

The *Microvolt*

July 2023



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Prologue

Publication: *The Microvolt* (USPS 075-430) is the official publication of the Utah Amateur Radio Club, Incorporated, 3815 S 1915 E, Salt Lake City, UT 84106. It is published monthly except August. Subscription is included with club membership at \$20 per year. Single copy price is \$1.50. Periodicals postage paid at Salt Lake City, Utah. Postmaster: send address corrections to The Microvolt, c/o James Bennet, 4960 W 5400 S Kearns UT 84118.

Deadline for submissions is the 24th of each month prior to publication. Reprints are allowed with proper credits to The Microvolt, UARC, and authors. Changes in mailing address should be communicated to the Club Secretary: James Bennet, 4960 W 5400 S Kearns UT 84118.

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 usually 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: James Bennet, KK7AVS, 4960 W 5400 S Kearns UT 84118. Let the Secretary know if you prefer the electronic edition of The Microvolt instead of the printed version.

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.

Ham Hot-Line: The Utah Amateur Radio Club (UARC) has a Ham Hotline, 801-583-3002. 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.

UARC 2023 Board

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Late Breaking News

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>

Writing for Microvolt

We encourage you to submit original pictures, articles, book reviews, software and hardware descriptions, nuggets of humor and responses to editorials. Photographs in the highest resolution are best. Send plain text without embedded pictures but labeled to correspond to pictures. E-mail the editor: microvolt@utaharc.org.

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

Latest News

UARC Meetings

UARC meetings are held on the second Thursday of each month except for July (annual steak-fry) and August (vacation). Meetings are held in the “Warnock Engineering Building” on the campus of the University of Utah. Watch the UARC website for the room and topics.

We encourage attendance of the live meeting, but we will also do our best to stream the meeting live on UARC’s YouTube page:

<https://www.youtube.com/c/UtahAmateurRadioClub>

From there, look for the feature that is marked “live.” The meeting should commence at 7:30. There should be some chatter on the channel by about 7 P.M. and you can connect in that period to make sure everything is working.

July Steak Fry

In place of our usual in-person meeting, UARC’s Steak Fry will happen on July 15, 2023 and will occur at the usual place - the Spruces Campground in Big Cottonwood Canyon in Group Area 7. Despite inflation, dinner - which will be a steak, salad, corn-on-the-cob, ice cream and all of the ’fixins will cost a measly \$15 per person - the same price for the past several years. There are sign-up links at the bottom of the page at <http://user.xmission.com/~uarc/announce.html>.

Our Cover

Count the radios, 75 MHz to 1090 MHz in a Cessna 172, fox hunting a rocket.

Photo Credits

Baofeng, rocketry, Jed Marti KI7NNP, rocketry Neal Baker KG7WRY.

License Classes

Utah County:

The Utah Valley Amateur Radio Club will be holding an Amateur Extra course 6:30 pm to 9:30 pm for five

Tuesdays in a row at the Orem Public Safety Training Room, 95 E Center Street. We’ll hold the course on July 18, July 25, August 1, August 8, and August 15. Sign up for the \$10 course at psclass.orem.org. No books needed, but you’ll need to bring a laptop or smartphone to each class. This class is fun, engaging, and hands-on, but its homework will challenge you. If you have questions, please call Noji Ratzlaff 801-368-1865 or email nojiratz@hotmail.com.

Salt Lake:

Technician: Zoom with KI7MTI and KK7AVS every Monday from 6:30 PM. Contact KI7MTI@gmail.com for invite.

General: KK7AVS 147.16 MHz, positive offset, tone 127.3, every Tuesday 7 PM – 9 PM.

Extra: In person, contact Ron Speirs K7RLS@comcast.net.

Local Beacons, SDR

K7JL: 10 watts, 28.2493 MHz CW, Sandy.

KK7AVS: SDR 33, 70 cm, 1.25M 2M 6M 10M 20M 40M, Kearns.

Cheap, Cheap, Cheap

My View

A new Baofeng UV-5R costs much less than a reasonable meal and drinks yet delivers serious power on the 2 meter and 70 centimeter bands. Is this a blessing bringing in new technician licensees in droves or the curse of Citizen’s Band? Will potential new technician licensees become bona fide radio amateurs or lose interest?



The \$20 - \$50 cost of this and similar radios reduces the amateur radio entrance fee to a degree we never thought possible a few years ago. They're all over Amazon. Their advertising does not specify that you need an FCC license to operate them. The attraction is low cost, high power, long distance communication. The purchase motivation is similar to problems associated with cell phone users and falls into four loose categories.

The "I can do anything in the wilderness because I have my cell phone to get rescued" attitude. Drive off into wilderness, get stuck, call for help, someone will hear and send rescue. Take a selfie and back off a cliff (mostly in Arizona, who would do that in Utah?) If you're stuck in a slot canyon or out in the west desert, a 5 watt HT won't get you rescued either. These people are the bane of the volunteer search and rescue groups, especially here in Utah.

The "I'll get a bunch of these and hand them out to my family and friends for emergencies because they can communicate farther than FRS or CB" attitude. This group expects to just turn on and communicate without frequent practice. We can expect them to be a diminishing problem as their batteries wear out, aren't charged, dropped and broken, instruction manual lost, or lost in the house "junk drawer". In a worst case scenario, we would have tens of rookies all demanding immediate service and willing to babble until they get it. The repeaters would be overwhelmed or garbled by users trying simplex on the same frequency.

The "It's a free country, I can transmit what I want at the highest power" attitude. The bane of Citizens Band which is supposed to be limited to 4 watts AM,

and 12 watts SSB. With threatening attitudes, colorful language, and ravaged amateur linear amplifiers, CB has become essentially useless and abandoned by the long haul truckers and the drivers it was supposed to support.

The "I need to buy one to see what all the fuss is about" attitude. This motivates columnists with \$30 burning a hole in their pocket. Fortunately there aren't enough of us around to cause much trouble.

Should we worry?

Boosting the power output of a \$20 transceiver with a \$900 three hundred and fifty watt power amplifier and a \$500 twelve element Yagi antenna probably won't happen more than once. Some reasons not to worry.

1. The devices are rather fragile and won't survive many trips to hard concrete.
2. The devices are not "plug and play". Using a repeater will be beyond most non-amateurs.
3. The users probably won't practice with them more than a few times before disillusionment sets in and they go in a drawer.
4. After a few years of not charging it or charging it all the time, the battery will probably die.

Will this increase the ranks?

The Baofeng and its ilk are not a gateway drug to advanced amateur radio. VHF/UHF are fun for a while, but for most, this wears off quickly. Too many complaints from social net companions about your poor signal will be a turn off. A quickie technician license, the license exam and a text book will cost more than the radio, will only attract those who are already predisposed to advancement, a very limited group.

What should be done?

There's not much we can do without becoming *ham-noxious*¹. After all, if you have at least a technician license, have at it. Symptoms of a problem would be

¹*hamnoxious* adjective
*ham-näk-she*s

1. Ham with a censorious attitude.
2. Ham that can only talk about their number of contacts, certificates, and awards.
3. Ham that always has better equipment than yours.
4. Ham that drones on and on until their PA burns out.

frequent interruptions on social and emergency nets where the transmitter doesn't have a call sign, frequently interrupts, or makes rude noises.

Things to do:

1. Use these at outreach events to show what can be done and how to do it legally.
2. Point them to classes. These are local people and probably don't know any better. UARC and local clubs will be happy to help.
3. Repeat offenders should be warned about fines and radio confiscation.
4. Foxhunt anyone?

Mile High Antennas

KI7NNP Jed Marti

After spending a weekend in the west desert at the Utah Rocket Club (UROC) launch in preparation for an even more remote Field Day, I observed many interesting uses of wireless communication and control. Many of you perhaps launched Estes model rockets when younger. Those of us that didn't outgrow this obsession moved on to bigger and bigger ones as our incomes improved.



There are many similarities between amateur radio and amateur rocketry. Rocketry requires multiple levels of certification - we don't have much imagination so they're called Level I, II and III. Instead of the

FCC rules we operate under those of the FAA and National Fire Protection Association (NFPA) and Bureau of Alcohol Tobacco and Firearms (BATF). Because of this, certification is mostly about safety and complying with the rules. You take a test half way through the process and build a large rocket with electronic controls as a final test. If it flies and can fly again, you're certified.

Two national organizations, National Association of Rocketry and Tripoli Rocketry Association provide some insurance for the land owner (typically the BLM in Utah). Home owner insurance provided by the flyer covers accidents and injuries.

That being said all launches are family events with plenty of excitement shared by even the youngest set who are encouraged to launch small rockets with parental supervision. Every flyer, even the youngest, is announced over the PA system, with the details of their rocket and asked if they're ready.



The advantage here is obvious - a continuous supply of new members as we old timers go *ad astra*. Local universities have rocket clubs and may even allow capstone projects for their members. It's not uncommon for us to have 10-20 undergraduates attempting to get certified on a weekend. Most of these students go on to STEM careers, some return as flyers to mentor the next group.



Wireless communications has 3 main uses: launch control, tracking and telemetry, and remote communications. The desert and the Salt Flats are murderous on copper and brass. Sand and salt get into everything. Like UARC, the club maintains a trailer that must be replaced every few years and as time has rolled on has accumulated more and more absolutely necessary stuff. Like UARC, finding a member with a truck big enough to haul the thing around is a constant problem as is finding a place to store it.



Add to this that gun powder is used to eject parachutes and its worst residue is sulphuric acid. Small rocket motors use gun powder as a propellant and the larger ones emit all sorts of noxious gasses (different colors are a big hit) that corrodes the lines from launch con-

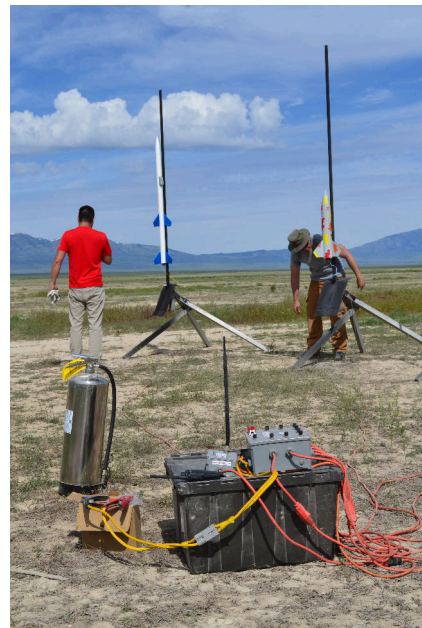
trol to the rocket.

Wireless Launch Control

A big win has been the introduction of wireless launch control equipment with about a 1000 yard range. With secure codes and short range, it has been very reliable - we've had no unplanned launches from RF interference. The main control station, the PA system, and wireless communications to far away pads are powered by a Jackery Solar system - no noisy generators need apply.



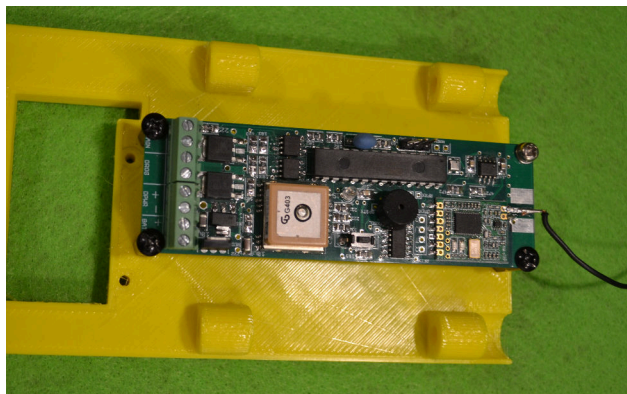
We use multiple launch stations each with its own code and pad number and one controller at the main table. Each pad is powered by a Lithium battery as starting a solid fuel engine and powering the bidirectional communication requires a lot of power. Proper electrical design ensures that the drain of starting (or short) does not interrupt secure communications.



Telemetry The big use of amateur radio has been the advent of 70 cm telemetry and control. Sharing commonality with amateur Pico balloons, deploy and

telemetry devices include a micro-controller, GPS, high power digital control, barometric and accelerometer altitude reporting, tilt sensing, RF transceivers, displays, times, beepers. Many of the transmitters have more than 100 milliwatts EIRP. Reputable manufacturers will request an FCC call sign before selling you one.

To save costs, some of these are kits such as the Arduino based system shown below. This has a beeper so you can tell if the payload is ready to fly, an AT-MEL micro controller, a barometric pressure sensor, high current drivers and a 70 cm transceiver module. A base station has an LCD to display altitude, speed, and position. Other systems work 900 MHz and 220 MHz (the cover).



To save weight, many rocket bodies are made from carbon fiber tubing which soaks up all RF. Special dispensation for antennas using external wires or copper tape adhesive are necessary, or, in the case of GPS, a fiberglass window for its signals.

Communications

As rockets get bigger and apogees higher (55 miles a current record) spectators and launch control have to be moved farther away - a catastrophic failure on the pad or near the ground can send shrapnel a considerable distance. Reliable two way communication between the pad crew and launch control must not use high power RF - internal shielding may be insufficient and cause premature ignition. In the past, we've used GMRS radios but these have insufficient range for ground chase vehicles that may get stuck in unforgiving terrain in desert temperatures. Getting stuck on the Salt Flats 10 miles from the freeway in 100+ degree weather is both expensive and dangerous.

Lessons Learned?

Attracting the young, losing them for a few years, and then reviving their interest after the demands of school, career and family have been met are central to many STEM pursuits. Model rocketry has the ad-

vantage of NASA advertisement and science fiction films. With parental encouragement, even the young can participate and perform most of the work themselves giving a sense of accomplishment that talking to the ISS cannot match. Post high school rocketry has competitions, college credit and a clear career path. Robotics has well established national groups encouraging team work, grant writing, and hands on experience. Graduates of these pre-college programs are rewarded with scholarships and are recruited by Universities. These people become the core volunteers mentoring the next generation.

Many UARC members had an early exposure to RF communications, left for years, and then resumed what they may have done for a living (or something like it) when leisure permits the pursuit. Our job is to welcome them back.

Member of the Month

Joe Chenworth AF7JC



This month we are featuring Joe Chenworth AF7JC, a UARC member of 38 years. Joe was born in Seattle, Washington. His father and grandfather were in the Air Force so his family moved frequently. Joe attended high school in North Carolina and was a sophomore when his best friend got him interested in amateur radio. In 1956, Joe and his cousin Richard

got their licenses at the same time. In 1957 Joe obtained his general class license. Unfortunately after graduating from high school ham radio got put on the back burner for college and other things. It was many years before Joe got back into amateur radio.

Joe received an undergraduate degree in mathematics and physics in North Carolina. After graduating, he enlisted in the Air Force but couldn't be a pilot because of astigmatism so was made a navigator. It was hard work and Joe didn't like it but got his lieutenant to send him to Salt Lake City where he got a degree in meteorology from The University of Utah. Joe was really excited about this as he always been interested in the weather as there were lots of hurricanes in North Carolina.

On Joe's first full day in Salt City he met Linda and they dated during his meteorology training. After completing training he married Linda and they moved to Mountain Home Idaho where Joe was a forecaster for all of western Europe and United States Air Force bases. Joe did this for 3 years.

The Air Force sent Joe to Chicago for a two week training on how to how to work with weather satellites. Then it was off to Southwest Germany to teach others how read and interpret satellite data. Joe wrote a book on weather satellites that anted him on their team. Joe left the Air Force after 10 years of active service.

When Joe and his wife Linda got to Salt Lake they found that she was having twin boys that were born in July 1970. Joe knew that Linda would need his help so he got a job at Skyline High teaching physics and chemistry remaining there 10 years. Joe and his wife have four boys and one girl.

Joe got a job with an engineering company in Park City and finally got back in to amateur radio. His son David wanted to get his amateur license. David passed his novice, technician and Morse code tests. While Joe's son David was taking his test they convinced Joe to to apply for his license again. He had to start all over. But, Joe got his general class in 1980 and went on to get his advanced license while he was in Park City. David got his general class license when he was 16 years old. Two of his other sons got their licenses and David still has his.

Joe and his wife bought a house in Heber City. Joe would drive back and forth every day because he worked in Salt Lake City where he taught mathematics and physics at Highland High for 28 years. Joe also worked nights teaching at BYU and Utah County. In 1985 Joe got his extra class license at the same time

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I got my technician license. Joe said I used to talk to him all the time and kept him company while he was driving home to Heber City. Joe likes VHF and the low band frequencies the best. He loves talking on 10 meters when it is open. Joe loves to hike and would always go with Gordon Smith K7HFV on Wednesdays when the weather was good. Joe went to his first field day last year at Payson lakes and spent Saturday making lots of contacts. He is planning on going again this year.

Joe, thank you for the privilege of interviewing you for the Microvolt.

73 N7HVF Linda Reeder