

April 2018



Still keeping on with the Society of Broadcast Engineers Monday Night Chapter 73' of the AIR VHF/UHF Hamnet. Details on how to join us at the bottom of the article here. Sure would like to have you join us from ANYWHERE in the world!

So with lots of flying flight simulator and drones for both EMF and for fun there hasn't been a lot of ham radio activity for me the past couple of months. Talking with my great friend Cris W5WCA on the 449.450 repeater most mornings here in Denver (mostly about flying!) and the Monday night net, plus checking into the Columbine Statewide Net on 3.989 MHz 7:30 MTN time has been most of my ham radio operations lately. Earlier in the month of March my good friend Tim KA0AAI stopped by and we did some setup on his DMR handheld, and I have been talking some on the W0TX Local DMR machine with Kenny K4KR in the Chattanooga Tennessee area a bit. Plus we are still on the ALLSTAR network usually connected into the KD0WHB Skyhub (node 46079) and on the W0GV AllStar repeater locally here in Denver. The W0KU 449.625 repeater can also connect into the AllStar network via IRLP. Pretty versatile stuff and we hope to expand the capabilities of all soon. Stay tuned!

As mentioned flying both my company issued drone for work and my personal Phantom 3 Advanced for practice and fun has been a source of real enjoyment for me. Getting to fly up and around towers in my zone are going to be quite informative and money saving for our company. It gets you up and close to the antennas on the towers of course without having to have a tower crew and the expense. This past month I put up a video on my "ke0vhjacktv" YouTube channel flying one of our sites. It was a bit of a windy day and I got QUITE close to the antenna and guy wires on the tower. WHEW! But I kept a close watch and am learning how to fly the drone (a Phantom 3 PRO) to get some great footage and detail on the upper reaches of the structure. If you didn't already take a look at:

<https://www.youtube.com/watch?v=B7v2ceKfgyY>



ews

Due to the current rules of flying near airports with controlled airspace you must now use a system that can take up to 90 days or so to get FAA permission if your tower is located within that space. I have a tower that is in just that position

that I really need to do an inspection at. SO, at this time I have applied for the permission to do so but am waiting, and so I expect that it will be May before I get the OK to do so. Details on how to apply are at: https://www.faa.gov/uas/request_waiver/ This web site shows a list of waivers granted, so I keep a look on it for mine to come thru: https://www.faa.gov/uas/request_waiver/waivers_granted/

However the FAA is beginning a program to make this process almost instantaneous. That will certainly make things quicker and easier especially when you need to inspect a tower in controlled airspace quickly. Take a look here: http://aopa.org/news-and-media/all-news/2018/march/08/faa-expands-drone-authorization-program?utm_source=drone&utm_medium=email&utm_campaign=180320drone

The FAA UAS data delivery system website is absolutely outstanding at showing permitted flight levels and areas of the whole country. This includes an amazing map that is movable and you can zoom into the area you are interested in. Take a look at it at: <http://uas-faa.opendata.arcgis.com/>

Another discussion says Part 107 operations do not require that you contact nearby airports in Class G airspace. That is a Section 336 (recreational) requirement. Please follow up with any further inquiries at UASHelp@faa.gov. Additional information is also available at <https://www.faa.gov/uas/>. Please select: UAS Safety and Integration Division AUS-400.

I am having a great time with my Flight Simulator setup in the hamshack. I now have 3 monitors so it is very easy to simulate the “cockpit” with this setup. It gives you a really 3D feel with depth perception, with a peripheral vision feel. I bring the monitors in so that they are together in what I call Flight Sim Configuration.



The computer screen on the left is switchable between the sim computer and my Win 10 machine so I can look up other airport and flight info.

As you can see the ham radio shelf is behind the center 32 inch monitor and inaccessible when I want to operate ham radio in this config. So I took a wall mount and set it up in a vertical way so the monitor will hinge up and rest on the shelf. That then makes the radios accessible and is in “ham station” mode!



Another view with the simulator in progress flying a Cessna 172



Making a turn to land at Centennial Airport in south Denver



See my Flight Simulator X landing a 737-800 at KATL Atlanta's Hartsfield Airport at night here:

<https://www.youtube.com/watch?v=Op8wOfeG0kg>

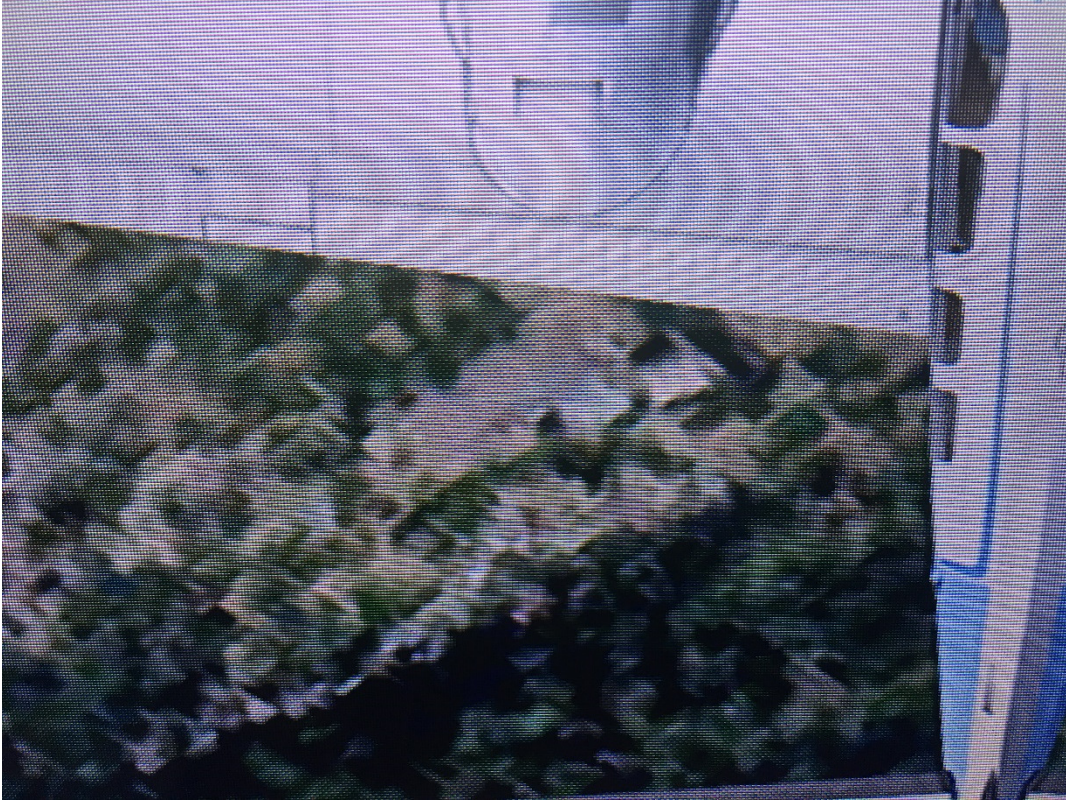
See my Flight Simulator X Piper landing at Centennial Airport Runway 28 here:

<https://www.youtube.com/watch?v=QZCiNSwrlx8>



This picture shows me "flying" the Beach Baron over our building in the Denver area!

With the Megascenery Colorado Flight Sim software flying over the state is really accurate and almost like using Google Earth! Pretty cool!



Right under the trailing edge of the wing is our transmitter site buildings near Denver!



This is flying SW of Pueblo Colorado over towards Greenhorn MT near our Rye Colorado site. WISH I could really get there this quick! ☺

One weekend in March we had what the natives refer to as “Thundersnow” in Denver. Sure enough, lightning struck near our Denver transmitter site and took out the ham radio connection to the 449.625 repeater up there AND our Nanobridge studio to transmitter backup link to our Trango main STL system. Not a good thing.

Funny thing is the studio Nano was communicating with the unit on the mountain but the transmitter side wouldn’t pass any network data. Checked the cable to the transmitter building and it was fine. So, to make a several day ordeal short the transmitter site Nanobridge was taking power from the building but passing NO traffic. Brought it down to the studio workbench and sure enough the network card was working from one side but not the other. SO, we switched out the whole Nanobridge M5 system (no longer made by the way)

for the Ubiquiti PowerBeam 5AC 300 system. I won’t list here all that it is capable of doing, but it is really outstanding in 2 ways that I will tell you about here. The first is if you need to change frequency to a different part of the 5 gig spectrum (5730 to 5840 MHz) you can tell the end you are working with to change and it will CHANGE THE OTHER END FIRST, then lock up both units together! OUTSTANDING! It has an onboard software alignment tool, speed testing, discovery mode, and a spectrum analyzer called “Airview”. VERY updated from the old Nanobridge system. BTW, the price is only right around \$100 per unit. The GUI has immediate real time monitoring of all parameters, signal strength on both ends, isolated capacity and throughput, signal to noise and interference, data rates of both ends, etc. This was one of the easiest to aim and get working projects I have ever done. Cris W5WCA helped me with the initial bench setup, Robert KC8GPD and Shane KØSDT helped with the studio and transmitter site setup. Robert and I ran a brand new cable and lightning protector up at the transmitter and then I “sight” aimed both ends and we walked it in for maximum signal from both sides. All tested well and I look at it just about every day. Should our Trango system fail it is ready to go. And soon, when our April pledge drives are over, we will put the PowerBeam on the air so we can do some needed work to the Trango system feed. More about that in a later edition!



Transmitter site PowerBeam



STUDIO SITE UNIT WITH LIGHTNING PROTECTOR



LOCAL

STL BKUP TX Site
PowerBeam 5AC 300

80:2A:A8:E8:AD:43
TX POWER 24 dBm

0.00
THROUGHPUT
CAPACITY
28.86
Mbps

Airtime

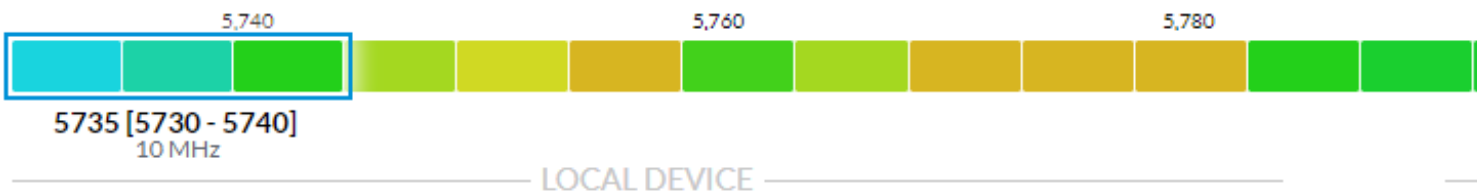
Distance 7.4 mi

Map

Link

Fr

SSID STL Link



SIGNAL -70 (-73 / -73) $\Delta 0$ dBm

NOISE FLOOR -98 dBm



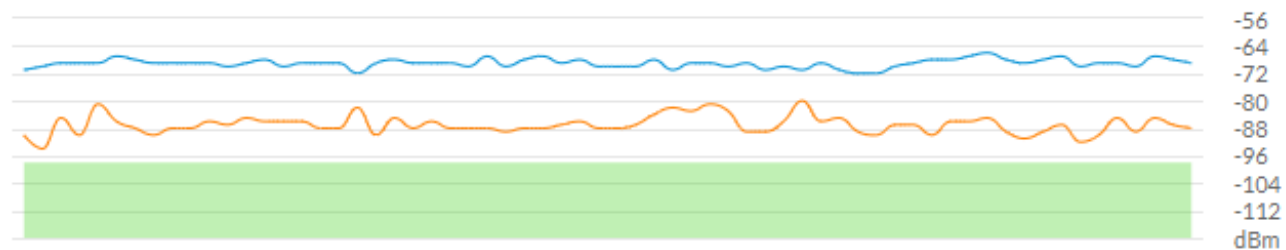
RX DATA RATE 4X (16QAM 2x2)

EXPECTED RATE 6X



ISOLATED CAPACITY / THROUGHPUT

SIGNAL, NOISE & INTERFERENCE



Average Signal
-69 dBm

Interference + Noise
-88 dBm

Noise Floor
-98 dBm

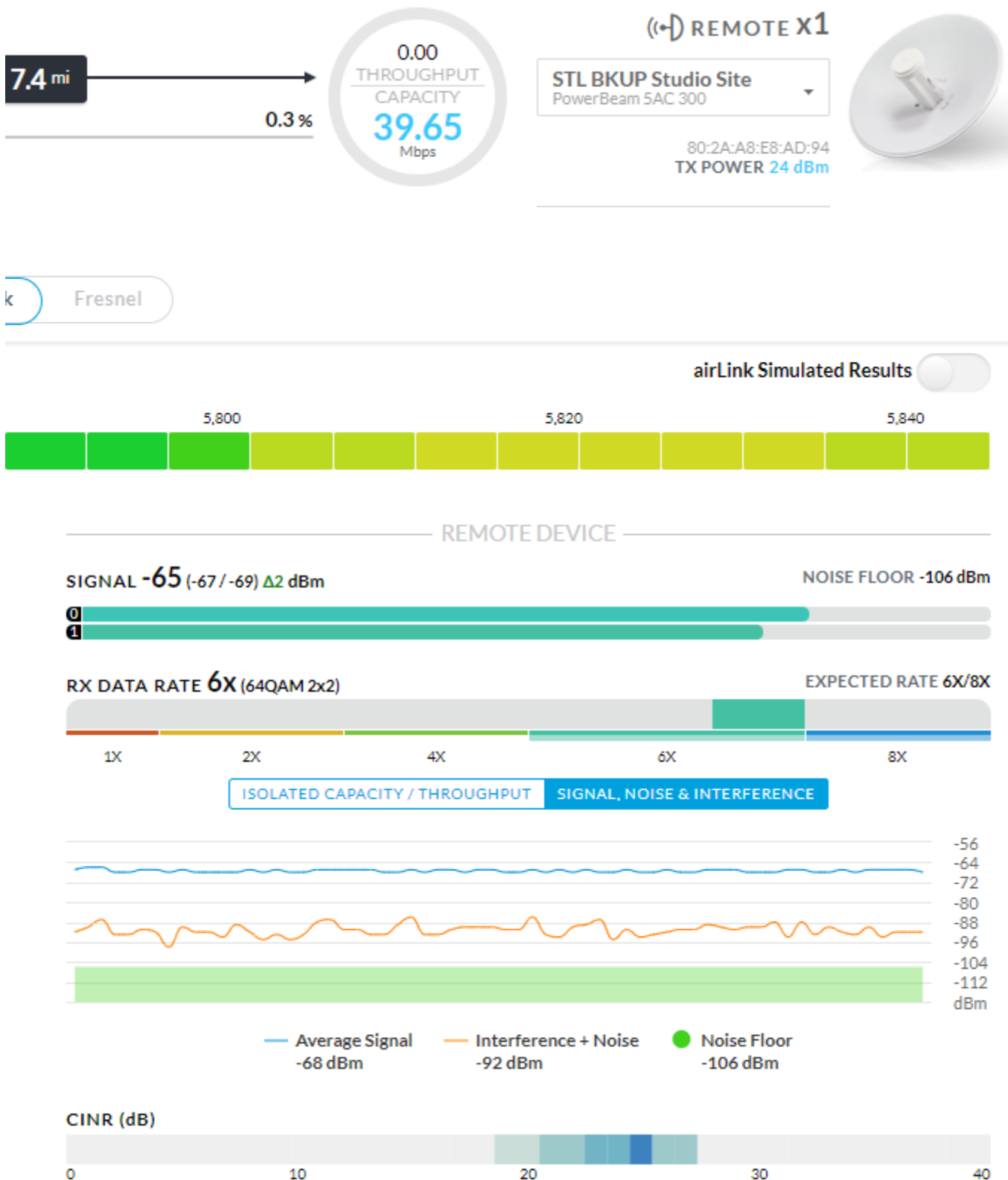
CINR (dB)



CIN

0

A picture of the GUI for the Transmitter site end



And the studio site end. As you can see the noise floor is higher at the transmitter end as might be expected. We put a bunch of Ferrites on the network leads up at the dish to reduce the noise floor from -92 to -98, improving the Interference + Noise from a -79 or 80 level to -88. Of course with a high power FM and UHF TV station less than 100 feet away this is outstanding performance almost as good as the parameters at the studio end. I am really impressed with these units and recommend them. Thanks to Cris for the original heads up about the Nano bridges and now the POWERBEAMS! And since we ran our network link and HD2 audio for

the better part of a year using these prior to the install of the licensed Trango system I am confident that they will do the trick!

Check out this article on the use of a solid state analog TV transmitter as a superconducting electron gun power amplifier. <https://accelconf.web.cern.ch/accelconf/IPAC2012/papers/thppc071.pdf>

Here are the links to my article archives

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201701Jan.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201702Feb.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201703Mar.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201704April.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201705May.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201706June.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201707July.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201708Aug.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201709Sep.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201710Oct.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201711Nov.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201712Dec.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201801Jan.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201802Feb.pdf>

<http://www.ke0vh.com/hamshack/archives/TheKE0VHHamshack201803Mar.pdf>

TWO YEARS AGO:

<http://www.smpte-sbe48.org/wp/2015/04/>

THREE YEARS AGO:

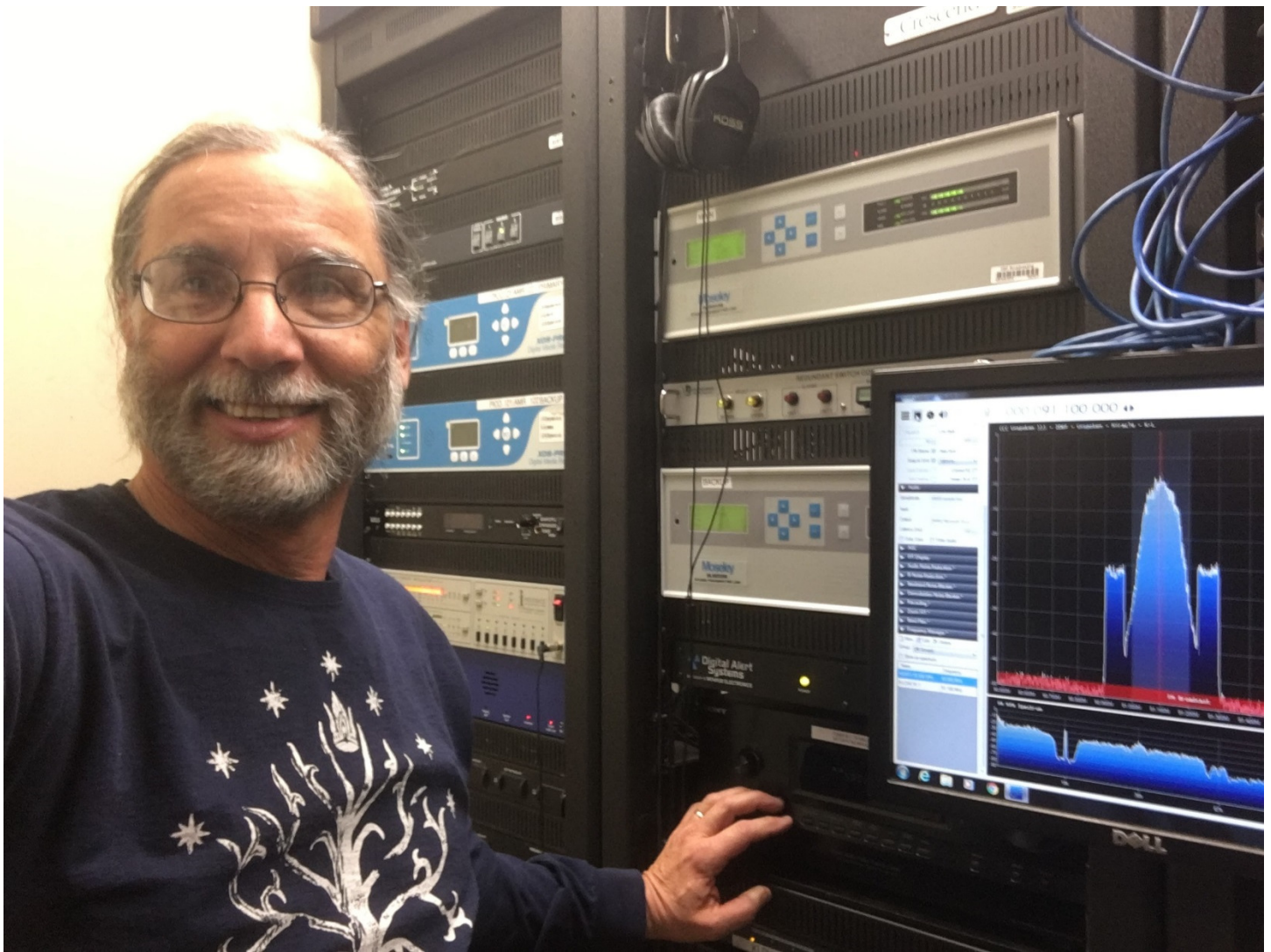
<http://www.smpte-sbe48.org/wp/2014/04/>

**Don't forget the SBE Chapter 73' Of the Air
AllStar (and Echolink) Hamnet, every MONDAY EVENING
At 7pm Mountain time (9pm Eastern) for radio discussions, both
Broadcast engineering and amateur radio.**

**Details on how to join us are at
<http://www.ke0vh.com/net/net.html>.**

**I hope
You will be able to join us and share your engineering and**

Ham exploits!



73' from "the Shack"& God Be With You!