The

Communicator

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The Bi-monthly Journal of Surrey Amateur Radio Communications

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Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

Contributions of articles and photos are welcome.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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QSK?

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...from the Editor's Shack

Do you have a photo or bit of Ham news to share? An Interesting link?
Something to sell or something you are looking for?
eMail it to communicator at ve7sar.net for inclusion in this publication.

Happy New Year!

You may see a bit of a change in this first Communicator of 2025. I have retired Microsoft Publisher and switched to Affinity Publisher. You may be aware that MS Publisher is being deprecated. Bug fixes and improvements have stopped it seems, as I was starting to see some erratic behaviour, not unexpected I presume as the publication has grown over the years from a few pages to well over one-hundred per issue.

It is a steep learning curve, but I hope that we can provide you with even more attractive content.

Our QRT column from last issue brought a flood of comments. The question was whether the current PDF format was preferable to an Internet blog site. It had been suggested that our content was difficult to search for as PDF files don't always show up in search engines. Well, the overwhelming opinion from our readers was to keep it as is, so PDF it will be. Another feature on the new software is the ability to generate a complete table of contents. I plan to publish that on our blog, and include it in emails, in the hope that this will improve article search. Enjoy this issue.

73,

~ John VE7TI, Editor
communicator@ve7sar.net

This Month's Cover…

Your Communicator Editor has been inducted into the Canadian Amateur Radio Hall of Fame, an honour for which I am truly grateful. Also selected was Adam Farson, VA7OJ (SK). Adam was very knowledgeable, well known in our area, and presented to our SARC group on several occasions. I'm in good company. You can read the inductees' profiles on page 60.

"I never figured I'd go into the Hall of Fame.
A kid from the Hill." - *Yogi Berra*

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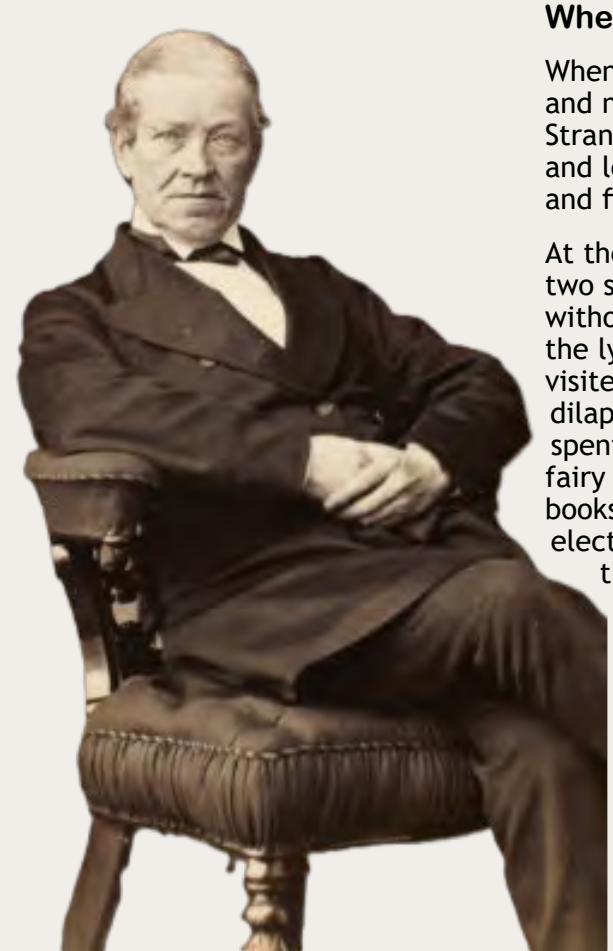
The Rest of the Story...

Charles Wheatstone

Much more than a bridge

Sir Charles Wheatstone



Charles Wheatstone was born in Barnwood, Gloucestershire. His father, W. Wheatstone, was a music-seller in the town, who moved to 128 Pall Mall, London, four years later, becoming a teacher of the flute. Charles, the second son, went to a village school, near Gloucester, and afterwards to several institutions in London. One of them was in Kennington, and kept by a Mrs. Castlemaine, who was astonished at his rapid progress. From another he ran away, but was captured at Windsor, not far from the theatre of his practical telegraph. As a boy he was very shy and sensitive, liking to retreat into an attic, without any other company than his own thoughts.

Wheatstone English concertina

When he was about fourteen years old he was apprenticed to his uncle and namesake, a maker and seller of musical instruments at 436 Strand, London; but he showed little taste for handicraft or business, and loved studying books better. His father encouraged him in this, and finally took him out of the uncle's charge.

At the age of fifteen, Wheatstone translated French poetry, and wrote two songs, one of which was given to his uncle, who published it without knowing it as his nephew's composition. Some lines of his on the lyre became the motto of an engraving by Bartolozzi. He often visited an old book-stall in the vicinity of Pall Mall, which was then a dilapidated and unpaved thoroughfare. Most of his pocket-money was spent in purchasing the books which had taken his fancy, whether fairy tales, history, or science. One day, to the surprise of the bookseller, he coveted a volume on the discoveries of Volta in electricity, but not having the price, he saved his pennies and secured the volume. It was written in French, and so he was obliged to save again, until he could buy a dictionary. Then he began to read the volume, and, with the help of his elder brother, William, to repeat the experiments described in it, with a home-

made battery, in the scullery behind his father's house. In constructing the battery, the boy philosophers ran short of money to procure the requisite copper-plates. They had only a few copper coins left. A happy thought occurred to Charles, who was the leading spirit in these research, 'We must use the pennies themselves,' said he, and the battery was soon complete.

At Christchurch, Marylebone, on 12 February 1847, Wheatstone was married to Emma West. She was the daughter of a Taunton tradesman, and of handsome appearance. She died in 1866, leaving a family of five young children to his care. His domestic life was quiet and uneventful.

Though silent and reserved in public, Wheatstone was a clear and voluble talker in private, if taken on his favourite studies, and his small but active person, his plain but intelligent countenance, was full of animation. Sir Henry Taylor tells us that he once saw Wheatstone at an evening party in Oxford earnestly holding forth to Lord Palmerston on the capabilities of his telegraph. 'You don't say so!' exclaimed the statesman. 'I must get you to tell that to the Lord Chancellor.' And so, saying, he fastened the electrician on Lord Westbury, and affected his escape. A reminiscence of this interview may have prompted Palmerston to remark that a time was coming when a minister might be asked in Parliament if war had broken out in India, and would reply, 'Wait a minute; I'll just telegraph to the Governor-General, and let you know.'

Wheatstone was knighted in 1868, after his completion of the automatic telegraph. He had previously been made a Chevalier of the Legion of Honour. Some thirty-four distinctions and diplomas of home or foreign societies bore witness to his scientific reputation. Since 1836 he had been a Fellow of the Royal Society, and in 1859 he was elected a foreign member of the Royal Swedish Academy of Sciences, and in 1873 a Foreign Associate of the French Academy of Sciences. The same year he was awarded the Ampere Medal by the French Society for the Encouragement of National Industry. In 1875 he was created an honorary member of the Institution of Civil Engineers. He was a D.C.L. of Oxford and an LL.D. of Cambridge.

Music instruments and acoustics

In September 1821, Wheatstone brought himself into public notice by showing the "Enchanted Lyre," or "Acoucryptophone," at a music shop at Pall Mall and in the Adelaide Gallery. It consisted of a mimic lyre hung from the ceiling by a cord and emitting the strains of several instruments – the piano, harp, and dulcimer. In reality, it was a mere sounding box, and the cord was a steel rod that conveyed the vibrations of the music from the several instruments which were played out of sight and earshot. At this period, Wheatstone made numerous experiments on sound and its transmission. Some of his results are preserved in Thomson's Annals of Philosophy for 1823.

He recognized that sound is propagated by waves or oscillations of the atmosphere, as light was then believed to be by undulations of the luminiferous ether. Water and solid bodies, such as glass, metal, or sonorous wood, convey the modulations with high velocity, and he conceived the plan of transmitting sound signals, music, or speech to long distances by this means. He estimated that sound would travel 200 miles per second (320 km/s) through solid rods and proposed to telegraph from London to Edinburgh in this way. He even called his arrangement a "telephone." (Robert Hooke, in his Micrographia, published in 1667, writes: "I can assure the reader that I have, by the help of a distended wire, propagated the sound to a very considerable distance in an instant, or with as seemingly quick a motion as that of light." Nor was it essential the wire should be straight; it might be bent into angles. This property is the basis of the mechanical or lover's telephone, said to have been known to the Chinese many centuries ago. Hooke also considered the possibility of finding a way to quicken our powers of hearing.)

A writer in the Repository of Arts for 1 September 1821, in reference to the "Enchanted Lyre," beholds the prospect of an opera being performed at the King's Theatre, and enjoyed at the Hanover Square Rooms, or even at the Horns Tavern, Kennington. The vibrations are to travel through underground conductors, like gas in pipes.

And if music is capable of being thus conducted," he observes, "perhaps the words of speech may

be susceptible of the same means of propagation. The eloquence of counsel, the debates of Parliament, instead of being read the next day only, – But we shall lose ourselves in the pursuit of this curious subject.

Besides transmitting sounds to a distance, Wheatstone devised a simple instrument for augmenting feeble sounds, to which he gave the name of "Microphone." It consisted of two slender rods, which conveyed the mechanical vibrations to both ears, and is quite different from the electrical microphone of Professor Hughes.

In 1823, his uncle, the musical instrument maker, died, and Wheatstone, with his elder brother, William, took over the business. Charles had no great liking for the commercial part, but his ingenuity found a vent in making improvements on the existing instruments, and in devising philosophical toys. He also invented instruments of his own. One of the most famous was the Wheatstone concertina. It was a six-sided instrument with 64 keys, logically arranged for simple chromatic fingerings. The English concertina became increasingly famous throughout his lifetime; however, it didn't reach its peak of popularity until the early 20th century.

In 1827, Wheatstone introduced his "kaleidophone," a device for rendering the vibrations of a sounding body apparent to the eye. It consists of a metal rod, carrying at its end a silvered bead, which reflects a "spot" of light. As the rod vibrates, the spot is seen to describe complicated figures in the air, like a spark whirled about in the darkness. His photometer was probably suggested by this appliance. It enables two lights to be compared by the relative brightness of their reflections in a silvered bead, which describes a narrow ellipse, so as to draw the spots into parallel lines.

Symphonium

n 1828, Wheatstone improved the German wind instrument called the Mundharmonika, creating the symphonium (or symphonion), a mouth-blown free-reed instrument with a logical layout of button keys, patented on 19 December 1829, prefiguring the bellows-blown English concertina. The portable harmonium is another of his inventions, which gained a prize medal at the Great Exhibition of 1851. He also improved the speaking machine of De Kempelen and endorsed the opinion of Sir David Brewster that before the end of this century, a singing and talking apparatus would be among the conquests of science.

In 1834, Wheatstone, who had made a name for himself, was appointed to the Chair of Experimental Physics at King's College London. His first course of lectures on sound was a complete failure due to his abhorrence of public speaking. In the rostrum, he was tongue-tied and incapable, sometimes turning his back on the audience and mumbling to the diagrams on the wall. In the laboratory, he felt at home and thereafter confined his duties mostly to demonstration.

Velocity of electricity

He achieved renown through a significant experiment conducted in 1834 – the measurement of the velocity of electricity in a wire. He cut the wire in the middle to form a gap that a spark could leap across and connected its ends to the poles of a Leiden jar filled with electricity. Three sparks were thus produced: one at each end of the wire and another in the middle. He mounted a tiny mirror on the works of a watch, so that it revolved at a high velocity, and observed the reflections of his three sparks in it. The points of the wire were arranged so that if the sparks were instantaneous, their reflections would appear in one straight line; however, the middle one was seen to lag behind the others because it occurred an instant later. The electricity had taken a certain time to travel from the ends of the wire to the middle. This time was found by measuring the amount of lag and comparing it with the known velocity of the mirror. Having determined the time, he only had to compare that with the length of half the wire to find the velocity of electricity. His results

gave a calculated velocity of 288,000 miles per second, which is faster than what we now know to be the speed of light (299,792.458 kilometres per second (186,000 mi/s)), but it was nonetheless an interesting approximation.

It was already appreciated by some scientists that the "velocity" of electricity depended on the properties of the conductor and its surroundings. Francis Ronalds had observed signal retardation in his buried electric telegraph cable (but not his airborne line) in 1816 and outlined its cause to be induction. Wheatstone witnessed these experiments as a youth, which apparently stimulated his own research in telegraphy. Decades later, after the telegraph had been commercialized, Michael Faraday described how the velocity of an electric field in a submarine wire, coated with an insulator and surrounded by water, is only 144,000 miles per second (232,000 km/s), or even less.

Wheatstone's device of the revolving mirror was later employed by Léon Foucault and Hippolyte Fizeau to measure the relative speeds of light in air versus water, and later to measure the speed of light.

Spectroscopy

Wheatstone and others also contributed to early spectroscopy through the discovery and exploitation of spectral emission lines.

As John Munro wrote in 1891, "In 1835, at the Dublin meeting of the British Association, Wheatstone showed that when metals were volatilized in the electric spark, their light, examined through a prism, revealed certain rays which were characteristic of them. Thus, the kind of metals which formed the sparking points could be determined by analyzing the light of the spark. This suggestion has been of great service in spectrum analysis, and as applied by Robert Bunsen, Gustav Robert Kirchhoff, and others, has led to the discovery of several new elements, such as rubidium and thallium, as well as increasing our knowledge of the heavenly bodies."

Telegraph

Wheatstone abandoned his idea of transmitting intelligence by the mechanical vibration of rods and took up the electric telegraph. In 1835 he lectured on the system of Baron Schilling and declared that the means were already known by which an electric telegraph could be made of great service to the world. He did experiments with a plan of his own, and not only proposed to lay an experimental line across the Thames, but to establish it on the London and Birmingham Railway. Before these plans were carried out, however, he received a visit from William Cooke at his house in Conduit Street on 27 February 1837, which had an important influence on his future.

Cooperation with Cooke

Cooke was an officer in the Madras Army who, while home on leave, attended some lectures on anatomy at the University of Heidelberg. On 6 March 1836, he witnessed a demonstration with the telegraph by Professor Georg Munke and was so impressed with its importance that he forsook his medical studies and devoted all his efforts to the work of introducing the telegraph. He returned to London soon after and was able to exhibit a telegraph with three needles in January 1837. Feeling his lack of scientific knowledge, he consulted Michael Faraday and Peter Roget (then secretary of the Royal Society). Roget sent him to Wheatstone.

At a second interview, Cooke told Wheatstone of his intention to bring out a working telegraph and explained his method. Wheatstone, according to his own statement, remarked to Cooke

that the method would not work and produced his own experimental telegraph. Finally, Cooke proposed that they should enter into a partnership, but Wheatstone was initially reluctant to comply. He was a well-known man of science and had intended to publish his results without seeking to profit from them. Cooke, on the other hand, declared that his sole objective was to make a fortune from the scheme. In May, they agreed to join forces, with Wheatstone contributing the scientific expertise and Cooke the administrative talent. The deed of partnership was dated 19 November 1837. A joint patent was taken out for their inventions, including Wheatstone's five-needle telegraph and an alarm worked by a relay, in which the current, by dipping a needle into mercury, completed a local circuit and released the detent of a clockwork.

The five-needle telegraph, which was mainly, if not entirely, due to Wheatstone, was similar to that of Schilling and based on the principle enunciated by Ampère. That is to say, the current was sent into the line by completing the circuit of the battery with a make-and-break key, and at the other end, it passed through a coil of wire surrounding a magnetic needle free to turn around its centre. Depending on which pole of the battery was applied to the line by means of the key, the current deflected the needle to one side or the other. There were five separate circuits actuating five different needles. The needles were pivoted in rows across the middle of a dial shaped like a diamond, with the letters of the alphabet arranged upon it in such a way that a letter was literally pointed out by the current deflecting two of the needles towards it.

Early installations

An experimental line, with a sixth return wire, was run between the Euston terminus and Camden Town station of the London and North Western Railway on 25 July 1837. The actual distance was only one and a half miles (2.4 km), but spare wire had been inserted in the circuit to increase its length. It was late in the evening before the trial took place. Cooke was in charge at Camden Town, while Robert Stephenson and other gentlemen looked on; and Wheatstone sat at his instrument in a dingy little room, lit by a tallow candle, near the booking office at Euston. Wheatstone sent the first message, to which Cooke replied: and "never," said Wheatstone, "did I feel such a tumultuous sensation before, as when, all alone in the still room, I heard the needles click, and as I spelled the words, I felt all the magnitude of the invention pronounced to be practicable beyond cavil or dispute."

Despite this trial, the directors of the railway treated the 'new-fangled' invention with indifference and requested its removal. In July 1839, however, it was favoured by the Great Western Railway, and a line was erected from the Paddington station terminus to West Drayton railway station, a distance of thirteen miles (21 km). Part of the wire was laid underground at first, but subsequently all of it was raised on posts along the line. Their circuit was eventually extended to Slough in 1841 and was publicly exhibited at Paddington as a marvel of science, which could transmit fifty signals a distance of 280,000 miles per minute (7,500 km/s). The price of admission was a shilling (£0.05), and in 1844 one fascinated observer recorded the following:

"It is perfect from the terminus of the Great Western as far as Slough – that is, eighteen miles; the wires being in some places underground in tubes, and in others high up in the air, which last, he says, is by far the best plan. We asked if the weather did not affect the wires, but he said not; a violent thunderstorm might ring a bell, but no more. We were taken into a small room (we being Mrs. Drummond, Miss Philips, Harry Codrington and myself – and afterwards the Milmans and Mr. Rich) where there were several wooden cases containing different sorts of telegraphs. In one sort every word was spelt, and as each letter was placed in turn in a particular position, the machinery caused the electric fluid to run down the line, where it made the letter show itself at Slough, by what machinery he could not undertake to explain. After each word came a sign from Slough, signifying 'I understand,'

A Charles Wheatstone "ABC" dial telegraph for the G.P.O., English, circa 1870

coming certainly in less than one second from the end of the word... Another prints the messages it brings, so that if no one attended to the bell... the message would not be lost. This is affected by the electrical fluid causing a little hammer to strike the letter which presents itself, the letter which is raised hits some manifold writing paper (a new invention, black paper which, if pressed, leaves an indelible black mark), by which means the impression is left on white paper beneath. This was the most ingenious of all, and apparently Mr. Wheatstone's favourite; he was very good-natured in explaining but understands it so well himself that he cannot feel how little we know about it and goes too fast for such ignorant folk to follow him in everything. Mrs. Drummond told me he is wonderful for the rapidity with which he thinks and his power of invention; he invents so many things that he cannot put half his ideas into execution but leaves them to be picked up and used by others, who get the credit of them."

Public attention and success

The public took to the new invention after the capture of the murderer John Tawell, who in 1845 had become the first person to be arrested as the result of telecommunications technology. In the same year, Wheatstone introduced two improved forms of the apparatus, namely, the 'single' and the 'double' needle instruments, in which the signals were made by the successive deflections of the needles. Of these, the single-needle instrument, requiring only one wire, is still in use.

The development of the telegraph may be gathered from two facts. In 1855, the death of the Emperor Nicholas at St. Petersburg, about one o'clock in the afternoon, was announced in the House of Lords a few hours later. The result of The Oaks of 1890 was received in New York fifteen seconds after the horses passed the winning-post.

Differences with Cooke

In 1841 a difference arose between Cooke and Wheatstone as to the share of each in the honour of inventing the telegraph. The question was submitted to the arbitration of the famous engineer, Marc Isambard Brunel, on behalf of Cooke, and Professor Daniell, of King's College, the inventor of the Daniell cell, on the part of Wheatstone. They awarded Cooke the credit of having introduced the telegraph as a useful undertaking which promised to be of national importance, and to Wheatstone that of having, by his research, prepared the public to receive it. They concluded with the words: 'It is to the united labours of two gentlemen so well qualified for mutual assistance that we must attribute the rapid progress which this important invention has made during five years since they have been associated.' The decision, however vague, pronounces the needle telegraph a joint production. If it had mainly been invented by Wheatstone, it was chiefly introduced by Cooke. Their respective shares in the undertaking might be compared to that of an author and his publisher, but for the fact that Cooke himself had a share in the actual work of invention.

Further work on telegraphs

From 1836 to 1837, Wheatstone focused on submarine telegraphs. In 1840, he testified before the Railway Committee of the House of Commons on the feasibility of a line from Dover to Calais and designed the machinery for making and laying the cable. In autumn 1844, with J. D. Llewellyn's help, he submerged an insulated wire in Swansea Bay and signaled from a boat to the Mumbles Lighthouse. The following year, he suggested using gutta-percha to coat the wire across the English Channel.

In 1840, Wheatstone patented an alphabetical telegraph, the "Wheatstone A B C instrument," which showed message letters on a dial. The same principle was used in his type-printing telegraph, patented in 1841, the first apparatus to print a telegram in type. It worked by two circuits, with a hammer pressing the required letter on the paper.

By 2 September 1845, the Electric Telegraph Company was registered, and Wheatstone received £33,000 for the use of their joint inventions with Cooke. In 1859, Wheatstone was appointed by the Board of Trade to report on Atlantic cables and advised the Atlantic

Telegraph Company on the successful lines of 1865 and 1866.

In 1870, the UK's electric telegraph lines were transferred to the Post Office and placed under government control. Wheatstone also invented the automatic transmitter, which punched signals on a strip of paper (punched tape) that controlled the signal currents. This allowed telegraphing about 100 words a minute, five times the ordinary rate. The Postal Telegraph service used this apparatus for sending press telegrams, and it was improved to send messages from London to Bristol at 600 words a minute and from London to Aberdeen at 400 words a minute. On 8 April 1886, when Gladstone introduced his Bill for Home Rule in Ireland, 1,500,000 words were dispatched from St. Martin's-le-Grand by 100 Wheatstone transmitters.

The plan of sending messages by a running strip of paper that actuates the key was originally patented by Alexander Bain in 1846. However, Wheatstone, aided by Augustus Stroh, was the first to bring the idea into successful operation. This system, often referred to as the Wheatstone Perforator, is the forerunner of the stock market ticker tape.

Optics

Stereopsis was first described by Wheatstone in 1838. In 1840, he was awarded the Royal Medal of the Royal Society for his explanation of binocular vision, which led him to create stereoscopic drawings and construct the stereoscope. He demonstrated that our perception of solidity is achieved by combining two separate images of an object taken from different viewpoints by each eye. In the stereoscope, two photographs of the same object taken from different points are combined to make the object appear three-dimensional. Sir David Brewster improved the stereoscope by eliminating the mirrors and incorporating lenses.

The 'pseudoscope' (a term Wheatstone coined from the Greek ψευδίς σκοπειν) was introduced in 1852. It is essentially the reverse of the stereoscope, making solid objects appear hollow and nearer objects seem farther away. For example, a bust appears as a mask, and a tree outside a window looks as if it is inside the room. Its purpose was to test his theory of stereo vision and for experimental psychology investigations.

In 1840, Wheatstone introduced his chronoscope for measuring minute intervals of time, used to determine the speed of a bullet or the passage of a star. An electric current actuated an electromagnet, which recorded the instant of an occurrence with a pencil on moving paper. It could distinguish 1/7300 of a second (137 microseconds) and measure the time a body took to fall from a height of one inch (25 mm).

On 26 November 1840, he demonstrated his electromagnetic clock at the Royal Society library and proposed a plan to distribute the correct time from a standard clock to local timepieces. The circuits of these clocks were electrified by a key or contact-maker actuated by the standard's arbour, and their hands corrected by electromagnetism. In January, Alexander Bain patented an electromagnetic clock and later accused Wheatstone of appropriating his ideas. Bain claimed he had communicated the idea of an electric clock to Wheatstone while working for him from August to December 1840. Wheatstone maintained he had experimented in that direction in May. Bain also accused Wheatstone of stealing his idea of the electromagnetic printing telegraph, but Wheatstone showed that the instrument was a modification of his own electromagnetic telegraph.

In 1840, Alexander Bain mentioned his financial problems to the Mechanics Magazine editor, who introduced him to Sir Charles Wheatstone. Bain demonstrated his models to Wheatstone, who dismissed their potential. Three months later, Wheatstone demonstrated an electric clock to the Royal Society, claiming it as his invention. However, Bain had already applied for a patent. Wheatstone tried to block Bain's patents but failed. When Wheatstone organized an Act of Parliament to set up the Electric Telegraph Company, the House of Lords summoned Bain to give evidence, eventually compelling the company to pay Bain £10,000 and give him a job as manager, causing Wheatstone to resign.

Polar Clock

One of Wheatstone's most ingenious devices was the 'Polar clock,' exhibited at the British Association meeting in 1848. Based on Sir David Brewster's discovery that the sky's light is polarised at a ninety-degree angle from the sun's position, the clock could determine the sun's position and apparent solar time by measuring this polarisation. The clock consisted of a spyglass with a Nicol prism eyepiece and a selenite object-glass. When directed to the North Pole and the prism turned until no colour was seen, the angle of turning indicated the hour of the day. Though not useful in countries with reliable watches, it was part of the 1875–1876 North Polar expedition equipment.

Wheatstone Bridge

In 1843, Wheatstone presented a paper to the Royal Society titled 'An Account of Several New Processes for Determining the Constants of a Voltaic Circuit,' which introduced the Wheatstone Bridge for measuring electrical resistance. Although first devised by Samuel Hunter Christie in 1833, Wheatstone brought it to prominence. His paper included practical formulae for calculating currents and resistances using Ohm's law and introduced a unit of resistance: a foot of copper wire weighing one hundred grains (6.5 g). He was awarded a medal for his paper. That same year, he invented an apparatus for remotely registering thermometer or barometer readings and patented a sound telegraph with Cooke.

Cryptography

Wheatstone's ingenuity extended to ciphers, creating the Playfair cipher, named after his friend Lord Playfair. Used by several nations' militaries through World War I and by British intelligence during World War II, it was initially resistant to cryptanalysis. Wheatstone also interpreted cipher manuscripts in the British Museum and devised a cryptograph for encoding messages, which could only be decrypted by a corresponding machine. As an amateur mathematician, he published a mathematical proof in 1854.

Electrical Generators

In 1840, Wheatstone introduced his magneto-electric machine for generating continuous currents. On 4 February 1867, he published the principle of reaction in the dynamo-electric machine, but C. W. Siemens had communicated the same discovery ten days earlier, and both papers were read on the same day. It was later revealed that Werner von Siemens, Samuel Alfred Varley, and Wheatstone had independently discovered the principle within months of each other. Varley patented it on 24 December 1866; Siemens highlighted it on 17 January 1867; and Wheatstone demonstrated it at the Royal Society on 4 February 1867.

Disputes over invention

Wheatstone was involved in various disputes with other scientists throughout his life regarding his role in different technologies and appeared at times to take more credit than he was due. Wheatstone was erroneously believed by many to have created the atmospheric electricity seeing apparatus that Ronalds invented and developed at the observatory in the 1840s and also to have installed the first automatic recording meteorological instruments there.

While on a visit to Paris during the autumn of 1875, and engaged in perfecting his receiving instrument for submarine cables, he caught a cold, which produced inflammation of the lungs, an illness from which he died in Paris, on 19 October 1875 aged 73. A memorial service was held in the Anglican Chapel, Paris, and attended by a deputation of the academy. His remains were taken to his home in Park Crescent, London, (marked by a blue plaque today) and buried in Kensal Green Cemetery.

… and that is history.

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News You Can't Lose

Field Day results are in

by JOHN SCHOUTEN with statistics provided by the ARRL

I am very pleased to report that ARRL Field Day 2024 results are now available and, as in past years, our SARC/SEPAR team did very well.

The ARRL reports that all 85 ARRL and Radio Amateurs of Canada (RAC) Sections participated in Field Day, and the ARRL received 64 entries from 27 countries outside the US and Canada, which is a record high for DX participation in this event.

While the number of participants increased this year, the total number of entries decreased by 126 from 2023, which is a 3% change. Traditional Class A and B field stations represented 42.2% of all entries, while Class D and E home stations represented 52.4% of the total entries. Class C (mobile) stations remained relatively unchanged from last year. Class F (Emergency Operations Center, or EOC) slightly increased from 2023.

2F					
North Central AR ARS					
ABSER (+N5HU)	2,450	2	39	11,792	AR
Bull# ARS					
KY4KY (+W4KBR)	2,228	2	40	6,692	KY
Surrey AR Comms					
VE7SAR (+VE7HME)	1,697	2	25	6,640	BC
San Jose EOC					
KE6PQV	1,352	2	2	6,208	SCV
Point Loma Radio Ops. Grp.					
W6A	1,672	2	9	6,150	SDG
Orleans Co. ARC					
W2ORC (+WA2DQL)	1,003	2	22	5,211	WNY
Greater Bridgeport ARC					
W1BPT (+K1PCN)					

The total number of reported QSOs increased by 4% to almost 1.3 million, likely attributed to increased propagation as we near the peak of Solar Cycle 25. The number of phone and CW contacts increased from last year, with more than 522,000 phone contacts and more than 490,000 CW contacts.

More than 283,000 digital QSOs were reported this year, which is a slight decrease from last year.

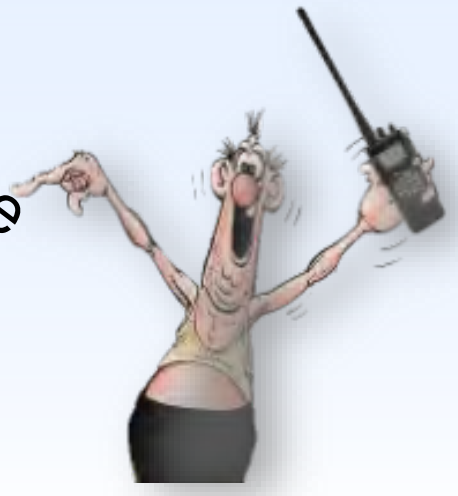
Having reviewed the results, it appears that we were first in Canada and third overall in our category.

For the complete article, the PDF file with Class A, B, and C scores is at https://contests.arrl.org/ContestResults/2024/Field-Day-2024-FinalQSTResults.pdf.

Class D, E, and F scores are at https://contests.arrl.org/ContestResults/2024/Field-Day-2024-FinalLineScores.pdf

~ John VE7TI

Page13—News You Can Lose



The Lighter Side of Amateur Radio

FCC Proposes Repeater Tax

In a move certain to cause controversy in the U.S. Amateur Radio community, the FCC has proposed a new Repeater Tax to free up radio spectrum.

The Dipole reached out to Jessica Rosenworcel, Chairwoman of the FCC Board of Directors, who confirmed the proposal before the board is to eliminate spectrum squatting by repeaters that have little to no use. Rosenworcel told The Dipole, "It is thought that a tax on repeaters will eliminate as many as 90% of existing Amateur Radio repeater systems which have been underused for years, freeing up radio spectrum for newer Amateur Radio operators to use the allocations for newer modes of operation." She went on to state, "If the spectrum is not used after this change then we may consider selling it off to industry. We don't think of it so much as a tax than a license fee, however as the repeaters are already licensed, it would have to be a tax by law."

Furious efforts are expected by the ARRL to oppose these changes. "We will lobby extremely hard to keep things exactly as they are, status quo, with cold repeaters and dead air." said ARRL President Rick Roderick when reached for comment. Roderick also said that, "if the United States employs this tax on repeaters then other nations like Canada are certain to follow."

Tax rates have not yet been determined and will not be until after the public consultation period has ended June 15, 2025, however an unnamed source has told The Dipole that suggested amounts could be in the range of $500 to $800 per year.

~ Reporting from the FCC, Washington D.C.
Scott VA7SL

Ham Radio gear prices set to soar with Trump tariffs says ARRL

The American Radio Relay League (ARRL) has warned its membership today that the impending import tariffs of the Trump administration will cause major disruptions to the cost of Amateur Radio gear due to almost all radio such equipment being manufactured in Asian countries. Given the wildly fluctuating statements the President-elect has made, ranging from 20% to 100%, import tariffs will undoubtedly make millions of products go up in cost to the American consumer and Amateur Radio will be no exception.

Bart Jahnke, W9JJ, ARRL Director of Regulatory Affairs, has stated that "All manufacturing brands will be affected, from Yaesu to Baofeng, from Icom to Retevis. The long list of items includes much more than radios, it will touch things like Raspberry Pi computers and Hot Spots. " Further Jahnke suggested that as the Trump presidency approaches, "Hams may want to make those important purchases now of gear they have been considering before the prices spike in 2025."

Expected big winners will be Canadian retailers along border states, US Hams are expected to just drive up North to such places as Toronto, Ontario and buy gear there, thus avoiding the import tariff that Trump says he will impose. Jahnke said, "We don't really understand what the point of these tariffs is and we will be advocating hard to put an end to them.

Can you imagine paying $18,000 for a Kenwood TS 990S instead of the current $9000 or $20 for a Quansheng UV-5r instead of the current $10?"

We reached out to RadioPlanet President Angelo Teffe for his comments and said, "We are really looking forward to the tariffs kicking in, we are now considering opening new locations and hiring more staff to handle the demand. Prices will be 20% to 100% cheaper in Canada and you can bring the wife up to see Fall colours in Ontario or tour the old city of Quebec with the savings!"

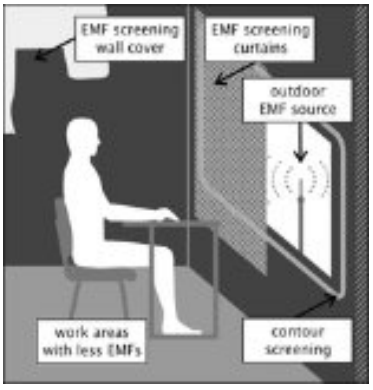
~ Reporting from RadioPlanet

The DIPOLE - the World's finest Amateur Radio News Source, like a Dipole there are two sides to every story, we ignore those sides, digging deeper for unwanted lobes and parasitic reactions.

Conclusive Evidence of Serious RF Exposure Health Problems

In a groundbreaking scientific study conducted jointly by the National Institute of Health and the American Journal of Health Studies into long-term radio frequency energy exposure, serious life changing health consequences were found.

The double-blind study followed 500 licensed Amateur Radio Operators for a 20-year period who had a daily exposure to emissions from all sorts of radio equipment. The operators used various power levels and equipment configurations at close distances and were monitored for health for changes as compared to a control group who were not exposed daily to emissions.



"The results were stunning," said researcher and Princeton University PhD candidate Rosemary Delahunty, "the physiological changes were clear and seem irreversible."

There is a lengthy list of health changes of which included the inability to read a paragraph from start to finish, and a serious decline in the ability to distinguish satire from reality. It was noted that many persons subjected to long-term exposure had a change in the way they saw themselves in a mirror which impacted their choice of apparel.

Another notable personality change was the need to point out that something was "fake" although only half the group could tell the difference.

~ Reporting from the National Institute of Health, Adrian VE7NZ & Scott VA7SL

Radio Ramblings

Reflections

by KEVIN McQUIGGIN VE7ZD / KN7Q

Kevin VE7ZD/KN7Q is active in EME, meteor scatter and much more. He lives on Vancouver Island.

I hope that everyone had a great holiday season. VE7LPM and I enjoyed the holidays here in Courtenay and were able to relax for a couple of weeks. After almost a year, our extensive house renovations are drawing to a close, so we finally had time to put our feet up and enjoy the holiday season.

It's good to reflect at the start of each new year and plan for the coming seasons. I don't make annual resolutions, but I do set out a rough plan for what I would like to accomplish each new year. In 2025 I would like to get back on 23 cm EME, continue my meteor scatter (MS) activities on 6m, get on 2m MS as well, and work on some new projects.

I'll describe one new project below.

Reflections and Amateur Radio

In the amateur radio context, "reflections" play a role in many amateur radio modes. I thought that this issue I would look at this admittedly quirky aspect of our hobby and use it to introduce a "passive radar" project that I have started to work on for 2025.

Let's look at a rundown of how reflections are a factor in much of amateur radio. No need to get into much complexity, let's

save that for the discussion of my new project!

A) HF Propagation:

HF radio signals (approximately 3 – 30 MHz) use the ionosphere as a reflector, as well as the surface of the earth, and this physical characteristic is responsible for the global propagation we see on the amateur radio HF bands. Transmitted signals are reflected by the ionosphere back down to the earth and then reflected again by the earth's surface up to the ionosphere. Multiple "hops" like this are possible. In this way, HF signals can propagate globally. Whether you're working DX on 20 metres or using an NVIS antenna on the lower frequency bands, reflection of signals enables our HF communications.

B) Meteor Scatter:

Meteor scatter (MS) is a popular mode on the 6-metre band (50 - 54 MHz) but some ops also use the mode on 2 metres, and occasionally on 10 metres as well. MS operators use the ionization created by meteors in the upper atmosphere to reflect radio signals up to about 3000 km. How does this mode of propagation work?

Meteors traveling in space encounter Earth and then enter our atmosphere 24/7, every day of the year – not just during the annual "meteor showers" covered regularly by the news media.

Most of these meteors are tiny - about the size of a grain of sand. Their high relative velocity means that they when they encounter our atmosphere, they heat up quickly, and then burn up due to friction. A single tiny meteor can travel 100 km before it burns up. This heating generates a significant ionization trail in the upper atmosphere, usually about 100 – 200 km above the Earth's surface.

Ionization trails reflect radio signals and can be used for communication between amateur stations. See Figure 1 for the methodology.

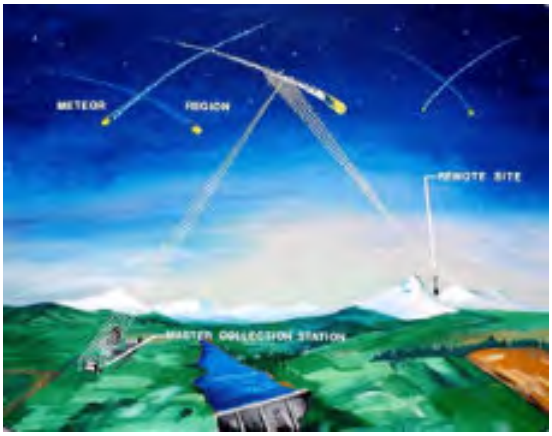


Figure 1 – Methodology of Meteor Scatter Communication [1]

On the 6m band an ionization trail will support radio communication for a few seconds, until the ionization dissipates. MS operators use this ionization to communicate with other hams who are also within range of the ionization trail high up in the atmosphere. A few seconds is all that is needed to call CQ or send a signal report.

Signals reflected from an ionization trail have a unique appearance on your computer display (see Figure 2) and a unique sound when you listen to them using your receiver. MS operators call the sound a "ping".

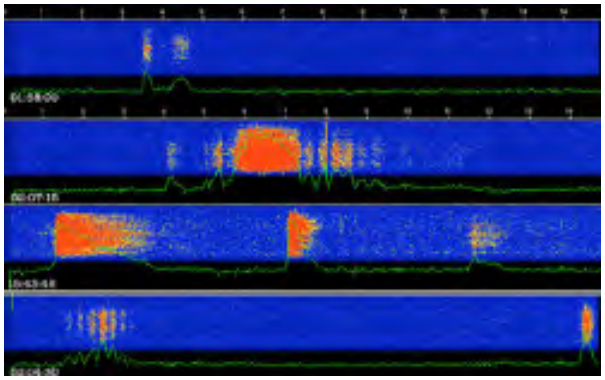


Figure 2 – Time Graphs of Several Meteor "Pings" on 50.260 MHz [2]

If you want to monitor meteor scatter activity, then tune your receiver to 50.260 MHz USB. Turn up the audio and listen for bursts of audio between about 0600 and 0800

hrs local time. You can hear these pings just about every morning.

I made a short recording of two meteor pings on December 12th. Download the recording at [3].

If you start WSJT-X in MSK144 mode then you will also see the meteor pings on the waterfall display. Figure 2 is a collection of MSK144 screenshots. You will likely even get some decodes from these pings, as shown in Figure 3. Like the popular HF mode FT8, MSK144 uses 15 second TX/RX periods: it listens for one 15 second period and transmits in the next. In excellent conditions with lots of "rocks" a QSO can be completed in one minute.

Figure 3 – Meteor Scatter Decodes [2]

The number of meteors hitting the atmosphere peaks around the time of local sunrise every day, so MS is an especially attractive mode for hams who are "early risers". VE7LPM and I usually get up early, so I go "on the meteors" around 0600 to 0700 hrs a few mornings every week.

MS does not require extremely high power, nor a large antenna. Modern HF rigs usually include the 6-meter band, and a three element Yagi will get you started. There are some simple Yagi designs available online; see https://www.qsl.net/on6mu/schemas/50mhz3el_yagi.htm. I built my first 6m Yagi from scrap aluminum tubing stored under the back step.

One hundred watts from your modern HF rig will let you get started with a few meteor scatter QSOs. More power makes it easier, but 100 watts will let you snag some contacts.

That said, you can certainly hear pings and get a few decodes even using a simple wire antenna like a 6m dipole, or even try listening using your 10m or 20m antenna. RX and decoding on a mismatched antenna won't be great, but you'll still see some pings. You can test the waters to see if you want to go further with the mode. Don't think that you need to spend hundreds of dollars to give meteor scatter a try!

Some days of the year have more meteors encountering the Earth than others. During low meteor count periods, QSOs take longer to complete. WSJT-X can manage this for you and repeat signal reports and other messages until the other station confirms receipt of the signal report or message. This can extend the time required for a QSO to several minutes or even to an hour, if the "rocks" are especially infrequent. Generally, though, you can compete a MS QSO in five to ten minutes in poorer conditions.

The maximum distance for a meteor scatter QSO depends on how high up each meteor is when it burns up. Think of each ionization trail as a mirror up (say) 100 km in the atmosphere. Maximum QSO distance depends upon the height of this mirror. Maximum QSO distances can reach up to about 2500 kilometers. While this isn't "big DX" compared to HF work, the unpredictability of the "rocks" and the positive vibe of the MS community make use of the mode interesting and fun. Like fishing, with meteor scatter you cast your line into the water, but never know how many fish you are going to catch!

There is lots of meteor scatter activity here in the western half of North America. The MS community has a few "watering holes" online where the ops chat in real time to set up skeds and discuss equipment and operating

techniques. Most popular of these sites is the "VHF-Chat" group on Slack [4]. The group is extremely friendly and helpful. Be warned: meteor scatter gets "under your skin" and the mode can be addictive!

C) Earth-Moon-Earth (EME):

EME or moonbounce is a clear example of a reflective amateur radio mode. EME is fundamentally a type of radar communication. Operators use amateur bands above 50 MHz to communicate with each other by reflecting their signals off the surface of the moon. See Figure 4 for how this works.

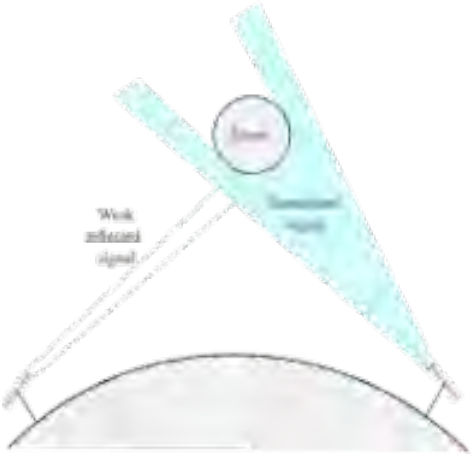


Figure 4 – EME Methodology (from [5])

From the moon you can see almost one half of the Earth at once (Figure 5). As long as the moon is above the horizon for both EME operators, then they are able to communicate. QSO *terrestrial* distance between stations can approach 20,000 km – half the circumference of the Earth. However, in terms of the *distance that signals travel*, an EME QSO represents the maximum "DX" that any ham operator can possibly achieve: EME signals travel on average 800,000 km in their journey from the sender to the receiver [6].

EME communication doesn't rely on the ionosphere. In fact, operators specifically use VHF, UHF and higher frequency amateur radio bands to ensure that their signals leave the Earth to reach space.

Directive antennas like parabolic dishes and multi-Yagi arrays focus the EME signals and allow them to reach the moon, where a very tiny percentage of the RF energy is reflected back towards the Earth [7]. The return signals are extremely weak, but low loss feedlines, sophisticated low noise preamplifiers and digital signal processing (DSP) allow them to be detected and decoded.

Figure 5 – Famous Image Taken by Apollo 8

EME is a complicated mode with a lot of sub-components that need to function correctly and in parallel. However, when it works it is incredible to hear and decode signals reflected from the surface of the moon. WSJT-X includes a mode called Q65 that I have used for over two hundred EME QSOs on 1296 MHz (the 23cm band).

Radio signals, like light, travel at about 300,000 km per second. The time delay for signals to travel to the moon and back is usually about 2.1 – 2.5 seconds. Given this delay, it is possible to listen to your own echoes after your signals return from the moon. This echo testing represents a very basic form of radar.

The peak near the center of Figure 6 shows the echo of my 300-watt signal. Note the Doppler shift (scale is at the top of the graph, in hertz) of about +18 Hz. A positive Doppler value indicates that the moon was moving towards my QTH (ascending in the sky) when the echo was received.

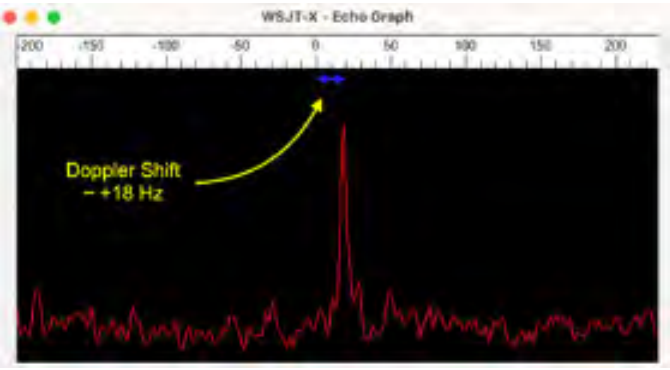


Figure 6 – Lunar Echo from VE7ZD

Commonality

What do these three examples have in common? HF communication, meteor scatter and EME operation all depend upon the reflection of RF signals.

In HF operation the ionosphere is used as a reflector to propagate signals terrestrially in order to achieve global propagation and log DX contacts. Incidentally, this correct HF propagation model was first developed (see Figure 7) in 1924 by US amateur John Reinartz, 1QP (W1QP) [8].

Meteor scatter depends on reflection of radio signals from ionization trails, and EME operation depends on reflection of signals from the surface of the moon. These reflections help accomplish the operator's objective: successful amateur radio QSOs.

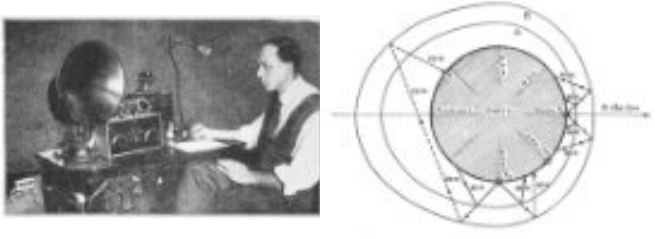


Figure 7 – John Reinartz 1QP and his 1924 Propagation Model [8]

Following the Thread

Let's follow this thread of "reflection" and look at an interesting new project that I will be starting in 2025: the development of a *passive radar* system.

This isn't really "amateur radio" in the classic sense because it's a receive-only project, but nonetheless, the project leverages our theme of "reflection", and the project exemplifies the way that hams have historically experimented with radio technology to learn and to design their own equipment and systems.

Besides, maybe a useful new amateur radio application will emerge from the work that I plan to undertake!

Passive Radar

Passive radar is called "bistatic radar" by radar experts and those working in the radiolocation industry.

Passive radar uses reflections from local VHF and UHF transmitters to track aircraft, marine and even vehicular traffic. The radar system is called "passive" because it does not include any transmission capability; instead, the system relies on radio signals that are already being transmitted in the area for other purposes, such as FM broadcast radio or local television channels. You can use these transmissions as "illuminators of opportunity" and track aircraft and other moving targets by piggybacking on the RF emissions of these transmitters.

These broadcast transmissions reflect off aircraft, ships, vehicles and other targets in the area and are received by the passive radar receiver. By comparing the timing and direction of these echoes to the reference signal from the broadcast transmitter, targets can be located and their azimuth, elevation, distance and velocity determined using signal processing mathematics. See Figure 8 *[next page]*.

In Figure 8, the aircraft is tracked by using two antennas: one pointed at a stationary transmitter (called the reference signal), and the other antenna pointed towards the target. Knowledge of the reference signal's waveform allows its echo from the target to be detected. Once this echo is identified, geometry and some other math can be used to locate the target and determine its velocity and range.

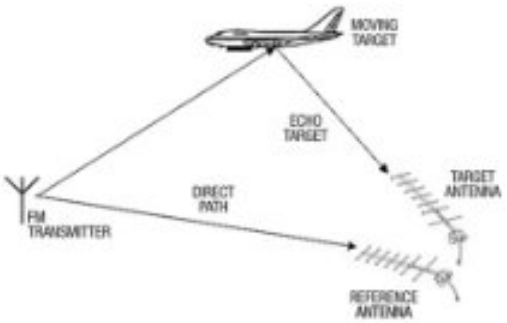


Figure 8 – Passive Radar Concept [1]

Passive radar is distinct from traditional "monostatic" radar in that the radar system does not need to include a high power transmit component. A typical monostatic radar station is shown in Figure 9. Lack of an onboard transmit component simplifies the design of the radar system and greatly reduces cost. Use of broadcast VHF/UHF radio and TV signals as reference signals leverages existing high-power broadcast transmitters as "illuminators of opportunity" and allows the radar system to locate targets using digital signal processing (DSP) techniques.

Figure 9 – Traditional "Monostatic" Radar Ground Station

There's an excellent online book entitled "An Introduction to Passive Radar" by H. Griffiths and C. Baker. It is available for download at https://ieeexplore.ieee.org/document/9826859. This book is serving as my main reference as I learn about how radar systems work.

A) Why Undertake This Project?

I've been interested in radar and how it works for many years. This project will get me into the nuts and bolts of the topic. It's primarily a software project.

My goal is to learn about radar and how radar systems work: as such, I want to develop all the software myself, from the ground up, without any reference to existing code or to any of the passive radar applications that are available on the Internet. You don't learn much from downloading a pre-packaged program and running it on your computer.

If the project is successful, I want to be able to monitor air traffic into the local airports in the Comox Valley, as well as flights arriving and departing from Vancouver International Airport. I hope to be able to generate plots and videos that show overflights, arrivals and departures of aircraft. Fun!

Lots of excellent reference materials are available online and in the library, and introductory radar courses are available on YouTube. See the references at [9] and [10].

B) Some Details:

A passive radar station (see the bottom right of Figure 8) employs two receive antennas:

- One antenna to receive the signal from a local broadcast station (left side of Figure 8) directly. This antenna points directly at the transmitter. This signal is called the reference signal. It illuminates targets with RF energy;
- A second "surveillance" antenna that points in the direction of the radar targets and receives echoes of the *reference signal*. This is called the *reflected* or *target* signal.

A dual channel receiver receives both the reference and the target signal. Signal processing code at the passive radar computer compares the reference signal to the echoes received on the surveillance antenna, and a bit of mathematics uses the time delay and frequency shift of the echoes to locat the target in azimuth, elevation and calculate its range and velocity.

Hardware

A) SDR:

All signal processing applications depend on hardware at the "front end" of the system: radio signals need to be received and transmitted, and this can only be done with analog hardware. The antenna and front-end RF amplifiers perform this function.

In an SDR radio, received RF is sampled, digitized and streamed to a suitable computer for processing. Together, the analog front end, the analog to digital converters and the streaming interface define the "SDR" (software-defined radio). The SDR performs digitization of RX signals and converts digital TX signals to RF for transmission. All SDRs incorporate internal microprocessors that control reception parameters and perform the digitization of RF signals.

In this project the TX half of the SDR is not used because passive (bistatic) radar uses illuminators of opportunity (broadcast transmitters) rather than transmitting RF energy itself.

An SDR does not define a complete radio system. It is good at transmission, reception, and digitization of signals, but it cannot perform all of the required radio operations by itself. The SDR needs to cooperate with an attached signal processing computer that:

- Performs modulation and demodulation on the digitized signal stream;
- Sets frequency, bandwidth, sampling rate and other radio parameters; and
- Switches the radio from RX to TX.

Together the SDR and its signal processing computer work together to define a complete radio system.

B) Signal Processing Computer:

For this project I need a capable signal processing computer that can analyze the digitized reference and target signals coming from the SDR to determine the location and velocity of the radar system's targets. This is a CPU-intensive task. While the process of signal analysis and echo detection and analysis is straightforward in concept, there is a significant amount of mathematics that goes into the solution of this problem. I'll be writing code for this in the coming months.

The first step in processing the target signal is called "clutter removal". "Clutter" is the term used for noise and extraneous reflections in the received target signal. These extraneous elements need to be removed from the target signal to leave just the target echo behind. Clutter removal is an extremely complex process.

Once the clutter component is removed from the target signal, then other formulae can be applied to it to determine the target's azimuth, elevation, range and velocity. Surprisingly (to me, anyway), this is a "smaller" problem than clutter removal. Nonetheless, the signal processing computer needs to be able to perform these mathematical operations efficiently as well.

I have a suitable computer for this task, but as an experiment I will first try to deploy a newly purchased Raspberry Pi (rPi) Model 5 single board computer in this role. I was really pleased with the performance of a less powerful rPi Model 4 in my last compute-intensive DSP project (an EME transceiver), so I think that the heftier rPi Model 5 may very well be powerful enough to work. If the Model 5 can't handle the load, then I will deploy a more powerful desktop computer.

Coherent Reception

As described above, a passive (bistatic) radar system utilizes two input signals:

- A *reference signal* received from a transmitter such as an FM broadcast station or a digital TV station; and
- A *target signal* that is composed of the reflection of the reference signal after it has bounced off a target such as an aircraft in flight.

The SDR needs to be able to receive both of these signals simultaneously, and in phase, and to do so with great degree of accuracy. This is called "coherent" dual channel reception. Not all SDRs have this capability.

I have an Ettus B200, an Analog Devices "Pluto" and several versions of "RTLSDR" dongles, but none of these SDRs support coherent reception [11].

I decided to purchase a coherent two-channel digital radio for the project. Consultation with my engineer friend Dennis (AC7FT/VE7BPE) and a review of coherent SDRs on the Internet pointed towards a couple of suitable radios:

- The Ettus B210 from Ettus Research in Oregon [12]; and
- The "bladeRF 2.0 Micro XA4" device from Nuand in New York [13].

Both units had solid specifications, good reputations, and both had been used successfully by academic researchers and hobbyists in passive radar projects. The radios are also used in the telecom industry.

There were other options such as the "Kraken SDR" [14] and other homebrewed devices that cobbled together a set of cheap RTL-SDR dongles to try to achieve coherency, but their specs were worse than those of SDRs designed from the ground up to be coherent.

I decided to avoid these radios to reduce potential sources of error. If I encounter performance issues with development of my system, I want to be certain that the problems aren't being caused by the SDR hardware. Use of a high quality coherent SDR at the front end of the system will isolate all errors to bugs in my software. I can then work to find and fix them.

I initially favoured the two-channel Ettus B210 SDR; I own its one-channel sibling the B200 and have been very happy with that radio over the past 6 years. However, the cost of the B210 has increased significantly to USD$2165 in the past few years.

The Nuand bladeRF has comparable specs to the B210 and is currently about one quarter of the cost. Additionally, my friend Dennis AC7FT/VE7BPE in Oregon has owned a bladeRF for three years, and he gave me solid positive feedback on the radio. There's always a trade-off in specifications versus price, but the bladeRF's USD$540 price tag was the deciding factor.

I purchased the bladeRF (see Figure 10) and it will be serving as the SDR for this project.

Figure 10 – The bladeRF 2.0 XA4 [16]

Software Development and Analytical Tools

There is a lot of mathematics required for clutter reduction and signal analysis in this project. I have found an excellent web site that discusses the mathematics of the passive radar (see https://dopplerfish.com/passive-radar), but I will need the help of some standard mathematical libraries to accomplish the necessary calculations.

I'll use the C programming language for most of the coding. The GNU Scientific Library (GSL) (see https://www.gnu.org/software/gsl) provides functions to perform the necessary linear algebra and regression (the way to find "best fit" solutions to azimuth, elevation and velocity based on the data in the de-cluttered target signal), and a FFT (Fast Fourier Transform) library called "fftw" that is widely used in industry and academia. fftw will enable faster analysis of the de-cluttered target signal. It is free and available at https://fftw.org.

My math in some of these areas can definitely use a "tune-up" after many years of neglect, so I see this project as a great opportunity to dust off old math skills and learn new ones.

To plot the output of the calculations (and hopefully to generate real time flight paths) I plan to use the open source "gnuplot" graphics package. It is available at https://gnuplot.sourceforge.net. Gnuplot has much more flexibility than (for example) Excel's graphing functions, and can animate data sets automatically.

An Example of Passive Radar Output

Let's look at an actual example of a passive radar system.

Canadian Electrical Engineer Max Manning developed a passive radar system while he was a graduate student at Dalhousie University in Halifax, NS around 2018. I referenced his excellent web site "Doppler Fish" above. I have not spoken with Max, but may need to find him if I run into insurmountable problems as I work to develop my own passive radar system. His code is available on GitHub (see https://github.com/Max-Manning/passiveRadar), but on principle I want to solve these problems myself and not refer to his (or anyone else's) code.

His passive radar web site at https://dopplerfish.com/passive-radar includes an animated graphic that shows his system in operation. Click on the link and go about halfway down the page. I'll reproduce a screenshot here, but the entire 18-second video is worth seeing. See Figure 11.

In the bottom left quadrant of Figure 11, you can see an aircraft in flight as well as its recent flight path. The video is much more impressive!

I hope that if I am successful in this project that I will be able to produce similar animations.

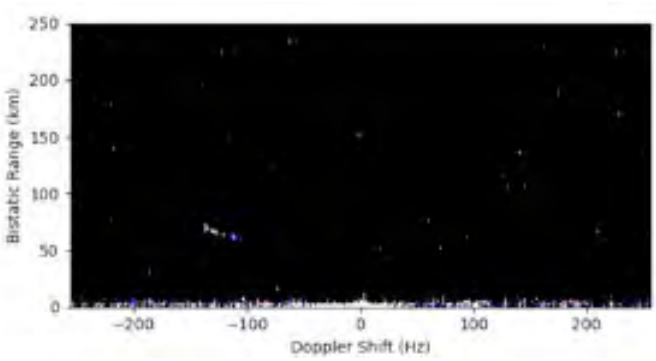


Figure 11 – Screenshot of Manning's Results

Project Plan

The project plan is evolving as I learn more about radar systems and passive radar in particular, but here are the next steps as I envision them at this writing:

- Learn how to use the bladeRF, and how to use its API (Application Programming Interface) to communicate with the SDR in order to set parameters such as frequency and sample rate, and how to control streaming of samples from both of the device's RX ports (reference channel and target channel);
- Get the bladeRF to be recognized by gnuradio and develop some simple test flowgraphs that will help me learn how to use the device;
- Write some test code that uses the GSL (GNU Scientific Library) package that I will use for any advanced mathematics required in clutter removal and echo analysis;
- Research local FM broadcast stations that can be used for the radar's reference signal. Look at the coverage of the broadcast transmitters to the northwest of my home QTH on Mt. Washington. Aircraft targets will be to the east and northeast – therefore it is important that the reference signal propagates well in that direction; and

- Build two small Yagis: one for the reference signal and the other (longer boom) for the target signal. Mount the reference antenna pointing at the broadcast transmitter and aim the longer Yagi northeast or east pointing to the target area.

This will be enough work for the initial stage of the project. Once I have the ability to capture and record the reference and target signals, I'll have some sample data sets to test my code against. I'll get to work on the functional signal processing code.

More to Come

I'll report back in future issues to give an update on how the passive radar project is going. I expect that there will be several challenges and "bumps in the road", but with perseverance I hope to be able to get a functional system going in about five or six months. Wish me luck!

Conclusion

That's it for this issue. I hope you found the overview of how "reflection" factors into amateur radio operations interesting. Take some time to "reflect" on where you are with your amateur radio operations, and where you'd like to go for 2025.

Feedback on Radio Ramblings is always welcome and may be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q

References:

[1] Graphic from https://www.researchgate.net/profile/Andy-Ward/publication/287420525.

[2] Screen shots and decodes from the popular open source WSJT-X program. The application runs on Windows, MacOS and Unix systems and is downloadable from https://wsjt.sourceforge.io/wsjtx.html. Documentation is included.

[3] The recording is about 20 seconds long and is at https://www.dropbox.com/scl/fi/j7xjr7bglj46v4h05cfpu/MS-Ping.mp3?rlkey=pywdbb2g7sobjbb6t9nuqu2vx&dl=0.

[4] The most popular real time chat site for meteor scatter is the Slack VHF-Chat group. You can reach it through https://slack.com/. Download the app and join channel "VHF-Chat".

[5] Diagram from https://144200.net/styled/files/propagation-eme-moonbounce-basic-concept-01.svg.

[6] Amateur radio's maximum DX record may increase significantly in the next couple of years. The Deep Space Exploration Society (https://dses.science), an amateur radio-based club in Colorado, operates an EME station using a 30-foot parabolic dish. They have started a project to explore EVE amateur radio communications: Earth – Venus – Earth. "Venus-bounce". If they are successful in this endeavour then it will be an amazing new amateur radio achievement. Radar echoes from Venus were used to map the planet in the late 20th century, but these studies by NASA and others used much bigger parabolic antennas and very, very high power levels. To be able to record Venus echoes using amateur power levels will be an amazing achievement!

[7] Path loss of EME signals reflected off of the moon is about 250 dB by the time the signals reach the EME receiver. To convert dB to a percentage, divide the dB value by ten and then compute one divided by this value. For example, 250 dB / 10 is 25. 1 divided by 10_{25} is 0.0000000000000000000000001. 500 watts transmitted and reflected off the moon will see 0.00000000000000000000005 or 5 x 10_{-23} watts at the receiver. EME signals are very weak!

[8] An interesting article on Reinartz and his HF propagation experiments is available at http://w2pa.net/HRH/dx-records-and-shortwave-reflections/.

[9] I've already mentioned the free book in the article, but once again it is entitled "An Introduction to Passive Radar", by Griffiths and Baker, and it is available for download at https://ieeexplore.ieee.org/document/9826859.

A more detailed book is “Advances in Bistatic Radar” edited by Nicholas J. Willis and Hugh D. Griffiths, 2007.

[10] “Introduction to Radar Systems” is a free online course from MIT’s Lincoln Laboratory. Eleven hours of instruction is spread over 10 lectures by Professor Robert M. O'Donnell, KO7DBF. The course is intended for people with a general understanding of radio and related systems and the mathematics is kept to a minimum. URL for the course is https://www.ll.mit.edu/outreach/radar-introduction-radar-systems-online-course.

[11] Some passive radar projects have tried (with varying levels of success) to connect two or more cheaper RTL dongles together so that they use a shared time base (clock), but this approach does not work reliably.

[12] See https://ettus.com.

[13] See https://nuand.com.

[14] See https://www.krakenrf.com/.

[15] It is not well known that this HF propagation model was not well-understood until 1925. HF signals were observed to propagate globally, but science did not have a functional explanation of how this occurred. A competition was sponsored seeking theories that could explain HF propagation, and the successful proposal (and correct model, which is still in use today) was submitted by an amateur radio operator, John Reinartz 1QP.

[16] See https://www.nuand.com/product/bladerf-xa4/.

52 Week Ham Challenge Begins January 1

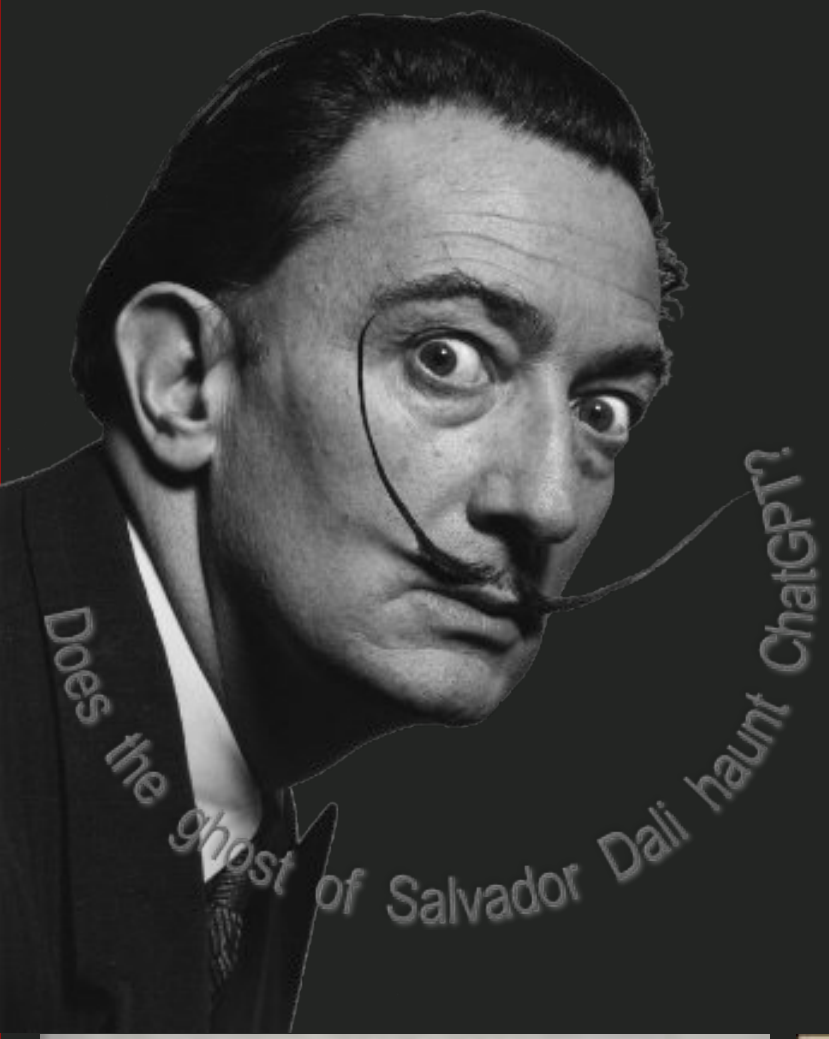
Fabian Kurz (DJ5CW), creator of Learn CW Online, recently announced the 2025 52 Week Ham Challenge. The challenge consists of weekly exercises ranging from designing QSL cards to receiving a station on 6m via sporadic E.

This is meant to inspire you to extend your horizon in amateur radio by weekly challenges through the year that touch all aspects of ham radio (and related fields). A lot of the challenges may be trivial for some participants (because it is what they do all the time), but very challenging to others. Participants of the challenge are encouraged to help each other in any way possible.

Participants are encouraged to post progress through social media using the #hamchallenge hashtag. An IRC channel is also available.

~ Amateur Radio Daily

Equine mobile?



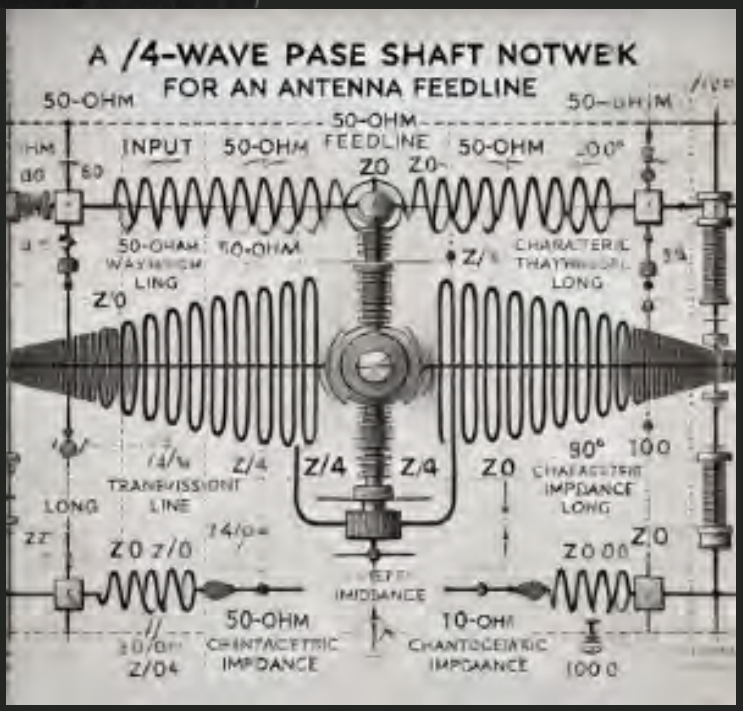
I am a frequent user of ChatGPT. When I asked for a theoretical explanation of a 1/4-wave phase shift network (for antennas), it gave a detailed, correct answer (including formulas). However, when I asked for a circuit diagram of a 1/4-wave phase shift network, ChatGPT hallucinated in bizarre ways.

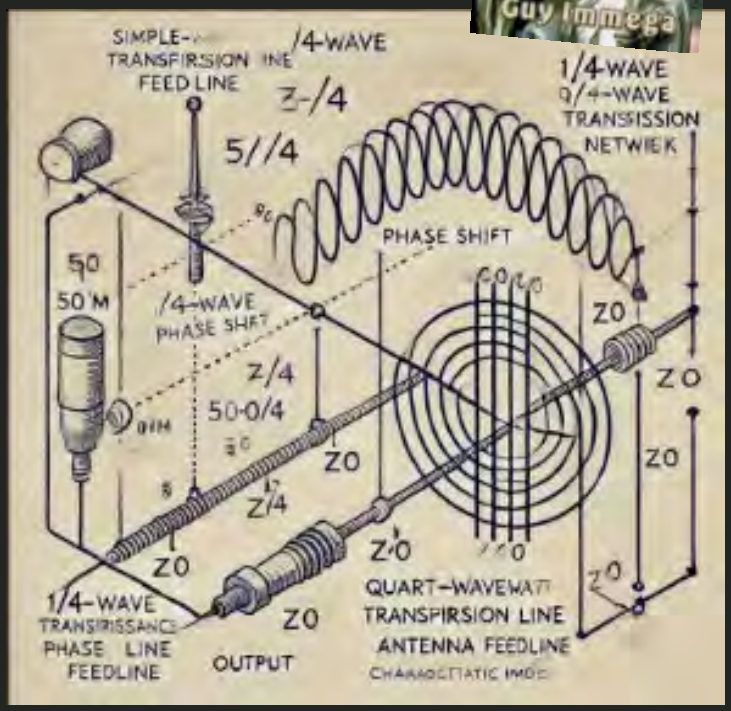
At first I was appalled at the nonsense. However, when I studied the diagrams, I was struck by their visual appeal. It was as if Salvador Dali (note the dipole moustache) decided to make a Dadaist interpretation of radio, emphasizing the absurd.

Below are two of ChatGPT's endless HALLUCINATIONS of a 1/4-wave phase shift network.

73,

~ Guy Immega VA7GI





Tech

Turn your Android phone into a real radio

by JOHN SCHOUTEN VE7TI

There are a lot of apps for cellphones that allow you to use your phone to connect to internet based radio networks, like Echolink, IRLP, DMR, or D-Star, but a US based Ham, Vance Vagell KV4P, has released an open source project. Based on the ESP-32 development board and a DRA818V (or SA818S-V) VHF HAM Radio Module to make the phone into an actual radio. YouTube video: https://youtu.be/TTboBthcY18

According to the project lead, The KV4P HT is a homebrew VHF radio that makes your phone capable of voice and text communication completely off-grid if you hold an amateur radio license. The radio simply plugs into the USB-C port on your Android smartphone and transforms it into a fully fledged handheld radio transceiver. It's completely open source (GPL3): the Android app, ESP32 firmware, PCB designs, and 3D printer files.

It's small enough to fit in your pocket and take anywhere, and since it has no internal battery it's the perfect radio to put in a go-bag or your car's glove compartment.

Features:

- Only US$35 to build, with three components to solder
- 100% ham radio, always completely off-grid
- Crystal-clear 44kHz 8-bit ADC/DAC audio, with filters and squelch
- Texting with notifications just like SMS — radio-based APRS messaging (not just location) with built-in 1200 baud modem (text like messaging without a network)
- Scan through unlimited memories and groups (the app controls the Radio)
- No battery means nothing to charge except your phone
- 1 watt transmitter can go miles yet sips your phone's battery • Antenna can be changed to suit the application.
- Accessibility options: live closed captions (on supported phones), turn-off animations, sticky PTT with haptic feedback

Despite the recent Canada Post strike, Adam Drake VE7ZAL has ordered the necessary parts and hopes to have the project completed soon, after which we will report back in a future Communicator.

~

Xiegu G90

John Schouten VE7TI is a recent Xiegu G90 purchaser and provides an unbiased review of this SDR transceiver

Pre-COVID, I was a frequent outdoor Amateur Radio enthusiast. We had an RV and often traveled BC and south into the western United States. The RV is sold now and I missed the ability to set up on a whim, with basic equipment to see what the bands would bring. In those days I used an iCOM IC-706MKIIG, and later the superb IC-7000. My range of antennas included wires up trees attached to the very capable iCOM AH-4 'tune-anything' random wire tuner, Hamsticks on a dipole adapter, a Hi-Q screwdriver HF and various other contraptions.

My base transceiver is an iCOM 7300 but when I got the urge to participate HF portable again I found it cumbersome to repeatedly extract the 7300 from my desk, pack it up, and set it up outdoors.

About six months ago, mid-summer, I got the urge again. We have a cadre of POTA enthusiasts at SARC and I have taught some workshops on building the 5-band linked HF dipole antenna (which is the best field antenna that I have ever used); see The Communicator November-December 2023 pages 46-49. I wanted to re-start my POTA log, especially given that there was now a dedicated website, mobile apps to announce activations, and an ability to log my contacts on-line.

But what to buy? I considered another iCOM as a first choice, though the price, given that it was to be a secondary rig was a bit steep. Weeks of research followed and I discovered an abundance of information on the Xiegu G90. My 'goto' source for impartial reviews is eHam.net and the reviews there were overwhelmingly positive.

The Xiegu G90 HF SDR Transceiver has become a popular choice among amateur radio enthusiasts due to its impressive features and performance. This portable 20W HF transceiver, with its Software Defined Radio (SDR)

architecture and built-in auto antenna tuner, offers a compelling package for both novice and experienced radio operators. Here's an in-depth summary based on user reviews from eHam.net.

Key Features and Specifications

Wide Frequency Coverage: The G90 covers HF bands from 1.8 MHz to 30 MHz, allowing users to explore various modes including SSB, CW, AM, FM and digital.

Built-in Antenna Tuner: The integrated auto antenna tuner is a significant advantage, especially for portable operations where antenna options may be limited.

SDR Architecture: The G90's SDR structure, with a 24-bit data size at a 48kHz sampling rate, ensures excellent transceiving performance and a highly configurable function experience.

Detachable Display Unit: The design of the detachable display unit allows for flexible positioning, enhancing the radio's portability and usability.

Compact and Portable Design: Its compact size and lightweight design make the G90 ideal for field operations and portable use.

Digital Signal Processing (DSP): Advanced DSP technology enhances receiver sensitivity and reduces noise, resulting in clear and detailed audio.

Waterfall Display: The waterfall display provides a visual representation of the spectrum, making it easier to identify and track signals of interest.

User Experience and Feedback

As mentioned, the Xiegu G90 has received a mix of mostly positive, but occasional critical feedback from users. Here are some common themes from these reviews:

Positive Aspects

Impressive Sensitivity: Users have praised the G90's sensitive receiver, which allows for picking up weak signals, making it suitable for long-distance contacts.

User-Friendly Interface: The intuitive interface and clear display make it easy to navigate the menu system and adjust settings.

Robust Build Quality: Despite its compact size, the G90 feels solid and well-built, capable of withstanding the rigours of portable operation.

Excellent Audio Quality: The DSP-enhanced audio provides clear and crisp reception, making it enjoyable for both voice and digital modes.

Wide ranging internal antenna tuner: It is remarkable that an SDR transceiver in this price range would even include a built-in antenna tuner, but the tuner in the G90 is responsive, and nothing short of superb.

In my own side-by-side tests with my 7300, I have found the sensitivity and selectivity extremely good and the G90 antenna tuner is amazing.

Potential Drawbacks

Small Display: Some users have found the small display challenging to read in low-light

conditions [I have not, although in dim light the characters on the buttons may be harder to read. There are mods on the internet to add some LED backlighting - Ed.].

Battery Life: The G90 required more amperage for transmit than for receive, and like any transmitter, the battery may not last for extended transmit operations. At 20 Watts output, the unit draws 6 to 7 Amps on SSB transmit and will certainly last for hours of POTA activation with a healthy external battery.

Steep Learning Curve: The advanced features and menu system may be overwhelming for some users at first. There are many videos and after-marked guides. I have not found learning to use it an overwhelming experience.

An audio output caution: The product manual cautions against using a mono plug in the stereo audio output jack. Shorting the left and right channel may have unpredictable results.

My main gripe? I find that I have to use something to angle the front face of the transceiver upwards for a comfortable viewing angle. Read on for the solution. T

The ARRL's QST magazine also tested the G90 and their report is at https://www.arrl.org/files/file/ProductReviewsForDeb/2021/0320.pdf. Their 'bottom line' was that "with 20 W of output power and a wide range internal auto tuner, the Xiegu G90 is a capable transceiver in a well-thought-out, compact package that will interest the portable operator"

Having used the G90 for 2 months now, my opinion is that the Xiegu G90 is a versatile and high-performance HF transceiver that offers exceptional value for its price. Its combination of features, performance, and portability make it a strong contender in its class. While it may have some limitations, the G90 is likely to satisfy the needs of many amateur radio operators, providing a reliable and enjoyable experience whether in your shack or for portable operation.

Although our West coast weather leaves few dry, or warm winter days, I have been out several times at local parks. The entire station fits nicely into a couple of inexpensive ammo cases. I know we are currently at or near the peak of the solar cycle, but the performance of this little rig is outstanding. Although there is a 20-watt maximum output, I have received 59+ reports from as far away as New York state, Alaska and Hawaii. I have worked Japan, Sweden, Namibia, Australia and a host of Caribbean and South American countries, some with as low as 5-watts on sideband.

3D Prints

If you read our last Communicator issue focusing on 3D printing, you will know that there are plenty of sources for free amateur radio accessories. There are certainly plenty for the G90. I have printed a nice stand to angle the G90 about 45 degrees upward to improve the viewing angle. You could also place it on a stand or even place it on your transport case to overcome that issue. I have seen a very nice implementation using the removable head mounted on a knee-board (also 3D printed).

For more detailed user reviews and feedback, you can visit the eHam.net review page.

The CE19 Digital Interface

When I purchased the transceiver from Amazon.ca there was a digital interface, known as the CE19 available for C$39. I bought it along with the transceiver and have now successfully linked it to N1MM+ and WSJT-X.

There are numerous web pages and YouTube videos dedicated to connecting the interface between your G90 and your computer. I was very pleased to learn that N1MM and WSJTX support the G90 by name, but for those applications that do not, the G90 is similar to the iCOM 7000 and 7100, and these settings may also be used. Since these iCOM transceivers are widely supported, you should have no difficulty in connecting the G90 to your application via the CE19 digital interface.

~ John VE7TI

Another Tape Measure Antenna

Wind this one up or down

Based on a HACKADAY article by DAN MALONEY

Amateur radio operators, known for their ingenuity and resourcefulness, have a long tradition of crafting unique antennas from unconventional materials. One such innovative creation is a portable antenna constructed from a humble tape measure.

Paul (OM0ET), a skilled ham radio enthusiast, sought a lightweight and easily deployable antenna for his field operations. He opted for a 50-meter steel tape measure as the foundation of his design. The tape, a flexible metal strip wound around a spool, would serve as the radiator for an end-fed half-wave (EFHW) antenna. This versatile design allows for operation on multiple bands, from 80 meters to 10 meters.

To complete the antenna, Paul incorporated a miniature impedance-matching transformer within the tape measure case. This transformer ensures efficient power transfer between the radio and the antenna. A BNC connector provides a convenient connection point for the radio, while a flying lead attaches to the tape itself.

To reduce weight and optimize performance, Paul removed the last ten meters of the tape. Additionally, he scratched off the coating at the 40-meter mark to create a reliable connection point for the alligator clip on the flying lead.

The resulting antenna is incredibly portable and easy to deploy. In a field test, the tape measure antenna proved to be a successful solution, meeting the criteria of portability and ease of use. By re-purposing a common tool, Paul has demonstrated again the creativity and adaptability of ham radio operators.

See Paul's video on YouTube

~ See the original article on Hackaday

POTA is Calling

Will you answer?

Operating a portable amateur radio station from a park can offer fantastic surroundings and provide an opportunity to demonstrate the public service role of the amateur radio service.

If you're not yet familiar with the program, Parks on the Air® (POTA) is a global amateur radio activity, growing in popularity, that involves operating portable radios from designated parks, nature reserves, and historic sites around the world.

Tens of thousands of parks are available in the program worldwide, each offering a unique experience. Operating styles and seasons will also affect the nature of the activation.Over 500,000 unique hunter callsigns are registered. In the event of an emergency, trained operators can contact people, locally or worldwide, with equipment that fits into a backpack, and without relying on the Internet or commercial providers, to provide an essential communications lifeline.

Program Objectives

POTA serves multiple purposes, but primarily provides a training platform for emergency communication. When natural disasters or other emergencies strike, traditional communications infrastructure can easily be overwhelmed, an occurrence that has been experienced many times in the past.

The program's objectives include:

- Promoting emergency awareness and communications
- Promoting amateur radio to the general public
- Encouraging amateur radio operators to develop their skills
- Promoting outdoor recreation and education
- Increasing awareness and appreciation of protected areas around the world

The Value to the Community

POTA activations offer several benefits to the community:

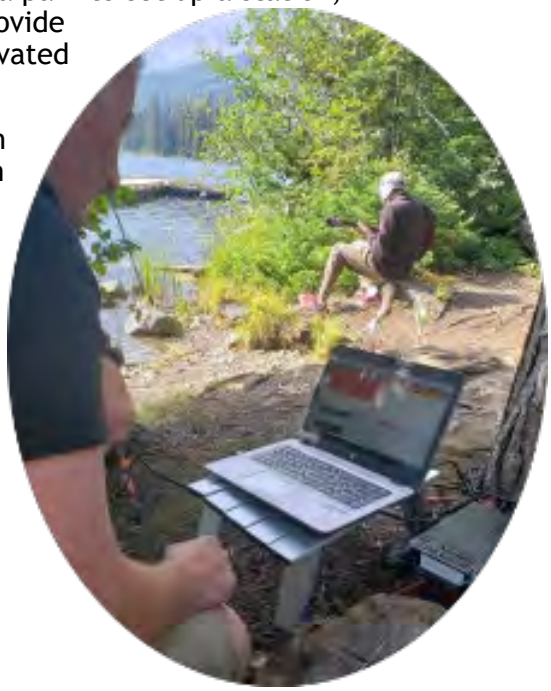
- Emergency Communication: In times of crisis, amateur radio operators can provide vital communication links, connecting people who are isolated or cut off from traditional networks.
- Community Engagement: ARPs bring people together, fostering a sense of community and shared interest.
- STEM Education: Amateur radio is a great way to learn about science, technology, engineering, and mathematics (STEM) concepts.
- Preservation of History: ARPs can be set up at historic sites, preserving and promoting local history.

By participating in POTA, you can contribute to your community's resilience and connect with people from around the world. In Canada, POTA lists almost 6,000 national, provincial, and territorial parks, nature reserves, and historical sites, and almost 12,000 in the U.S.

How to Get Involved

To participate in POTA, you'll need an amateur radio certification. This license, issued by the Federal Communications Commission (FCC) in the United States or a certificate issued by the Ministry of Innovation, Science, and Economic Development (ISED) in Canada, allows you to transmit on specific radio frequencies. Once qualified, you can participate in the program. You don't need to be a seasoned radio operator to participate. Many clubs, including SARC, offer training programs for beginners. The camaraderie and shared passion within the amateur radio community make it easy to learn and grow.

Participating with POTA can happen via one of two paths: as an "**activator**" who heads out into the parks or as a "**hunter**" who tries to contact someone in a park. Activators are the individuals that pack up their portable gear and head out to a park to set up a station, while hunters provide contacts for activated stations.



Either way, as an activator or from the comfort of home as a hunter, you will enjoy the experience. For more information on POTA, visit their website at: https://parksontheair.com/

A Different Kind of Foxhunt

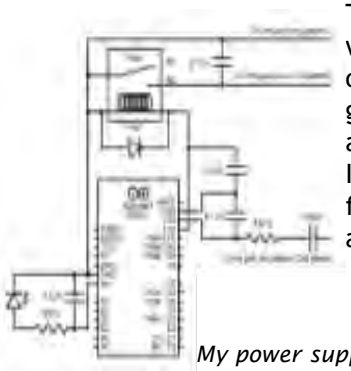
Suitable for the urban fox

by BERNIE MONDERIE VE3BQM

The last few months, I've been thinking about a different way to do a Foxhunt. My vision was to have a Foxhunt available whenever you want, especially this time of year. Not everyone lives in town, and everyone's busy shopping and might not be able to dedicate an afternoon on a specific day for a group search. But what if the fox kept calling you out for a few minutes here and there, whenever you had a chance? No pressure, just try it out and see what you can find with your gear, experimenting with different antennas to get the best results. Go get that Fox!

Where to start with my build? You guessed it: Google and YouTube. The first step was to make a Fox using things I had in my toolbox. I got a Baofeng radio, Arduino UNO, batteries, a waterproof box, and a Drok buck converter. Simple enough, right?

I first searched using Miss Google and came across this: https://www.hackster.io/nfarrier/auto-keyer-for-radio-fox-hunting-e89b99 "Cool, I can do this," I thought, so I did. After putting it all together, I programmed the Arduino UNO using the Arduino software with the code from that website. I set up the CW message, and everything tested just fine. My vision was starting to come true!



Tested everything, and boy was this great! One watt output from the radio gave good range. I packaged it all up and headed outside. I found a good hiding place for the Fox, with easy access and safety in mind.

I could hear it from the east and west side of town. All was good darn... a few days later I couldn't hear it anymore until I was right beside it. I took the Fox home and discovered the TX (transmit) wasn't putting out power anymore, even though the battery was still good. My Fox SX5 Mosfet transistor must have failed. It must have been spending too much time in TX mode. So, I replaced the radio and changed the transmit message, reducing the time by almost 50 percent.

I put the Fox back in its den, and it was happy again, calling everyone to get searching. Darn... a few days went by, and once again, it stopped transmitting. I figured it must be the batteries. Out it came, and yes, the batteries were depleted. However, the Fox SX5 Mosfet transistor also failed again.

There goes the fox hunt, second radio blown. How disappointed you all would be! I talked to a fellow ham about Baofeng radios. He uses them more often than me, and he showed me in the manual that the duty cycle is very small, 03/03/54 minutes (RX/TX/Standby). My fellow ham had a spare radio he wasn't using, so I bought it from him.

I did a few more programming changes to adjust the duty cycle. I also decided to add "MORE POWER!" (à la Tim Allen) So, I added a second Makita battery for a longer stay in the den.

I relocated the fox to be closer to home, just because I know I'll need to replace the batteries in a few days. For those of you in the area, I hope you all get a chance to find the Fox.

Happy Fox Hunting! 73,

~The Silver Fox VE3BQM

My power supply was an 18 volt 5.0 Ah Lithium-Ion Battery (Makita BL1850b) feeding in the Drok Buck Converter to reduce the voltage to 7.4 Volt for the Radio and that voltage was also perfect to feed the Arduino Uno as it has a 12 volt connection with its own regulator to supply 5 volt to the board.

USA Radio Orienteering Championship

Global competitors in Michigan

THE SUN TIMES NEWS

Over 50 radio orienteers from 13 states across the USA as well as Canada, Australia, Uganda, and China ran through parks and forests surrounding Chelsea, Dexter, Pinckney, and Brighton, Michigan last week competing in the 23rd USA Radio Orienteering Championship October 5th through the 13th, 2024. The championship was jointly hosted and organized by the American Radio Relay League (ARRL), the Southern Michigan Orienteering Club (SMOC), and the Chelsea Amateur Radio Club.

Radio Orienteering, also known as Amateur Radio Direction Finding (ARDF), is a multi-skill sport that involves running and navigating using only a map and compass (orienteering) while using a hand-held radio receiver and antenna to locate multiple transmitters hidden in a forest. The sport has direct application to important activities such as search and rescue, wildlife tracking, airborne and seaborne navigation, defense & security, and communications.

Competition involved hilly terrain, intricate navigation challenges, signal reflections, and elite-level orienteering racing, but beginners were also welcomed with coaching, practices, and a training camp to get started in the sport. Races included the Sprint at Hudson Mills MetroPark, the Foxoring race in the Winnewana forests of Waterloo State Recreation Area, the 2m Classic at Eddy Discover Center forests, and the 80m Classic at the Bishop Lake forests of Brighton State Recreation Area.

The International Amateur Radio Union (IARU) also sanctioned the championship to dually-function as the IARU's Region 2 (Americas) Championship. A search and rescue team exhibition contest was also held to highlight the important civic and humanitarian applications of radio transmitter hunting. Civil Air Patrol (CAP) volunteers from Livingston Squadron and Jackson Squadron, as well as a team from California competed in a practice distress beacon hunt. CAP's Jackson Squadron team won the contest by being the first team to locate the small beacon hidden in Waterloo Rec Area's forest.

Medals were awarded to the top three finishers in each class of competition including junior, elite, and masters age classes. For the Elite men's class, Gheorghe Fala of Backwoods Orienteering Klub (BOK) in North Carolina won the Sprint and Foxoring races, while Eduard Nasybulin from Massachusetts won both Classic races. For the Women's W35 class Erin Hammer and Sandra Quinn Giovannini also from BOK split Sprint and Fox-O golds, while Lori Huberman from New York won gold in both Classics. William Wright (callsign WB6CMD) from Bay Area

Orienteering Club (BAOC) in California swept all four races for gold medals in the M60 class and Nadia Scharlau (KO4ADV) from BOK won gold in three of the four race formats finishing just behind gold medal finisher Natalia Leoni in the Sprint. Several beginners and first-time racers accomplished notable results, including first-timer Roland Woodward (KQ4QYZ) from Wisconsin finishing ahead of some veteran M60 competitors for bronze medals in the Sprint and Foxoring races. Results will be considered for Team USA selection to compete in the World ARDF Championship next year (tentatively in Lithuania). In addition to the races competitors enjoyed several social gatherings, a cultural outing to the Henry Ford Museum & Ford F150 Rouge Factory, and a presentation on the radio & astronomical topics from Dr. James Cutler of University of Michigan's Department of Aerospace Engineering. Several of the competitors were also delighted to witness the impressive northern lights spectacle on the 11th.

~ The Sun Times News

New Zealand government supports amateur radio

The Government of New Zealand recently approved $23.1m for four critical front-line volunteer service organizations to replace storm-damaged assets and provide training and equipment to improve New Zealand's response to future emergency events. This funding includes:

- $14.6 million for Surf Life Saving New Zealand.
- $3.1 million for Coastguard New Zealand.
- $3.1 million for New Zealand Land Search and Rescue (LSAR).
- $2.3 million for Amateur Radio Emergency Communications (AREC).

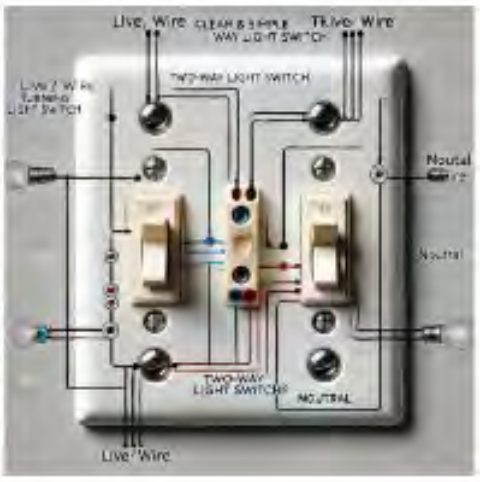
This urgently needed investment will lead to quicker, more coordinated responses and ensure hard-working volunteers have what they need to protect themselves and others.

Note from Mark VA7MM:

Recently ChatGPT 4 was asked to produce a circuit diagram for a two way light switch.

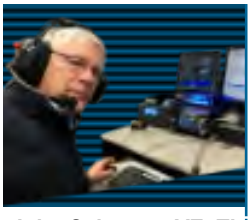
The attached artistic looking rendering is what was produced.

This artwork illustrates that large language models like ChatGPT 4, at present, are incapable of circuit design.



A Special Interest Group for the iCOM 7300, 7610, 9700 and compatible models

Mastering iCOM HF: A Deep Dive into Filtering Capabilities



John Schouten VE7TI

Has both an iCOM 7300 and 9700 and is fascinated by the 'hidden' features of these transceivers.

The iCOM IC-7300 and it's cousins are a testament to modern radio engineering, offering a level of filter control that was once the realm of high-end, specialized equipment. This article delves into the intricacies of its filtering capabilities, exploring how they can enhance your listening experience and isolate weak signals, even in the most challenging radio environments.

A Leap Forward in Filter Technology

In the past, ham radio operators were limited to a handful of fixed filter options. To change filters, one often had to physically modify the radio, a process that was time-consuming and could potentially damage the device. These filters, typically crystal filters, were often limited in their frequency response, offering only a few bandwidth options.

I will be focusing on the IC-7300 but these steps are also applicable to the other SDR-based iCOM HF transceivers. These transceivers represent a significant leap forward in filter technology. As fully software-defined radios (SDR), they offer a wide range of programmable filters that can be tailored to specific listening needs.

This flexibility allows you to fine-tune your listening experience, whether you're chasing weak DX signals or simply enjoying a casual QSO.

Understanding the Basics of Filtering

At the heart of the IC-7300's filtering capabilities lies the concept of filter bandwidth. This refers to the range of frequencies that a filter allows to pass through. A narrow bandwidth filter can help isolate a specific signal, while a wider bandwidth filter can capture a broader range of frequencies.

The IC-7300 offers a variety of filter bandwidths for different modes, including CW, SSB, AM, and FM. By selecting the appropriate bandwidth, you can optimize the filter's performance for your specific listening needs. For example, in CW mode, a narrow bandwidth can help isolate weak signals, while a wider bandwidth can be useful for monitoring a broader frequency range.

The Significance of Filter Shape

Beyond bandwidth, the IC-7300 allows you to adjust the shape of the filter response. This is known as filter sharpness, and it can significantly impact the quality of received signals. A sharper filter can provide better selectivity, but it can also introduce ringing artifacts, which can be annoying. A softer filter, on the other hand, can reduce ringing but may also allow more interference to pass through.

The IC-7300 offers both sharp and soft filter options, allowing you to tailor the filter's response to your specific preferences. For example, a sharp filter can be useful for isolating weak signals in noisy conditions, while a soft filter can provide a more natural listening experience.

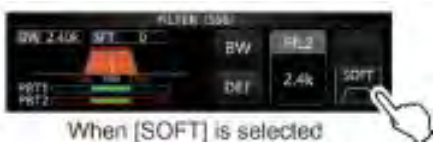
You can independently set the DSP filter shape for each operating mode to soft or sharp.

1. Set the operating mode to SSB, SSB-D or CW. (Example: USB)

2. Touch the filter icon for 1 second. This opens the FILTER screen.

3. Touch the filter icon several times to select FIL1 (wide), FIL2 (mid) or FIL3 (narrow).

4. Touch [SHARP] or [SOFT].



5. To close the FILTER screen, push EXIT .

You will find this described in your IC-7300 manual on page 4-3

The Notch Filter: A Powerful Tool for Interference Reduction

The IC-7300 is equipped with a powerful notch filter, which allows you to eliminate specific frequencies, such as interfering signals or local noise. This feature can be invaluable in challenging listening environments, where strong signals can mask weaker ones.

The notch filter can be activated in three modes:

Auto-notch: This mode automatically detects and suppresses interfering signals. It's a convenient way to quickly clean up a noisy band.

To activate the Auto-notch filter on your iCOM IC-7300, simply press the NOTCH button once. You'll see "AN" appear on the display, indicating that the Auto-notch function is active.

The Auto-notch filter automatically detects and suppresses interfering signals, such as those caused by nearby stations or local noise. It's a convenient way to clean up your listening experience without manually adjusting filters.

Press the button again to get:

Manual-notch: This mode allows you to manually adjust the frequency and width of the notch filter. This provides more precise control over the filter's operation.

To set manual notch filtering on the iCOM IC-7300 follow these steps:

1. Identify the unwanted signal: Tune to the frequency where the unwanted signal is present.
2. Activate Manual Notch: Press and hold the NOTCH button on the front panel until "MN (Manual Notch)" appears on the display.

3. Adjust the Notch Frequency: Use the MAIN tuning knob to adjust the frequency of the notch filter. The receiver may make a squealing noise, this is normal. You'll hear the unwanted signal decrease in volume as you approach the correct frequency.
4. Adjust the Notch Width: Select the width by pressing the “Width” box on the touch display. A narrower notch will more precisely target the unwanted signal, while a wider notch will attenuate a broader frequency range.
5. Fine-Tune: Continue adjusting the frequency and width of the notch filter until the unwanted signal is minimized or eliminated.

The process is described in your IC-7300 manual on page 4-6.

Additional Tips

Monitor the Audio Scope. The audio scope on the IC-7300 can help you visualize the unwanted signal and the effectiveness of the notch filter.

Experiment with Settings. Don't be afraid to experiment with different notch filter settings to find the optimal configuration for your specific situation.

Consider Auto Notch. If the unwanted signal is consistent and predictable, you may want to use the simpler Auto Notch function instead.

Additional Considerations

Filter Memory: The IC-7300 allows you to store different filter settings for different modes and bands. This is a convenient way to quickly switch between different filter configurations.

The IC-7300 has two primary methods for storing and recalling filter settings:

Memory Channels

1. For storing navigate to the desired frequency and mode.
2. Adjust the filter settings (e.g., bandwidth, IF shift) as needed.
3. Press and hold the M button until you hear a beep.
4. Select a memory channel number (M1-M50) using the CURSOR buttons.
5. Press the ENTER button to save the settings.
6. To recall a setting press the M button to access the memory channel list.
7. Use the CURSOR buttons to select the desired memory channel.
8. Press the ENTER button to recall the stored settings.

Memo Pad

1. To store navigate to the desired frequency and mode.

2. Adjust the filter settings as needed.
3. Press and hold the MEMO PAD button until you hear a beep.
4. The current frequency, mode, and filter settings will be stored in the next available slot (MP1-MP5).
5. To recall, press the MEMO PAD button to access the memo pad list.
6. Use the CURSOR buttons to select the desired memory slot.
7. Press the ENTER button to recall the stored settings.

Additional Tip

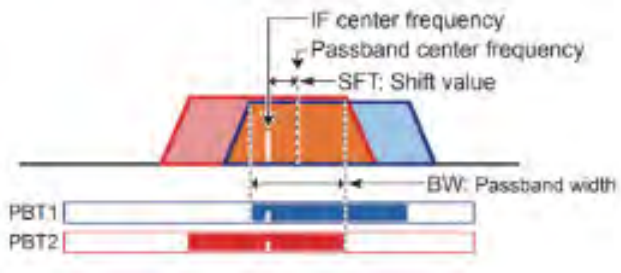
- You can customize the names of memory channels and memo pad slots to help you identify them easily.

IF Shift

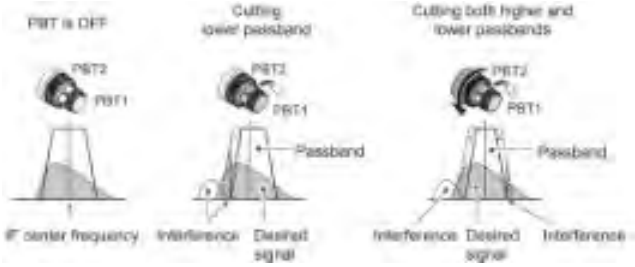
The IF shift feature allows you to shift the intermediate frequency (IF) signal up or down in frequency. This can be useful for reducing interference from nearby stations, which can be helpful for several reasons, including separating Close Signals. By shifting the IF, you can move a weak signal away from a stronger one, making it easier to hear.

Fine-Tuning Audio. Adjusting the IF shift can help optimize the audio quality for different listening conditions.

Here's how to use IF Shift on your IC-7300



1. Press the screen icon marked “FIL1” or FIL2 or FIL3, as the case may be for 1 second.



2. To adjust, use the concentric knob marked “TWIN PBT / CLR” at the top left of the 7300.
3. The inner knob shifts PBT1, the outer shifts PBT2.
4. Adjust the shift by rotating the buttons to increase or decrease the IF shift value. The display will show the current shift value.
5. If you rotate the control too much, the received audio may not be heard because the passband width is too narrow.
6. Confirm the Setting: Press the EXIT button to confirm the new IF shift setting.
7. Pressing the “TWIN PBT / CLR” knob for 1 second clears the custom setting and returns to default.

Additional Tips

Experiment with Different Settings. Try different IF shift values to find the optimal setting for your specific listening conditions.

- Monitor the Audio. Listen carefully to the audio quality as you adjust the IF shift.
- Consider the Mode. The appropriate IF shift value can vary depending on the operating mode (e.g., SSB, CW, FM).
- Consult the Manual. Refer to the IC-7300's manual for more detailed instructions and specific tips for different operating modes.

By effectively using IF Shift, you can enhance your listening experience and improve your ability to separate signals and reduce interference.

Noise Reduction (NR)

The IC-7300's built-in noise reduction system can help to reduce background noise, making it easier to hear weak signals. Push the “NR” button to turn the Noise Reduction function ON or OFF.

The Noise Reduction function reduces random noise components and enhances desired signals that are buried in noise. The Noise Reduction function uses the DSP circuit.

To manually adjust the Noise Reduction level to where noise is reduced and the received signal is not distorted:

1. Hold down NR for 1 second.

- Turns ON the Noise Reduction function and opens the NR menu.

2. Adjust the Noise Reduction level to between 0 and 15. Adjust to a higher level to increase the reduction level, and a lower level to decrease it

This effect reduces background noise while preserving signal clarity.

Noise Blanker (NB)

To activate press the "NB" button. Holding the “NB” button in for 1 second will activate the menu.

For threshold Adjustment use the cursor buttons to adjust the sensitivity of the noise blanker.

The desired effect is to eliminate impulsive noise, such as power line interference.

Level: Adjust the level where the Noise Blanker activates between 0 and 100%.

Depth: Adjust the noise attenuation level between 1 and 10. The default is 8.

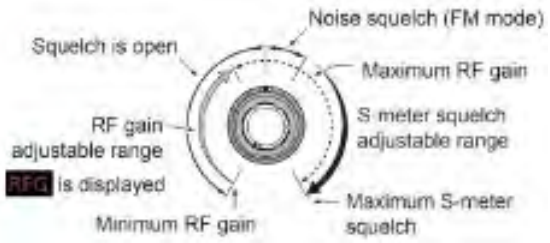
Width: Adjust the blanking duration time between 1 and 100. The default is 50.

RF Gain

Use the RF Gain knob (behind the volume control) to control the receiver's sensitivity.

Effects: Lowering the RF Gain can reduce noise, but it may also weaken weak signals. Adjust the RF gain to decrease the noise received from a nearby strong station.

- Rotate counterclockwise to reduce the RF gain, which reduces the receive sensitivity. “RFG”



appears when AF RF/SQL is set to the counterclockwise from the 11 o’clock position. “RFG” indicates that the RF gain is reduced. If a strong signal is received and “OVF” (Overflow) appears, reduce the RF gain until “OVF” disappears.

Additional Tips

- Antenna Placement. Proper antenna placement and grounding can significantly reduce noise levels.

By understanding the intricacies of the IC-7300's filter settings and effectively utilizing its various features, you can significantly enhance your listening experience. Experiment with different bandwidths, filter shapes, and notch filter settings to find the optimal configuration for your specific operating conditions. With a little practice, you'll be able to isolate weak signals, reduce interference, and enjoy crystal-clear audio, even in the most challenging radio environments.

You will find some great iCOM videos at Tom WA2IVD’s ***Ham Radio A2Z*** YouTube channel. The video that demonstrates the use of filters and noise reduction is at https://youtu.be/KcDPL7O0bos?si=2A9aDOmV9Gm9qhxC

~ John VE7TI

Schooling ChatGPT on Antenna Misconceptions

You may want to be skeptical of AI claims

by DAN MALONEY - HACKADAY

We're not very far into the AI revolution at this point, but we're far enough to know not to trust AI implicitly. If you accept what ChatGPT or any of the other AI chatbots have to say at face value, you might just embarrass yourself. Or worse, you might make a mistake designing your next antenna.

We'll explain. [Gregg Messenger (VE6WO)] asked a seemingly simple question about antenna theory: Does an impedance mismatch between the antenna and a coaxial feedline result in common-mode current on the coax shield? It's an important practical matter, as any ham who has had the painful experience of "RF in the shack" can tell you. They also will likely tell you that common-mode current on the shield is caused by an unbalanced antenna system, not an impedance mismatch. But when [Gregg] asked Google Gemini and ChatGPT that question, the answer came back that impedance mismatch can cause current flow on the shield. So who's right?

In the first video, linked on the Hackaday website [Gregg] built a simulated ham shack using a 100-MHz signal generator and a length of coaxial feedline. Using a toroidal ferrite core with a couple of turns of magnet wire and a capacitor as a current probe for his oscilloscope, he was unable to find a trace of the signal on the shield even if the feedline was unterminated, which produces the impedance mismatch that the chatbots thought would spell doom. To bring the point home, [Gregg] created another test setup in the second video, this time using a pair of telescoping whip antennas to stand in for a dipole antenna. With the coax connected directly to the dipole, which creates an unbalanced system, he measured a current on the feedline, which got worse when he further unbalanced the system by removing one of the legs. Adding a balun between the feedline and the antenna, which shifts the phase on each leg of the antenna 180° apart, cured the problem.

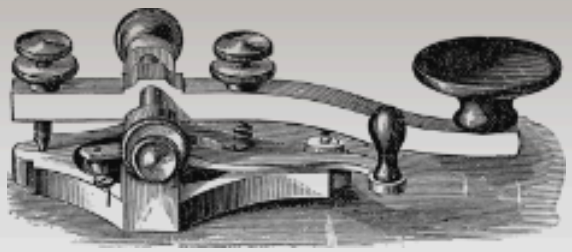
We found these demonstrations quite useful. It's always good to see someone taking a chatbot to task over myths and common misperceptions. We look into baluns now and again. Or even ununs.

~ Dan Maloney
Read the original article at HACKADAY

The Less Involved Data Society

Your first CW QSO

by LIDS CW



You've been practising your Morse for a little while now and it's been hard work. Now someone has suggested you try a live QSO on air and all you want to do is run and hide until they go away! Don't panic; your friends at LIDS are here to help.

- Start by finding someone to help you. You can do this by tweeting your request for a QRS sked, and add the hashtag #lids for good measure. You'll probably be inundated with offers. Arrange a mutually convenient time on a band you can both work that will give you a good chance of success. Also give them an idea of how slowly you want them to send to you. Be realistic; few things are more discouraging than trying to copy Morse that is too fast. Stay in your comfort zone.
- Here are a few hints and tips for when it comes to the actual sked:
- Start by finding and exchanging on Twitter a mutually clear frequency.
- If your radio has a narrow CW filter, use it. You already know the exact QRG so eliminating as much adjacent interference as you can will make copy easier and more relaxing.
- Arrange for your sked partner to contact you rather than you making the first move. They can also take care of ensuring the frequency is clear (QRL?).
- Listen out for "<yourcall> <yourcall> DE <theircall> <theircall> KN".
- Take a deep breath and relax.
- Don't worry about messing up. You are working a friend, and your mistakes, hesitations and extended silences will be met with patience and understanding.
- Don't try to send faster than you are able. Take your time, think about each character you are going to send before you send it, even if that means taking a pause while you compose it in your head.
- You may find it helpful to keep a QSO template or crib sheet of standard exchanges in front of you, so that you don't get lost or forget what to say.
- Remember: you are not in a contest and there are no standards to attain.
- If you make a mistake in sending, pause, breathe, and send it again.
- Don't worry that your contact will be critical of poor sending or run out of patience. Quite the opposite. Like a parent watching their child take its first steps and then take a tumble, they will be nothing less than thrilled at hearing you make your first dits and dahs on the air.
- If the other person is sending too fast, send 'QRS'. There's no need to pad it out or explain why, simply put it back to them to send again at a speed you can manage.
- If you get really stuck, use Twitter's direct message facility as a talk-back channel.

When you've finished, wait for that adrenaline high – you've just made your first CW QSO – well done! Make sure you tell the world via Twitter; the congratulations will come flooding in, and rightly so. Don't forget to thank your contact, and ask them for constructive feedback. And then set up another sked!

~ 73 ES GL.

http://lidscw.org/resources/your-first-cw-qso

TECH TOPICS

Experimental Maritime Mobile on 630m

Land-based Amateurs experiment at sea

by MARK MATTILA VA7MM and TOBY HAYNES VE7CNF

On a 2017 circumnavigation of the inner south coastal waters of British Columbia, Figure 1, maritime mobile operation on 630m was tested on the sailboat 'Hakuna Matata'. Communication using CW Morse telegraphy and SSB voice with land based radio amateurs in the region was made from these anchorage sites:

- August 4, 2017: Boho Bay, Lasqueti Island (49 29.808N, 124 13.857W);
- August 8 and 9, 2017: Silva Bay, Gabriola Island (49 09.047N, 123 41.670W); and
- August 10 and 11, 2017: Winter Cove, Saturna Island (48 48.621N, 123 11.575W).

Land based radio amateurs participating in the 630m communication experiments were John Gibbs, VE7BDQ; Markus Hansen, VE7CA; Jack Askew, VA7JX; Steve McDonald, VE7SL; and Roger Graves, VE7VV.

The purpose of the exercise was to figure out how to implement 630m amateur communications gear on a small sailing vessel and assess the capability of the low frequency (LF) band for low power maritime use. The LF band has a maritime history with 600m, 500 kHz, being used for most of the 20th century as an international calling and distress frequency for Morse code maritime communication. Beginning in the late 1990s, most nations concluded maritime distress use of the 600m band which was replaced by the Global Maritime Distress Safety System (GMDSS). GMDSS has multiple modern communication components that range in frequency from LF for NAVTEX up to UHF for satellite based systems.

Figure 1: Route of the Hakuna Matata, 630m maritime operation sites and participating stations.

Requirements

Getting a 630m band signal on the air from a sailing vessel such as the Hakuna Matata has a number of requirements that include:

- signal generation at 475 kHz and receive capability on the same frequency;
- transmit power level high enough for communication but low enough to avoid issues with RF voltage in the presence of mast and rigging;
- antenna as long as practical to obtain efficiency;
- tuning the antenna; and
- system ground with coupling to seawater.

Work was done on the vessel before the sailing season that facilitated the radio experiments including installation of new batteries, installation of all new RF ground system braid and counterpoise conductors and installation of an antenna for 2m FM communication.

Signal Generation

A unique 630m band linear transverter, Figure 2, designed by VE7CNF was used for the maritime operation. The transverter design is a bidirectional high-power mixer circuit that directly takes full RF output drive from an Icom 746Pro transceiver operating at an IF of 1.975 MHz and mixes with a local oscillator at 1.5 MHz down to 475 kHz. For receive, signals pass backwards through the circuit and are up-converted to 1.975 MHz with some minor attenuation of received signal. The bi-directionality of the unit enables both transmit and receive without T/R antenna relays or switching circuits thus simplifying implementation.

The transverter has no power amplifier and typically draws 175 mA at 12V DC. The Icom 746Pro transceiver operating from the vessel's 12V DC power system produces about 70 W RF at 1.975 MHz which drives the transverter to about 20 W total RF output. The transverter by design dissipates about 50 W of RF power in internal fan cooled dummy loads thereby passing 20 W of RF power to the antenna. This power level was deemed safe to avoid RF voltage issues on the antenna and satisfactory for testing low power regional LF ground wave communication.

Antenna and Ground

The antenna is a 38' long 14 gauge wire suspended between the main halyard pulley at the top of the mast and the port stern rail, Figure 3. The ends of the antenna are insulated using long end insulators and a clearance of several feet is provided between the antenna wire and adjacent mast, rigging and backstay antenna. A general arrangement of the antenna and ground radial configuration is presented in Figure 4. As a safety precaution and to avoid RF coupling that might interfere with tuning, the vessel's adjacent HF backstay antenna was disconnected during 630m operation. A loading coil with approximately 170 uH of inductance was used at the base of the wire antenna with a 950 uH variometer in series that provided up to 1120 uH total

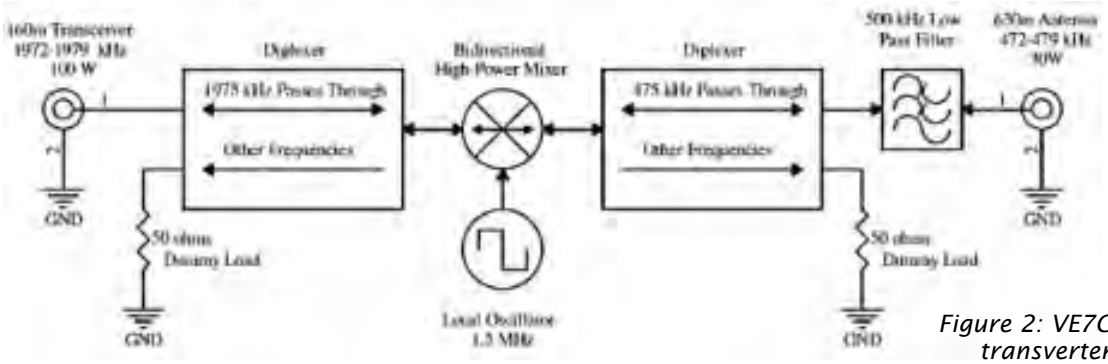


Figure 2: VE7CNF power mixer transverter block diagram.

Figure 3 [above]: Base loading coil and 38' sloping vertical antenna

Figure 4 [below]: General arrangement of antenna and ground radials on the boat.

combined inductance for resonating. A multi-tapped matching transformer wound on a toroidal core was provided for matching to 50 ohm transmission line impedance, Figure 5. The antenna was raised separately at each anchorage and tuned and then removed before the vessel got underway.

Tuning and matching of the antenna was done using a signal generator and a portable oscilloscope to measure a non-inductive resistive voltage divider setup at the base of the antenna. Using the voltage waveform on the oscilloscope, the variometer was adjusted resonate the antenna. Its resistance was estimated from the measured voltage ratios on the scope. With antenna resistance determined, the matching requirements were estimated using voltage divider formulas. The antenna system resistance was about 50 ohms total so the matching transformer was not required. With the antenna match determined, the final step in antenna tuning was to re-tune the variometer to give a dip on the transverter's RF voltmeter, Figure 6, and check that the dip matched the same RF voltage with a dummy load connected.

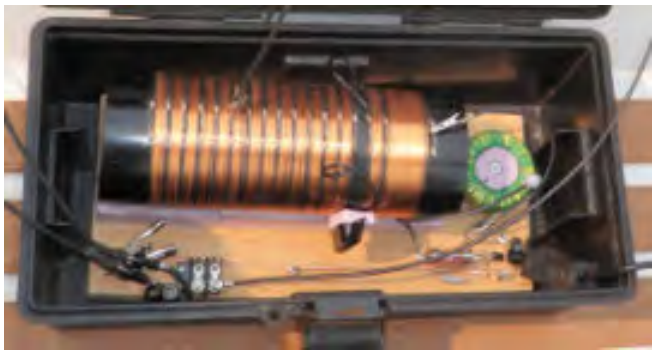


Figure 5: Variometer coil with multiple taps (left) and matching transformer (right).

The estimated efficiency of the 38' long vertical antenna used is 0.27% and at 20 W RF power level this equates to an equivalent isotropic radiated power (EIRP) from the antenna of 160 mW. The Authors note that vertical antenna performance depends on system ground for return currents thus coupling to seawater is important.

Sites:	CF7MM/MM 475 kHz Radio Operation Sites								
Coordinates:	Boho Bay, Lasqueti Island 49°29.808'N, 124°13.857'W			Silva Bay, Gabriola Island 49° 09.047'N, 123° 41.670W			Winter Cove, Saturna Island 48° 48.621'N 123° 11.575'W		
UTC Dates:	August 4, 2017			August 8 & 9, 2017			August 10 & 11, 2017		
Station Call	Range (km)	Rpt Rcvd (RST)	Rpt Sent (RST)	Range (km)	Rpt Rcvd (RST)	Rpt Sent (RST)	Range (km)	Rpt Rcvd (RST)	Rpt Sent (RST)
VA7JX	88	not operating		142	599	599	195	not operating	
VE7BDQ	100	449	519	48	579	569	23	599	599
VE7SL	98	579	589	43	599	599	10	599 +10dB	599 +10dB
VE7VV	132	incomplete		81	449	559	40	579	579
VE7CA	85	not operating		45	559	579	59	579	579

Table 1: Example ground wave signal report and range data for participating 475 kHz CW stations.

The antenna ground system comprised:

- the vessel's cast steel keel with a surface area of about 25 square feet; and
- two 30' wires, one each running along the starboard and port gunwales.

Tests were done to determine which of these two ground components provided the most effect on the 630m antenna. When the gunwale ground wires were disconnected leaving only the keel, it was found that the antenna capacitance and resistance did not change. When the keel was disconnected leaving only the gunwale wires, the antenna capacitance dropped from 100 pF to about 87 pF and the antenna resistance dropped by a few ohms. This indicates that the cast steel keel dominated ground coupling to seawater and would have been sufficient on its own, however, for compliant test conditions both ground system components were used for all communications.

Figure 6: Set-up with VE7CNF power mixer transverter on the left and HF transceiver IF on the right.

Operation

Operation was coordinated using south coast 2 m FM repeaters with 630m operation scheduled for late morning and early evening. Propagation was ground wave and signal reports were exchanged with participating stations in all but one instance with communication ranges from 10 to 142 km, Table 1 *[above]*.

Observations and Conclusions

The authors were impressed with the signal reports received given the transmitter's EIRP was estimated at about 160 mW with range up to 142 km. Received signals from participating stations varied from S1 to S9+10dB and copy was easy for all contacts. The remote anchorages were radio quiet providing good signal to noise ratio for reception of LF signals.

The exercise demonstrated the feasibility of 630m amateur radio maritime operation and the performance of low EIRP groundwave CW communication over ranges up to 142 km. The setup, tuning and disassembly of the LF antenna at each anchorage were easily accomplished.

The authors wish to acknowledge and thank Steve McDonald, VE7SL, for first publishing the results of the 630m maritime operation on his Amateur Radio Blog dated August 18, 2017 and entitled 'A 630m Maritime Adventure' posted at URL:

https://ve7sl.blogspot.com/2017/08/a-630m-maritime-adventure.html

~ Mark VA7MM & Toby VE7CNF
va7mm@telus.net

From the

ATV Journal

My Recommendations for a Portable / Mobile DVB-T Station

by JIM ANDREWS KH6HTV

Jim Andrews, KH6HTV publishes the free ATV Journal via email. All past issues are archived at: https://kh6htv.com/newsletter/

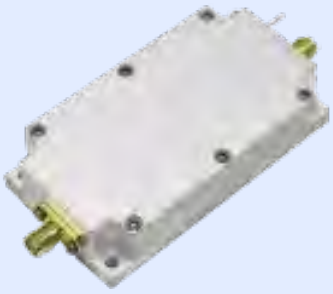
I have often been asked: *"What equipment should I buy if I want to get started in DATV, but I can't operate from my home base due to poor location to access the repeater?"* This means one needs to be able to instead operate mobile, or set up a portable station out in the field somewhere. This thus also applies to ARES groups thinking about getting into adding ATV as part of their "bag of tricks" to offer to their local public safety agencies of police, fire, etc.

So, I am offering here my suggestions of the key elements required to assemble just such a DATV station.

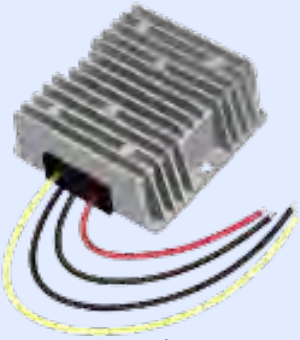
Hi-Des model HV-320,
DVB-T/ISDB-2/ISDB-Tb Modulator
100~2500 Mhz = $400

Hi-Des model HV-120,
DVB-T Receiver = $250

OutStar RF Power Amplifier Modules, available on eBay, typically about $60-70 ea.70cm RF Linear Power Amplifier, P(dtv) = 0.9 W 2.5 Mhz - 1.2 Ghz



23cm RF Linear Power Amplifier, P(dtv) = 2 W. 915/1200-1320/1250/1420 Mhz/1.5 Ghz., Gain 40 dB



12 to 24Vdc Boost Switcher, typically about $15-20

70cm & 23cm Low Noise Pre-Amplifiers, $90 ea.

Tri-band 2m/70cm/2cm Antennas & Accessories: Diamond NR2000N mobile antenna = $85; Diamond DPK-4MN-N antenna mag. mount = $ 55; Diamond SRH-999 whip antenna = $55

Video Camcorder + Camera Tripod

Small 12Vdc, Video Monitor

12Vdc high capacity Battery & Smart Charger

The above photos have shown the key components required. So what are the costs involved? Video Camcorder Price = ??, varies dramatically depending upon your requirements, video camera tripod = $50; small 12Vdc color Video Monitor, many choices available on Amazon for $50-100; LiFePO4 battery & smart charger, prices are all over the place, available from Amazon, E-Bay, etc. but count on at least $100.

Hope you find this helpful. Aloha,

~ Jim KH6HTV

Jim's informative publication, the ATV Journal, is published regularly.

This article is reprinted from ATV Journal 178, with permission from the author.

B.C. QSO Party

Notes from the Contest Coordinator's desk

By REBECCA KIMOTO VA7BEC

Rebecca Kimoto VA7BEC is the Secretary and contest coordinator for the British Columbia QSO Party, held on the first full weekend of February each year.

Visit ORCA at: https://www.orcadxcc.org/index.html

The 2025 running of the British Columbia QSO Party takes place Feb 1–2 in two segments: 12 hours on Saturday, Feb 1 and 8 hours on Sunday, Feb 2. Local time in BC? That's 8am to 8pm on Saturday and 8am to 4pm on Sunday. Participate on one day or both — the choice is up to you.

There are a few points to note for 2025.

1. Announced operations

We will post a list of announced operations (BC operators who plan to be on the air) a few days before the event on the BCQP website. This should raise awareness of activity in BC and help operators near and far find you — point antenna in the right direction for your location in BC — or at least be listening for you.

If you plan to be on the air and want to be on this list, contact me by Monday, January 27 and let me know the callsign you will be using, the mode(s) you plan to work, and the federal electoral district that you will be activating.

2. Rally on 80m, 160m last hour of Saturday segment

The rally idea worked really well in 2024, and we'll do it again in 2025.

Here's the schedule:

- 80m CW at 0315z
- 160m CW and SSB at 0330z
- 75m SSB at 0345z

3. BC multipliers: Federal electoral districts — NO CHANGE

BC doesn't have counties — the typical QSO party multiplier — so we use federal electoral districts for BCQP.

The electoral map was recently redrawn to reflect changing population numbers across Canada and, with predictions of an early federal election, I expected new district names to be in place and the respective abbreviations for BCQP purposes to be used in BCQP 2025. I even prepared a new multiplier list. However, no election has been called and, according to Elections Canada, the new electoral map won't actually go into effect until an election is called. So for BCQP 2025, we will use the existing electoral map.

BC stations, confirm your federal electoral district here: https://www.elections.ca/home.aspx.

In the center of the page, you'll see Voter Information Service. Type in your postal code or the postal code of the place closest to where you plan to operate if not at home.

Log uploader

Given the increasing popularity of BCQP and a sustained high number of submitted logs above 300, we will be asking participants to upload logs electronically to a special portal in 2025. Check the rules for the log uploader address and associated details.

Rules, tools — including a very handy same-weekend schedule of events and exchanges and a map of federal electoral districts and abbreviations — as well as FAQ, in-depth event analysis/reports and scores from past years... all available for viewing from links on the BCQP page of the Orca DXCC website. Go to http://www.orcadxcc.org/bcqp.html and click on the appropriate link.

Good luck and, most importantly, have fun.

73

~ Rebecca VA7BEC

British Columbia QSO Party 2025

1600z Feb 1 to 0359z Feb 2 AND Feb 2 1600z to 2359z

Objectives:

- Stations in British Columbia contact other stations in the province as well as the rest of Canada, the United States and beyond.
- Stations outside British Columbia make contacts with VE7/VA7 stations.

Category photo in 2016

Original photo certificates for top scores in all classes of entry in BC in each BC federal electoral district and outside BC in each state, province in rest of Canada and DX entity). New photo every year! Collectible!

Note: Certificate eligibility requires at least 10 valid QSOs

Plaque photo in 2019

Plaques offered in 11 sponsored categories: Top YL (Canada), Top YL (US), Top BC single-op, Top BC multi-op, Top US, Top Canada outside BC, Top DX, Top Mixed Mode, Top CW, Most Federal Districts Contacted and Top Club in BC

BCQP is fully supported by N1MM contest logging software, CQ/X GPS-enabled software for mobile contesting and N3FJP state QSO party logging program.

Follow links at **http://orcadxcc.org/bcqp.html** for rules, tools, helpful hints, and in-depth event analysis/reports and scores from past years.

BCQP is included in the State QSO Party Challenge.

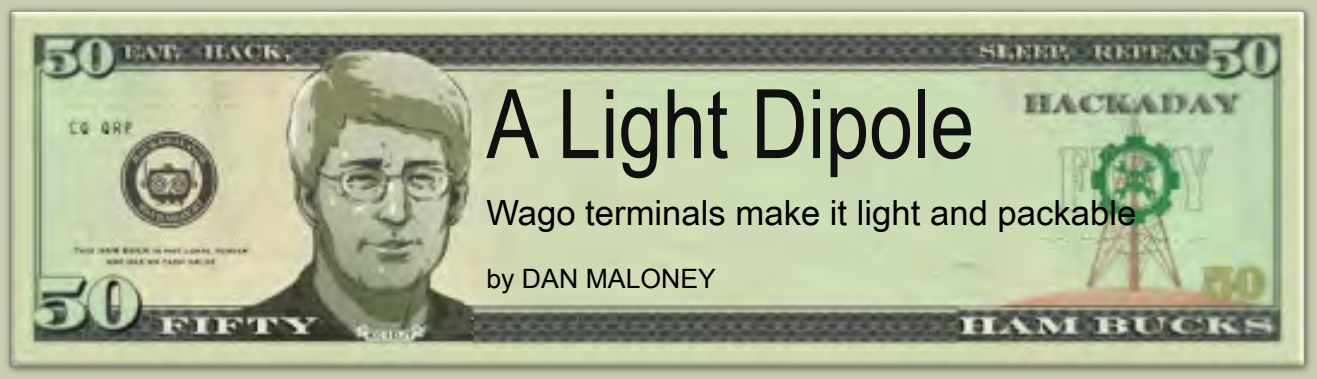
- Enter competition by posting BCQP score to 3830scores.com

Questions?

Email BCQP Contest Coordinator, Rebecca VA7BEC at va7bec@gmail.com

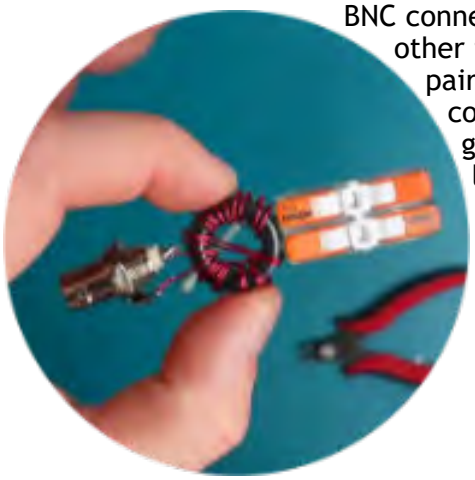
Join Orca DXCC in BCQP 2025 — First weekend in February

It's always a whale of a good time!



For the amateur radio operator with that on-the-go lifestyle, nothing is more important than having your gear as light and packable as possible. If you're lugging even a modest setup out into the woods, every ounce counts, which is why we love projects like this packable dipole antenna feedpoint.

At its simplest, a dipole antenna is just two pieces of wire cut to a specific, frequency-dependent length connected to a feedline. In practical terms, though, complications arise, such as keeping common-mode currents off the feedline and providing sturdy mechanical support for the antenna to suspend it safely. [Ham Radio Dude]'s design handles both those requirements while staying as small and packable as possible. The design starts with a bifilar 1:1 current balun, which is wound on an FT82-43 ferrite toroid with 22 AWG magnet wire. One side of the balun is connected to a BNC connector while the other is connected to a pair of Wago splice connectors that are glued together. A loop of paracord for mechanical strain relief is added, and the whole thing gets covered in heat-shrink tubing. The antenna is deployed by attaching a feedline to the BNC, clipping quarter-wave wires into the Wago terminals, and hoisting the whole thing aloft. Full build details are in the video below.



Left: The feedpoint of the light dipole with the BNC connector, balun and Wago terminals

Right: Link to the YouTube video.

People will no doubt be quick to point out that these Wago terminals are rated for a minimum of 18 AWG wire, making them inappropriate for use with fine magnet wire. True enough, but [Dude] was able to get continuity through the Wagos, so the minimum gauge is probably more of an electrical code thing. Still, you'll want to be careful that the connections stay solid, and it might pay to look at alternatives to the Wago brand, too.

~ Dan Maloney

The original article is on Hackaday: https://hackaday.com/2024/12/15/wago-terminals-make-this-ham-radio-dipole-light-and-packable/

An easy field strength meter

Build it on a budget

by GARY SKETT VA7AS

Anyone use a field strength meter anymore? It"s kind-of like a radiometer for RF energy. Remember the radiometer? It"s those little black and white squares that spin inside a glass ball when light shines at it… the brighter [or hotter] the light, the faster it spins.... Cool "instrument" from the 1870"s.

Well a field strength meter is sort of like that, in that in its heyday, it was used by Hams and CB"ers to measure the transmitted signal strength of any antenna -- from a distance usually 1, 3, or 30 meters or whatever measured distance you had. As long as the meter was "calibrated", one could set up the antenna, mount a FS meter X number of feet or metres away, pump 1, 5, 10 or 100 watts out of it and measure the "strength" of the RF field at that measured distance. It was simple, you could tune for maximum meter deflection… usually meant your SWR was at its lowest… an OK tool if you didn't have a sophisticated watt meter or new-fangled SWR bridge.

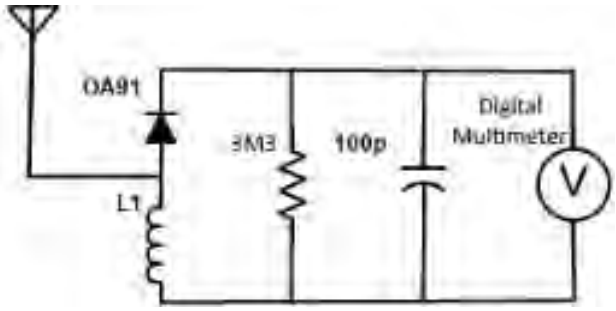
Today, it"s can be used by the Ham antenna experimenter to measure the gain of the antenna – in RF volts or Db or whatever scale you had labeled on your meter… even S-units. A sensitive FS meter can pick up low power bugs, or any source of RF energy – guess what those ghost hunters use? More useful if you spent big dollars and put a tuned circuit, attenuators or a pre-amp in the circuit, and of course lots of LEDs.

But of course, good RF meters are expensive and somewhat hard to find… not many at the swap meets these days… and they are usually combined with other types of measuring devices, watt or SWR meters… thus more money than the typical cheap Ham wants to dish out. Solution, make your own!! OMG! What a concept! A simple FS meter is the simplest thing to make and is good enough to see if the antenna under test is radiating more power than your old ground plane, old mobile vertical or just radiating at all in a particular direction or in all directions.

Here is what you need:

1. A digital voltmeter with a dc millivolt scale – every Ham should have a few in their shack.
2. A Germanium diode, just about any one, as long as it"s Germanium, like 1N34, 1N270, 1N914 or 1N100. The best one, a non-North American standard… the super sensitive OA91 from down under or Europe/UK – Great for your crystal radio project too.
3. A 3.3MΩ 1% resistor, 1/8 or ¼ watt.
4. A 100 picofarad capacitor
5. And a hand-made inductor [L1] of 7 turns on a ¼ inch coil form with a ferrite slug (some experimentation required to cover the NA FM Band) Oh, 24 to 28 AWG lacquered wire.
6. Some miscellaneous parts like an antenna or antenna connection, a tiny box to put it all in, and some jacks that your DVM leads will insert into.

Here is the schematic diagram:



Using a digital multimeter, as opposed to an analogue meter has a few advantages in this circuit. First, the impedance of a DVM is very high, around 10MΩ per volt on most meters. This will not shunt or load down the tank circuit. Second, compared to an analogue meter, very slight differences in signal strength can me more easily observed. An third, a digital meter will have better linearity responding well to both weak and stronger signals.

All you want to see is the numbers… the higher the number, the more signal strength. Just remember a few basic rules. Keep the distance and power out the same for all your experiments… and turn off all your APRS trackers and digipeaters as they will want to add their 2-cents worth to your measurements.

If you have it in a hand-held configuration, you can "see" lobes, minimum and maximum RF fields as you walk around your test antenna.

Oh, and then put a set of crystal ear plugs in place of your DVM and you might just hear the nearest AM broadcast station… well, at least until they all disappear.

~ Gary Skett VE7AS

Kudos

I'll post, once again, that **The Communicator** published by Surrey Amateur Radio Communications is effectively a magazine of, and for, this era. It's online-only, created by volunteer authors and editors, and free to access by all current and prospective Amateur Radio Operators. If it isn't already, it will soon be available in many other languages, much, much better than "Google Translate" thanks to various artificial intelligence translation systems. Imagine such a publication that has hundreds of volunteer authors, from around the world, that's auto translated into native languages. Amateur Radio has always been a "worldwide society", but its media has always been somewhat limited to a specific country or language… but that doesn't need to be the case in this era.

~ Steve Stroh N8GNJ
https://www.zeroretries.org

*Thank you Steve, and for those of you who have not been to **zeroretries**, it is a wealth of information that is on my frequent reading list. -Ed.*

Satellites

AMSAT - OSCAR 7:

A resilient satellite's enduring legacy

We are celebrating a noteworthy milestone in the launch of Amateur Radio satellites. AMSAT-OSCAR 7, or AO-7, is a remarkable testament to the ingenuity and perseverance of the amateur radio community. Launched into Low Earth Orbit on November 15, 1974, this satellite was initially believed to have ceased functioning in 1981 due to a battery failure. However, in a surprising turn of events, AO-7 re-emerged in 2002, revealing its continued operation and its clandestine role in facilitating communication during Poland's martial law era.

A Pioneer in Satellite Technology

AO-7 is renowned for its pioneering contributions to satellite technology. It was the first satellite to achieve a satellite-to-satellite relay, connecting with AMSAT-OSCAR 6. Additionally, it played a crucial role in early experiments with low-budget medical data relay and Doppler location techniques for search-and-rescue operations.

Technical Specifications and Capabilities

AO-7 carries two amateur radio transponders:

- Mode A: Uplink on the 2-meter band, downlink on the 10-meter band.
- Mode B: Uplink on the 70-centimeter band, downlink on the 2-meter band.

It also features four beacons operating on the 10-meter, 2-meter, 70-centimeter, and 13-centimeter bands.

A Durable Legacy

As of June 25, 2015, AMSAT reported that AO-7 remains operational, powered solely by its solar panels. The 21-year outage was attributed to a battery short circuit, which was later resolved when the circuit became an open circuit.

AO-7's enduring legacy is a testament to the innovative spirit of the amateur radio community and the remarkable resilience of its hardware. This historic satellite continues to inspire and amaze, pushing the boundaries of space exploration and communication.

~ AMSAT
https://www.amsat.org/2024/12/

Check out this great YouTube video about OSCAR 7's build and design https://www.youtube.com/watch?v=D6XYlq4u2Yg

Dutch Amateur Radio Operators Detect Signals From Voyager 1

The Dwingeloo Radio Observatory, a single-dish radio telescope located near the Dutch village of Dwingeloo, was constructed between 1954 and 1956. At the time of its completion, its 25-meter diameter made it the largest radio telescope in the world, a title it held until 1957 when it was surpassed by the 76-meter Lovell Telescope.

Although officially decommissioned in 2000, the Dwingeloo telescope has experienced a resurgence. It was designated a national heritage site in 2009, and in 2012, the "C.A. Muller Radio Astronomy Station" foundation (CAMRAS) undertook a restoration project. The telescope's dish was removed, refurbished, and remounted, returning the instrument to working condition.

Today, the Dwingeloo telescope is utilized by radio amateurs, amateur astronomers, and professional astronomers for various projects. One notable application is Earth-Moon-Earth communication, commonly known as moonbounce, which enables communication between different parts of the world via the Moon. I had an opportunity to visit the complex during a trip to The Netherlands in 2019. Unfortunately the facility was not open.

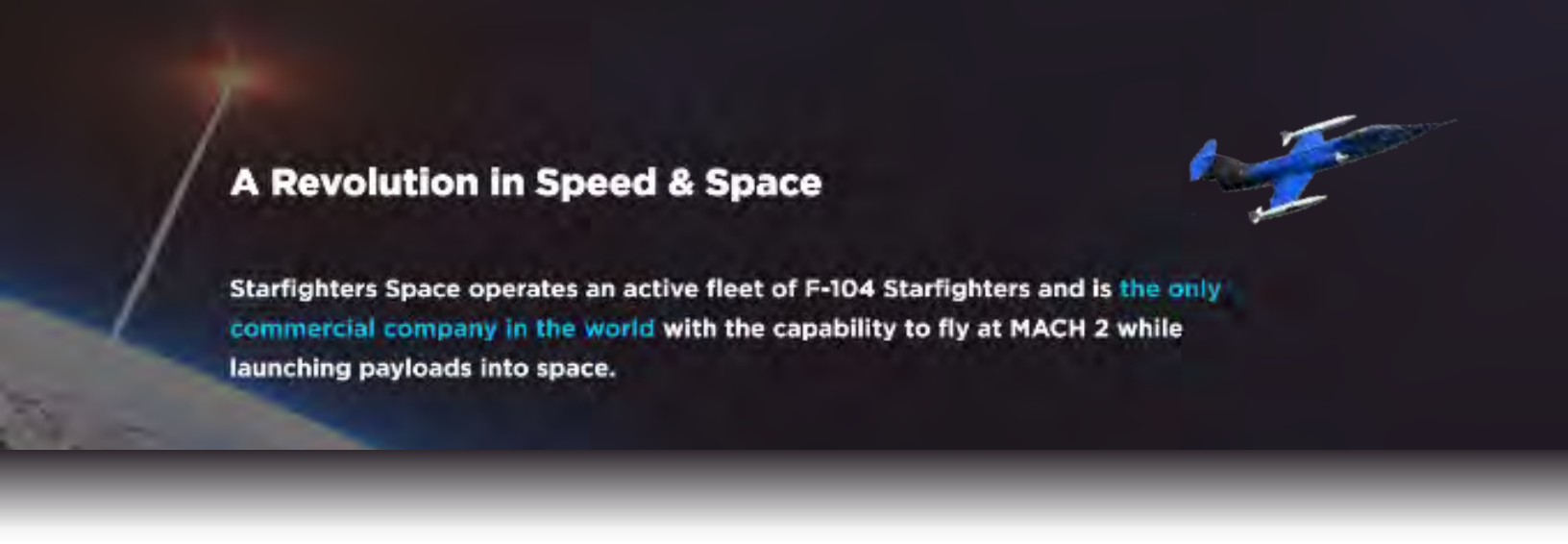
More recently, the telescope has played a crucial role in receiving signals from the Voyager 1 spacecraft. This feat is particularly impressive considering the immense distance between Voyager 1 and Earth—nearly 25 billion kilometers. The telescope's design, originally optimized for lower frequencies, necessitated the installation of a new antenna to accommodate the 8.4 GHz telemetry signal from Voyager 1.

In October 2023, Voyager 1 experienced a technical issue that forced it to shut down one of its two transmitters. Thanks to the efforts of the NASA JPL flight team, the spacecraft was successfully recovered and is now operating normally.

To detect the extremely weak carrier signal amidst background noise, the team employed orbital predictions to correct for the Doppler shift caused by the relative motion of Earth and Voyager 1. This allowed the signal to be observed live in the Dwingeloo telescope's observation room, and subsequent analysis confirmed the Doppler shift's correspondence with Voyager 1.

While NASA primarily relies on the 70-meter dishes of the Deep-Space Network (DSN) for communication with Voyager 1, the Dwingeloo telescope's involvement underscores its ongoing significance in astronomical research.

~ John VE7TI



Starfighters Space, a Florida-based company, plans to launch small satellites using supersonic F-104 Starfighter jets. This method would be faster and cheaper than traditional launches. The company operates a fleet of these retired jets and aims to capitalize on the growing market for nanosatellites. Starfighters Space plans to reach an altitude of 45,000 feet at Mach 2 speed using the F-104s. Rockets mounted on the wings would then deploy the satellites into low-Earth orbit. Test flights with dummy rockets have already taken place, with actual launches planned for early 2025.

It's cost-effective, launching from an airplane is significantly cheaper than traditional rockets, with the advantage of a faster turnaround since F-104s can take off and land more frequently compared to rockets. Starfighters Space already owns and maintains a fleet of F-104s. The company is expanding to Texas to conduct supersonic research missions for the Department of Defense (DoD). This could involve suborbital, hypersonic, or low-Earth orbit flights. The location offers access to a potential high-speed airspace corridor.

Starfighters Space sees an opportunity in the growing demand for hypersonic research driven by competition with other countries. Their unique approach could contribute to advancements in this field. But there are challenges ahead as FAA regulations mandate that civilian aircraft in the US cannot exceed Mach 1 over land, requiring launches to occur over the ocean. Because of their limited payload capacity, F-104s can only carry smaller satellites.

But overall, Starfighters Space offers a novel and potentially disruptive approach to satellite launches, leveraging readily available supersonic jets for a cost-effective and rapid solution.

~

Update on the local high altitude balloon project

Picos - we are trying to ready two Pico balloons for flight as soon as the weather is good. We are going with a minimal configuration for weight and gas to see if this gets us our first circumnavigation. This means though we need a very clear and very still day to get out of danger as the ascent will be quite slow. We also have been waiting almost three weeks for a sunny enough day in Vancouver to test our payloads that are built and ready with the solar panels. As soon as we have lift off we will let everyone know here and on unsocial media.

Thanks to Steve VE7SLZ and Stephen VE9QLE we now have a live video transmit system ready to put in the next HAB. However, we still need to get the receiver built and working. The rest of the equipment is in hand and ready to package up, but we will do that once we have tested the video system to see what the power drain and RF considerations are. As above, we also need acceptable weather, so my best guess right now is "sometime in late winter/early spring."

Thank you all for your support on these projects!

~ Adrian VE7NZ

They don’t make ‘em like they used to…

Imagine it’s 1977. You buy a brand new Kenwood TS-520S, and it becomes your new base radio. You’ve never been happier. You make contacts and have a great time. As the 70s give way to the 80s, you grow your hair and don disco pants. Then, in 1984, you treat yourself to a new radio (remember, the cell phone isn’t out yet). You get your first Yaesu 430S, and your old Kenwood is placed on a shelf, forgotten.

Fast forward to this year. Your venerable 430S develops a fault, so you arrange for a repair. Remembering your old TS-520 gathering dust, you power it on, and voila—perfect communication! Only, no! A radio of that age, left sitting on a shelf, is very unlikely to just fire up and work. Components age and we typically do not expect something like this to happen. Except—this time, it just did.

The analogous TS-520 was actually an S-band radio that NASA installed on Voyager 1, built before the 1977 launch. It was last used in 1984 and subsequently powered down to reduce the load on the small nuclear isotope that powers the craft. Since then, the superior X-band radio, which was also built before 1977, stayed in use.

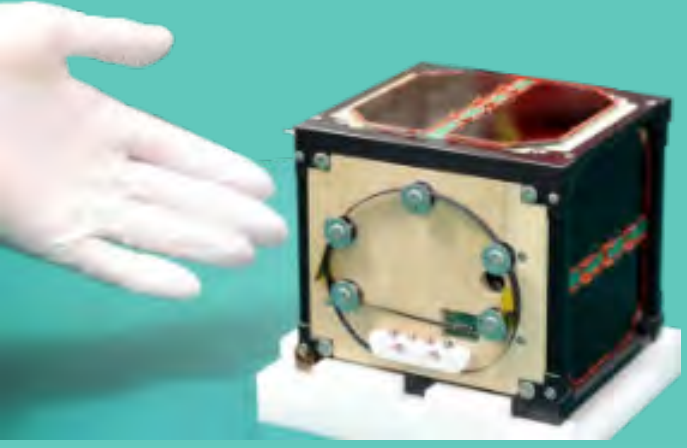
Recently, when NASA engineers sent a signal to the craft to turn on a small heater for instrument testing, a power glitch triggered an emergency power cycle. The X-band transceiver was shut down, and the lower-powered S-band radio was activated, beginning to transmit.

NASA was aware that the Deep Space Network had lost contact with Voyager, so engineers tuned into the S-band signal. To their relief, they received information about what had happened. After conducting some evaluations and tests, Voyager was instructed to turn the X-band back on, and communication was fully restored, while the S-band was returned to a frigid shutdown.

That’s a remarkable 40-year period of sitting "on the shelf," only to perform flawlessly when first activated. I don’t care what anyone thinks about spacecraft engineering—that's an impressive technological feat by any stretch of the imagination. It’s a pity our ham radios weren’t built to the same standard, but then again, they didn’t cost as much either.

Still... Impressive.

~ Courtesy Papakura Radio Club Inc.



LingoSat ISS Deployment

First wooden satellite

LignoSat is a 2U-sized CubeSat whose outside structure is mainly composed of wood. The aim is to provide more people with the opportunity to develop amateur satellites at a lower cost.

The satellite is named after the Latin word for "wood" which is "Ligno". LignoSat is made of wood from honoki, a magnolia tree native in Japan. Wood from the tree is customarily used for sword sheaths. The choice of material was determined through a 10-month experiment aboard the International Space Station. The satellite was assembled through a traditional Japanese crafts technique without screws or glue. It still has some traditional aluminium structures and electronic components.

This satellite performs the following missions:

- **Amateur Radio Mission:** LignoSat will extract call signs of the amateur radio stations from the FM packet data signals uplinked, and respond to them by using the CW downlink and their call signs to send “thank you” messages. This shows the success of the interactive satellite communication using only UHF frequencies.
- **Educational mission:** Another LignoSat mission is to educate students to learn about the characteristics of the satellite by acquiring its HK data such as the internal temperature, the strain of the wooden structure, and the Earth’s magnetic field and calculating the rotational direction and rate of the satellite as well as observing the effect of the space environment on the wooden structure of LignoSat.

On December 9th, the satellite was released into orbit from the ISS, about 400 km (250 miles) above the Earth. LignoSat’s downlink frequency of the CW beacon is 435.82MHz +- Doppler.

Please track the satellite using the orbital elements (TLE) of the ISS for a while after deployment. As time passes, it will gradually fly ahead of the ISS. The antenna is scheduled to be deployed 30 minutes after deployment.

Please send your reception reports to jh3bum@jamsat.jp.

Hopefully there are no extra-terrestrial termites. ;-)

~

Canadian Amateur Radio Hall of Fame Appointments 2024

Adam Farson, VA7OJ (SK) and John Schouten, VE7TI

https://www.rac.ca/canadian-amateur-radio-hall-of-fame-2024/

The Board of Trustees of the Canadian Amateur Radio Hall of Fame is pleased to announce that John Schouten, VE7TI, and Adam Farson, VA7OJ (SK), have been named to the Hall of Fame. Radio Amateurs of Canada recognizes deserving Amateurs by appointments to the Canadian Amateur Radio Hall of Fame.

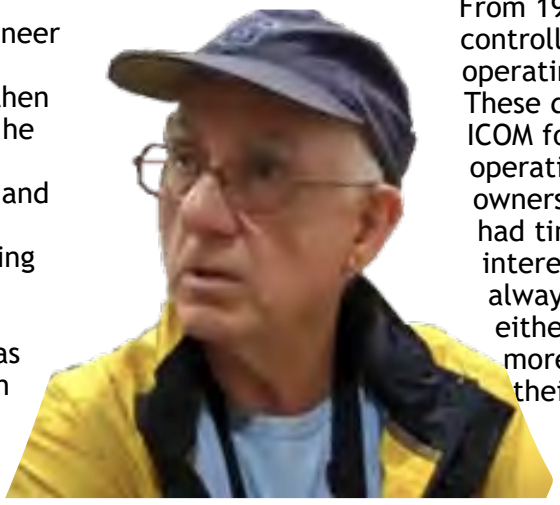
The Constitution for the Hall specifies that the appointment as Member of the Hall is made for "outstanding achievement and excellence of the highest degree, for serious and sustained service to Amateur Radio in Canada, or to Amateur Radio at large".

The Trustees of the Hall have interpreted the Constitution to mean that the person has performed significant service over many years to enhance the well-being of Amateur Radio.

Adam Farson, VA7OJ (SK)

Adam Farson was born in England in March 1940, and he obtained his first Amateur Radio licence in South Africa in 1962 as ZS1ZG (later ZS6XT).

Adam worked as a Radio Engineer with General Telephone and Electronics Corporation and then for Siemens in Florida where he was able at last to set up a permanent operating station and test bench. He became well known for his skill in converting retired commercial Motorola handhelds for Amateur Radio use and for many years he was a VHF repeater coordinator in Florida. He was instrumental in promoting the noise-power-ratio (NPR) method of testing the behaviour of a receiver which was used for years in the telecommunications industry.



In 1999, Adam moved to Vancouver, British Columbia to begin his retirement. In the decades that followed, he set up a lab in his home in which he tested many Amateur Radio products and published detailed test reports. He continually updated his knowledge by attending major Amateur conventions and he shared his professional expertise with the Amateur community in Canada and internationally.

Adam was an active member of the North Shore Amateur Radio Club (NSARC) in Vancouver for over 20 years and served as a Director, Website Manager, Examiner and a CW tutor and he was a regular speaker at club meetings and at other local clubs. He also created a comprehensive website featuring his test reports and articles on testing techniques.

From 1989 to 2020, Adam was the net controller for the ICOM HF radio net operating Sundays on 14.316 MHz. These discussions along with the online ICOM forums he moderated, provided operating and repair advice for ICOM owners. He always had a smile, always had time to "talk radio", always had an interesting radio-related story and always would help another Amateur – either with knowledge and advice or more practically by testing/repairing their equipment.

John Schouten, VE7TI

Born in the Netherlands, John moved to Canada at age 9 and has lived in the Greater Vancouver area since 1960. As a qualified electronics technician, John's early career saw him work in the telecommunications industry where he first gained exposure to Amateur Radio, although he did not become licensed at that time.

John left his technological career behind in the mid-1970s when he joined the Vancouver Police Department, serving for 30 years as a Patrol Constable, Police Dog Handler ("K9" Officer), Homicide Detective, and emergency planner. He served as the Manager in charge of police operations at BC's regional 9-1-1 and emergency response centre and as Deputy Chief of the Support Services Division before his retirement in 2003, and joining the E-Comm 9-1-1 Corporation Board of Directors.

During his policing career John was able to return to his long interest in Amateur Radio and became licensed as VE7VPU. In October 1998, John and three other Amateurs brought together Amateurs from across the region to form the Vancouver Emergency Community Telecommunications Organization (VECTOR). John served as a Director of VECTOR and liaison officer with the City of Vancouver for several years.

John was instrumental in developing a relationship between the City of Vancouver's Council and VECTOR, involving the Amateur group in many civic events. VECTOR provided communications for events such as the Celebration of Lights and other large activities. This relationship continues to this day.

In 2003, John was recognized by the BC Provincial Emergency Program as Communications Volunteer of the Year, having served as the Southwest Regional Radio Representative, and for his work on developing a series of training packages.

John has been a key member of the Surrey Amateur Radio Communications Society (SARC) and Surrey Emergency Program Amateur Radio (SEPAR) for many years. He has applied his creative talents as Editor of SARC's bimonthly publication "The Communicator" to build it from a short club newsletter distributed locally, to a free magazine which averages 125 pages that is downloaded over 30,000 times per issue across the globe. John is also the coordinator and lead instructor of SARC's Basic course for new Amateurs, recently expanded to include a successful summer school course for grades 8-12.

John works closely with SEPAR and the City of Surrey to continue to integrate Amateur Radio into the community providing emergency communications. Using SEPAR's portable equipment they are able to provide communications for biking, walking and other civic and community events within the City of Surrey.

Congratulations!

Radio Amateurs of Canada and the Board of Trustees of CARHOF sincerely congratulate John Schouten, VE7TI, and Adam Farson, VA7OJ (SK), on their appointment to the Hall of Fame.

A detailed account of their achievements will be presented in an upcoming edition of The Canadian Amateur magazine.

For more information on the Canadian Amateur Radio Hall of Fame please visit: https://wp.rac.ca/carhof/

~ Frank Davis, VO1HP
Chair, Board of Trustees
Canadian Amateur Radio Hall of Fame

The Santa Barbara 1925 Earthquake

And the Amateur Radio operator who provided the first communications

The 1925 Santa Barbara earthquake hit the area of Santa Barbara, California on June 29, with a moment magnitude between 6.5 and 6.8 and a maximum Mercalli Intensity of IX (Violent). It resulted in 13 deaths and destroyed the historic center of the city, with damage estimated at $8 million (about $111 million in 2017).

Although no foreshocks were reported felt before the mainshock, a pressure gauge recording card at the local waterworks showed disturbances beginning at 3:27 a.m., which were likely caused by foreshocks. At 6:44 a.m. the main shock occurred which lasted 19 seconds. The epicenter of the earthquake was located in the sea off the coast of Santa Barbara, in the Santa Barbara Channel. The fault on which it occurred appears to have been an extension of the Mesa fault or the Santa Ynez system. The earthquake was felt from Paso Robles (San Luis Obispo County) to the north to Santa Ana (Orange County) to the south and to Mojave (Kern County) to the east.

Though thirteen people died, it may have been far worse without the actions of three heroes, who shut off the town gas and electricity preventing a catastrophic fire. Most homes survived the earthquake in relatively good condition, although nearly every chimney in the city crumbled. The downtown of Santa Barbara was destroyed. Only a few buildings along State Street, the main commercial street, remained standing after the earthquake. The City Cab building and The Californian and Arlington garages, all large and fully occupied parking structures, collapsed full with cars. Many other vehicles were crushed in the downtown area. At least one death resulted when a driver near the San Marcos building was crushed as walls of buildings fell onto cars parked there.

In the business district, an area of about 36 blocks, only a few structures were not substantially damaged, and many had to be completely demolished and rebuilt. The facade of the church of the Mission Santa Barbara was severely damaged and lost its statues. Many important buildings, including hotels, offices, and the Potter Theater, were lost. The courthouse, jail, library, schools, and churches were among the buildings sustaining serious damage. Concrete curbs buckled in almost every block in Santa Barbara. Pavement on the boulevard along the beach was displaced by about 20–36 centimeters (0.66–1.18 ft), but the pavement in the downtown generally was not damaged.

Brandon Wentworth 6OI (1905-1987)

Brandy, as he was known, was a life long professional in radio and a historian, who earned his first amateur license at age 15 as 6AIK. In 1925 following a devastating Santa Barbara earthquake, he summoned the U.S Marines from a hastily rigged transmitter in downtown Santa Barbara, using his 6OI call sign. That was the first communication with the outside world, from a table in the middle of the 800 block of State Street.

In 1926 as a Stanford University student, he began using a tiny radio shack on a hill overlooking the campus, in an attempt to work around the globe. That DX milestone in Amateur Radio was achieved in 1927, when Wentworth, operating under the call sign 6OI, confirmed contacts with all inhabited continents. This accomplishment, known as achieving “Worked All Continents” (WAC), demonstrated the remarkable potential of amateur radio for long-distance communication. Wentworth’s success highlighted the capabilities of the evolving radio technology and the dedication of amateur operators to push the boundaries of global communication. This achievement inspired many other amateur radio enthusiasts to pursue similar goals, fostering a spirit of international camaraderie and technical excellence within the amateur radio community.

Brandon Wentworth’s 6OI QSL card

The next year Hiram Percy Maxim (1AW) and the ARRL organized the first international DX party, the precursor of international DX contests.

Brandy sailed as a commercial radio operator all over the Western waters. After college he held a position with Fox Movietone sound roving all over Europe. Then as a White House newsreel crew member, he traveled with President Franklin D. Roosevelt on campaign trips. During WWII Brandy served as a radio officer with the Army Air Forces. Following the war he had a engineering position with the FAA retiring as Chief Electronics branch airways facilities division. He became K6UJ, moving to Laguna Beach Calif.

Years ago W8SU [SK] ordered a communications book from Mrs. Wentworth in the state of Maine. She was a very helpful lady and sent out her husbands book promptly. He'd observed the book being recommended by the Society of Wireless Pioneers. Although not aware at the time that Brandon was a real first class Radio Pioneer and had achieved WAC, which was considered in that era as "Ultimate DX".

In the final years of Brandy's life, the family moved to Mount Desert Island, Maine in 1980, he began research on famous Naval radio station NBD and completing "The Famous Radio NBD" *[available for free loan, but also available for purchase on Amazon although the price may shock you].*

The rebuilding of Santa Barbara

In an odd twist of fate, by leveling much of Santa Barbara's commercial district, the earthquake proved a boon to Santa Barbara's businesses. City officials seized the opportunity that the earthquake gave them to enforce a stricter building code, requiring commercial buildings along State Street to conform to a Spanish-Moorish style of architecture. The earthquake demonstrated that traditional construction techniques of unreinforced concrete, brick, and masonry were unsafe and unlikely to survive strong temblors the earthquake demonstrated that traditional construction techniques of unreinforced concrete, brick, and masonry were unsafe and unlikely to survive strong temblors.

Thus the 1925 earthquake is responsible for the distinctive architecture in the city that has made Santa Barbara a popular tourist destination for over 70 years.

~ John VE7TI, with research contributed by W8SU [SK] [2006], and photo located by Kevin VE7ZD/KN7Q

[Above] Mission Santa Barbara after the earthquake.

[Left] Santa Barbara today, almost a century later.

Antenna Height Matters

True or False?

by JOHN CORBY VA3KOT

How often have you read that an antenna should be placed as high as possible – the higher the better? Is it true? My inner skeptic says "hmm, maybe". It's certainly an aphorism that is open to scrutiny. Aphorism? The American Heritage® Dictionary of the English Language defines "aphorism" as: "a tersely phrased statement of a truth or opinion".

I've got wires in low places

The problem with tersely phrased statements of a truth or opinion is they get repeated so often that people begin to accept them as unchallengeable fact. "The higher the better" may actually be perfectly good advice – in some circumstances. A good friend and code buddy of mine is a farmer. He farms antennas. Among the many wires and towers on his property are three 1200 feet long beverage antennas that are just high enough to allow his tractor to pass beneath them. He is a devotee of the "Gentleman's Band" (160m) and uses his beverage antennas for receive only. His transmitting antenna is a full size quarter wave vertical – a 130ft tall tower with enough radials to trigger a global shortage of wire.

"Beverage antennas are for receiving only, you can't use them for transmitting". There must be a stone tablet somewhere with those exact words engraved on it. Well, why not transmit into a Beverage antenna? I wrote a post some time ago with the title "A 200ft Antenna Up Zero Feet – How Does it Perform" about a "grasswire" antenna I had built. It comprised 200 feet of wire laid directly on the ground. "Oh, no! All your signal will be absorbed by the ground" the voice in my head was telling me. Except it wasn't. I QSOd on that antenna more than once. The theory of why it works is laid down in another old post: A Most Unusual Antenna.

John Corby VA3KOT resides in Owen Sound, Ontario but is more often found operating CW out in the "Big Blue Sky Shack". He especially enjoys activating parks for the POTA program and blogging about his experiences at HamRadioOutsidetheBox.wordpress.com

Another strange but proven antenna

European blogger and podcaster Ed Durrant introduced me to what I initially perceived to be a very bizarre antenna – the VP2E (Vertically Polarized 2-Element). It is a monoband wire antenna with one very interesting feature – the apex of the 20m version that I built is only about 14 feet high. And yes it works fine business; I have completed several POTA activations with it. The low profile makes this a stealthy antenna that is less likely to attract the curiosity and suspicions of other non-ham users of public spaces.

So what about the popular End-Fed Half Wave (EFHW) antenna?

One of the many online forums I read regularly is populated by a group of commenters that, shall we say, do not fully endorse the benefits of the EFHW antenna. It may be true that the EFHW is often used in a manner that does not bring out its best features. A popular version of the EFHW comprises an electrical half-wavelength of wire fed through a broadband 49:1 transformer. The problem is it gets treated as a resonant multi-band antenna. It has SWR dips on its fundamental frequency and harmonics, but the bands are not exactly harmonically related. No problem, some hams believe, just press the tune button on the radio and hey presto 1:1! Yes, the radio sees 1:1, but that doesn't make the antenna, at the other end of the coax, resonant.

EFHW links using 2mm banana plugs

Before we get back to the main topic of this post let me just outline a version of the EFHW that overcomes the issue just discussed – the linked End-Fed Half Wave antenna.

Opening or closing the links optimizes operation on my 3 bands of interest – 20m, 30m and 40m.

The antenna is resonant on each band and does not have to rely on harmonics, although it works well on all three bands with all links connected. *And no tuner is required!*

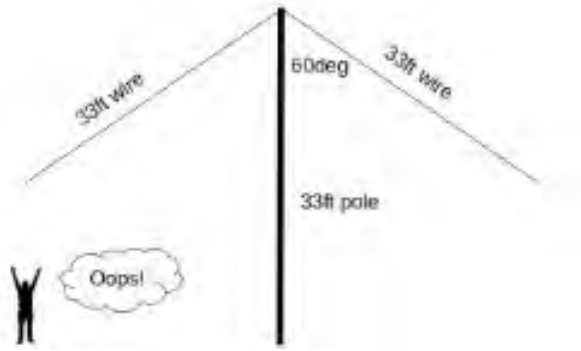
How low can you go?

Field portable operators like myself find it essential that all antennas can be rapidly deployed and are as lightweight as possible. If I have to haul my aging bones, weighed down by all my gear, up the steep rocky inclines of the Niagara Escarpment, weight counts. It is truly surprising how much extra gear accompanies my tiny QRP transceiver on a field trip.

If an EFHW is deployed in typical fashion it requires a suitable tree for support. Or, in the absence of a suitable tree, a pole. "The higher the better" right? I have a fiberglass pole that will get a wire up 30 feet, but it is quite heavy. So I asked myself if it is really necessary to go up that high. Perhaps a shorter, lighter pole could be used, but how will that affect antenna performance?

Reach for the sky

Picture this; a 40m EFHW antenna is erected supported by a 33ft pole at its center. If the angle between the two wire sections is 120 degrees (greater than 90 degrees is recommended), the ends of the wire will need additional supports. What, now three poles to haul up the trail?

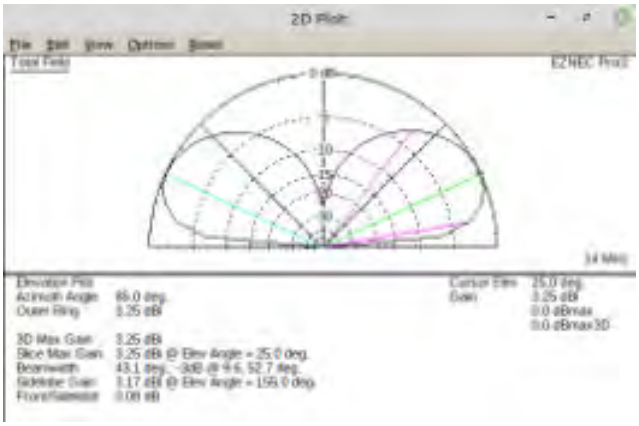


Maybe, er, the pole is too long?

We often hear of SOTA operators using EFHW antennas and mounting them on short poles. There is one brand of telescoping pole that extends to 20 feet, yet can be collapsed small enough to fit in a backpack. Maybe I'll buy one some day, but for now I have rigged a fairly sturdy telescoping 16ft pole that is ultra light, although it is still 4ft long when collapsed.

So what do computer models have to say about working with an EFHW for 20m, 30m and 40m that is only 16ft tall at its apex? I should add that this idea is helped by the feedpoint of an EFHW being a high voltage/low current point and can therefore be mounted very close to ground.

NB: *The following radiation pattern charts are based on using the full length of the antenna with all links connected. My own build of the antenna gives an SWR well below 2:1 on all three bands without a tuner in this configuration.*

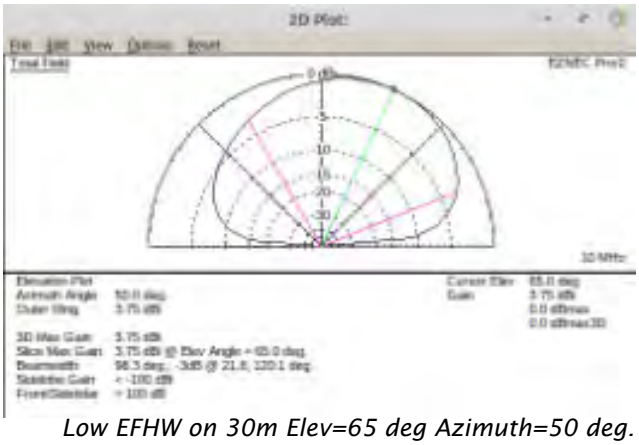


Low EFHW on 20m Elev=25 deg, Azimuth=85 deg.

The radiation pattern on 20m is the familiar donut shape with maximum RF energy at 25 degrees to the horizon at a broadside azimuth of 85 degrees.

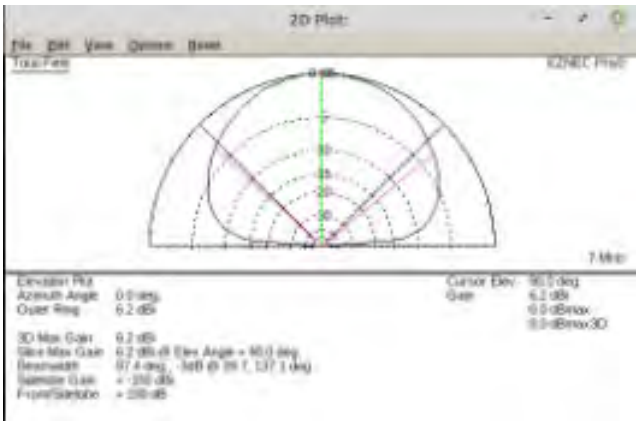
There is even about a half S-unit of gain. For good DX the radiated signal is still at unity gain down to 10 degrees.

On 30m the picture is a little different with most of the radiated energy at 65 degrees elevation. However, the antenna still performs well down to an elevation of 20 degrees, but at an azimuth of 50 degrees.



Low EFHW on 30m Elev=65 deg Azimuth=50 deg.

Disadvantage? No, in fact the directionality of the antenna could be an asset by allowing the antenna to be oriented to favor a desired direction.



On 40m, as expected, the antenna acts as an NVIS (Near Vertical Incidence Skywave) antenna for local contacts within a few hundred kilometers from the transmitting station.

But, look closely and you can see a lot of signal going out down to an elevation of 40 degrees which should cover whichever continent you are on. Good predicted gain too.

No tree, no pole, no problem

Leave the pole at home but take a buddy along for the outdoor operating session. Ask him to hold the center of your wire above his head. You can reassure him that the high voltage points on 40m are

well away from him, just don't switch to 20m. Ok, don't really do that please. My point is that the antenna will still work (according to the models) with the apex down at six feet above ground.

At that very low apex height the radiation pattern on 20m changes from broadside to firing RF off the far end of the wire at a still useful +/- 3dB elevation between 20 and 50 degrees. Strangely, that is similar to the radiation pattern of the VP2E we discussed earlier. Maybe I'm getting closer to understanding how that strange beast works.

Efficiency?

We haven't entirely forgotten about antenna efficiency and yes, proximity to the ground does result in some of our signal being swallowed by our friendly home planet. But there are conflicting objectives based on whether we are designing an antenna that adheres to the laws of physics (I am a college physics grad) or, we need a field expedient, rapidly deployable temporary antenna that will grab a few quick QSOs before being torn down and packed away.

Think of it this way, if we really placed the greatest importance on efficiency and getting the best signal reports, we would throw away our QRP radios and carry a legal maximum linear amplifier into the field. Why deliberately use only 5 watts when you could be pumping out enough power to stay warm in winter?

Since operating QRP is one of the most popular activities in the world of ham radio it would seem we have already made that decision. A field antenna doesn't have to be perfect, it just has to be efficient enough to fill the log sheet.

~ John VA3KOT

What did Beethoven do for Ham Radio?

You may not be a classical music fan but you're probably familiar with the opening bar of his 5th symphony: "dididit dah". Let that go around in your head a few times. There, now you know the letter V in Morse Code!

Now add the simplest letter of them all, E. It's just a "dit" in Morse. Hey, now you know VE. Now add a "dah" to Beethoven's famous V and you've got yourself a 3. Now you know VE3 already.

Ah, but what if you have a VA3 callsign? No problem, just add a "dah" to the E and you have yourself an A.

Everyone knows SOS; it's 3 "dits", 3 "dahs", 3 "dits". So now you've learned 6 letters and that's nearly a quarter of the whole alphabet.

Footnote: Music and Morse Code have one very important thing in common – rhythym! Just ask country music singer Johnny Cash. Ok, you can't; he is singing with the choir invisible (the poetic version, not the band of the same name). Johnny Cash was not only a talented musician but an outstandingly good radio telegraphy operator during his time in the military.

Thanks Ludwig!

~ John VA3KOT

I am at peace with the RFI gods

The right ferrite for the job

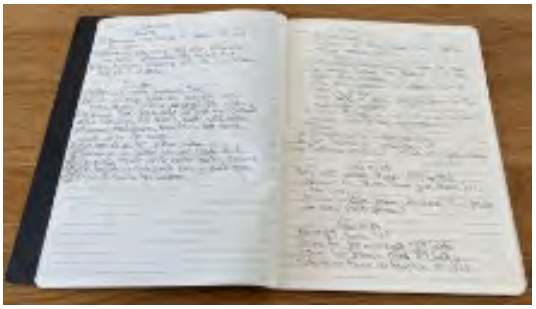
by MIKE WEIR VE9KK

Mike Weir VE9KK was first licensed in 1989 and upgraded to advanced in 2000. He primarily operates contests both CW and RTTY.

His blog is at:
VE9KK the world of CW

At the beginning of November, I posted regarding the journal I was going to start regarding my RFI. I wanted to log ideas to try, results from the ideas and detailed records of the RFI. In the past, it was scribbled on a paper here and there and when needed to refer to I could not find the notes. This was a great help and allowed me to track what did and did not work.

I then blogged on December 1st regarding ferrites I had purchased. They were bought and arrived in mid-November and I had a chance to give them a go. Now in my post on the ferrites, I did mention I purchased a brand called Fair-Rite, which I felt where a very good brand. I wanted to make the first test for this product an easy access one. I have mentioned in the past our electronic Maytag washing machine always had issues with RF from my operating. When I transmitted the



washers would stop and just hummed. If the machine was not being used but still plugged in and I transmitted all the LED lights would come on and it would start to buzz. The only solution while operating was to turn off the power to the washer. In the past, I tried some snap-on chokes from MFJ and put them on the washers AC power cord, which did not work. I snapped on 2 of the Fair-rite chokes and to this day I have had no issues at all with the washing machine. The machine can sit there powered on or doing a load of laundry and no issues at all.

Fair-Rite with 4 loops (4th on backside)

That was a very promising sign to me and I was thrilled to see such positive results. Back to my RFI journal. The only issue I was facing was my contest program N1MM+ while I was transmitting would freeze. I was not able to transmit a contest reply and that would prove frustrating. After a short time the program resumed but that could be 3 seconds, 30 seconds or a PC reboot.

The other issue was my N1MM+ programs logging screen would go black and sometimes the whole program had to be rebooted for it to work again. I felt I had narrowed down the issue to my ground leads. I have 3 of them, the Icom 7610, LDG autotuner and the PC metal frame. Each of these 14 gauge green ground wires is fastened to a copper plate where the main ground is secured. I wound the ground wire 4 times through a clamp on the Fair-Rite toroid and also on the incoming number 6 ground cable (I put 3 snap-on ferrites on that as there was no way to wrap that size of cable). I spent the whole weekend on the radio in the CQ WW DX CW contest on all bands and full power. I did not have one issue at all. Since then, I have taken part in CWops and MST weekly one-hour contests without issue again. My fingers are crossed that I have found the right ferrite for the job.

~ Mike VE9KK

Handie-Talkie or Walkie-Talkie?

by BOB WITTE K0NR

The Motorola HT-220 Handie-Talkie

In ham radio, we often use Handie-Talkie or HT to describe a compact, handheld transceiver. My first exposure to the term Handie-Talkie was when I became a licensed radio amateur in 1977. As a student at Purdue University (W9YB), the absolute coolest VHF radio to have was the Motorola HT-220. Even a used one commanded a high price so they were out of my price range and I never owned one. These were 6-channel crystal-controlled transceivers…back then you had to set up the radio with the particular 2m frequencies you wanted to use. Because it was such an iconic radio, there are many HT-220 enthusiasts still around with websites with tons of useful information. See the HT-220 Page.

Motorola trademarked the name Handie-Talkie and used that nomenclature for many years with its line of portable radios. However, this trademark has expired, so now Handie-Talkie is a generic term.

The First Handie-Talkie

But the HT-220 was not the first Handie-Talkie, so I started poking around to find out how this name originated. Back in World War II, the SCR-536 was a portable “hand-held” transceiver developed in 1940 by Galvin Manufacturing (later Motorola, Inc.) I put “hand-held” in quotes because, by today’s standards, it was a Hand FULL. But most people

Bob Witte K0NR maintains a great blog site, and offers a book at https://www.k0nr.com/wordpress/

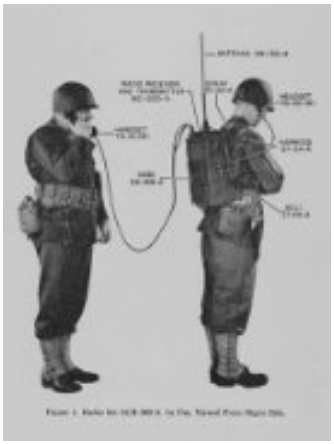
consider the SCR-536 to be the first modern, self-contained HT transceiver. The Wikipedia article for the SCR-536 describes the radio quite well. The radio put out about 360 mW of RF power on 3.5 and 6.0 MHz (Oops, I mean 3500 to 6000 kilocycles) using Amplitude Modulation (AM). The circuitry relied on smallish vacuum tubes, creating quite a design challenge. Motorola has a page on its website that talks about the origins of the radio. IEEE Spectrum also published an excellent article: The SCR-536 Handie-Talkie Was the Modern Walkie-Talkie's Finicky Ancestor. The January 2005 issue of QST has an interesting article by Gil McElroy, VE3PKD, A Short History of the Handheld Transceiver. It provides more history and insight into this fun topic.

The First Walkie-Talkie

The SCR-536 Handie-Talkie

A few years later (1942), a backpack portable radio was introduced, called the SCR-300. I always assumed that the backpack-style radio would have come first and the more compact radio SCR-536 would be later. (Actually, there were previous backpack radios, such as the SCR-194). This new backpack-style radio was referred to as a Walkie-Talkie. According to the manual, the SCR-300 was "primarily intended as a walkie-talkie for foot combat troops". I suppose the emphasis was on how you can walk and talk, with a radio on your back.

The SCR-300 Walkie-Talkie transceiver.



This article: SCR-300 WW2 Radio Backpack: The "Walkie Talkie" That Shaped the War describes this radio as a game-changer for front-line troops. The radio weighed a heavy 35 pounds, and used Frequency Modulation (FM) on 40 to 48 Megacycles

Of course, with technology development, there is always the question of "who was first"? The SCR-194 that predated the SCR-300 might be considered the first walkie-talkie. However, the SCR-300 and the SCR-536 seem to get all of the glory, probably due to their impact on the war effort. However, take a look here if you want to dig deeper: TALK the WALK or WALK the TALK: Who actually developed the first Walkie-Talkie?

This article describes the development and use of the SCR-300 and mentions some of the limitations of the SCR-194: SCR-300 History Development Employment and Details Final Draft. This is a big file with many photos but worth reading if you have the time.

Today's Terminology

Shown is the Yaesu FT-4X handheld transceiver

Fast forward to today and we see that the HT and Handie-Talkie nomenclature is common in the amateur radio world. The photo to the left shows a modern 2m/ 70cm HT, the Yaesu FT-4X.

The term "walkie-talkie" has morphed to something quite different and is used generically to describe a handheld radio. This term covers a wide range of radios, from low-cost Family Radio Service (FRS) radios to higher-quality professional radios. This is quite different from the original Walkie-Talkie, a backpack radio weighing 35 pounds.

The military has progressed with improved communication technology, still using backpack-style radios, now referred to as *manpack* radios. These are amazing radios that pack extensive capability into a relatively small package. The AN/PR-158 shown below covers 30 to 2500 MHz in frequency, satellite comms, advanced encryption, narrowband and wideband modes: AM, ASK, FM, FSK, PSK, CPM, GMSK, and plenty more. This radio weighs 12.7 pounds with the battery installed, so a lot lighter than the old SCR-300.

A modern military manpack radio (AN/PR-158)

So that's a quick tour through some radio terminology along with a bit of historical perspective. I discovered there is an infinite supply of information out there on the history and technology of military radios. If you want to dig deeper, go for it!

~

Graphic courtesy of Ham Radio School

Which Modes Have You Operated?

For our local 2m net, the Net Control Station asks a *Question of the Night* to stimulate some discussion. Recently, the question was:

Do you have any interest in CW. If yes, Do you currently operate CW or do you plan to learn? If you have no interest in CW, what other modes besides voice do you operate on or would like to?

I am not a huge CW fan, but I do use it from time to time, especially when it comes to squeezing out difficult contacts on VHF or UHF. However, this question had me thinking about the various modes I have operated, so I made a list:

- SSB - quite often on HF, VHF, UHF
- CW - not nearly as often but on HF, VHF, UHF
- FM/PM - lots of VHF activity here, 2m FM is the Utility Mode
- AM - a few times, just to check it out
- RTTY - I used to do this often but my interest has faded
- PSK31 - I used to do this often but my interest has faded
- FT8 - this one has taken over my digital operating
- FT4 - a faster alternative to FT8, often better to use
- Q65 - I just started using this for weak-signal VHF/UHF
- MSK144 - for meteor scatter, but I haven't done that for a while
- AX.25 - VHF packet radio, including APRS
- DMR - the most common digital mode in Colorado
- D-STAR - I used D-STAR when it first came out but lost interest
- C4FM - Yaesu Fusion, I've used it a few times

Each one of these modes has a story behind it… often I was just looking for something new to try. (If you find yourself getting bored with ham radio, it might be time to try a new mode.)

This list also reminds me that I need to get back to chasing grids on the 2-meter band, using CW, SSB, FT8, MSK144, and Q65. I have a new tower up that I've not taken full advantage of for VHF/UHF.

That's my list of modes used, what does your list look like?

73,

~ Bob K0NR

KB6NU'S HAM RADIO

Hurricane Helene

has changed my outlook on emergency communications

by DAN ROMANCHIK KB6NU

Dan Romanchik KB6NU blogs about amateur radio at KB6NU.com when he's not trying to figure out which way current flows. Dan teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com

I was never very interested in emergency communications. Perhaps it's because I live in Michigan, which according to World Atlas, is the second safest state as far as natural disasters go.

With what has gone on lately in North Carolina I'm re-thinking my position. I still don't think that every ham has to go whole hog (pun intended) on emergency communications, but we should have the ability to communicate without grid power and some knowledge of emergency communications techniques and protocols.

This may or may not include amateur radio. Tom, K4SWL, has some interesting thoughts on this. He was right in the middle of the Hurricane Helene situation and speaks from experience. See his blog to read more about his experience and his thoughts on going forward. They've decided to go with GMRS where he lives.

Here are some other reports on how radio amateurs responded to the hurricane in North Carolina:

- Forget cell phones — amateur radio shines in the wake of Helene
- When cell towers and internet fail, ham radio operators can still talk. How to get involved
- Helene trapped Asheville broadcasters in their station. They've stayed on air ever since

Personally, I have the ability to put a low-power transceiver on the air, and I can power this setup with solar panel. I did this for a 24-hour period several years ago on Field Day during the COVID crisis. I could do a lot more, though. Now's the time to start the conversation.

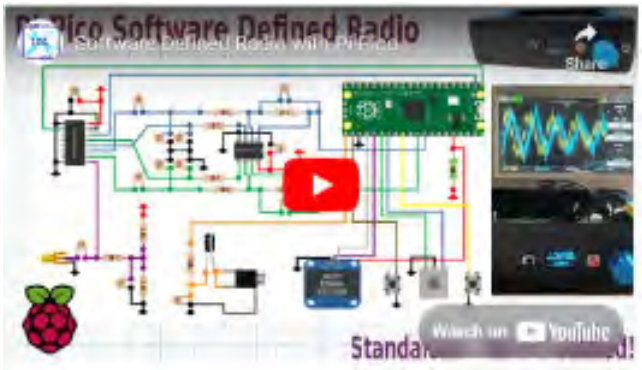
~ Dan KB6NU

Pico-based SDR runs stand-alone

Microcontrollers are getting to be very powerful. The Raspberry Pi Pico, for example, feature dual core processors, running at frequencies up to 150 MHz, with 520 kB of SRAM, and 4 MB of on-board flash memory. They're very inexpensive, too. You can get one of these microcontrollers from reputable dealers for less than $8. If you're willing to take a flyer on Ali Express, some of them are going for less than $2.

As shown in the video, this lets one build a software-defined radio (SDR) without a PC!

Think of the possibilities. One of the things that comes to my mind is to couple this with an Si5351 module and amplifier to make a small HF transceiver.



For more information:

A. Article discussing how it works.
B. Discussion on qrptech@groups.io.

~ Dan KB6NU

I'm excited to invite you to a **new HAM Radio Discord server** created for operators across the Pacific Northwest—but open to radio enthusiasts everywhere who share a passion for this incredible hobby!

Whether you're into SOTA, POTA, SKCC, CW, DXing, or anything else HAM-related, this is a welcoming space to dive deeper into the hobby and meet like-minded operators.

If you're passionate about HAM radio and want to connect with others who share your enthusiasm, we'd love for you to join us. Let's build a thriving community together!

Click here to join: https://discord.gg/rbJwQtxj

~ N7JTT

Foundations of Amateur Radio

The venerable QSL bureau

by ONNO BENSCHOP VK6FLAB

Onno Benschop VK6FLAB

To listen to the podcast, visit the website: http://podcasts.vk6flab.com/. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

Full instructions on how to listen are here: https://podcasts.vk6flab.com/about/help

One of the oldest global aspects of our hobby, other than actually using the radio, is the QSL bureau. It uses a postcard-like system to confirm that two stations made contact, sent via the postal service as a so-called QSL card. Of course, that only works if you have each other's address which after World War II was somewhat difficult. As a result the QSL bureau was born.

Intended as a single point of contact for a country, a local QSL bureau consists of one or more volunteers, paid staff or contractors, who act as the distribution point for incoming and outgoing QSL cards. If you and I agreed to confirm our contact via the bureau, my QSL card to you would be sent to the VK outgoing QSL bureau, which would hold my card until there were sufficient outgoing cards from all over Australia to your country to package them all up and send them to the incoming QSL bureau in your country.

Your QSL bureau would then wait until there were enough QSL cards for your region to send it on, where it would eventually get into your hands in a variety of ways, via the postal service, through your local club, or at a local hamfest where the QSL bureau might have a stall. Your QSL card to me would make a similar, reverse, journey.

This process could take weeks or sometimes years.

Although not fast, this worked for many decades, but once electronic communications and computers started appearing, combined with increased costs associated with privatised international postal services, the wheels started coming off.

Getting access to historic documents has proven challenging. I can tell you that over the years the IARU, the International Amateur Radio Union, has coordinated and controlled how the QSL bureaus should work. For example, a resolution adopted in 1985 and updated in 2009 "strongly encouraged" its member societies to accept incoming QSL cards for all amateurs in their country, regardless of affiliation. It also instructed QSL bureaus to only send cards to the official QSL bureau if there was more than one.

Several years ago, the IARU administrative council recognised several trends, among them the environmental impact of unwanted cards generated in bulk by computer logging software, lower levels of adoption and ultimately the closing of some smaller QSL bureaus after being overwhelmed by undeliverable cards from increasingly popular holiday DXpeditions.

In September 2018, the IARU adopted resolution 18-1 that stated that it "resolves that member societies are encouraged to continue to offer QSL bureau service in their countries, exchanging cards with the bureaus of other member-societies, for as long as doing so is economically justifiable, and further resolves that amateurs are encouraged to adopt confirmation practices, including but not limited to using electronic confirmation systems, that reduce the volume of unwanted and undeliverable QSL cards being introduced into the bureau system."

This resolution took effect on New Year's Day, 2019. I'll also note that the IARU has its own year 2000 issue, having been in existence for nearly a century, its resolutions are named after the last two digits of the year followed by a sequential number, so resolution 25-1 could refer to 1925 or 2025, but I digress.

The internet has introduced several confirmation processes. The most vocal of these is "Logbook of The World", or LoTW. I'm not a fan and haven't been for some time. I'll get into why in a moment. Other contenders are eQSL.cc, qsl.net, qrz.com, clublog.org and others that have yet to steal the limelight. If I've forgotten the one you run, let me know.

Saying that I'm not a fan of LoTW is understating it. Recent ARRL ransomware payments aside, why do I need to legally prove beyond a reasonable doubt that I made contact with some random amateur? Why does this need to be authenticated, signed with a time-limited certificate and verified with 100 points of identity and why do we continue to roll out new and interesting procedures for what is essentially a postcard saying that on this day, time and frequency we made

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: http://amazon.com/author/owh. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: @vk6flab or check the website for more: http://vk6flab.com/

If you'd like to join a weekly net for new and returning amateurs, check out the details at http://ftroop.vk6flab.com/, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: https://www.facebook.com/groups/foundations.itmaze

This podcast episode was produced by Onno (VK6FLAB). You can find more at http://vk6flab.com/

contact using this mode for the purposes of .. wait for it .. our hobby?

The eQSL website has an interesting statement: "One of the problems with an e-mail based system is that there is no security inherent in that mechanism. Anyone can purport to be P5ABC, and you'll have a difficult time verifying it."

So what .. and what made you think that the postcard ending up in your letterbox was guaranteed to be from P5ABC?

If you're going to the effort of pretending to be P5ABC, what harm does that do in the scheme of things? For that matter, how do you know that the station you talked to on-air was actually P5ABC? I ask because I've spoken to an amateur who recently did some HF direction finding during several popular DXpedition pile-ups. They discovered that there were several stations purporting to be the DXpedition that were not.

So. Right now we're in a situation where many if not all amateurs are connected to the internet. Most will have an email address. You already know mine, cq@vk6flab.com. If we made contact on-air, send me an email. If what you wrote matches my logs, I'll send you a reply to confirm it.

How do you get the address? One possible approach is to create an online email database where you could submit the email address associated with your callsign and you could look-up a station to contact them.

Another is for member societies to offer email addresses, the ARRL and the WIA already offer this service to current members.

I'll also point out that one of the reasons that the QSL bureau was instigated in the first place was because some addresses for amateurs were not available. If you make contact today and you want to send them an email confirmation the question to ask is simple: "Hey, what's your email address?"

Will that cover everyone?

Nope. Neither does the current system. What it achieves is that my personal private identifying information isn't stored at the ARRL if I'm not a member. Besides, in my opinion a list of email addresses combined with callsigns is hardly something worth getting excited about, unless of course it's used by manufacturers to send out product announcements and discount codes. We should be so lucky.

If you have a better idea, you know how to get in touch. What I can say is that this is the ultimate decentralised QSL system, not unlike the contact you made on HF.

~ I'm Onno VK6FLAB

Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.

No-ham Recipes

Oatmeal brown bread

by BARB GOODIER VE3KKY

The oatmeal and corn meal in this bread give it texture and fibre. Can you resist a buttered piece, hot from the oven?

- 2 cups (500 ml) water
- 4 teaspoons (20 ml) butter
- 1 cup (250 ml) quick cooking oatmeal
- ⅓ cup (90 ml) molasses
- ⅓ cup (90 ml) sugar
- 1 teaspoon (5 ml) salt
- ½ cup (125 ml) yellow corn meal
- 1 teaspoon (5 ml) dry yeast
- Dash of sugar (a bit less than ⅛ teaspoon or a bit less than .65 ml)
- 5½ cups (1.4 litres) all-purpose flour
- ¼ cup (65 ml) warm water

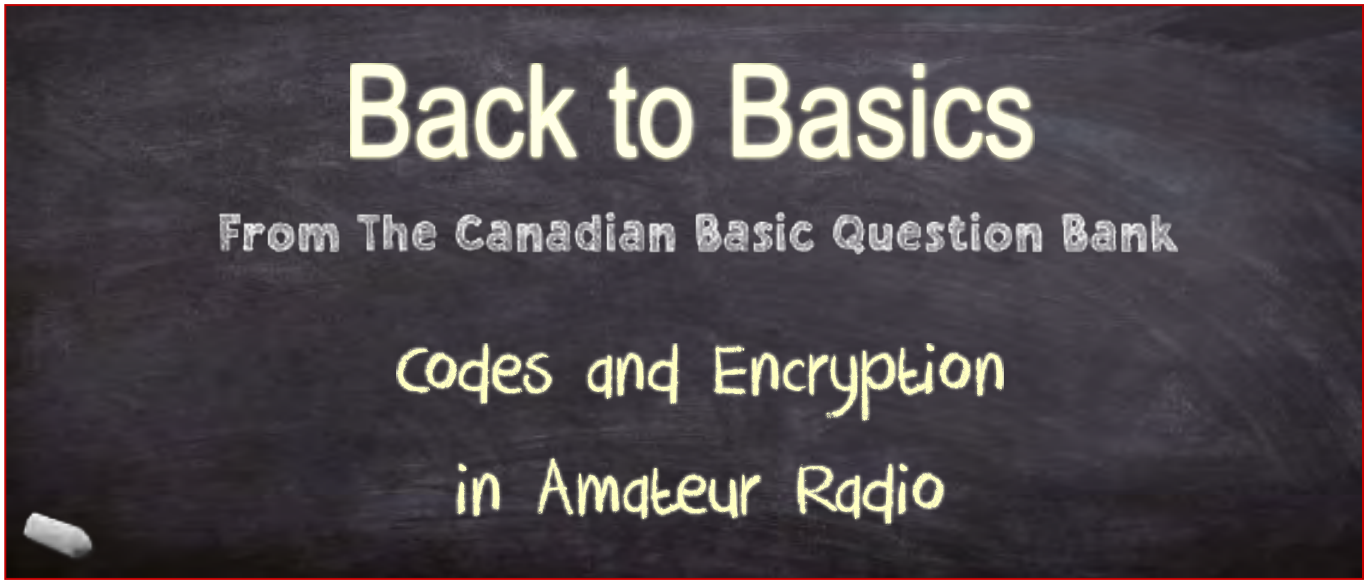
Preheat your oven to 350F (180C or a very moderate oven)

Bring 2 cups (500 ml) water to boil. Add sugar, butter and salt. Stir to dissolve sugar. Add oatmeal and com meal and mix well. Add the molasses. Let cool to lukewarm.

Meanwhile, mix the yeast and dash of sugar with ¼ cup (65 ml) warm water and let stand unti dissolved. Add the dissolved yeast to the cooled mixture in the bowl and sift in 1 cup (250 ml) flour. Mix well, cover and let stand in a warm place until bubbly and light.

Beat the sponge down and sift in flour to make dough stiff enough to knead. Turn the dough out onto a floured surface and knead 10 minutes. Place the dough in the greased bowl and turn it to grease all sides. Cover and let stand in a warm place until doubled in bulk. Punch down dough, turn it onto a lightly floured surface and knead it for a few moments. Let it stand for 5 minutes.

Divide the dough in half. Form each half into a loaf. Place in a greased 9x5 inch (22.9 x 12.7 cm) bread loaf pan. Let rise, in a warm area, until loaves are doubled in size. Bake for 35 minutes.



John Schouten VE7TI has been teaching amateur radio courses for over 25 years, and is the Course Coordinator for Surrey Amateur Radio Communications

Based on a recent RAC article by Dave Goodwin, VE3KG
Radio Amateurs of Canada Regulatory Affairs Officer.

Amateur radio is fundamentally designed for open communication, emphasizing the free exchange of ideas and information. As such, encryption is generally prohibited under amateur radio regulations to maintain transparency and ensure accessibility for all licensed users. Radio Amateurs of Canada has been discussing the use of codes and encryption in Amateur Radio as a small number of Canadian Amateurs are experimenting in this area of the hobby.

From the current Basic Question Bank, there are three relevant questions that reveal nuances in ISED's position on codes and encryption in Amateur Radio. Here are the three questions:

B-1-7-5 You wish to develop and use a new digital encoding technique to transmit data over amateur radio spectrum. Under what conditions is this permissible?

A. When it is used for commercial traffic
B. When it includes sending the amateur station's call sign
C. When the encoding technique is published in the public domain
D. When it is used for music streaming content

B-1-7-6 When may an amateur station in two-way communication transmit an encoded message?

A. During contests
B. When transmitting above 450 MHz

C. Only when the encoding or cipher is not secret

D. During a declared communications emergency

B-1-7-7 What are the restrictions on the use of abbreviations or procedural signals in the amateur service?

A. They are not permitted because they obscure the meaning of a message to government monitoring stations

B. Only "10 codes" are permitted

C. They may be used if the signals or codes are not secret

D. There are no restrictions

Codes and encryption is a topical subject and has arisen in recent posts on Amateur Radio forums. Frequently the commercial encryption methods used by iCOM, D-STAR, Yaesu, Kenwood, and various DMR systems is mentioned.

There is a difference between proprietary/patented/licensed and secret encodings. You can have something that is proprietary, patented and requires paid licenses, but the format is openly documented. For example, video formats like H.264 and HEVC. Morse Code is a code. RTTY uses the Baudot Code. The Q-signals we use (QRZ, QSL, QTH, etc.) are also codes. APRS uses ASCII, and ASCII is a code. The popular digital data modes of FT8 and FT4 use codes.

Canadian regulations state that: “we can use “a code or cipher,” but it can’t be “secret” and the FCC and international amateur radio regulations say that transmissions "shall not be encoded for the purpose of obscuring their meaning" (with an exception for satellite control).

The AMBE voice codec used by D-STAR, System Fusion, and DMR is secret. If such an encoding is secret, then the purpose is very much to obscure the meaning. Specifically, the purpose of the obscuration is to prevent an independent implementation, requiring you to obtain a decoder from them or their licensees. Only they hold the key to decrypting the transmission. One presumes that it would be legal to have to buy a permit or a licensed device, but how is it legal to have a secret encoding that obscures the content of the transmission?

There has been much ado over the FCC *Petition for Rulemaking* seeking encryption for emergency communications. You can read the details of the petition elsewhere through a Google search. Technically encryption on amateur radio bands is illegal. However, the FCC has been letting it happen for years and the ARRL has turned a blind eye to it. D-STAR uses a proprietary vocoder that takes an analog voice signal and converts it into a data bitstream. The algorithm isn’t publicly documented, and you can’t decrypt it, unless you buy a proprietary chip.

Some may quote US rule § 97.309 (4)(b) which basically says one can transmit an “unspecified digital code” if the digital code is not intended to obscure the meaning of the communication. Presumably the people who created and use D-STAR don’t intend to obscure the meaning of the communication, so perhaps it is within the law.

The algorithm used in the D-STAR chip is a matter of public record, fully disclosed to the patent office. You can duplicate the algorithm – but commercial use of it is prohibited by patent law, not the FCC. Further the use of the algorithm is not to obscure the meaning of the message but to compress audio. This is also clear by the patent and by its application in the D-STAR standard. In US6199037 et al you will find the background. There is significant documentation within the patent. You will find it very difficult to create your own version of the CODEC but that is an issue of work effort – not of availability of the algorithm.

Encryption in amateur radio is a complex and regulated topic, with different policies governing its use in Canada and the United States. Understanding these differences is crucial for licensed amateur operators in both countries.

Policies in Canada

Similarly, Canadian regulations under the Ministry of Innovation, Science and Economic Development (ISED) Canada, do not allow encryption in amateur radio communications. The Radio Amateurs of Canada (RAC) emphasizes the same principles of transparency and the importance of keeping amateur radio free from obfuscation. However, specific exceptions, such as encryption for satellite control, might align with international norms, depending on the nature of the application.

Policies in the United States

The U.S. Federal Communications Commission (FCC) prohibits the use of encryption in amateur radio communications. Exceptions exist only for very narrow purposes, such as controlling remote space stations. The rationale is that encrypted transmissions can mask the content of communication, violating the amateur service's principles of openness and accountability. The FCC requires that all communications be intelligible to licensed operators who might be monitoring the transmissions.

Comparative Analysis

Both ISED and the FCC enforce strict rules against encryption to protect amateur radio's core values. However, the Canadian regulatory framework also emphasizes aligning with international standards, reflecting the country's broader regulatory approach.

In Canada

In Canada, RAC has advocated for clarity in encryption policies to ensure compliance and relevance to modern communication needs.

Similarly, discussions continue in the U.S. regarding potential updates to encryption rules for emerging technologies in amateur radio.

The International Telecommunication Union (ITU) and the International Amateur Radio Union (IARU) establish broad guidelines for amateur radio operations, including encryption usage, emphasizing transparency and non-commercial communication. Here's a breakdown of their positions:

ITU

The ITU, through its Radio Regulations, underlines that amateur radio is primarily a non-commercial service for self-training, intercommunication, and technical investigations. It specifies that all transmissions must be open to public monitoring, meaning encryption or other methods to obscure content are generally not allowed. This ensures that amateur radio aligns with its purpose of fostering open exchange and public interest. The ITU mandates global consistency in this approach through its member states, including Canada and the U.S.

IARU

The IARU, a federation representing amateur radio globally, echoes the ITU's stance. It advocates for amateur radio to remain an open service, highlighting that encrypted communications conflict with amateur radio's foundational principles. The IARU also notes that exceptions, such as encryption for security during emergency communications, must align with local regulations while maintaining adherence to international norms. This ensures that amateur operators contribute to disaster relief without undermining amateur radio's ethos.

Both organizations stress that any use of encryption in amateur radio must be approached cautiously and transparently, safeguarding its role as an open and collaborative service worldwide.

Radio Amateurs of Canada's recently published policy on Codes and Encryption in Amateur Radio. Dave Goodwin VE3KG is the RAC

Regulatory Affairs Officer, and has documented the policy as follows:

"A small number of Canadian Amateurs are experimenting with encryption. Most of this experimentation is with some of the digital voice modes. Some of these experiments are on repeaters and some are on simplex frequencies – all in the Amateur VHF and UHF bands. A few experimenters have published their keys on obscure discussion boards on the internet, and a few have approached Innovation, Science and Economic Development Canada (ISED) for guidance on using encryption.

Can Canadian Amateurs use codes or encryption?

We Amateurs use codes all the time. Morse Code is a code. RTTY uses the Baudot Code. The Q-signals we use (QRZ, QSL, QTH, etc.) are also codes. APRS uses ASCII, and ASCII is a code. The popular digital data modes of FT8 and FT4 use codes. Digital Voice modes all use some form of coding system and a few can easily be set to "encrypt".

In spite of all these codes, there are many Amateurs who will tell you that Amateurs may not use codes. Are they right? Well, like so many regulatory questions, the answer is "it depends".

Here is what the International Telecommunication Union (ITU) Radio Regulations say on the subject:

"25.2A 1A) Transmissions between amateur stations of different countries shall not be encoded for the purpose of obscuring their meaning, except for control signals exchanged between earth command stations and space stations in the amateur-satellite service. (WRC-03)"

The ITU regulations raise the question of the purpose of a coding system: this regulation clearly says we *"shall not" encode transmissions* "*for the purpose of obscuring their meaning.*" So, your intentions count. Clearly, Amateurs may not make their communications unreadable by others. How can you encrypt without making your communication unreadable? By sharing the "key."

The *Canadian Radiocommunication Regulations* are based on the ITU regulations. There is specific mention of encryption in one section: B-001-007. Those questions are listed as examples at the beginning of this article.

"47. A person who operates radio apparatus in the amateur radio service may only... (b) use a code or cipher that is not secret"

So, we can use "a code or cipher," but it can't be "secret". Therefore, we are free to innovate and develop new techniques. We may not use any form of secret coding scheme, but we can use coding schemes "published in the public domain". Morse, Baudot, ASCII – these are all codes that are widely and publicly available to anyone.

But how "public" does the code have to be, to be considered "published in the public domain"? RAC has had discussions with ISED on this question and we have come up with a solution. RAC has created a page on its website where any Canadian Amateur experimenting with encryption can publish the keys for their system. ISED has indicated that this page will meet the regulatory requirement for the keys to be "published in the public domain."

The Place for Encryption Info

RAC's and ISED's objective is to make it possible for Canadian Amateurs to experiment with these techniques while being compliant with the regulations. We want to do this by providing a single, widely- recognized place to share this information. This is the one-stop shop for information on encryption in Canada."

If you are experimenting with encryption, please fill in the form at the bottom of the encryption webpage to report the details of your experiments. The content will be reviewed by RAC volunteer Ted Reinhardt, VE3EDE. The encryption webpages (http://www.rac.ca/encryption) are available to anyone, whether they are members of RAC or not.

So, in Canada, the correct answers to the questions cited at the start of this article:

B-001-007-005

Q: You wish to develop and use a new digital encoding technique to transmit data over amateur radio spectrum. Under what conditions is this permissible?

C. When the encoding technique is published in the public domain

B-001-007-006

Q: When may an amateur station in two-way communication transmit an encoded message?

C. Only when the encoding or cipher is not Secret

B-001-007-007

Q: What are the restrictions on the use of abbreviations or procedural signals in the amateur service?

C. They may be used if the signals or codes are not secret

In Canada, if you have questions on this subject, please send an email to encryption@rac.ca.

~ John VE7TI

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City of Surrey
separ
Surrey Emergency Program Amateur Radio
https://separ.ca/

SARC
Surrey Amateur Radio Communications
http://ve7sar.net

January 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home				December SARC Directors Meeting 1900-2100		Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930 Contest: ARRL RTTY Roundup
5	6	7	8	9	10	11
Contest: ARRL RTTY Roundup	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net	SARC Meeting 1900-2100	2000 GOTA Net		Coffee: 0700 OTC Open 0930
12	13	14	15	16	17	18
	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net		2000 GOTA Net		Coffee: 0700 OTC Open 0930
19	20	21	22	23	24	25
	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net	SARC Directors Meeting 1900-2100	2000 GOTA Net		Coffee: 0700 OTC Open 0930 Course GOTA Workshop
26	27	28	29	30	31	
	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net		2000 GOTA Net		

February 2025

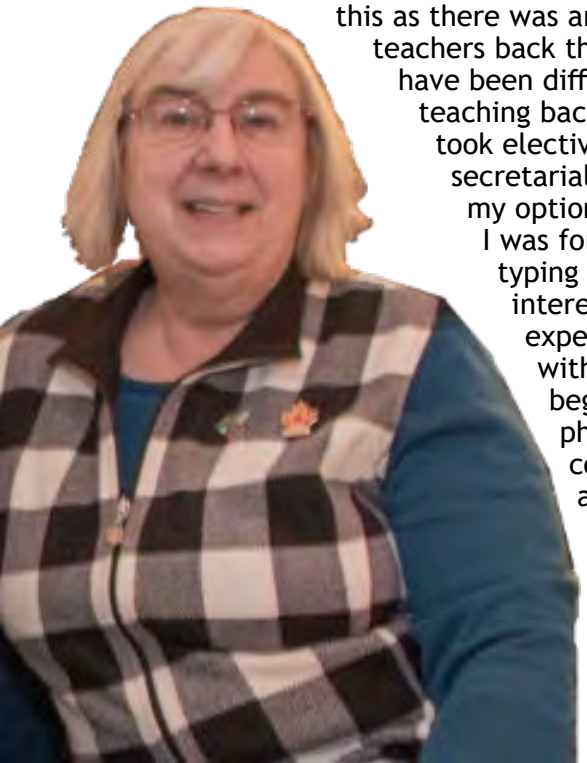
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
	Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home					Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930 Course Antenna Workshop Contest: BC QSO Party (CW, SSB)
2	3	4	5	6	7	8
Contest: BC QSO Party (CW, SSB)	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net		2000 GOTA Net		Coffee: 0700 OTC Open 0930
9	10	11	12	13	14	15
	Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net	SARC Meeting 1900-2100	2000 GOTA Net		Coffee: 0700 OTC Open 0930 Contest: ARRL Int'l DX (CW)
16	17	18	19	20	21	22
Contest: ARRL Int'l DX (CW)	BC Family Day Basic Course 19-21:00	1930 SEPAR Net 2000 SARC Net		2000 GOTA Net		Coffee: 0700 OTC Open 0930
23	24	25	26	27	28	
	Basic Course 19-21:00	Basic Course Exam 19-21:00 1930 SEPAR Net 2000 SARC Net	SARC Directors Meeting 1900-2100	2000 GOTA Net		Coffee: 0700 Basic Course Exam 09:30-Noon

Radio-Active

Profiles of SARC members

Meet Jeanne Wilson VA7QD

coordinated by LARRY BLOOM VE7LXB



I was born in Saskatoon, Saskatchewan, and lived there for the first three and a half years of my life. My family then moved to British Columbia, and I have lived here ever since. I consider B.C. my home.

I had plans to pursue a teaching career after completing my high school education, but councilors at my school were advising against this as there was an over-abundance of teachers back then and it would have been difficult to find a job teaching back then. Instead, I took elective courses with a secretarial focus to broaden my options after graduation. I was fortunate that my typing teacher gave interested students job experience opportunities with local businesses. I began answering phones in an office, copying documents, and did lots of filing.

Eventually, I accepted a job offer at CIBC which became my career path as I had decided that University was not for me. I ended up working for CIBC for almost twenty years and after that the Delta Credit Union for another thirteen.

Along the way I became involved in Emergency Support Services including an apartment fire call-out at a Reception Center. There were two apartments involved, one with a fire and the other with second-hand smoke. Both apartments were evacuated, and a Reception Center was set up at the local Senior's Center. My Emergency Support Team was deployed there to provide registration for the evacuees to arrange food, clothing, and shelter at nearby hotels. I noticed that a few of our team members were also amateur radio operators. I watched as they passed messages between different areas negating the need for a runner. This seemed highly effective as compared to the runners.

At our debrief after the event, it was pointed out that that our runners were always on the go as opposed to traffic between the team members who were amateur radio operators. Fortunately for me, the radio operators invited anyone interested in obtaining their own certification to join them at their next local meeting.

Earlier that same year, I had decided to challenge myself to learn something new and with that in mind I decided to check it out. At the door I was greeted by the club president who I knew through work. Realizing that I didn't have a call sign they set to work introducing me to the hobby. I am especially grateful to Rebecca VA7BEC who sat beside me and translated the ham-speak into English terms that I understood. This helped provide me with the confidence that I could learn the terminology and become an operator.

Thus began my ham radio journey.

After completing the eight-week course I took the exam on my birthday in 2010. Although I missed honors by only two percent, I was thrilled that I had achieved my primary goal – I was now a ham. Nevertheless, my examiner Keith, convinced me to rewrite the exam a few days later which, I'm proud to say, I passed with the requisite honors which gave me more band opportunities. I will always be in Keith's debt for convincing me to take the exam again and for having the confidence in me that I could do it. Sadly, Keith is now a SK.

I must say that my favorite thing about ham radio is contesting. I just love to work a pile up and I admit that I am competitive and always looking to better my score. Plus, it's exciting not knowing who my next contact will be! After the contest is over, I love checking to see if I have contacted any new countries or IOTAs.

The first contester I met was Dave Bauer VE7AHT. He took a few of us newly graduated amateurs to the radio room for orientation and gave us the opportunity to spin the dial. He steered us to a much-valued DXCC frequency. Which one do you ask? Well, my first log entry was Mapelo Island (HK0NA) 2012-01-28 as VA7QLT. Up until then I had only done local VHF and UHF events. Dave opened the world of HF radio, and I was hooked. I began operating the club station and learning the ropes. Dave would be the first of many Elmers who would help guide me along my HF contesting journey. As for my ham future, I am always up for new challenges. Recently, I had the opportunity to gain experience using a digital mode called FT8.

The Surrey Amateur Radio Club is my local club and extended ham family. They provide club projects, socialization at the club Saturday morning breakfast, and ham, emergency, and related electronic activities at the Operations Training Center after breakfast. And of course, the opportunity to compete in various contests throughout the year in the club radio room. Coaching assistance is always available. There is a deep sense of camaraderie. I am also a member of the Surrey Emergency Preparedness Amateur Radio (SEPAR) program.

My second and third ham families are the Comox Valley Amateur Radio Club and the Orca DX and Contesting Club. Both clubs provide friendship, Elmer advice, and assistance when needed. To all the hams that have been in my life past and present I thank you for your endless support on my ham radio journey.

In 2015 I changed my call sign to VA7QD mostly for contesting purposes. Then in 2016 I learned that a team was being assembled to travel to VIMY RIDGE in France for the 100th Centennial the following year. Although I was interested in joining them, I was concerned that my skill set wasn't adequate, but I was encouraged by one of the team leaders to give it more thought. Finally, I got up the courage to apply and received a "what took you so long, welcome to the team" message in my inbox the following morning. I was both nervous and excited and realized that this was a huge opportunity. The year leading up to VIMY, Christine VA7TU and myself spent considerable time operating at Fred Orsetti's VE7IO station in South Surrey BC. Christine and I were the 2 YL's chosen to join the team comprised of seasoned DXers and contesters. There we honed our skills under Fred and Stan's VA7NF tutelage. This would turn out to be a once in a lifetime experience.

This past September, my friend Margaret VA7VF and myself decided to cross Haida Gwaii off our bucket list. Our plan was 2YL's operating an IOTA NA-051 and some POTAs from Graham Island, Haida Gwaii. Our primary antenna was a 5-band segmented dipole made at one of John Schouten's VE7TI workshops. We operated the 20m band under poor propagation conditions but still made 5 SSB contacts and over 100 contacts on FT8. We eventually passed on POTA due to torrential rain. We enjoyed a very brief window of dry sunny weather and mostly operated from the comfort of our hotel room – running coax through the window opening while enjoying the amazing ocean view.

A few guys from the military base nearby spotted our antenna and thought it was a prank. They made inquiries as to who was responsible for setting up the antenna facing the beach. They were told it was the two ladies in room 11 who were operating radio. The next morning as I headed to breakfast, one of the men told me I had a great antenna. He even knew it was an inverted V. Turns out he had been making antennas himself at the base. One of the other gentlemen asked if we had made any contacts. "Of course," I replied, and proceeded to list our best – Russia, Serbia, Argentina, and many from the USA, Japan, and Australia. That got us a big smile and 'military approval.' I also like to think we also generated some ham radio interest in this small community.

In closing, I have other hobbies and interests as well. For instance, I have been quilting since 1998. Quilting allows me to try new patterns and color palettes. My favorite quilting projects are baby and lap quilts. Most of what I make is donated to various charities. I did make a few quilts that I've given to friends and relatives.

What's next on the radar? Another island, perhaps. That was a lot of fun!

73

~ Jeanne VA7QD

Steve VE7SXM in process of cable reorganization and conversion to 100% 12v battery power, including addition of inverter and transfer switch.

SARC news...

OTC 12v power project - success

As many are aware, over the past couple years SARC has migrated most of the OTC Radio Room to 12v DC powered by a pair of 75AH LiFePO4 batteries. Currently, only the rotator controller and computer monitors use 120 VAC, and the HF amplifier uses 208 VAC. The conversion paid off big time! As the recent ARRL 10m contest was in progress Saturday morning, the power went out and continued out for most of the day. We were able to move the needed 120 VAC equipment (monitors and rotator controller) over to a power inverter and continue to operate at 100 w without the amplifier. Many contacts were made while on battery power; without it we would have had to shut down and miss a large part of the contest. This was a good live exercise for future emergencies. In coming days, the conversion to 12VDC will be completed.

~

New SARC Winlink gateway available

Thanks to the efforts of Horace VA7HXB, SARC now has a Winlink gateway at Surrey Firehall One. Callsign is VE7HME-10 and the frequency is 145.710 MHz

Wanted by a member

Monty VA7MMW is looking for a female connector like the one shown for his Yaesu FT-101B. It is a CINCH JONES S-312-CCT POWER SOCKET 12PIN. If you can help Monty please contact him at mam@mail.ubc.ca.

10 GHz Beacon now Fully Operational

After making repairs and adding a 150 mW amplifier, Dino VE7NX and Scott VA7SC have now returned the 10 GHz beacon to full operation from the North repeater site at Concord Tower in Surrey. Reports are that VE7SAR/B CN89NE is being heard all over the Lower Mainland on 10,368.225 MHz, even at locations without line-of-sight to the source - presumably by reflections from the mountains and structures. Two other SARC members are now constructing 10 GHz TX/RX devices of their own. In the New Year, Dino will be showing us how to monitor the beacon using simple equipment.

On Dec. 18th, a three-way 10 GHz contact was made between Scott VA7SC in Langley, Dino VE7NX on Concord tower in Surrey and Kirk VA7RKM in Victoria by bouncing signals off Mount Baker in Washington.

~

The Contest Contender

CQ WW DX Contest [CW]

At 2366, perhaps our highest number of Qs for any contest

by JOHN BRODIE VA7XB

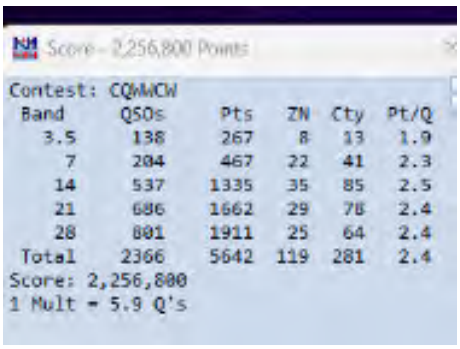
JOHN BRODIE VA7XB reporting on SARC's contesting efforts.

The CQ WW DX Contest for CW on Nov. 23-24 will go down as one of our most successful contests with 2366 contacts and claimed score of 2,256,800 by our 4-man team of: Slawa VE7LWW, Les VA7OM, Jan VA7VJ and John VA7XB. Exactly 100 countries worked. We have peak sunspots to thank for this great experience.

Most of the excitement was on 15m and 10m, the latter being the hot band even into the early evening. In the log we have: Mauritius, Rodriguez island, St. Helena, Saudi Arabia, Nepal, Kazahkstan. Strong signals were also copied from India, a rare experience, but we couldn't break the pileup to work 'em. Snagged Nepal however, which is close!

Only one disappointment… nothing from deep Africa.

~ John VA7XB

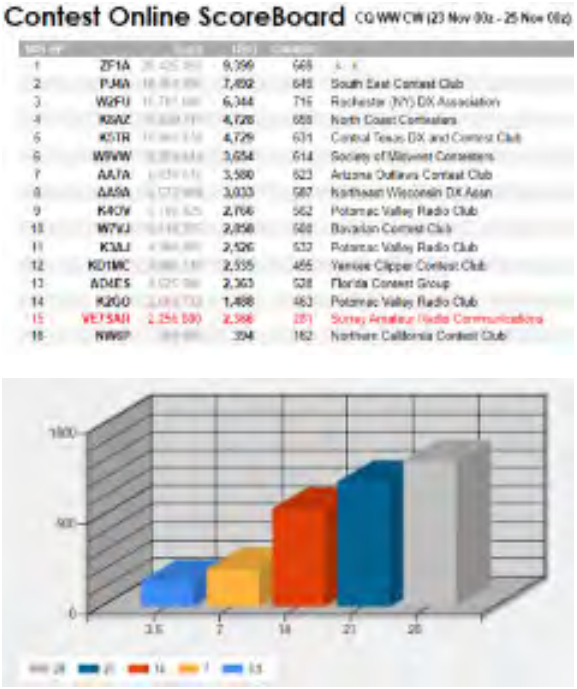


Score: 2,256,800 Points

Contest: CQWWCW

Band	QSOs	Pts	ZN	Cty	Pt/Q
3.5	138	267	8	13	1.9
7	204	467	22	41	2.3
14	537	1335	35	85	2.5
21	686	1662	29	78	2.4
28	801	1911	25	64	2.4
Total	2366	5642	119	281	2.4

Score: 2,256,800
1 Mult = 5.9 Q's



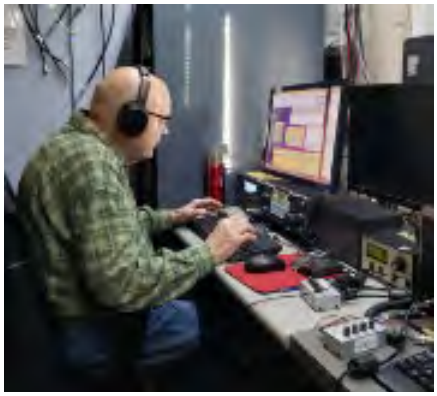
Hello to SARC alumnus Michael Birtles VE7GMP and new wife Julie. Michael is now living in Calgary.

ARRL 10m Contest

by JOHN BRODIE VA7XB

The omens were not quite so favourable compared with previous weeks, as reported by Tad Cook K7RA's Propagation Forecast Bulletin on Dec. 13th:

"The high solar activity in October this year suggests that this may have been the peak of an 11-year cycle. This is not to say that solar activity will not continue to rise. On the contrary, it may well be that the first maximum of the cycle took place in October and that we can look forward to a second maximum. This could take place in 2025 or 2026 at the latest, but it will be followed by a decline. Solar activity in November was lower and December's is even lower."



This was the first time we have challenged the 10m DX contest as a team, so were unsure what to expect. As we all know, 10m is essentially a daytime band which limits activity in the winter months when daylight hours in the northern latitudes are short.

During the less than 12 hours that the 10 metre band is open to us in North America, most of Europe is in darkness, with the predictable result that only occasionally did we work Europeans. Then towards sunset, the disadvantage is reversed as the Pacific and eastern Asia come into daylight. Predictably, most of the action for us was within North America, the Caribbean and South America.

Strong winds came up on Saturday resulting in a power failure in the late morning. Although we are equipped to operate without commercial power, it brought home that further work is needed. First thing was to turn off all unessential equipment including 12v

lighting, the antenna rotator, the second monitor and most importantly the 1 kw amplifier. Now we were running 100% on battery plus inverter but without the amp, network and Internet (no spots). The advantage was that our background noise level dropped. It is normally S3 to S5, but noise all but disappeared during the outage.

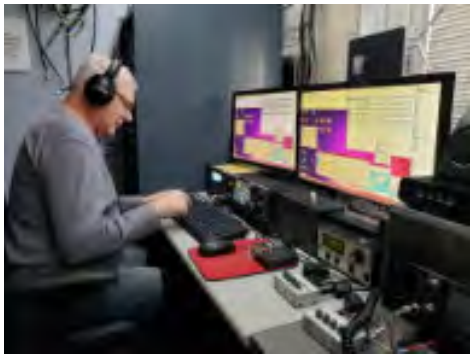
Operation continued at 100w for several hours until mains power was restored that evening, by which time 10m had shut down. After 8 hr of running on battery, we still had lots of capacity remaining. Next step in the coming weeks will be to fully commit to inverter plus battery, including transfer switch, for those remaining devices which require 110v or 220v (monitors, rotator, network switch).

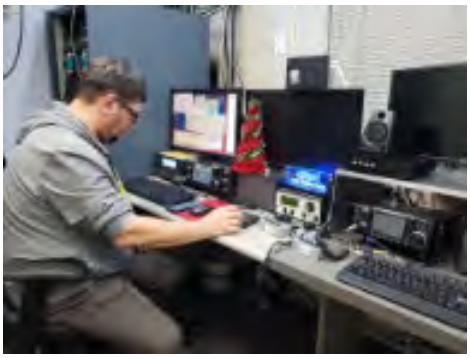
Further challenges: when restarted at 0630 hr on Sunday morning after the power was restored overnight, the PC and display at first malfunctioned and we lost the first couple hours of the day while getting things running smoothly. Later we experienced occasional alarms and auto power downs for the 1 kw amp when operating SSB, a problem which has yet to be diagnosed.

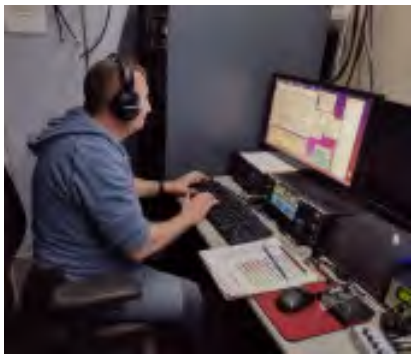
A big thanks to our team of Dmitry, Les, Jan, Kapila, Slawa, Mike, Steve, John TI and John XB. 1449 contacts for a claimed score of 730,392. Not a bad showing, all things considered.

Next challenge is the RAC Winter Contest on December 28th. For this we operate as VE7RAC with two radios, each with their own amplifier.

~ John VA7XB

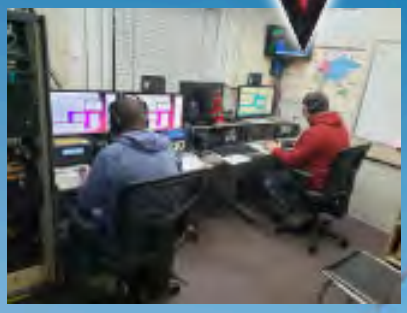


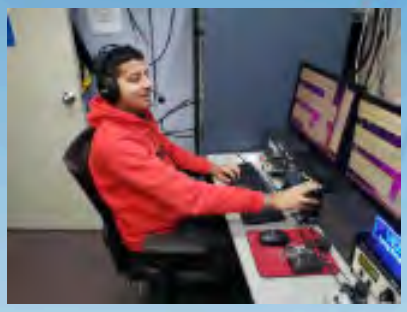


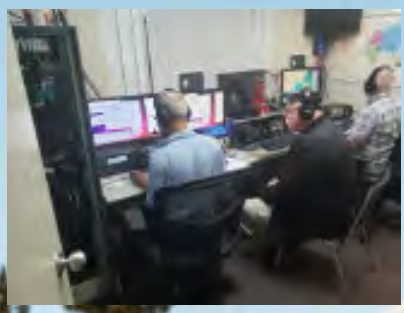


RAC WINTER CONTEST

by JOHN BRODIE VA7XB







Using the same setup as last year – two IC-7610s and two 1-kw amps – we hoped to beat our previous score of 1553 contacts and 521,780 points. In fact, we did partially accomplish that goal, with 1588 contacts, but with a slightly lower score of 509,220 points.

Seven SSB operators and 6 CW operators stepped up to participate as the official RAC station from BC, using callsign VE7RAC. Winter conditions precluded deploying Bigfoot tower or raising the wire antenna, so we anticipated less than ideal performance on the lower bands. As anticipated, some mutual interference was experienced between stations despite the use of bandpass filters and triplexer/diplexers, and during the evening hours it became necessary to power down on both stations while on 80m and 40m. However, daytime activity was brisk until the closing hours on Saturday when it died off.

Thanks to our team of: Dmitry VA7DVO, Scott VE7KAT, Manvir VA7BKI, Kapila VE7KGK, Doug VA7JDJ, Larry VE7LXG, John VE7TI all on SSB, and; Slawa VE7LWW, Jan VA7VJ, Les VA7OM, Fred VE7IO, Dino VE7NX and John VA7XB on CW. Unfortunately, Steve VE7SXM was missing in action due to illness.

The RAC Winter Contest is not supposed to be a DX contest, but on Saturday morning with the beam pointed NE we were successful in confirming numerous Qs with Europeans. The most interesting contact of all was on 15m SSB (by Doug VA7JDF) – ZS5AFJ in Durban, South Africa *[see photo next page]*. 20m and 15m were the most productive bands, as usual.

~

RAC Winter Contest - continued

Band	3.5	7	14	21	28	Tot	Accum
3.5	61	0	0	0	0	61	61
7	0	127	0	0	0	127	188
14	0	0	503	0	0	503	691
21	0	0	0	552	0	552	1243
28	0	0	0	0	345	345	1588
Total	61	127	503	552	345	1588	1588

Spider Beam of ZS5AFJ

SARC news...

The SARC Vancouver Island chapter met on December 17th in Courtenay. From L>R John MacFarlane, Derek Hutchinson and Kevin McQuiggin. Kevin asked ChatGPT for its version which produced the images above.

Brian VE7JYD, a past SARC CW Course student let us know recently that he has exceeded 3,000 CW contacts. He also reports that his speed and confidence continue to grow.

Another CW class student, Dmitry VA7DVO sent in the following: “Today I have done my first CW POTA activation. I made 15 QSO before my brain fried. I was in the Mud Bay, activating my favourite park (CA-3245, Boundary Bay Wildlife Management Area).

I'm still testing my car setup, and the HF antenna on the roof did not work too well. I had to install an antenna outside, but it still should work as my rainy day setup. I was running 60W on 20 meters using a tiny telescopic antenna but still managed to get coast-to-coast to Maryland. I had to send a lot of question marks, but the people were patient with me. CW is still hard on my brain, and I'm drained right now, but very excited.”

November 2024

SARC General Meeting minutes

November 13, 2024

Recording Secretary MIKE PORISKY VA7YEG

SARC General Meeting Minutes 24.11.13

Attendance: 21 present + 1 by Zoom

Start Time: 7:02pm

Location: Surrey Fire Training Centre, 14923 64th Ave, Surrey

Welcome & Presentation of Agenda - Steve M.

Guest presentation

Steve introduced **Rick Richardson VE7WF/VE7SKY** whose talk was *"Amateur Radio in Space – An Introduction to Amateur Radio Satellites and Beyond"*. Topics included an overview of AMSAT – a US organization that started 50 years ago in partnership with 26 other organizations.

The history of Satellites was covered from the Oscar 1 beacon to Cube Sats (4" x 4") used today. Rick reviewed the types of Satellites, typical power output, satellite orbits. The N2YO web site can be used to track all amateur radio satellites. Also, the site 'https://amsat.org/fm-satellite-frequency-summary' lists the relevant frequencies. Amsat.ca is expected to come online soon.

The equipment needed and the process used to communicate with different satellites was covered in detail along with plenty of images to better understand the hobby.

Many universities are given the opportunity to design cube sats and see their projects launched. There are now educational specialties for interested students.

Break: There was an extended Break caused by building power failure at 19:45. We continued without power at 20:05

Business Meeting

Steve M. called the general meeting to order at 19:59. The agenda and other overhead slides were not available due to the lack of building power.

1. Announcements

- SARC had 3 tables at the Burnaby swap meet and was able to sell over $1100 of surplus items.
- The December meeting will be replaced with our Christmas social taking place at 11:30 on Saturday, December 7.

- Fred VE7MPI is moving into a smaller condo and still has some equipment for sale.
- Adam Drake is still looking for donations of handheld radios that he can give to his summer school graduates. If you have one that sees little use, it can be left with Reg N. who will collect and turn over to Adam.
- Darryl VA7CQD is promoting Christmas donations for the Surrey Food Bank. If you wish to donate, please send an e-transfer to payments@ve7sar.net, identify it as Food Bank, and SARC will coordinate with Darryl.

2. Committee Reports

A. Financial Report – given by Steve M. in absence of Scott.

B. Nets – Reg N

- All nets are operating well.
- The recent wind storm has taken out VE7RNV and VE7RVF. There is no fix scheduled at this time. VECTOR is using VE7TEL.

C. SEPAR/OTC – Gord K

- Steve and Gord met with the S&R group to discuss the building. We are still waiting for information about the new office space. Discussions involved cleaning and general maintenance. The large filing cabinet located outside of the radio room was given to SARC and is now being used to store tools, etc.
- As the result of the cross-border committee meeting, an Emergency interoperability report will be released in a week. It was suggested that we assign a representative who can check into their net to confirm cross-border communications.
- Steve is in discussions with the vendor regarding the repair of the Hi-Q antenna. The board will determine the next step – whether to proceed with shipping the Antenna out for repair.
- Roof cleaning is still required for a few more weeks.

D. Membership – John B. (absent) 138 members.

E. Contests – John B. (absent)

- Summer field day results are in. For our 2F category SARC placed #1 in Canada and #3 overall. Congratulations to all who participated.
- Upcoming contests will be announced as the dates get closer.
- Repeaters – Steve M: All repeaters are operating normally.

F. HAM Classes - John S.

- One teaching class to go in the current course. This will be followed by a review session and then exams. The next course will start during the first week in January.

3. New Business

- Art reported problems in communicating with the 70 cm repeater.
- Gord is watching for new towers where we would be able to relocate our repeaters.
- Jeremy asked whether there would be any benefit if we were to start logging our connection problems so that the issue can be brought to the city's attention.
- Gord is in communication with TELUS about obtaining any decommissioned antennas.
- Reg N. suggested that SARC install a second UHF repeater with possible connections for AllStar and/or Yaesu Fusion. To be discussed later.

4. Adjournment

- Reg N. moved to adjourn the meeting. Seconded by Stan. - Carried.

Meeting adjourned at 20:41 hours.

~ Minutes prepared by Mike Porisky VA7YEG

SARC Christmas Gathering

An estimated 50 members and family members attended the annual Christmas social and pot-luck on Dec. 7th – our biggest and best yet. A large variety of hot and cold food items were brought and shared by members. As a bonus, members were invited to take away free surplus items from inventory that had not sold at past swap meets; this proved to be popular, and most was gone by the end of the event.

Food Bank donations from SARC members totaled $250, thanks to the initiative organized by Darryl VA7CQD.

Reprint Policies

This is a bi-monthly journal about amateur radio, and other relevant topics, published by Surrey Amateur Radio Communications (SARC) .Reprints are often requested, and these are our policies for re-publication of articles from The Communicator,

You may use articles authored by SARC members for your club newsletter or other amateur radio publication, provided that the purpose is non-commercial, you credit the author, and provide a link as follows: https://ve7sar.blogspot.com/search/label/SARC%20Communicator. If our article indicates it is from a source outside of SARC, we cannot transfer that right, and you must seek permission to re-publish from the original source. We appreciate being notified via email to communicator@ve7sar.net if one of our original articles has been re-printed elsewhere.

We welcome your comments and feedback

Please consider leaving a comment via email to communicator@ve7sar.net, or on our blog site https://ve7sar.blogspot.ca or, better yet, contact our authors directly, so they know someone is out there reading their work in our publication.

Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.

SEPAR Report

SEPAR in 2024

by GORD KIRK VA7GK

Over this last year SEPAR has continued to remain active in many areas. The line between SARC and SEPAR (the club vs emergency program) is quite blurry.

Activities have included, in no particular order:

- Field Day (setting up the portable towers and SEPAR trailer etc.)
- radio communications for the race Run Surrey Run,
- supporting a Surrey School initiative for high school students,
- weekly nets (several from the recently cleaned up and reorganized Fire Hall 1 radio room, with some new net control operators
- monthly tests of the commercial Inter-municipal Emergency Radio System,
- meeting the Cross Border Agencies in Washington State in person to restart the Cross Border Working Group,
- attending many Swap Meets and talking about the emergency program,
- attending the annual radio direction finding "Fox Hunt"
- maintaining and enhancing capabilities at the Operations and Training Center (OTC).
- participating in the annual Great Shake Out event (this year with some high schools now involved)
- holding antenna building workshops,
- supporting our team of instructors with licensing classes and GOTA workshops
- setting up a satellite station at the OTC radio room
- POTA events and training
- Winlink training sessions

Gord Kirk VA7GK is a SARC Director and the City of Surrey SEPAR Coordinator

- several fabulous presentations on various amateur radio interest topics (satellite and balloon launches etc.)
- having an online advanced amateur training group begin with club members,
- public displays at two emergency preparedness fairs
- And, our weekly breakfast and OTC drop ins.

The above list is by no means exhaustive and I have likely missed several activities.

With each activity whether it is a club event or an emergency program event we end up with active amateur operators who have more experience or have grown in their ability to use their radios. To see younger people coming and become active is exciting. I am thinking of the movie Field of Dreams "If you build it they will come". By taking the time to have an active slate of events, participation is growing in our community. We see new amateurs asking about volunteering in SEPAR program. In all cases we have a community that is using their radios and becoming more proficient radio operators.

It has been about friendships and supporting each other with antenna projects and over the air radio testing.

Our hobby has so many exciting facets there is always something new to learn.

All of these events lead to a better prepared community. With the amateurs knowing how to use their equipment and what to expect in a disaster situation we are all better off. In fact, we were laughing that the most recent presentation on “Setting up Winlink” was cut short because the power went out. The funny part was this was already a rescheduled presentation because the power went out at the one before as well. The next presentation we will bring the generator…

As we were traveling home from the OTC with the widespread power outage people were on their radios informing others which areas had outages, where trees were blocking roads etc. A real-life example of how radio can be used to provide valuable information in this situation. Radio allows one-to-many communication, so those listening could get a picture of what was happening and help others coming onto the repeater later in the day.

We look forward to new activities and adventures in 2025 and as the Volunteer Emergency Coordinator I am grateful for the team surrounding this program to make it a success.

Please continue to be involved, every small contribution adds to the collective progress and helps build the team. Participate when and where you can, try something new this coming year. Most of all turn on that radio and use it, from home, in your car, in a park, it is an adventure that can take place wherever you are…

As always if you want more information on the SEPAR or SARC program please reach out.

~ Gord VA7GK
SEPAR Coordinator

The Purpose

My goal is to create a list of useful frequencies in the Vancouver area. This is by no means a comprehensive list. On the contrary, it has been carefully vetted to exclude any repeaters and frequencies that are not in service or are not in common use. Many of the Vancouver-area repeaters listed on sites like Repeaterbook are useless, either because they're not functional or because nobody uses them. I'm trying to avoid that with this list. There are a few quiet repeaters on the list but only if they serve a strategic purpose, such as covering an area that other, busier repeaters don't cover as well, or operating in a band that isn't otherwise represented.

The Structure

The basic structure of the Vancouver Area Frequency List is simple. There's a tab called Complete List which lists all the frequencies, and then there are a bunch of other radio-service tabs that break the list down into individual radio services. The basic idea is that the Complete List will be used by those who might want to program their radio (either in whole or in part) using one of our downloads (CHiRP, RT Systems, etc), and the other radio service tabs will be used by people who simply want to refer to the list for information, possibly using some of that information to program their radios their own way. The other radio service tabs get their information from the Complete List. There are no frequencies on the other radio-service tabs that aren't listed in the Complete List.

The Downloads Tab

The Downloads tab is where you will find the files needed to program your radio/scanner, and a PDF if you'd like to keep a copy of the list offline (or even, God forbid, print it).

There are three CHiRP files and three RT Systems files, each of the three having a different channel-name length. Many radios, even good ones, only have 6-character alpha tags, and some have 12-character tags. I'm trying to accommodate those.

The CHiRP files *do not* accommodate memory banks because my experience has been that the memory-bank feature in CHiRP doesn't work reliably. The RT Systems files *do* accommodate memory banks and they'll also work if you can't or don't want to use that feature.

Please, follow the instructions. Things rarely go well with tech if you ignore instructions.

The generic file is there if you are using oddball software, or writing your own import. Obviously, you'll need to map my fields to yours.

The Emergency Channels

Generally speaking, I hate duplication of data, but I've done that for the emergency channels. They're not actually duplicated at the data level (I just linked them) but they appear twice in the list. I've done this for two reasons:

- Many radios have just 100 or so memory slots so they will never be able to scan the emergency channels further down in the Complete List.
- Even those whose radios have a thousand or more memory slots can benefit from knowing that memories 90-100 are emergency channels from various services. You can just type 90 into your radio and cycle through them. They're also on the scan list.

Provincial Emergency Plan for Amateur Radio

Many of the notes on the amateur frequencies refer to the Provincial Emergency Plan for Amateur Radio, an effort taken in the 2000s by the Provincial Emergency Radio Communications Service to coordinate spectrum usage in emergencies. Thanks to John Schouten VE7TI for his help providing that information.

~ Reg VA7ZEB

ARRL Asks Hams to Send Radiograms via the Web

In a recent issue of the National Traffic System (NTS) Letter, the ARRL encouraged amateur radio operators to utilize the Radiogram portal on the web to submit free messages to friends and family.

While plenty of NTS volunteers are standing by ready to relay Radiograms, there's a need from hams to send messages:

We have had approximately 70 applicants authorized to become “radiogrammers” and we are very grateful for their offers of help, but they would really benefit from more messages to generate and relay.

The link takes you to a webpage where you enter the particulars for sender and recipient, select a message and operators in the NTS will send it on to the recipient. Sending Radiograms helps volunteers hone their skills in preparation for emergencies.

What happens next?

A volunteer, FCC-licensed Amateur Radio operator will pick up your message from this web site and then send it, by Amateur Radio, over the air to other volunteers in the National Traffic System. The message will be received by a "ham" who lives in or near your recipient's city. Then, the message will be delivered in person or by telephone.

For more information about The National Traffic System and traffic handling visit: https://nts2.arrl.org/training/

~ ARRL

A typical received message reads as follows:

NNNN R HXG CALLSIGN ARL 7

SURREY BC 2132Z DEC 24

PIERRE LEROUX

1407 SHAWN STREET

TORONTO ON K4D 2L1

613 6165 5555

PIERREL ATSIGN GMAIL DOT COM

BT

ARL FIFTY EIGHT X

ALL THE BEST

BT

JOHN SCHOUTEN

HAM LEFTOVERS...

2.3Km at 45microWatts on 6m

While some people do talk using microphones or Morse code keys, there are a lot of digital modes now. Some, like RTTY or PSK31, can support conversations, but the more popular ones, like FT-8, are very stripped down. Your computer exchanges basic information with the other station's computer, and that's it. The LongChat program is very new, and sadly it is only for Windows so far.Check it out at https://youtu.be/ixmKc-gDQT0

Britain's raiding dreadnought of the aether

The transmitter that disrupted the German war machine.

Among the best-kept secrets in Great Britain during World War II was a 600 kW medium-wave transmitter which was code named "Aspidistra." The transmitter would disrupt the German war machine through misdirection and fake news. Read the entire article here.

Morse code: Ready to transmit

At the world Morse Code championships in Tunisia, competitors must battle to be the fastest and most accurate at sending and receiving Morse code. A BBC documentary podcast https://www.bbc.co.uk/programmes/p0k8y9kq

John White VA7JW (NSARC presentation) on space weather

Well, there is no weather in space quite like that on Earth It has been an extraordinary year in propagation and its not over yet. As Hams, what we need to know is how space weather affects HF activities. So in two parts, here is space weather explained. Part 1: https://youtu.be/J7GbmhJJnWE?si=GftOKoInfeDbdPLh, and Part 2: https://youtu.be/m4KMpj3IMa8?si=BTrscxTuvO7Vozs3

How to build a six-band vertical antenna for under $40.00

Jack W3CT wanted to see if a "common person" (in his words) could build an effective vertical ham radio antenna. If you look at the video below, the answer is apparently yes.

He started with a 24-foot fishing rod and a roll of 22 gauge wire. The height of the antenna wire is just over 20 feet long and he has several ground radials, as you might expect for a vertical antenna.Vertical antennas have pluses and minuses. One advantage is they have a low angle of radiation, which is good for long distance communication. It is possible to make arrays of vertical antennas, and we are surprised we haven't seen any of those lately. The YouTube video is at: https://youtu.be/4AuFceHBcFU

Blog vs PDF?

Feedback from our readers and a reminder about The Internet Archive

by JOHN SCHOUTEN VE7TI

Last issue I asked for feedback on an opinion piece written by Cale Mooth K4HCK.

That article promoted blog content rather than the PDF format used by The Communicator, suggesting that topics were difficult to search for in a PDF.

Well, we got feedback and it was overwhelmingly in favour of keeping our current format. To those who responded, thank you. Here is one reply from a group of 35 readers from The Netherlands:

"It was with great pleasure that we learned of the existence of your magazine through a referral from the author Sander van der Haar of the article about his remembrance activities in Normandy, France, and Groesbeek, the Netherlands. We have continued to make the magazine known digitally to amateurs in Whatsapp groups involved in similar and ARES activities.

Your magazine is full of stories, but what makes these articles interesting is that this digital form of distribution makes it possible to include Internet references in the text. This makes the magazine informative, with the pleasurable addition of endless, but self-determined, Internet surfing fun on related topics.

I asked the members of my Whatsapp group if I could tell you on their behalf that, as far as we are concerned, the magazine can continue to exist in its current format. The response was positive, even though we were all experiencing the magazine for the first time.

Of course, a magazine like this can only survive if there is enough content. And fortunately, I have noticed that more international content is being provided. As long as this is the case, and as long as someone takes the time to publish it in this form, we (see undersigned) support this great initiative.

Yours faithfully,

Erwin van der Haar, PA3EFR"

That is certainly encouraging comment. We have considered what steps might be taken to make The Communicator accessible to a wider readership, and one of these steps has been to publish a complete table of contents for each issue, as part of our new issue notifications. This should show up on search engines and meet the missing element identified by Cale.

As always, we recommend The Internet Archive for content searches, not only for our publication but for many other current and historical journals and magazines. The precise search capability at the Archive has served me

well as Communicator Editor when I've need to research a past article, not knowing in which issue it was published.

The Digital Library of Amateur Radio & Communications: A treasure trove for enthusiasts

A shout-out to other clubs and groups that have a catalog of their newsletters or other historical printed and audio-visual material, whether in English or other languages:

The Digital Library of Amateur Radio & Communications (DLARC) has rapidly become a significant resource for amateur radio enthusiasts and historians alike. Launched by the Internet Archive, the collection includes a diverse array of materials such as ham radio newsletters, podcasts, videos, books, and catalogs.

A Growing Collection

Kay Savetz K6KJN, is program manager, special collections at Internet Archive. The DLARC's collection is impressively diverse, featuring historical and modern newsletters from not only SARC, but various amateur radio groups worldwide, including historical correspondence, newspaper clippings, ham festival flyers, and newsletters.

Kay provided a fascinating presentation about the collection for our general meeting in January 2023. You can view this presentation at: https://youtu.be/7IyWiO7v-Fc?si=UECTyfszN8-CR_we

Accessible and Comprehensive

One of the standout features of the DLARC is its accessibility. More than 300 radio-related books are available through controlled digital lending, allowing anyone with a free Internet Archive account to check out materials for a period ranging from one hour to two weeks. This makes it an invaluable resource for researchers, students, and the general public interested in the history and practice of amateur radio.

Digital and Multimedia Content

The DLARC also hosts a variety of digital and multimedia content. This includes amateur radio podcasts and video channels such as Ham Nation, Foundations of Amateur Radio, and the ICQ Amateur/Ham Radio Podcast. The library also serves as a mirror and archive for "born digital" content, ensuring that valuable digital resources are preserved for future generations.

Conferences and Catalogs

In addition to newsletters and multimedia content, the DLARC includes presentations recorded at radio communications conferences like the GNU Radio Conference (GRCon) and the QSO Today Virtual Ham Expo. The library also boasts a growing reference collection of past radio product catalogs, including those from Ham Radio Outlet and C. Crane.

A Community Effort

The DLARC is funded by a significant grant from Amateur Radio Digital Communications (ARDC), which aims to document, preserve, and provide open access to the history of amateur radio and early digital communications. The project welcomes contributions from the community, encouraging individuals to donate materials that can help expand this invaluable resource.

The Digital Library of Amateur Radio & Communications is a remarkable initiative that not only preserves the rich history of amateur radio but also makes it accessible to a global audience. Whether you're a seasoned ham radio operator or a curious newcomer, the DLARC offers a wealth of information and resources to explore.

I'm QRT for this issue.

~ John VE7TI

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2024-2025

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A look back...

At The Communicator—January 2015

Past Communicators are available at:
Past Communicator Issues

or search the complete Communicator contents & index at:
SARCindex

January & February

The holiday season is over and its time to get back to business.

Our January meeting will be either in-person at the Fire Training Centre or via Zoom if the weather is inclement. Our February meeting will also be either in-person at the Fire Training Centre or via Zoom, weather dependent.

We hope to see you there.

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228. On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

We have a 'Get On The Air' net directed at new hams on Thursday evenings at 8pm, on our 2m repeaters: North: 147.360MHz+ Tone=110.9Hz and South: 147.360MHz+ Tone=103.5Hz. Our SARC Elmers will be on hand to answer your questions.

Every Thursday evening at 8 pm is SARC's net for newly certified hams, although more experienced hams are also encouraged to attend. This net operates on the same frequencies shown above for the Tuesday nets. Participants will help you with your new-ham questions and assist you in getting comfortable using your radio. Check in with your GOTA net hosts.

Join the 220 MHz net taking place at 7:30 pm on the last Sunday of every month on VE7RSC repeater 223.960 MHz -1.6MHz tone 110.9 Hz, with net control, Shawn VE7BD. This is not a "chat" net – just check in, exchange signal reports, and get on with your evening.

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the Surrey Fire Service Training Centre, 14923 - 64 Avenue, Surrey, BC. Here is a what3words link and map: https://what3words.com/markers.addiction.ozone

Weekly SARC Social

Saturday between 0730 and 0930 hrs at the Denny's Restaurant, 6850 King George Blvd., Surrey BC

Workshops

Saturday between 1000 and Noon at the OTC 5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local on 147.360 MHz (+) Tone=110.9

SARC Net

Tuesday at 2000 hrs local on 147.360 MHz (+) Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228

2m South: 147.360MHz+
Tone=103.5Hz Fusion capable;
No IRLP/EchoLink

1.2m: 223.960 Mhz -1.6
Tone=110.9Hz

70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737
WiRES-X Room ID 00047

We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for the club.

The price is $4 each or three for $10 and they