The *Microvolt*

April, 2018
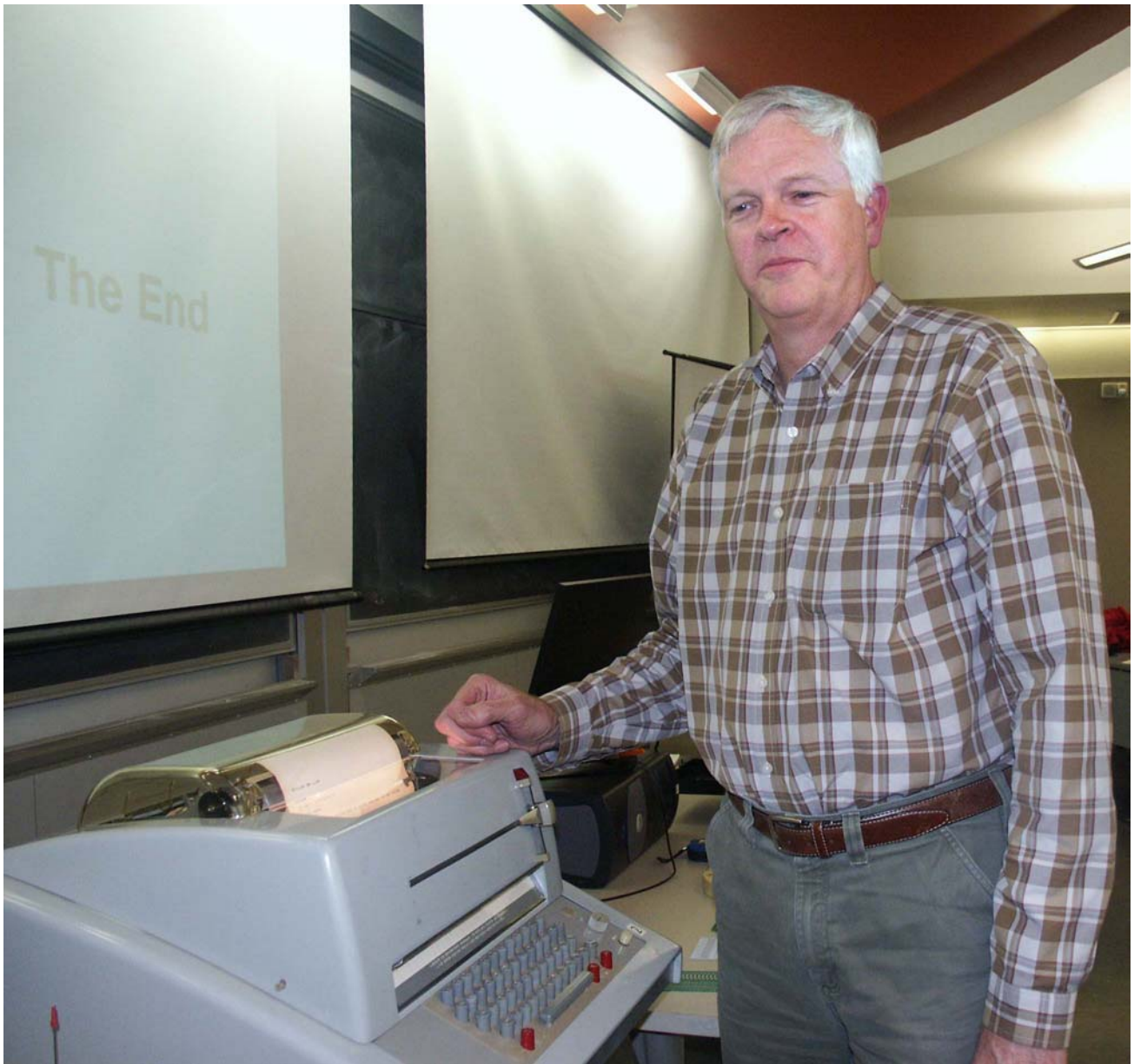
Prologue

Club: The Utah Amateur Radio Club was organized under its present name in 1927, although its beginnings may date back as early as 1909. In 1928, it became affiliated with the American Radio Relay League (club #1602) and is a non-profit organization under the laws of Utah. It holds a club station license with the call W7SP, a memorial call for Leonard (Zim) Zimmerman, an amateur radio pioneer in the Salt Lake City area.

Meetings: The club meets each month except July and August. The meetings are held on the second Thursday of the month at 7:30 PM in the University of Utah's Warnock Engineering Building, generally in room 1230 or 2230, sometimes in 2250 or 105.

Membership: Club membership is open to anyone interested in amateur radio; a current license is not required. Dues are $20 per year, including a _Microvolt_ subscription. _The Microvolt_ and membership cannot be separated. Those living at the same address as a member who has paid $20 may obtain a membership without a _Microvolt_ subscription for $12. Send dues to the Club Secretary: Ton Kamlowsky, WA7ZRG, 4137 Clover Lane, Salt Lake City, UT 84124-2711.

Contributions: Monetary contributions are gladly accepted. Send directly to the Club Treasurer: Chuck Johnson, 1612 W. 4915 S. Taylorsville, UT 84123-4244. For in-kind contributions, please contact any board member to make appropriate arrangements.

Repeaters: UARC maintains the 146.62- and 146.76- repeaters. The repeaters are administered by the UARC Repeater Committee. Comments and questions may be directed to any Committee member. The Lake Mountain repeater (146.76-) is IRLP node 3352. Instructions for IRLP use are on the club website.

Ham Hot-Line: The Utah Amateur Radio Club (UARC) has a Ham Hotline, 583-3002. Information regarding Amateur Radio can be obtained, including club, testing, meeting, and membership information. If no one answers leave your name, telephone number and a short message on the answering machine, and your call will be returned.

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IRLP Information

For information on using the club's IRLP node on the 146.76 repeater, check http://www.utaharc.org/irlp.

For late breaking news listen to the UARC Information Net Sundays at 21:00 on 146.62 or set your browser to: http://user.xmission.com/~uarc/announce.html

We are grateful to the management of XMission, our Internet Service Provider (ISP), for the donation of this Web-Page service.

For account information go to:
http://www.xmission.com/   Or call 801 539-0852

April Meeting:
"MESH" and The Wasatch-100

For multiple decades one of the largest public service events for which radio amateurs have supplied communications is the Wasatch Front 100-mile Endurance Run. The event includes approximately 15 aid stations spread from Kaysville to Midway. Amateurs at each aid station use packet radio to enter runner in- and out-times directly into a database at the finish line.

In 2012, a few amateurs started using MESH, a high-speed microwave relay system, in addition to packet radio, the traditional scheme, on VHF. Initially it connected just two of the aid stations. Later, the finish line was added. At our April meeting, Charles Gray, KE6OZU, and Ed Sim, N7RTA, will tell us how they have used this experience to evaluate and set up networks. The addition of MESH has reduced traffic on the packet network and at net control. Now volunteers are sought to expand MESH useage.

The meeting will take place at 7:30 P.M. on Thursday, April 12, in room 2050 (the "Robison" classroom) of the Warnock Engineering Building on the University of Utah campus.

The front elevators in the Warnock Building have the second floor locked out in the evening. There are two possible solutions for the handicapped. The first is to get into the elevator and then send an able-bodied person up the stairs to the second floor to call the elevator. The second method is to find your way to the elevator in the southwest corner of the building (the same elevator we have been using during fall semester) and use it to access the second floor.

UARC meetings are held on the second Thursday of each month at 7:30 P.M., in the Warnock Engineering Building on the University of Utah campus. The meetings during the University's spring semester of 2017 will be in room 2050 on the second floor.

See http://user.xmission.com/~uarc/meetmap.html for a map and information on finding the building. The room number varies depending on availability.

Of course, the meeting will include the "standard" meeting features:
- Availability of ARRL books from Brett or John, the "book ladies"
- An opportunity to join UARC or renew your membership
- An opportunity to join ARRL or renew your membership
- The chance to meet face-to-face the people you talk to on the air
- The "Meeting after the meeting": A chance to enjoy pizza or other gastronomic delights with other hams. It happens at Litza's Pizza, 716 E. 400 South.
- The "Meeting *before* the meeting": A similar get-together for those who can leave work early enough to get there by 5:15 P.M. It is held at "The Village Inn," 910 E. 400 South in Salt Lake City.

Latest News

Our Cover

Our cover this month features John Whitney, AF7ZU, showing a restored teletype machine. John along with his sons, Brian, AF7ZT, and Steven, AF7ZV, worked for several years to get this and other teletype printers in usable condition, and then built equipment and wrote software to convert serial protocalls and alphabets to make them usable for accessing internet.

Meet the Presenters

Our presenters for the April 12 meeting have sent us some material to introduce themselves.

Charles Gray, KE6QZU:
I have been interested in electronics and in Amateur Radio since High School. I started working in electronics soon after graduation from high school. I have been involved in several disasters. The one that got me moving in Amateur Radio was the 1989 Loma Prieta Earthquake. (Well the no-code requirement also helped) I first got my Technician class license in 1995, then advanced to General in 2007, and then to Extra in 2008.

I have enjoyed working both digital and analog modes in the VHF and UHF bands, and I am now working with mesh as well. I was involved in the 2002 San Ramon Earthquake swarm. I have been in Houston for Hurricane Katrina, Rita, and Ike.

Since 2012 I have been involved with the Wasatch 100 providing Mesh communications among several of the aid stations and the finish line. We actually used Mesh to enter data and query runner information. I also have been working throughout the SLC valley teaching and testing Mesh. We have created links as long as 19 miles between stations. We have used video, VOIP, and chat over the Mesh networks. I use the Raspberry PI as a server behind the mesh routers. I also have Mesh running on the Raspberry Pi, and a laptop.

Ed Sim, N7RTA:
- Interested in Ham Radio since 1968, Licensed since 1991
- Helped organize the Salt Lake Peaks Amateur Radio Club in 1992
- Earned Extra class in 2001
- Volunteer Examiner for the ARRL and W5YI
- Interested and involved in HSMM MESH since 2012
- Ham Radio Coordinator for the SLC Marathon from 2004 to 2014
- Helped with the Wasatch 100 since 2005

New Name for the Book Person

Welcome to Rick Gregory, KG7GOW., who has graciously taken over the job as the person who makes sure we have a proper number of ARRL books available at our club meetings along with kits and other items. There seems to be just one problem: Rick doesn't seem to like being called "Book Lady." The name first came into use when Susan Boman, AA7HD (now a silent key) took the position decades ago. It continued happily through the terms of Fred, Brett, and John and it just seemed to have such a nice ring that no one thought to change it.

Well, the time has come. We hereby announce a contest for a new name for this position. Send your suggestions to Rick at mailto:rfg@xmission.com. If there are one or more entries that are acceptable to Rick, the author of the best one will receive a $25 credit toward item(s) carried by the book, uh, person. Give it some thought and send your ideas off to Rick.

April License Classes

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Bill Rouleau AE7UI and I will begin another set of classes for the Technician and General licenses. Each course will run for 8-9 weeks. The Technician course will be held on Monday evenings from 7-9 PM starting on April 9th. There is no charge for the course but there is a $33 fee for the manual.

The General course will be held on Tuesday evenings from 7-9 PM starting on Tuesday April 10th. There is no charge for this course either; the manuals are $30 each.

Both courses will be taught in my "shack" at my home, about 5000 South and 1500 East. An exam will be offered at the completion of the course for which there is a $14 fee payable at the exam. If you are interested, or know someone that is, please email me at ad7sr@arrl.org and I will send details. Let me know as soon as possible. We like to limit the classes to about 10 students and the General course is already beginning to fill up.

—Morris Farmer, AD7SR

What is a "WebSDR?"

By Clint Turner, KA7OEI

Not surprisingly, a "WebSDR" is an SDR (Software Defined Radio) that is accessible via the Internet — but what is it, really? A traditional receiver — an "HDR" (Hardware Defined Radio) has various parts that work together to take an RF input and produce audio — but all of this is simple mathematics: The "Mixer" in a "real" radio converts one frequency to another (in software that's just a bit of addition/subtraction and multiplication), the "AGC" (Automatic Gain Control) "looks" at signals and keeps them at a constant level (more addition/multiplication) while the BFO (Beat Frequency Oscillator) takes the IF (Intermediate Frequency) signals and converts them to audio (another mixer!) What is done in hardware can be pretty simply done in math — and computers do that pretty well!

It would make sense, therefore, that if you were to somehow get a bunch of signals on a ham band into a single computer that the "math stuff" described above could be wielded to tune in a signal and make audio — and if the computer were fast enough, with enough memory (not a problem these days) that it could do it for many signals, simultaneously. If you take that just a bit further, the audio that each of these virtual receivers recovers could be put into a "pipe" and

sent to many different users connected to that computer via the Internet and that's the function of a WebSDR.

Unlike a more "conventional" ham station — either one in your shack, or a remotely-controlled radio — this offers some interesting capabilities. Unlike a single receiver, each user has control of his own "virtual" receiver and can tune it to whatever frequency he likes (as long as it is being covered) in whatever mode that he likes — and this has some interesting implications: A single, "good" receive system can be leveraged to provide a service for many people, simultaneously — many dozens or even hundreds — and because it's reachable via the Internet, those users could be almost anywhere!

While this can be applied to receiving, this same "usable by many" approach cannot be applied to transmitting: Simple physics makes it difficult and expensive to construct a single transmitter — or several — that use the same antenna, and even if that were available, those transmitters would wipe out reception on all nearby frequencies anyway: In any case, a single site could support only a handful of simultaneous transmitters at most while a receive-only site could support

many. This "receive only" capability actually works well with the way most amateurs use their radios: We typically spend far more time receiving than transmitting — or at least we should!

Having access to a remote receive system has some interesting implications as well. As is typical on HF, whether or not two stations can hear each other often depends on where they are – – they can be too close to each other and have the signal "skip" over them, or they can be too far and not be able to hear one another. Having a bit of "diversity" in site location can help with this problem: If you can't hear the other station, you may find another receiver that can.

Another problem that is becoming more chronic is that of "local" noise. With the growing ubiquity of electronic devices all over our houses we are slowly submerging ourselves in a sea of noise — most often in the form of small, plug-in power supplies (i.e. "wall warts") that use switching supplies, which are literally small, powerful oscillators/transmitters that help convert one voltage to another. I'd bet that the reader would be completely shocked to know that some manufacturers of these devices tend to use low-quality parts — or omit altogether — those components that might prevent these devices from spreading an electronic miasma across the radio frequency spectrum! Other devices that create such noise can include lighting — both "bulbs" and dimmer/controllers—, computer monitors and TVs, plus many appliances with built-in power supplies that lack good filtering.

The result of this is that unless one actively executes a "seek and destroy" strategy (or better-filters) these noisy devices (the methods and

techniques could fill many articles!), receiving weak signals at HF becomes increasingly difficult as the S-meter slowly climbs over time. In such a situation, while our receive capability may be increasingly compromised, we can still transmit as well (or as badly!) as before, so access to a WebSDR can help with this situation — perhaps while you are working to solve your local noise problem, or you have tried to resolve the noise issue but have found it to be intractable.

Another utility provided by WebSDRs is the ability to check out your own transmit station: If you have several antennas, you can "see yourself" and by comparing signals from several antennas that you might have — or similar antennas from other stations near you — it is possible to do a "sanity check" to see if everything is working well. Because there are a number of WebSDRs in geographically disparate locations one would compare signals at those receivers, too, to see if differences between antennas/stations were due to geography, antenna pattern or propagation.

Finally, WebSDRs can also be used to divine various aspects of propagation: Are the bands really closed, are they "short" (favoring local stations), are they "long" (favoring distant ones) or just plain "weird" (a topic too big to cover!) By tuning around on several WebSDRs and listening to who is working what can be both educational and informative.

For more information on the WebSDR project, go to http://websdr.org . There, you will not only find a list and interactive map of many WebSDRs around the world, but also background information and answers to a few questions. If you are interested in looking about on a WebSDR here in Utah, go to http://utahsdr.org .

The Northern Utah SDR Receiver

Now that Clint has described a Web SDR, you should know he modestly failed to mention being

the principal designer of the new SDR in northern Utah. Over the last several months Clint has been

working with other hams, particularly Mike Mimbach, KCØJRE, to gain access to an abandoned radio site in northern Utah near Corinne and put it to good use. The jewel of the site was an omni-directional gain antenna covering 3 to 30 MHz! It is a TCI model 530-4 and has the appearance of a maze of wires radiating out from a 92-foot aluminum tower. It was the perfect antenna for a web SDR receiver.

The Corinne site is now available for use and is known as the "Northern Utah WebSDR." It can be tuned to any of the HF bands plus a few short wave broadcast bands, the new 630-meter band, and two meters. It was even given a positive review on the "Ham Nation" webcast.

There are currently two servers in operation. One covers 160 through 40 meters plus the A.M. broadcast band, the new 630-meter band, and the 60- to 49-meter shortwave broadcast bands. Server number two covers 10 MHz and higher bands. Each can accommodate as many as 50 users at a time, each choosing his own frequency, mode, and

bandwidth. You can access the site by going to http://www.utahsdr.org/. The site contains technical details, a block diagram of the setup, and even a data sheet for the antenna.

Some have said "now all we need is a matching transmitter and all will be perfect." That won't be happening. The beauty of the site for receiving is the *lack* of nearby transmitters. Transmitters for multiple users would be a near-impossible feat and even one transmitter on the air would cause serious receiving degradation in many parts of the spectrum.

Maintaining the installation will require some funding for rent, power, mainenance, etc. Putting the site on the air was done through personal contributions of a number of amateurs. Research is underway to find the best structure to allow multiple hams and clubs to make continuing donations.

Gary Crum, KK7DV, has some photos of the site and the antenna including some looking down from a drone. See: https://photos.app.goo.gl/IQ01v1yYfoOEb5gu2.

License Examination Schedule
Opportunities to test for new or upgraded amateur licenses

Date	Day	City	Contact Person	Phone
04/07/18	(Sat.)	Salt Lake City[1,4]	Gordon Smith, K7HFV	(801) 582-2438
04/14/18	(Sat.)	Hurricane[2]	Gary O. Zabriskie, N7ARE	N/A
04/18/18	(Wed.)	Provo[5]	Steve Whitehead, NV7V	(801) 465-3983
04/18/18	(Wed.)	St. George[2]	Gary O. Zabriskie, N7ARE	N/A
04/21/18	(Sat.)	Logan	Richard D. Elwood, KE7GYD	(435) 770-7050
04/30/18	(Mon.)	Taylorsville[5]	Garth Wiscombe, W7PS	(801) 558-5936
05/16/18	(Wed.)	Provo	Steve Whitehead, NV7V	(801) 465-3983
05/16/18	(Wed.)	St. George[2]	Gary O. Zabriskie, N7ARE	N/A
05/21/18	(Mon.)	Taylorsville[3]	Garth Wiscombe, W7PS	(801) 558-5936

[1]Preregistration required. Check with the contact person before the test session.
[2]More information at http://www.dixieham.org/meetings.html
[3]New location is the Taylorsville City Hall, 2600 Taylorsville Blvd, Room 110
[4]More information at http://www.utaharc.org/Exams/
[5]Preregister by going to http://www.hamstudy.org/sessions/ and finding the session date.
More details at http://user.xmission.com/~uarc/testinfo.html.

Member of the Month
Willard Liddell, KI7PGV

By Linda Reeder, N7HVF

This month we are featuring Willlard Liddell, KI7PGV. Willard was introduced to amateur radio at a very early age. His mentor was his best friend, Glen Murray, KB7QYI. Glen has his General license and the two have been best buddies since grade school.

Glen tried really hard to convince Willard to get his ham radio license but Willard had other things on his plate that needed his attention. He was working hard on becoming a dispatcher. Willard is a Utah State coast emergency medical dispatcher and he is 911-certified. He had to keep track of several radio channels. He worked on the 800-MHz band and still monitors it. He also worked with criminal justice. When warranted, he had access to driver licenses. Willard worked as a dispatcher for 28 years and was a sergeant for six years.

Willard and his wife, Lisa Ann, have two children, both girls. They are all grown now. Muriell Cassie is 18 and will be graduating from high school this year. She trains horses. Leesa Diann is at Weber State college working on her bachelors degree in the medical field. Willard's wife, Lisa, is a nurse and draws blood. She works at the NorthPointe Medical Park, in Tooele.

Willard has a disability. He was born with a bone disease requiring him to wear a brace all of his life. It has gotten worse as he has gotten older. He had a hip replacement which caused lots of problems. Willard has a special device in his Jeep that enables him to put on the brakes using his arms. He also uses a cane.

Once Willard retired he decided it was time to get into amateur radio. He received his Technician license on August 3, 2017. He is now studying hard to upgrade to General. He hopes to get that taken care of in a couple of months. He is very active in the West Desert Amateur Radio Club and Tooele County Emergency Management. They maintain computer operations and several repeaters. If you have a ham license you can use them.

Willard likes to talk on the repeaters. His favorite thing about amateur radio is investigating radio models. He really enjoyed the presentation on antenna modeling. It is right up his alley. He has an Icom 7100 HF and VHF transceiver. Willard is active on the D-Star reflector. He is also a member of ARRL and UARC.

Willard says ham radio is his number one hobby. His number two hobby is indexing for the LDS Church. He has indexed 122,000 names. Willard schedules the ward building if members need it for special activities.

Willard has six dogs and three cats.

Willard, welcome to the hobby. We wish you the best on upgrading to General.