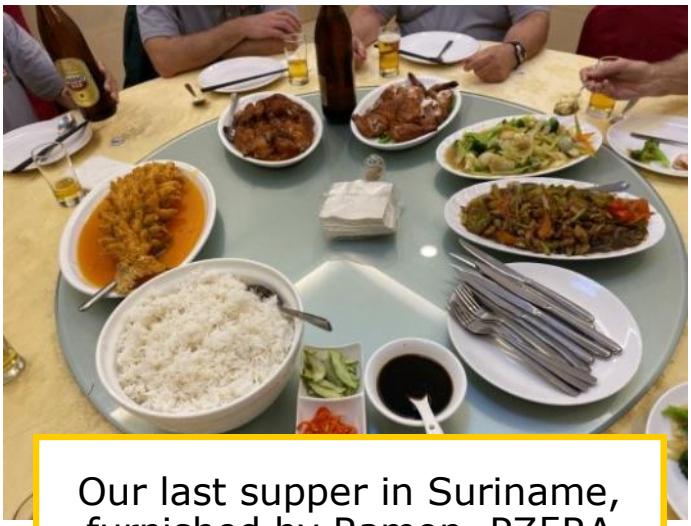
Gross QSOs=9602 Dupes=209
Net QSOs=9393
Unique callsigns worked = 5232

As one goal, we were going to try to match or exceed the scores we ran up the last time the group operated from Suriname. In 2015 10 meters was open during much of two days. We really only had one opening, for a very short hour and a half on Saturday this year. There was also a brief opening on Sunday, but didn't last long.

The bottom line is that we didn't match our 2015 effort, which yielded more than 20,000,000 points.

In the final analysis, we pretty much agree that there are several factors that held us back from a better performance. Run station 2 was only putting out 500 watts instead of a full

KW. Running full power on run station 2 would probably have helped a little. The K-3 on that station experienced some receiving issues. There seems little doubt that the NE beverage wasn't right. We could have been a lot more serious about seeking multipliers and passing them to the other radio. The unfamiliarity with N1MM+ on the part of some of us may have been a factor as well. When I was operating there were lots of times when I could only get partial calls and would slow down trying to make sure I got the call right. With two ops listening, that could have sped things up. That might have been a better strategy. Lots of little things may have made a difference, but I still don't know if we could have broken our old record.



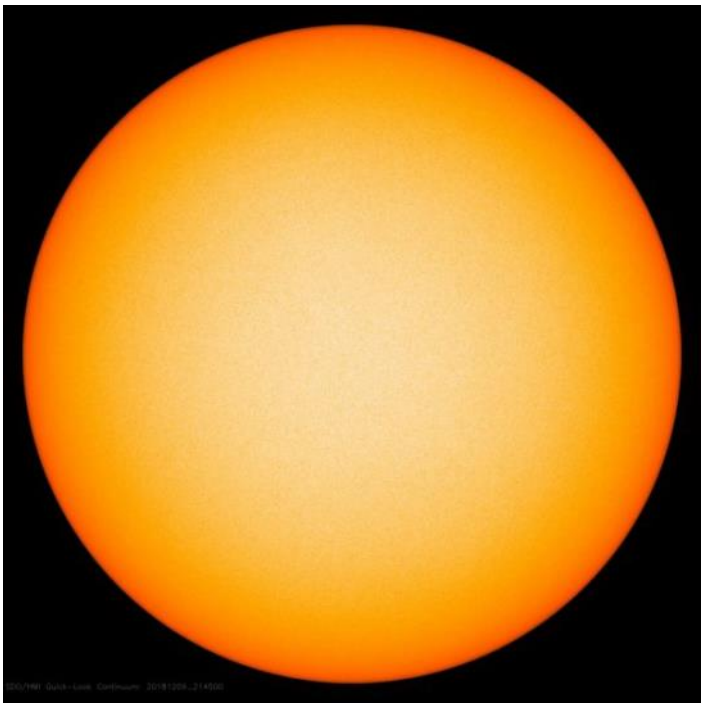
Our last supper in Suriname, furnished by Ramon, PZ5RA

After the contest the clean up and take down went a lot faster than the set up, as can be expected. We left the backup K-3 on during Monday and worked a few hundred contacts, including some stations that wanted PZ, but weren't in the contest. That evening Ramon took us all out to dinner at a Chinese restaurant where we celebrated, toasted, and generally had a good time. Ron and Vlad arranged before the contest to have PZ5W polo shirts made, which we all wore to the dinner. There had been a hope that some of the guys who had not seen much of Suriname would be able to do a little touring on Monday. That didn't happen because the 26th of November happens to be Independence Day in Suriname. Downtown Paramaribo was closed and the traffic would have made it virtually impossible to do any sightseeing. "Next time", everyone said. Guess that means that all had a good time and wouldn't mind returning for another contest. While none of the Minnesota guys had met the Californians in the flesh prior to this operation, the group had no problem working together. I think it is fair to say that we all made new friends and enjoyed getting to know each other.

A final postscript: Every one of us with the exception of Rob, who flew to San Diego, experienced flight delays on the return trip home due to the snow storms that ravaged the country. That meant scrambling for hotel rooms in Dallas, Chicago and/or Miami.

But all made it back home in time for Thanksgiving!

Bill Dean, WØOR



2020 Sunspot Prediction?

Treasurer's Report *from Pat Cain, KØPC, Treasurer*

TOP LINE SUMMARY

TCDXA OPERATING BUDGET FY 2020
(Sep 2019 - Aug 2020)

December 7, 2019

INCOME		ACTUAL	BUDGET	Actual 2019
Surplus from FY 2019 (balance 8/31/2019)		**5291.41**		*2945.79*
Member Dues 2020 by Cash/Checks/PayPal		2629.00	4500.00	*5219.28*
Door Prize Ticket Sales club share		256.00	500.00	*602.00*
Donatons (estates, wills, etc.)		0.00	0.00	*0.00*
Refunds and Reversals		0.00	0.00	*2400.00*
TOTAL INCOME		**8176.41**	**5000.00**	*11167.07*
EXPENSES			BUDGET	Actual 2019
Member Recruitment/Retention		0.00	(150.00)	*(35.00)*
Website ISP & Domain Name		(65.00)	(150.00)	*(84.69)*
Office Supplies, Miscellaneous expenses		(25.00)	(50.00)	*0.00*
Flowers <SK> and Hospital gifts		0.00	(200.00)	*0.00*
Holiday Party Dec 2019		0.00	(500.00)	*(425.73)*
ARRL Spectrum Defense Fund		0.00	(250.00)	*(250.00)*
NCDXF Donation		0.00	(250.00)	*(250.00)*
MWA Plaque		0.00	(75.00)	*(75.00)*
DXpedition Contributions Total		(250.00)	(4000.00)	*(4755.24)*
#1 Dxpedition - W8S Swains Island	(250.00)			
#2 Dxpedition -	0.00			
#3 DXpedition -	0.00			
#4 Dxpedition -	0.00			
#5 Dxpedition -	0.00			
#6 Dxpedition -	0.00			
#7 Dxpedition -	0.00			
#8 Dxpedition -	0.00			
#9 Dxpedition -	0.00			
#10 Dxpedition -	0.00			
TOTAL EXPENSES		**(340.00)**	**(5625.00)**	*(5875.66)*
NET		**7836.41**	**-625.00**	
Checking balance		**5752.41**		
PayPal balance		**1794.00**		
Cash / Checks on Hand		**290.00**		
NET BALANCE		**7836.41**		

When required, Wells Fargo & PayPal online statements can provide detail not shown in this report.

The MWA Contest Corner

By Al Dewey, KØAD

Feasibility of Remote Multi-Ops

Ways to attract new hams to contesting and MWA is something that has been talked about for a long time. Everyone agrees this is a good idea but opinions on how to do it vary. Everyone also seems to agree that Elmering by veteran contesters is an important key to success. Some have done this by agreeing to host a multi-op at their location and invite hams that have shown an interest in contesting but are just getting started. I commend those who have opened up their stations for a multi-op during the contest season. However, due to space and other factors, some of you may not have a station that could easily accommodate a multi–op. For example, my station is very small and is located in a den that is right off our bedroom. Not real conducive for multiple operators during a contest.

I recently acquired a Flex 6600M. Some of you may have noticed the advertisement (See Figure 1) in *QST* for Flex's Version 3 software release including something called "Multi -Flex." It portrays two guys operating a single Flex 6600M from two different locations. This got me to wondering about the feasibility of doing a simple Multi-Single contest effort using this technology. There are a lot of details that would have to be worked out (and tested!) but wouldn't it be great if you could take part in a multi-op effort without having to leave your house or apartment? Of course, some contesters are already partici-

Figure 1 – Version 3 Software with Multi-Flex Allows Operators From Two Locations to Operate the Same Radio Simultaneously

pating in contests as single ops using services such as RemoteHams. And some have even figured out ways to multi-op remotely using big contest stations.

MWAers like NØIJ, KØMPH, and others are already doing virtually all of their contesting remotely as single ops. It would seem like the next step would be to try this as a Multi-op (remotely). There are certainly a lot of technical details that would have to be worked out but it seems feasible. With radios like the Flex 6600M with Multi-Flex, it would seem like we would be one step closer. Figure 2 is a conceptual diagram of how this might work.

operation. One thing you have to figure out is whose turn it is to transmit. A transmit light on the radio front panel, the Maestro, or the computer screen will tell you when the other operator is transmitting. Multi-Flex will simply prevent the second operator from transmitting so there is no risk of rig damage with both operators trying to transmit at once. Some have suggested that a secondary means of communication (e.g. something like Facetime) be used to coordinate operation. There are certainly some details that need to be worked out but it would seem like the potential for simple remote Multi-Ops (especially for contest mentoring) is a real possibility. Who will be the first MWAer to give this a try?

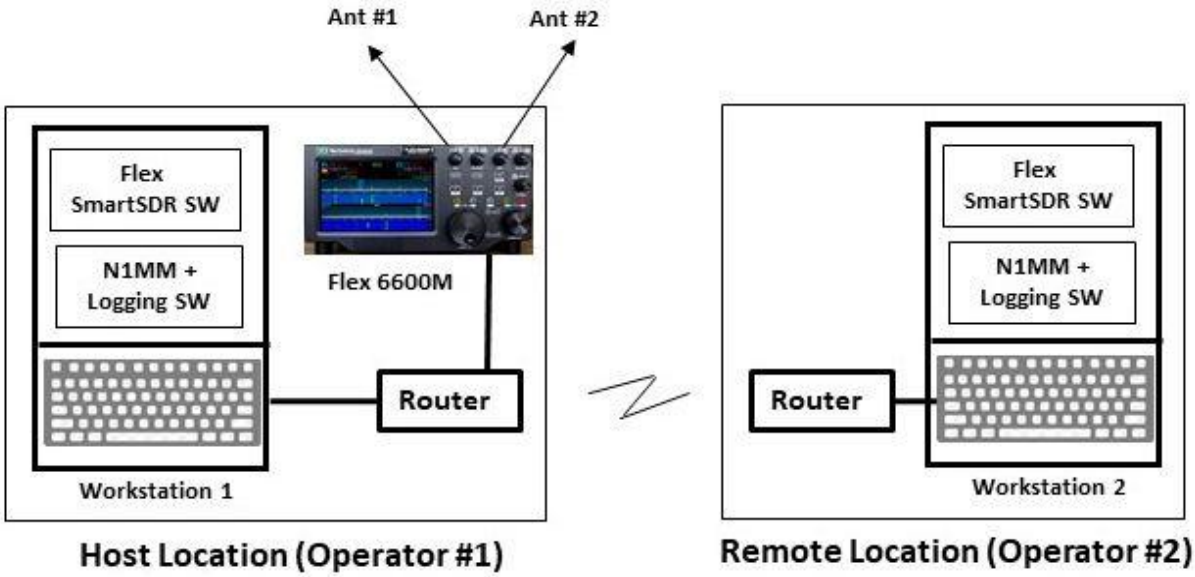


Figure 2 – Conceptual Diagram of How a Simple Multi-Single Contest Operation Might Be Set Up Using Flex 6600M and Multi-Flex

Keep in mind that, at least with the Flex 6600M, it is not possible to transmit on two bands at the same time. So a Multi-2 effort would not be possible using this solution. In reality, the Multi-Flex solution might be best for efforts in which you are mentoring a new contester with a simple Multi-Single

Another Multi-Flex Contest Application

In reading about the Multi-Flex solution, I read about one application that could be applied right now to big contest stations. Those of you who have contested at WØAIH in the past may recall that most of the bands had both a Run

and a Spot radio. They were positioned right next to each other. When the spotter wanted to work someone, he held up his hand (or something) to alert the runner to standby while the spotter made a quick call. The runner and spotter tried hard to make sure they were not transmitting at the same time on the same band. At some point, I believe some interlock circuitry was put in place to prevent this. This concept worked fine but it meant that the operating position for each band needed to have two transceivers and two amplifiers. With the Multi-Flex solution, you could replace all this with one Flex 6600M, and one Power Genius amplifier. Although the Flex equipment is not inexpensive, the Multi-Flex solution with a single radio and amplifier would certainly cost less than two radios and two amplifiers at each band operating position. I understand that some of the big contest stations are already taking advantage of this.

See you in the pileups. Al, KØAD

DXing . . . Back Then & Much Later

By Jim, KØJUH

When I got started DXing back in the '50s, life was much simpler. And so was technology. Everything in the shack was plug and play, and intuitively, it was readily learned and understood. Reading the manual was optional.

Fast forward to the high tech world we live in today, and you can forget about learning your SDR transceiver and Digital mode software intuitively.

Their User Guides are "long winded" for a good reason; the stuff is complicated and it takes a boat load of pages to explain how everything works!

Consider yourself lucky if you have a buddy who can be your "high tech Elmer" and help you get started. Even with their help, they'll be times when the User Guide will be your friend and come to your rescue.

Have these latest weak signal digital modes been a boon or a detriment to the future of amateur radio? That's a question that has many answers - too many to cover here.

The popular FT8 mode frequencies are crowded 24/7, while the CW frequencies are a "ghost town." If this continues, are we subject to "use it or lose it"?

The boys in the Ivory tower at the FCC will determine that the next time they pow-wow with their counterparts throughout the world and allocate the RF radio spectrum.

National 303 & Viking Valiant
"Back Then"

Icom 7610 SDR Transceiver
"Much Later"

Until then, enjoy, and spend some time on ALL the modes.

73, Jim, KØJUH

MAJOR DXPEDITIONS
AND THEIR IMPACT ON THE DXCC AWARD

The DXCC #1 Honor Roll Award is achieved by working all 340 Entities on the current list. For many, the "last one" was one of the Top Ten Most Wanted, and was made possible by a Major DXpedition that activated a rare and remote location.

Over the years, DXpeditions have always been expensive. They've had price tags with big numbers, and today's numbers are getting bigger! The hard-luck 3YØZ DXpedition to Bouvet Island in 2017 was reported to have a $750,000 price tag on it!

The rising costs of Major DXpedition logistics and transportation is fast approaching the limits of donations from Individuals, Clubs, and Foundations.
****** Where's the shortage of money going to come from?***

Along with the money problem is the aging operators. Some members of the DXpedition have made many trips around the Sun and may be looking at retiring from the pileups.
****** Where are the younger replacement operators going to come from?***

Current Club Log Top Ten Most Wanted DXCC Entities

1. P5	NORTH KOREA	Radio Not Allowed	East Asia
2. 3Y/B	BOUVET ISLAND	Uninhabited	South Atlantic Ocean
3. FT5/W	CROZET ISLAND	Scientific Base	Southern Indian Ocean
4. BS7H	SCARBOROUGH REEF	Uninhabited	South China Shoal
5. CE0X	SAN FELIX ISLANDS	Navy Garrison	Pacific Ocean
6. BV9P	PRATAS ISLAND	Uninhabited	South China Sea Atolls
7. KH7K	KURE ISLAND	Uninhabited	Pacific Ocean Atoll
8. KH3	JOHNSTON ISLAND	Uninhabited	Pacific Ocean Atoll
9. FT5/X	KERGUELEN ISLAND	Scientific Base	Southern Indian Ocean, Antarctica
10. 3Y/P	PETER 1 ISLAND	Uninhabited	Bellingshausen Sea, Antarctica

******As of now, several key questions related to the future of Major DXpeditions remain unanswered. No need to worry. We're confident the worldwide DX community will have the answers.***

73,
Jim, KØJUH
The Old Duck Hunter

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TWIN CITY DX ASSOCIATION (TCDXA)

CLUB FACT SHEET

Who We Are:
The Twin City DX Association (TCDXA) is a 501(c) (3) non-profit amateur radio organization, whose members have an interest in DXing and in supporting the club mission: ***Dollars for DX***. Bylaws and Articles of Incorporation govern the club's operation.

Club Mission:
The club mission supports major DXpeditions with financial donations. The source of operating income for this activity is an annual contribution (dues) of $25 from each member.

DX Donation Policy:
The policy supports major DXpeditions that meet our requirements for financial sponsorship. All requests must be approved by the Board of Directors. Final approval is by vote of the full membership. Over 70 DXpeditions have been sponsored since 1997. Details are available on the website at: http://www.tcdxa.org/sponsoreddxpedtions.html

Club History:
The club was formed in the early 1970s by a small group of DXers from the Twin City area. Over the years, the club has changed; most notably by opening its doors to anyone interested in DXing - from the casual to the very serious operator. Our membership now resides in numerous states and several countries.

Requirements for Membership
We welcome all hams who have an interest in DXing and hold a valid FCC Amateur Radio License. It doesn't matter whether you're a newcomer, or an old-timer to DXing; everyone is welcome!

Meetings:
The club meets on the third Monday of each month (except July & August) at PUB 42 Restaurant in New Hope, MN. Members gather early in the bar for Happy Hour, and move into a private room at 5:00pm for dinner and a short business agenda, followed by a program. If you enjoy a night out on the town with friends, you'll enjoy this get together. Meeting attendance is NOT a requirement for membership.

Club Officers:
Four officers, plus one additional member make up the Board of Directors; currently: Bill Mitchell, AEØEE, President & Director, *wsmitchell3@gmail.com*, Bert Benjaminson, WBØN, Vice President & Director, Pat Cain, KØPC, Secretary/ Treasurer & Director, *k0pc@arrl.net*, Mike Cizek, WØVTT, Director & DX Donation Manager and Doug Arnston, KØPX, Director.

Website:
We maintain a website at www.TCDXA.org that provides information about a variety of subjects related to the club and DXing, The site is maintained by our webmaster Pat Cain, KØPC.

Newsletter:
The ***Gray Line Report*** is the club newsletter, which is published on a quarterly basis. We're proud of the fact that 99% of the content is "homegrown" – written by our members. Past issues are on the website at: http://www.tcdxa.org/newsletter.html.

How to Become a Member:
An application for membership can be completed and submitted online, or printed and mailed in. (See http://www.tcdxa.org/Application.html) Contributions may be made by check or via the PayPal link on the homepage at www.TCDXA.org.

Visit us at a Meeting:
You are most welcome to attend a meeting, and look us over, before joining. Meetings are held at the PUB 42 Restaurant at 7600 Avenue North in New Hope (http://pub42.com/). Join us for happy hour at 4:00pm with dinner at 5:30pm, followed by the meeting at 6:30pm.

VKØIR	K5D	AHØ/NØAT	3W2DK	K4M	XU7MWA
ZL9CI	VK9DWX	5X8C	FT4TA	TX3A	S21EA
A52A	FT5GA	K9W	VK9MT	KMØO/9M6	J2ØRR
T33C	3D2ØCR	XRØZR	VK9DLX	YS4U	J2ØMM
3B9C	E4X	T3ØD	VU4KV	YI9PSE	BS7H
TX9	CYØ/NØTG	3W3O	EP6T	ZL8X	N8S
CP6CW	VP8ORK	3W2DK	VP8STI	4W6A	3B7SP
3YØX	VU4PB	FT4TA	VP8SGI	T32C	3B7C
K7C	STØR	VK9MT	TX3X	HKØNA	5JØA
5A7A	3D2C	VK9DLX	VP6DX	7O6T	K5P
VU4AN	3CØE	VU4KV	TX5C	NH8S	FT4JA
VU7RG	TT8TT	EP6T	9XØR	PTØS	PZ5W
VK9DW	9M4SLL	3GØZC	9U4U	FT5ZM	ZL9A
CEØZ	TT8KO	TO6OK	XX9D	EP6RRC	T31EU
XRØZC	VP8O	T3ØGC	6O7O	VP6R	ZK3A

TCDXA DX DONATION POLICY

The mission of TCDXA is to support DXing and major DXpeditions by providing funding. Annual contributions (dues) from members are the major source of funding.

A funding request from the organizers of a planned DXpedition should be directed to the DX Donation Manager, Mike Cizek, WØVTT. He and the TCDXA Board of Directors will judge how well the DXpedition plans meet key considerations (see below).

If the Board of Directors deems the DXpedition to be worthy of support, a recommended funding amount is presented to the membership for their vote. If approved, the TCDXA Treasurer will process the funding..

Key Considerations for a DXpedition Funding Request

DXpedition destination
Ranking on *Most Wanted Survey*
Most wanted ranking by TCDXA Members
Logistics and transportation costs
Number of operators and their credentials
Number of stations on the air
Bands, modes and duration of operation
Equipment: antennas, radios, amps, etc.
Stateside and/or foreign QSL manager
Website with logos of club sponsors
QSLs with logos of club sponsors
Online logs and pilot stations
Up front cost to each operator
Support by NCDXF & other clubs
LoTW log submissions
Previous operations by same group
Valid license and DXCC approval
Donation address: USA and/or foreign

To join TCDXA, go to http://tcdxa.org/.