

September 2020

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New ARRL Chief Takes Over This Month Board Elects CEO David Minster, NA2AA

The ARRL Board of Directors has elected David Minster, NA2AA, of Wayne, New Jersey, as ARRL's new Chief Executive Officer. He'll take the reins starting on September 28th. Minster is currently Managing Partner at Talentrian Partners, a management consulting firm serving the consumer goods and luxury goods industries.

Minster began his career as a software engineer, moving into management at Unilever, as a Chief Information Officer. More recently, Minster served as CEO of jewelry brands Scott Kay and Judith Ripka.

"Building a culture of accomplishment and accountability is what I do best," he said. "My initial focus will be working with the Board on establishing strategic goals and concrete plans to navigate ARRL through the digital transformation required for the coming decades of its Second Century. This includes exciting and innovative ways to be engaged in amateur radio, while growing activity and membership."



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Scorsone Recognized for Two Decades of Service

Past President Tom Scorsone, KC2FCP, was presented with a plaque honoring him for two decades of service to the club as its chief officer. He now serves as President Emeritus, advising the officers and board.

The inscription on the plaque reads:

"Presented to Tom Scorsone, KC2FCP,

In Recognition of Two Decades of Service as
EGARA President

With Grateful Appreciation of the Members
East Greenbush Amateur Radio Association"

The plaque was presented on behalf of the club members by President Bryan Jackson, W2RBJ and Treasurer Steve Van Sickle, WB2HPR.



Next Membership Meeting - September 9, 2020 - Venue TBA

Hamfests Canceled Worldwide Due to Covid-19 EGARA Looks to Next Year

EGARA was far from alone when it decided not to hold its Hamfest 2020 because of Covid-19. Clubs across the country and around the world were also forced to cancel their events this year.

The Japan Amateur Radio League (JARL) has announced the cancellation of several amateur radio events planned for last spring because a government policy requesting that events be canceled or postponed, saying “events that attract large numbers of people have a large risk of infection.” Affected events included the West Nippon Ham Fair on March 8, the Chugoku Regional Amateur Radio Direction Finding Competition on March 15, and the Kagawa Ham Festival on March 22.

West Nippon Ham Fair organizers said they considered postponing the event for 6 months, but concluded there was no certainty that the coronavirus situation would be resolved by then.

In England, the Wythall Radio Club decided to cancel its hamfest as well. “As a responsible club, we have taken this step to minimize any risks to the expected 400+ visitors and traders from the COVID-19 virus, due to the uncertainties regarding the spread of the virus,” the club said.

Across the United States, plans for dozens of Hamfests were shut down, with the cancellations posted on the ARRL website, including EGARA’s. The club moved its Hamfest date from May to August 29th, but the continued spread of Covid-19 forced that date to be abandoned as well due to liability concerns which made the grounds of the East Greenbush Fire Department unavailable.

“We will continue to promote the many sponsors who had agreed to participate in this year’s Hamfest and honor our commitments to them as sponsors of Hamfest 2021,” said club President Bryan Jackson, W2RBJ. “We have securely stored the \$3,500 worth of prizes they donated and will have them on hand for next year’s giveaways and raffles.”

EGARA Hamfest Sponsors



WWV/WWVH Stand Ready to Fight Global Chaos

They'd be joined by their partners in the Military Auxiliary Radio System

By James Careless, Radio World Magazine

It may seem improbable that two radio stations that announce the time could end up being world-saving superheroes. But one day Colorado shortwave station WWV and its sister station WWVH in Hawaii may do just that.



The reason: If a massive solar coronal mass ejection from the sun ever supercharges the earth's ionosphere, the resulting power surge would overload satellites and ground-based digital communications systems. The Internet would be just one of the casualties: This planet's unshielded electronics could be fried.

Actually, the right term is not "if" but "when." In 1859, a massive solar flare hit the atmosphere; it was named the Carrington Event after UK astronomer Richard Carrington, who spotted the flare and deduced what was coming. The resulting nighttime auroras were so bright that sleeping miners in the Rocky Mountains woke up and made breakfast.

At the time, telegraph networks in North America and Europe were the only electronics in widespread use, and the Carrington Event flare definitely affected them. The current induced into the telegraph wires was so strong that some operators received serious shocks. Others discovered that they could send and receive Morse Code over the network, without having to connect power sources to it.

In our modern world, a Carrington Event-sized solar storm "could lead to power loss for a period of weeks or more," according to a 2013 analysis prepared by Lloyd's of London and Atmospheric and Environmental Research.

"This would cause major disruption to transport, food supplies, emergency and hospital services ... It is also likely that financial markets (especially as the financial sector is generally concentrated in the areas most at risk i.e. the northeast of the U.S.) could be significantly disrupted by a severe space weather event."

When the next Carrington Event-sized solar storm hits the Earth, WWV and WWVH will step up to quell the chaos. The reason: Not only do WWV and WWVH's powerful shortwave radio signals easily cover North America and much of the world, but the facility has a generous supply of diesel standby generators, screened/shielded facilities to protect equipment from power surges and a robust, non-digital transmission infrastructure.

"Quite frankly, much of our equipment is tube-based analog technology," said Glenn Nelson, an electronics technician at WWV and sister time code station WWVB. "This mean it is less vulnerable to power surges damage than digital equipment."

With Assistance from MARS

WWV and WWVH won't be the only superheroes working to bring order back to a world blasted by a solar storm (or a man-made electromagnetic pulse; either will do). The stations will be joined in their efforts by their partners

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WWV Ready to Save the Day... continued from page 3

in the Department of Defense Military Auxiliary Radio System. MARS members are amateur radio volunteers trained and certified to operate on DOD frequencies using military messaging protocols in order to communicate with the U.S. military.

MARS was established by DOD back in 1925, to enlist the help of hams during man-made and natural disasters, and to serve as trained pool of radio operators to support the military.

“It is always difficult to coordinate rescue officials and volunteers when there is a widespread communications breakdown, especially on the scale of a Carrington Event,” said Paul English, who runs the U.S. Army’s MARS program. “Hams will play a vital role in such emergencies gathering situational awareness information for the military on a county level,” he told Radio World. “They’ll tell us what’s the status of electricity, water and transportation, and we’ll compile that information on a national level to help guide the nation’s response.”

Using their powerful transmissions and broad coverage, WWV/WWVH will serve as central information hubs for MARS team members. The team will be packed with hams from across the United State, “who use their own equipment and donate their time to provide this service,” said amateur radio operator Cal Zethmayr (callsign W4GMH). WWV and WWVH’s broadcast will keep everyone on the same page and working together despite the chaos.

Getting Ready for Disaster

Mindful that solar storms can strike at any time, DOD holds MARS exercises on a regular basis. Since April 19, 2019, WWV/WWVH have been a part of this process, by announcing current and upcoming MARS exercises during their 24/7 time broadcasts.

“The WWV and WWVH announcements will provide information to Amateur Radio participants regarding the purpose, dates, times and locations of the exercises and other information,” states the WWV web site at www.nist.gov/pml/time-and-frequency-division/radio-stations/wwv.

“WWV will air MARS announcements on the 10th minute of each hour, and WWVH will use the 50th minute. The announcements will air for about two weeks, prior to and during each exercise.”

It is impossible to say when the next Carrington Event-level solar storm may hit our planet. It could be hundreds of years from now; it could be tomorrow. But when this storm does strike, the staff at WWV/WWVH and their MARS team members will be there to help quell the chaos. They’ll be real-life superheroes aiding the U.S. government in finding out which Americans urgently need help, so that it can be sent as soon as possible.

“When you look at today’s world where we are completely dependent on computer-controlled electronics in all aspects of our lives, a Carrington Event-sized coronal mass ejection could be devastating,” said English. “WWV, WWVH, and MARS will help us cope in such emergencies.”

Information about upcoming MARS exercises can be found at www.dodmars.org.



On the Beam

News & Notes

EGARA Scores 3003 Points on Field Day

It was a different Field Day this year, with club members operating their individual home stations instead of the usual two station setup at the Masonic Lodge. Still, it saw EGARA score an impressive 3,003 points, a substantial increase over last year's 2,042. Normally contacts made between home stations have not counted during FD, but ARRL allowed them this year because of the challenges presented by the Coronavirus outbreak.

This year's contact leader was Dave Smith, WA2WAP, who made an amazing 541! Scoring the most points was Joe Ostering, N2CJF, with an incredible 938. Although Joe had fewer contacts, he scored more points by working mostly CW, which gives 2 points per contact.

For their efforts, each won a Wouxun DMR KG-UVN1 HT radio.

Overall, the club made a total of 1254 contacts and scored 3003 points. The individual tallies are below.

Field Day 2020 Totals

Name	Call Sign	Total Contacts	Total Points
Bryan Jackson	W2RBJ	50	100
Steve VanSickle	WB2HPR	82	328
Don Mayotte	KB2CDX	37	124
Donald Chittenden	N2USM	152	304
Joe Ostering	N2CJF	240	938
Bob Stanley	W2RBS	7	64
Jim Pendolino	KC2HRO	71	256
Tom Scorsone	KC2FCP	39	128
Dave Smith	WA2WAP	541	591
Nick Field	KD2JCR	8	66
Russ Greenman	WB2LXC	27	104

This year's FD contest winners (most contacts & most points) each received a Wouxun KG-UVN1 DMR/Analog HT radio worth over \$150!

The Wouxun KG-UVN1 works with other makes and models of DMR supported radios with both Tier I & II compatibility -- plus compatibility with existing analog systems on the UHF and VHF Amateur Radio bands.

It offers 3072 channels, 250 zones, and a whopping 160,000 contacts -- and the full radioid.net contact database is preloaded! The KG-UVN1 has CTCSS/DCS, digital encryption, channel scan, group scan and text messaging. It also features VOX, a full DTMF keypad, programmable multi-function side keys, and much more. Radios supplied courtesy of Wouxun.



EGARA Roundtable Meeting Minutes

Although the club does not have regularly scheduled meetings during July and August, it does host a monthly Roundtable every fourth Wednesday of the month. They begin at 7 pm and utilize the club's 147.270 repeater (PL 94.8). EGARA Vice President Nick Field, KD2JCR, serves as Net Control. The next Roundtable is set for September 23rd.

The July event had 12 members check-in and the August on-air meeting had ten. Both sessions ran about a half hour each, with each member updating the group on their activities over the summer.

President Bryan Jackson, W2RBJ, also uses the Roundtable to provide updates relevant to the club. These included:

- The club has purchased the HF/6 meter grand prize for the Hamfest. The radio had been ordered prior to the cancellation of this year's event and will be held over for next year's Hamfest.
- The club has also purchased a complete multi-volume set of the ARRL Handbook to be used as the top giveaway at this year's holiday party.
- The club is exploring the opportunity to hold a VE exam session, using proper social distancing protocols.
- Club members have continued maintenance of the Masonic Lodge Hall and grounds over the summer. The lawn tractor used to cut the grass was given its annual maintenance in the spring and new mower blades were installed, with two spare sets purchased for future use.

New ARRL Chief Takes Over This Month... continued from page 1

Minster got his Novice license, WB2MAE, in 1977, when he was in his teens. He progressed from Advanced to Amateur Extra and, after a stint as NW2D, he settled on the vanity call sign NA2AA in the 1990s as a way to honor a mentor, N2AA, and the contest station that he used to frequent, K2GL, in Tuxedo Park, New York.

Minster's ham radio pursuits have ranged far and wide over the years. His background includes National Traffic System training and participation in public service events, as well as contesting from home, club stations, and contest stations in the Caribbean -- particularly on Bonaire, where he is a member of PJ4G. Primarily a CW operator, Minster collects unique and vintage bugs and keys.

Minster earned a bachelor's degree in computer engineering from The Ohio State University and has a special interest in satellites, digital communications, remote operation, and ham radio computing and software. He has written keyer software for the commercial market, and contest logging, packet, and satellite telemetry software for personal use.

In addition to being an ARRL member, Minster is a member of AMSAT, the Frankford Radio Club, the Straight Key Century Club, CWops, and the North American QRP CW Club.

"I spend every day of my life, one way or another, engaged in amateur radio. It is more than just a hobby for me; it is my community. It is where I live; where I have built lifelong friendships, and friendships that span the globe. Amateur radio allows me to dream and to experiment. I can't wait to bring my energy and boundless enthusiasm in service to ARRL."

ARRL President Rick Roderick, K5UR, said, "We are excited to welcome David as our new CEO, and look forward to his progressive leadership. His experience in management and operations, plus his activities in amateur radio, will serve our organization and members well."

Minster will succeed Barry J. Shelley, N1VXY, who was CEO in 2018, and who has been serving as ARRL's Interim CEO since January 2020. Shelley had been ARRL's Chief Financial Officer since January 1992.

Curious About DMR?

"The nice thing about standards is there are so many to choose from."

There's ironic humor in this statement; a standard should result in everyone doing things the same way in order to be compatible, and prevent having to constantly re-invent the wheel. Yet, everyone has to have their own standard!

Just take two-way radio digital voice systems for example: there's P25 phase 1 and phase 2, NDXN, DMR, TETRA, OpenSky, Provoice, and dPMR, along with a whole host of legacy digital voice modes as well. That doesn't even consider the ham radio contenders, such as DStar, Fusion, FreeDV, some old offerings from Alinco & AOR and so on. And guess what? Absolutely none of them are compatible!

Choosing what digital voice standard you'll go with can be daunting. For emergency services and government communications, P25 is by far the most dominant, there's no doubt about that. For business & private radio, DMR followed by NXDN is the two most popular choice. In the ham radio arena, the picture is a little less clear. DStar took an early lead, but Yaesu is keen to take market share with their Fusion offering. Hams have always been keen to leverage off existing commercial equipment, and it seems the most popular commercial system adopted presently is DMR.

Some think DMR will take the lead in both the commercial business & private two-way radio field as well as in ham radio. This is helped in no small part by the ready availability of DMR radio equipment at prices that rival traditional analog two-way radio, and that one of the biggest names in two-way radio, Motorola, are throwing their weight behind DMR. Some, like the Motorola's SL7750, blur the line between DMR radio and cellular mobile phone.

But even with DMR, there are three "flavors". These are actually "tiers" or levels of functionality for DMR systems.

Tier 1: The simplest form of DMR is Tier 1, which is mainly used for simplex communications, with no repeaters. The human voice is digitally sampled and compressed with the AMBE+2 codec, and then transmitted in this digital form to another radio.

Tier 2: Things start to get a bit more complicated here. With Tier 2 DMR, repeaters are used in a TDMA arrangement, with two "timeslots. What this means is that two completely separate radio transmissions can be going through the repeater at the same time; each radio takes turns in transmitting in short 27.5 millisecond bursts. In addition to this, radios can be set to logical closed groups called 'talk groups', which you can think of as 'virtual channels'. Repeaters can be linked via the Internet to form networks that can be as small as just two repeaters, or thousands of repeaters across the world. Again, the AMBE+2 codec is used to turn speech into compressed data for transmission. All amateur radio DMR systems are Tier 2, as are many business / commercial radio DMR systems.



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DMR... continued from page 7

Tier 3: This is effectively a trunked radio system on top of Tier 2. A pool of frequencies are used to carry the TDMA transmissions. This is used by more complex or larger networks for big businesses and commercial radio users.

So why go to all this trouble, when plain old analogue FM works perfectly well?

DMR has the advantage that it four times more efficient when it comes to spectrum usage. For one 25 kHz analogue FM channel, you could fit four DMR transmissions. Not only that, but DMR offers some very flexible calling facilities - you can call one person, a group of people, or everyone in your fleet at once. While not every DMR network supports it, sending of data and short messages is also possible.

DMR is also designed to be easy to network, with connections using IP, so creating wide coverage areas using a network of DMR repeaters is already built-in; cover your city or cover the entire country! Yet another advantage is because a DMR transmitter is only turned on about half the time due to it transmitting in bursts, battery life is longer.

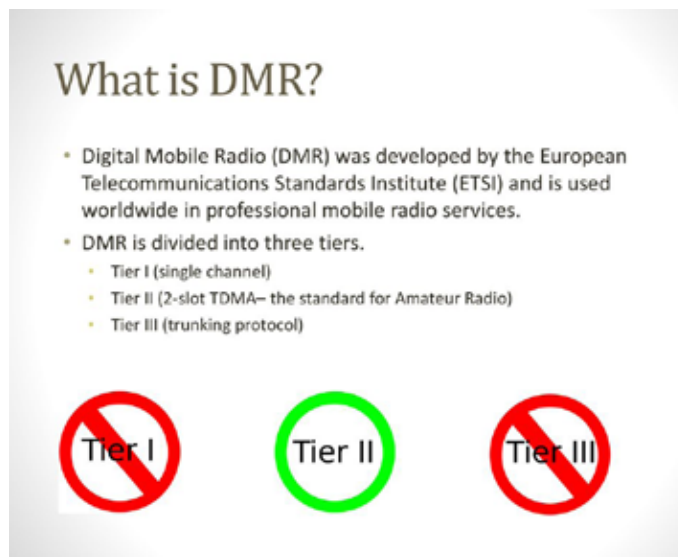
Some DMR Jargon:

Color codes: Every DMR transmission uses a “color code” which is very similar to CTCSS or PL tones in the analogue radio world. On a repeater or simplex frequency, every radio must use the same color code to be able to communicate together. The main use for color codes is for where two repeater coverage areas on the same frequency may overlap, different color codes are used to ensure each radio accesses the correct repeater.

Timeslot: For Tier 2 and 3 systems, a timeslot is a slice of time, about 30ms long, that a radio can transmit in, or receive in. There are two timeslots per frequency, and you need to have your radio configured for the right color code for the repeater, the correct timeslot and correct talkgroup for you to be able to hear anything.

Zones: This is simply a collection of channels & talkgroups, all grouped together in one “zone” or bank. A radio user can switch zones to access a different lot of channels & talkgroups that they may wish to use. Typically a zones are divided into repeaters for different areas, so you might have one zone for the west side of a city, and another covering the east side of the city - but there’s nothing to say that you must set up a zone that way.

Code Plug: This is a Motorola term that has stuck over the years, and in the DMR context means a complete configuration file of channels, talkgroups, zones, contacts etc. for a radio. The code plug can be saved to computer disc, and is used to program a radio to give it the functionality a user requires.



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DMR... continued from page 8

CPS: Another Motorola term, meaning Customer Program Software. Simply put, this is the software you'd use to create a "code plug" and configure your radio.

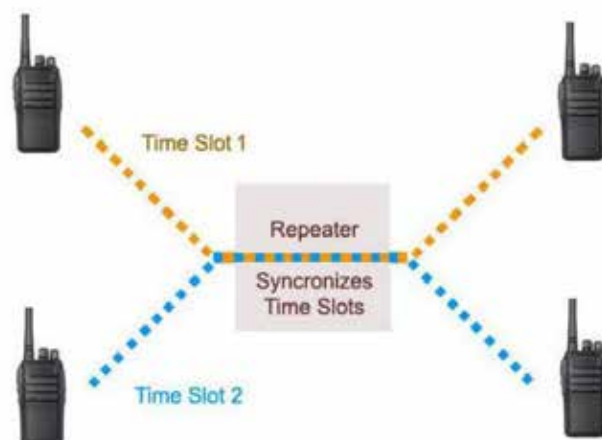
Hotspot: A small box that connects to the internet and acts like your own personal low power DMR repeater, useful if you're not in range of a DMR repeater to access. You can even take them with you and use your cell / mobile phone wireless data to connect the hotspot to the Internet and be able to use DMR anywhere you get cellular signal. Most hotspots are multi-mode, handling not only DMR but DStar, Yaesu Fusion and P25 as well. ZUMspot, Jumbospot, Openspot, MMDVM etc are all examples of hotspots that you can buy or build yourself.

So what's in it for me?

The use of DMR in radio hobbyist circles falls into two categories: ham / amateur radio and scanning receiver use. Lets take a quick look at each:

Ham radio: Hams have long taken advantage of surplus, second hand, or even new commercial radio equipment and re-purposed it for their own use, and DMR equipment is no exception. Worldwide, DMR enabled and connected repeaters are appearing and are interconnected to provide a huge linked network spanning the entire globe.

Depending on the talk group selected, you could be communicating just around town, across your region, across the entire country, and some groups even cover the world. Motorola DMR equipment is frequently used, but increasingly the cheaper units have increased the affordability and availability of DMR equipment to the mass market. In some cases, you can get on air to the DMR scene for less than a hundred dollars!



Scanning: As the world relentlessly marches on to a digital future, many businesses and commercial interests have migrated their legacy analogue FM two way radio systems to DMR. There are scanners available that can hear DMR, enabling the scanning hobbyist to continue to listen to such transmissions.

For those hobbyists who can't justify the high price tag of those scanners to listen in to DMR, there are other alternatives: certain computer software can decode DMR with a regular scanner and a 'discriminator tap', or a 'virtual audio cable' if using an SDR, or if portable DMR reception is desired, an entry level DMR transceiver will do the job very well - to keep yourself on the correct side of the law, you should disable any transmit capabilities of these transceivers.

For further information on DMR try these links:

- https://drive.google.com/open?id=0B-NVaCQ_e0OLOUN3N0Q3T3IRTXM
- <http://www.k4usd.org/guide.pdf>

My First Experience with DMR

By Steve VanSickle, WB2HPR

My DMR adventure began when Joe, N2CJF gave me a WOUXON KG-UVN1 hand held radio which he won as a prize for making the most CW contacts during this year's Field Day exercise. With very little repeater activity in his area, Joe knew that this dual-band DMR/Analog radio would be put to the test in the NY capital district.

After reading through the Spartan operating instructions, I decided to program an analog repeater pair using the front panel buttons. After a long while, I succeeded in accessing the Bald Mountain repeater. I began to run the radio through its paces on my test bench, to evaluate the radio's performance. Satisfied with the operation, I awaited the day when I would be able to use it on the DMR modes.

Fast forward to the last week of August.

Dave, WA2WAP was kind enough to send me some information about DMR as found on YouTube. Dave has had a good deal of experience with digital modes, and thoughtfully got me off to a good start. After some discussion, Don, KB2CDX gave me some additional DMR information, and I ordered the requisite "Hot Spot" from R and L Electronics. While waiting for the order, I obtained a digital ID from Band Meister, with much coaching from my mentors, Dave and Don. These two gentlemen have the patience of Job!

The following week, I had the new Hot Spot, a small microcontroller/radio/wi-fi interface which gave me access to the DMR network through the Internet. Don programmed all the necessary parameters and channels and talk groups into the equipment. After thorough testing, Don was ready to facilitate the Hot Spot installation in my shack and get me on the DMR network.

My first DMR contact was with club member Ridge Macdonald, KB2HWL, who was operating from his car using a mobile hotspot. (Thanks for the QSO, Ridge!) There was no indication that Ridge was in his car, no repeater drop out or picket fencing which sometimes occurs on conventional analog FM systems. Don also took great care to explain all the basics of this new mode as well as the radio button functions. Thanks, Don for generously spending the morning getting me up to speed!

Well – how does it work??

In one word – AWESOME! – in today's parlance of overused verbiage. The contact information is clearly depicted on the radio screen, the audio is crystal clear and free of "white noise" – it's amazing to be able to connect with any of the thousands of world-wide users on DMR. What was once considered the "Future" of ham radio, DMR is "now" and I can imagine it to become even better.

If you are interested in DMR, I encourage you to watch some of the YouTube videos. There will probably be many unfamiliar terms – like BER, Parrot, raspberries, hot spots, node, pi-stars, and so forth. Don't let this intimidate you, you'll find a wealth of information on the web, and you can learn much from DMR mentors like Don and Dave.

They'll be glad to help you and get you started on your own DMR ham radio adventure!

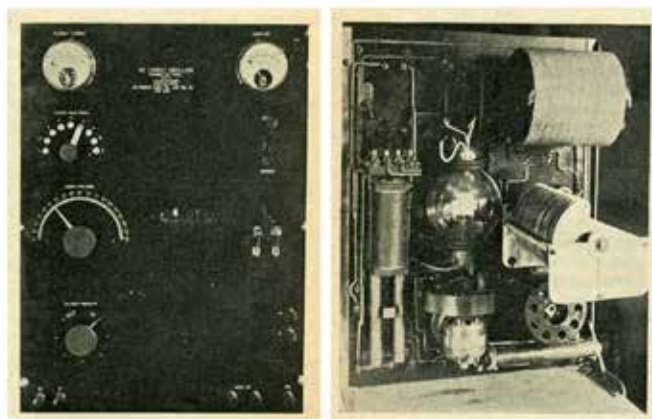
The History of Ham Radio: Spark to CW

Chris Codella, W2PA, author, John Pelham, W1JA, editor, Phil Johnson, W2SQ, editor

(Editor's note: By special arrangement with the authors, Sidebands is pleased to present this multi-part series on the history of ham radio. Subsequent chapters will be published in future monthly editions of the newsletter)

Through the years, starting well before the war, amateurs occasionally had discussed undamped oscillations and how Audions could be used to detect them. By summer 1916 a government radio inspector was predicting that in five years most amateurs would be using undamped waves. QST noted that with the influx of “mature men” and a willingness to spend more (around \$250) on equipment, it was just a matter of time before a “Mr. Undamped Wave” would appear and lead the way. A few things, including a world war, would have to happen first to improve wireless technology.

Everything seemed to depend on the ability to develop transmitting equipment to produce undamped waves, a difficult task without high power vacuum tubes. And receiving them was problematic too—most spark receivers were not designed to hear undamped, unmodulated, narrow signals. Transmitters and receivers would both have to change in fundamental ways. Commercial equipment makers began to take interest, seeing a new market opportunity. The new DeForest quarter-kilowatt undamped transmitting set was one way to get going quickly, if you could afford it.



The DeForest Oscillation,
250 watt CW transmitter, ca. 1916

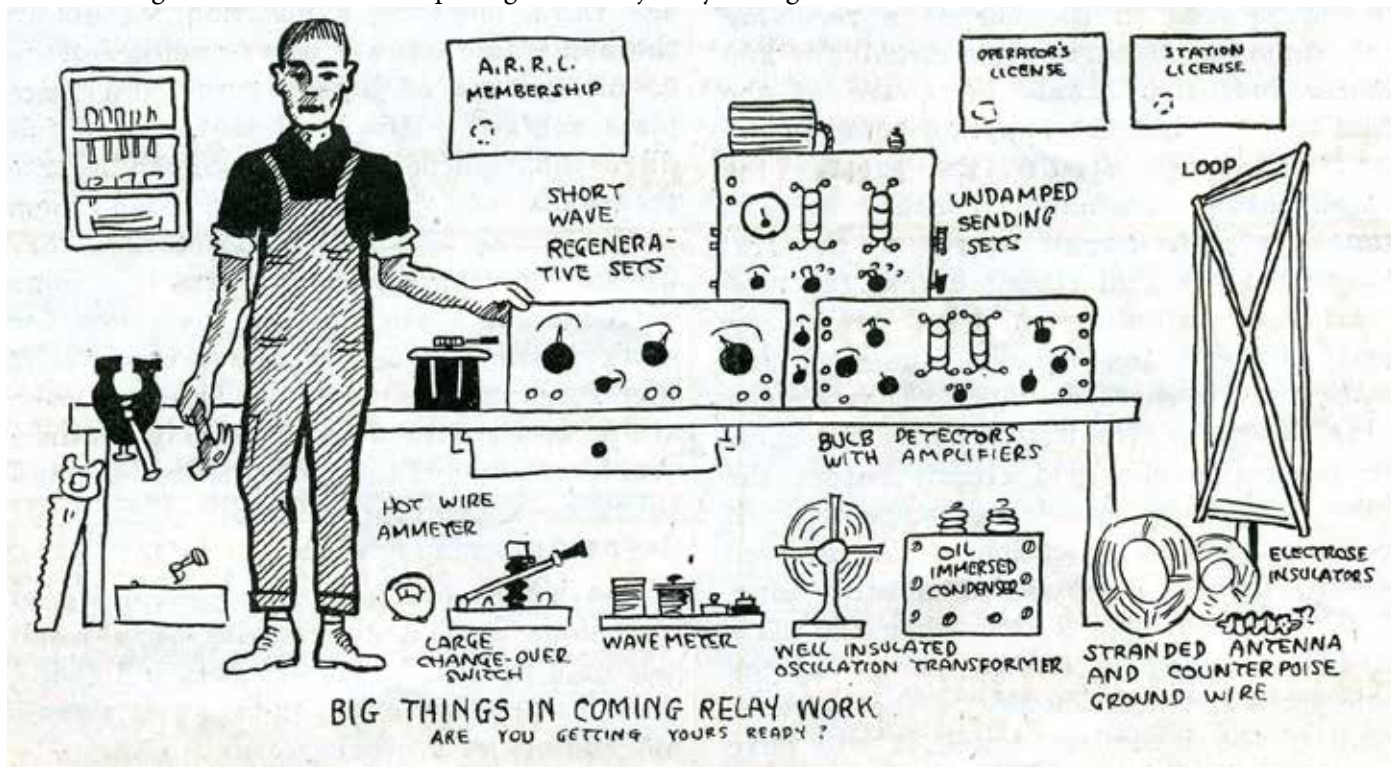
But even assuming innovation would supply the technology, someone—quite a few someones, in fact—would have to adopt it and put signals on the air. The only way to really get going was for a lot of amateurs to switch over together; otherwise there would be no one to talk to. QST suggested that anyone already planning to get on the air with undamped waves should let Hebert, Mathews, or the Seefreds know about it so that everyone could begin to get coordinated, which would help the relay work a great deal. One correspondent suggested that the League should consider establishing a special appointment for stations with the capability.

Work on using undamped waves for amateur radio began in earnest only after vacuum tubes were improved and made cheaper. These advancements, which finally made it practical and affordable for hams to use vacuum tubes to build oscillators for transmitting, were brought about by the demands of military use during the war. Just as QST was coming back after the shutdown, incoming editor and ARRL Secretary Kenneth B. Warner wrote about what was the new wave, literally and figuratively. This was the first time the mode was referred to in the magazine as continuous wave transmission, or C.W. The vacuum tube was the only device capable of producing CW signals at low power levels and zero decrement. “To put this in the simplest possible language, with [vacuum tube] transmission all our energy is concentrated on as near one wavelength as is possible by any known method,” noted Warner. The greater efficiency promised to allow distant communication with much lower power than spark and much less QRM. But this “Radio Utopia” would not be possible until everyone was on CW. Should a spark station come on, it would likely overwhelm the receiver and drown out a nearby CW signal.

Although vacuum tubes made generating CW easier and were more reliable and more uniform in behavior than before the war, they had not yet been perfected. Oscillators were still unstable, difficult to adjust, and keying one on and off for telegraphy would make its frequency fluctuate wildly. One method used to avoid this was to run the oscillator continuously and shift the wavelength with the key—something we'd call frequency-shift keying (FSK) today. Of course, this meant that a signal was always being transmitted even when not being keyed. Somewhere else on some other wavelength a reverse code would be heard, doing nothing useful and causing QRM.

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The Old Man got into the discussion too, writing about “Rotten Undamped,” relating his first attempt to receive CW. At first he was confused, mistakenly trying to copy the so-called “back lash” (the signal emitted when the key was up—inverse Morse) instead of the primary signal. Then he dealt with skittish receiver tuning when his every hand and body position affected it. Another annoyance was that with undamped waves, which he sometimes referred to as “unmoistened,” all signals sounded the same—they had no personality like signals from spark transmitters, each of which had its own special sound. You could change the tone of an undamped signal at will just by tuning the receiver—it had no inherent sound of its own.



All the elements of the modern station – from September 1919 QST

In the fall of 1919 an anonymous author, probably Kruse as technical editor, speculated about using a single circuit for both transmitting and receiving.⁶ It was the first reference to the possibility of transceiving. A transmitting circuit would work quite well as a receiving circuit by replacing the high voltage supply with a battery at “normal” (i.e., lower) voltages. It would provide “inconceivable gain in operating ease” since the transmitter would be, by definition, tuned to the same wavelength as the receiver. And a Navy correspondent, who wrote about his experience building a regenerative receiving circuit for both CW and spark using a British Audion, noted offhandedly that by inserting a key in the B+ line it could also send CW for 2 miles—another transceiver.

The following spring QST declared, “AMATEUR continuous wave telegraphy for relay work has at length arrived ... Not that it is by any means perfected in its details, but it is working and the benefits we expected are being experienced as well as the troubles we expected.”

Gradually, stations began to appear on the air using undamped waves, either pure CW or modulated in some manner. Two commercial stations called “Air Service,” with call signs UM and GMC, belonging to the Glen. L. Martin Company (now Lockheed-Martin), were using both CW telegraphy and phone on 180 and 370 meters. Several prominent amateur stations appeared too, including 2XX in Ossining, NY, using both “voice modulated,” and “straight undamped,” and had been routinely heard in Little Rock, Arkansas. NSF, the Navy Lab station at the Washington, D.C. Navy Yard was using both “straight and chopped C.W.”

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History of Ham Radio...

But the station presented as the most interesting was that of J. O. Smith, the ARRL Traffic Manager, 2ZL. Smith was “junking his spark set as outgrown,” having experienced CW’s superiority over spark in getting through in the presence of QRM and QRN. 1AW also compared modulated CW from 8XK in Pittsburgh to spark and found that 2.5 amps of modulated CW (MCW) was received at approximately the same strength as 8.5 amps of “sharply tuned spark,” since, for the CW signal, all of the energy was concentrated on one frequency.

CW also sounded quite different from spark. “Because of the totally differing characteristics, too, C.W. can often be read thru an inferno of spark QRM,” remarked Smith. And it was difficult to tune in. “The very sharpness is a handicap in these early days, for one must be right on the tune to hear it,” he added. “Oh what a world that speaks for the QRM minimizing possibilities of C.W.!” This was more of a problem than a benefit at this point because of the instability of oscillators in both transmitters and receivers. To make contacts, amateurs were either prearranging specific times and wavelengths, or starting out on spark and then moving to CW using “exactly the same wave,” so that two stations could more easily find each other. Modulating CW with a buzzer or a tone could make it audible on a “non oscillating set,” and also made it easier to tune in.

The Colpitts oscillator and a simple transmitter based upon it were introduced in May 1920 and took amateurs one step further towards stable frequency control. By July, QST was reporting a “gradual but sure trend from spark to undamped,” and that “we are on the eve of a great transition in amateur methods.” Even The Old Man, one year after complaining about “Rotten Undamped,” had changed his mind about this CW stuff and wrote that he was swearing off spark, anticipating an end to QRM. “I’ve been fixing for this shift for some time,” he claimed.

QRM has got so fierce that most of the time it is impossible to work any distance at all. With rotary gaps belching forth five amperes on any old tune, as loud at 2500 meters as at 200, and the unlicensed moonshine spark coil stuff from the what-nots going it every night, doing any relay work is like listening to a whispered life story in a night-life restaurant with the jazz band gone amuck close up on your starboard quarter.

By fall, there was a marked increase in the number of CW stations, despite the unavailability of vacuum tubes, or at least ones capable of appreciable power at reasonable cost—the only remaining impediment to even more widespread use. QST assured readers that an ample supply was on its way, and meanwhile amateurs could always buy them from England where there seemed to be a plentiful supply of various kinds and capabilities.

2XJ and KQO (S.S. Ontario) reported using what they called a “break-in” system for CW. The transmitter output fed a split inductor in which one end went to the antenna and the other to ground, each through its own tuned circuit. When balanced, the two currents flowed in opposite directions and did not induce any signal in a set of secondary windings which were connected to the receiver. However, signals coming in via the antenna at one end of the inductor pair would flow through the inductors in series and still produce a signal in the receiver. It was an ingenious way to avoid switching, but at the cost of wasting half of the transmitter power which went directly to ground.

As fall arrived, 1920 became the first year in which traffic handling had continued uninterrupted through the noisy summer.¹⁴ “The word ‘season,’ in connection with amateur radio, was now only of historic value. It is a term once used in an age that is gone for good,” wrote Traffic Manager Smith. He attributed most of this success to more stations using CW: “... it would seem that the entire male population of the continent of North America, also a few, even, of the Superior Sex, are going to install C.W. sets very soon.”

Although the state of the art did not yet make good CW easy to produce, its popularity continued to grow rapidly. Warner noted, “in the vernacular of the day, straight CW is ‘the berries.’” A separate, parallel world inhabited by low power CW stations was now on the air every night underneath and oblivious to the spark chatter.

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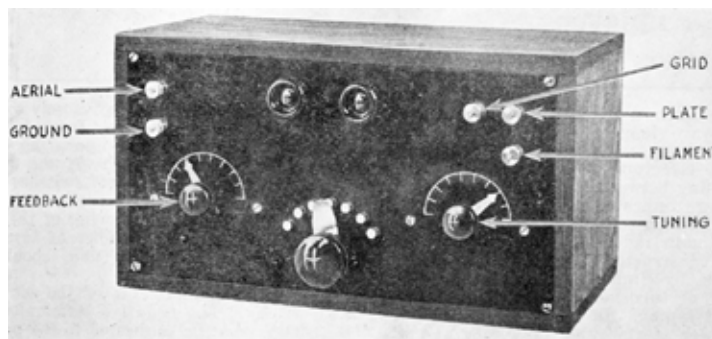
History of Ham Radio...

In August, the U. S. Shipping Board announced an offer to sell four complete spark transmitters at “less than 10% of their cost price.” Spark was clearly on its way out.

Besides the difficulties caused by the lack of vacuum tubes, tuners designed for spark were too unstable and imprecise for CW. Finding a desired wavelength and staying there was not simple. A few new techniques made a big difference. In June, John L. Reinartz, 1QP, also nicknamed “1-Kewpie,” 17 of South Manchester, Connecticut, presented his new tuner designed specifically for CW.¹⁸ It offered a way to tune CW more easily than spark—something quite surprising, considering the usual problem with CW being so sharp to tune compared with spark. Furthermore, Reinartz’s new tuner reduced the number of adjustments necessary to tune in a CW signal, achieving what is taken for granted today: a single adjustment that lets you tune across CW stations, stop at any selected one, then continue tuning past it but still be able to return to the previous wavelength by resetting the tuning dial.

In Reinartz’s new design, a single inductor with multiple taps was used to tune the receiver. Two additional moveable inductors on either side of the main one were used to improve feedback on short wavelengths and allow the detector to oscillate. Once an operator set up this coupling using a particular aerial, the inductors could be left alone and the circuit could be tuned with a variable capacitor. The two key innovations in the Reinartz design were to separate the tuning of the antenna circuit from that of oscillation wavelength, and to provide regeneration feedback that did not need readjustment after changing wavelength. These two adjustments could be set up first around a given wavelength range and then alone.

Then, a single variable capacitor could be used to tune around within its range of adjustment. A second variable capacitor provided additional, finer tuning of the beat note once a signal was selected. This design also greatly reduced or eliminated the capacitance effects of the operator’s hand near the equipment (The Old Man’s complaint). And the tuner could even be used to transmit, for “local” (meaning low power) use, by putting the detector into oscillation and keying the ground lead, or by inserting a microphone there. Whether local or not, however, a receiver that transmitted too would increasingly become a problem rather than a useful feature.



The Reinartz tuner

As the next summer season arrived with its severe noise conditions, another instance of an on-air contest was planned, this time between spark and CW. From 16 through 19 July at times and wavelengths to be announced, pairs of stations in each division would transmit a message for general reception by everyone else. To enter, you would copy messages from as many stations as possible with a witness present (which could be any of “...mother, father, sister, brother, uncle, aunt, grandmother, grandfather, a blacksmith, clergyman, policeman, doctor or lawyer”). Your score would be calculated as the total miles (line-of-sight distance) of all receptions, both spark and CW together. The operator with the highest score would win, with other high scorers getting honorable mention in QST. This is not quite the equivalent of a modern contest since stations were either transmitting or receiving, but not both. In that respect it more resembled the transatlantic tests which would come later. The published schedule of transmitting stations revealed that most were planning to operate well above 200 meters, apparently still uncertain about the usefulness of the region below.¹⁹

But the test turned out to be mostly a bust since it happened to take place on one of the stormiest nights across the country. The organizers had wanted to test CW’s effectiveness under noisy conditions, but these were a bit too much. Only 14 reports were received.²⁰ Although this was a very small sample, there did seem to be a slightly longer distance heard with CW than with spark (adding them together per the rules).

As the summer of 1921 drew to a close, it was becoming clear to many that CW would replace spark, though few anticipated how swiftly it would happen.

Tech Classes Move Online

By Dan Romanchik, KB6NU



I've been teaching ham classes for more than a dozen years now. My specialty has been the one-day Tech class. In this type of class, you review all of the questions in the question pool with the students over the course of six to eight hours, and then immediately give them the test before they can forget anything.

I would hold these classes three or four times a year and regularly have 20 – 30 students in each class. The pandemic, of course, has put the kibosh on these classes. The last one I taught was in January.

Frankly, I was wondering if I'd ever teach one again. But a little over a month ago, I was approached by a fellow in Portland, Oregon about teaching an online class for some folks that he'd corralled there. After giving it some thought, I said yes.

So, now, in place of face-to-face classes, I'm teaching online Tech classes. There are pluses and minuses to this approach. One negative is that I miss the face-to-face interaction with the students. On the plus side, teaching online allows me to offer classes more frequently. My first was in June. Last week, I completed the second class, and in August, I will teach a third class.

I have had to make some changes to the format. Making people sit in front of a computer for six hours or more seemed like cruel and unusual punishment. So, instead of a one-day class, the online class consists of four, two-hour sessions, spanning two weeks:

- Session 1
 - Electrical Principles
 - Electronic Components and Circuit Diagrams
- Session 2
 - Radio Wave Characteristics
 - Antennas and Feed Lines
- Session 3
 - Amateur Radio Signals
 - Electrical Safety
 - Amateur Radio Practices and Station Setup
- Sessions 4
 - Station Equipment
 - Operating Procedures
 - Rules and Regulations

This seems to be working out pretty well. I'm using Zoom, and most people have been able to attend without too much hassle. To simulate the whiteboard that I use extensively in the face-to-face class, I'm using the Autodesk Sketchbook program (<https://www.sketchbook.com/>) and sharing my screen with the Zoom meeting attendees. To write on the "whiteboard," I'm using a Gaomon M10K2018 drawing tablet.

Sketchbook allows me to build up a document in layers, and the result is kind of a hybrid PowerPoint presentation and whiteboard. I can make layers appear when I start discussing a particular topic and then write over them. For example, when I go over the questions that use Ohm's Law to calculate current in a circuit, I display the later with " $E = I \times R$ " and on a second layer, show how to calculate the answers to the questions

To take the test, students have to sign up for an online test session. Fortunately, several VE groups are offering online, remote testing. To sign up for one of these sessions, all students have to do is go to <https://hamstudy.org/sessions>. For the first two classes, the W5YI VEC scheduled a special test session.

I foresee teaching these classes monthly until the demand wanes. The next class will start on Monday, August 3. To register for the class, go to <https://www.kb6nu.com/product/next-online-tech-class/>. To find out when these classes will take place in the future, potential students can sign up for my mailing list by going to <https://landing.mailerlite.com/webforms/landing/m6l6t4>.

About the author: Dan Romanchik, KB6NU, is the author of the KB6NU amateur radio blog (KB6NU.Com), the "No Nonsense" amateur radio license study guides (KB6NU.Com/study-guides/).

CALENDAR

Septemner, 9 2020 - 7 pm - Monthly club meeting by teleconference. Details to be emailed.

September 23, 2020 - 7 pm - EGARA Roundtable on 147.270 repeater

Pro Tip: Helping Others & Yourself

Sooner or later, you will encounter operators needing assistance. If they ask for help, offer your services and expertise.

Remember too that they may not be aware that there is a problem, such as with poor audio, a distorted signal, or erratic operation. New operators may not know the right way or time to call another station.

But before informing them of the problem, ask yourself how you would want to learn about a problem with your station.

When describing the problem, be polite and be as clear as you can in your description. And be patient! A new operator may need some extra guidance and advice in understanding how to fix the problem.

Just as important... when other operators tell you that you have a problem, don't get mad or embarrassed. Thank them for bringing the problem to your attention and make them feel good about helping you. And, consider asking them to help you troubleshoot.

Ham radio is all about helping each other, on and off the air.



For Sale

- **Arrow Model 52-S4** - 4-Element 6 Meter Yagi antenna in good condition. \$75.00
Contact Steve at: svansick@nycap.rr.com

- **IFR-1100S Service Monitor. With Spectrum Analyzer and Oscilloscope.** Tested, Preventive Maintenance and Calibrated (\$895) last year. AM - FM, CTCSS Generator, In very good condition. 900.00 or make reasonable offer.
- **Military Watt Meter AN/URM-120 B/U 2 to 1000 MHZ** Complete and with Carrying Case. In excellent condition. Never abused or used on the road. Great Shack / Bench Watt Meter. Picture available. \$100.00 or make reasonable offer.
- **Yaesu FT-2900 Programing Software by RT Systems** Cable included. used once. Registered and includes password. \$35.00
- **UHF RX preamp.** one input, three outputs with SO-239s. Runs on 12 V. Good Shape. \$8.00

For above, contact John WB2HZT at:

Radiowizz@aol.com

Gear to Sell, Swap or Buy?

Send your listing to W2RBJ@Outlook.com

Join the Roundtable!
Every 4th Wednesday of the month at
7 pm on the 147.270 Repeater
(PL 94.8)

The East Greenbush Amateur Radio Association

Organized in 1998, by Bert Bruins, N2FPJ, (SK) and Chris Linck, N2NEH, the East Greenbush Amateur Radio Association, an ARRL affiliate, is committed to providing emergency services, educational programs, and operating resources to amateur radio operators and residents of the Capital Region of New York State. The club station is W2EGB. The club also has several VHF and UHF repeaters open to club members and the public.