Sidebands

W2EGB

# A Quick History of How We Got to Here

From Smoke Signals to VOIP

Telecommunications -- including Amateur Radio -- has come a long, long, long way since people first began figuring out ways to connect with each other thousands of years ago. The history of telecommunication illustrates this never-ending push for progress, becoming more widespread and efficient as the development of modern civilization has unfolded. And, as we all know, innovative new ways seem to come along every day.

ShoreTel, an IP communications service provider, has put together an interesting timeline of how it began and how it got to where it is today. We thought it would be interesting to offer the highlights in this month's newsletter -- but there are more details available at ShoreTel's website and at this link: **https://www.shoretel.com/history-telecommunication.**

- **Prehistoric Era - Fires, beacons, smoke signals, drums, horns:** Man's first attempts at distance communication were extremely limited. Prehistoric man relied on fire and smoke signals as well as drum messages to encode information over a limited geographic area as they attempted to contact neighboring clans.

The Chief hates that we went binary...
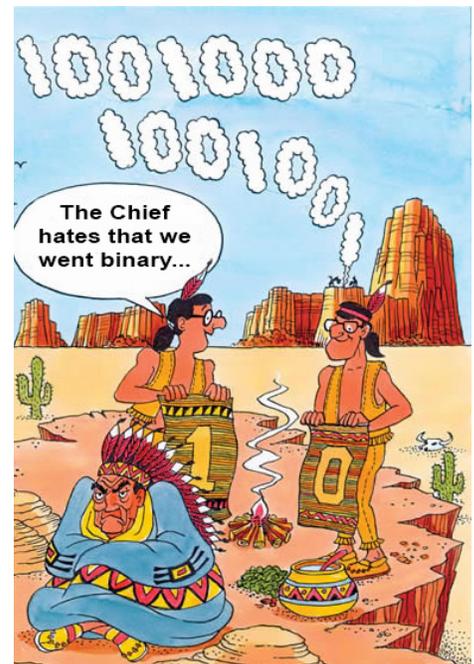
These signals also needed to have very simple, pre-decided meanings like "safe" or "danger" or "victory" or could be used as a form of alarm system in order to alert prehistoric clans to predators or invading clans.

- **6th century BC - Mail:** Cyrus the Great was a Persian emperor at the height of Persia's power in the 6th century BC. The empire was so vast that Cyrus couldn't easily communicate from one end to the other: He is credited as having established the first postal system in the history of the world. Other ancient powers like Egypt, Rome, and China eventually built their own postal systems later on.

Dues Are Due
It's that time of year again and EGARA is looking for your membership support! See page 5 for details.

Telecommunications - From There to Here: 5th Century BC to 1858

- **5th century BC - Pigeon post:** Persia and Syria are credited with establishing the first pigeon messaging system around the 5th century BC due to the discovery that pigeons have an uncanny ability to find their way back to their nests regardless of the distance. Travelers would bring doves and pigeons along with them, attach messages to them and release them to fly back home. Later on, pigeons would be used by Romans to report the outcomes of sporting events and by Egyptians for military communications.

- **4th century BC - Hydraulic semaphore:** In the 4th century BC, the hydraulic semaphore was designed in ancient Greece as a method of communication, and it was vital during the first Punic War. Very much like early smoke signals or beacons, it involved a network of identical containers on separate hills, each with a vertical rod floated in it. These rods would have predetermined codes inscribed at various intervals. Someone who wished to communicate would signal another with a torch; they would synchronize and then simultaneously open their spigots and drain the water until it was at the desired code. This system also had the same limitations as smoke signals - the messages had to be pre-determined prior to sending them.

- **Circa 490 BC - Heliographs (shield signals):** The heliograph or shield signal was first documented during the famous Greek battle of Marathon that took place in 490 BC. A heliograph involves the shining of the sun on a polished object like a shield or mirror. Interestingly enough, in this instance, the signal given was not really understood, since its meaning had not been clearly agreed upon prior to it being used.

- **15th century CE - Maritime flag semaphore:** The ability to communicate between ships was very difficult before the 15th century. At that time, flag semaphore, a special code involving the positions of two hand-held flags, was introduced. Each position and motion represented a letter or number. This made it very easy for fleets to communicate.

- **1672 - First experimental acoustic (mechanical) telephone:** Robert Hooke is first credited with creating an acoustic telephone in 1672. Hooke discovered that sound could be transmitted over wire or string into an attached earpiece or mouthpiece. At the time, it's not clear that he was aware of the implications of this discovery, as his notes point toward his desire to use this device to make music.

Hooke's acoustic phone
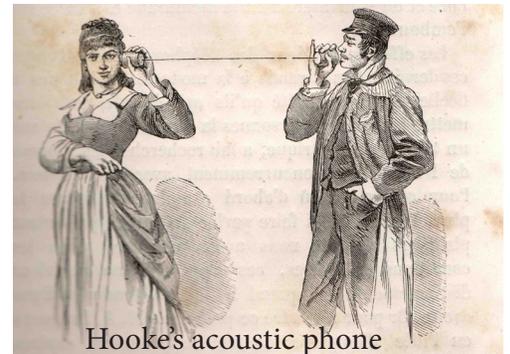
- **1790 - Semaphore lines (optical telegraphs):** Using the maritime flag semaphore as a starting point, the Chappe brothers, two French inventors, created the first optical telegraph system in 1790. The optical telegraph was a system of pendulums set up somewhere high like on a tower or the top of a town clock. The telegraph would swing its mechanical arms around and sign messages from one tower to the next. It was the first telecommunications system in Europe.

- **1838 - Electrical telegraph:** Samuel B. Morse had been working on the idea of a recording telegraph with friends Alfred Vail and Leonard Gale. They discovered that when connecting two model telegraphs together and running electricity through a wire, you could send messages by holding or releasing the buttons in a series of intervals. This became known as Morse code and lay the foundation for modern land-line phones.

- **1858 - First trans-Atlantic telegraph cable:** At this point, most of Britain and the United States had telegraph stations and were able to regularly communicate within their own countries, but a man named Cyrus Field from New York wanted to lay the first transatlantic telephone cable to connect England and the United States by telegraph. This project, though it was met with many setbacks, was finally completed in August of 1858.

Need an Antenna? Build Your Own!

January meetings are traditionally EGARA's antenna building night and this year was no exception.

This time the featured antenna was the 2 meter coaxial monopole roll-up antenna for use with a hand-held radio. This versatile antenna is inexpensive and easily built in just a few minutes -- especially helpful if you need an emergency antenna for your rig. Best of all, it will outperform the "rubber ducky" that comes with most hand-helds. It's also an antenna that can be stowed in one's Go-Kit and easily set up.

At the meeting, 14 members built the roll-up antenna with materials paid for by the club. The beauty of this little gem is enhanced transmission and reception, while extending battery life by operating on low power. By changing dimensions, this design can be easily adopted to 220 or 440 mhz. The diagram shows the formulas to use for determining wire lengths for the particular frequency you want your antenna to work on. **Note: The version in the diagram is below is designed to be housed in plastic conduit and mounted -- it does not fold up.**
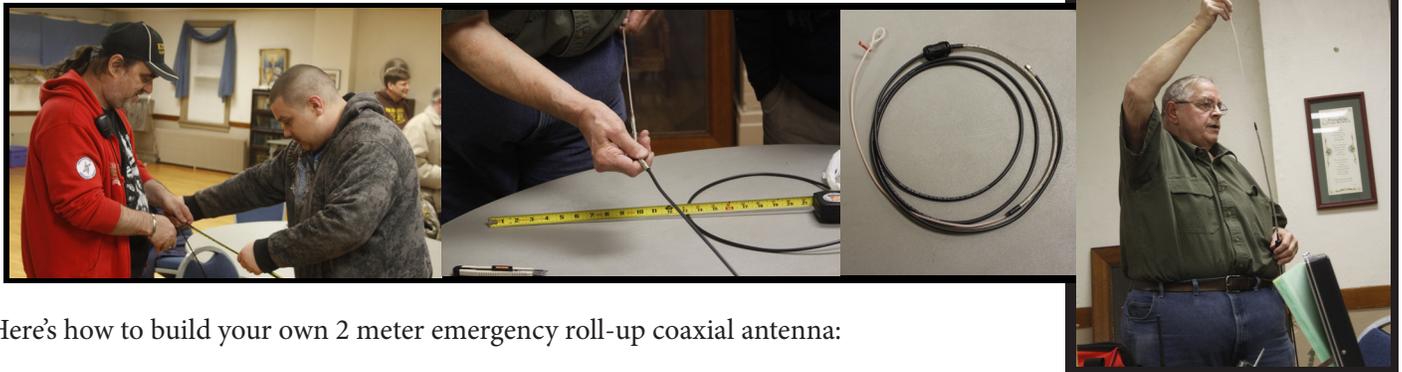
Here's how to build your own 2 meter emergency roll-up coaxial antenna:

1. Select the best quality RG-58 a/u cable – about 10 feet is a good starting point.

2. Beginning at either end, strip 21 inches of the outer jacket (black PVC) insulation, being careful to avoid nicking the braided shield (or your finger tips!).

3. Carefully fold the exposed braid back over the remainder of the coax cable, smoothing out any bumps or wrinkles. This should result in about 19 inches of braid, and the exposed center conductor with just its dielectric insulation.

4. Tape the ends of the braid. Install a ferrite snap-on choke over the black PVC insulation just below the end of the braid.

5. Install a connector to match the antenna jack on your radio.

6. Hang the antenna vertically from the center conductor end and attach the connector to a radio with an SWR meter;

7. Trim the end of the center conductor, ¼ inch at a time for the best SWR. Keep your transmissions brief (use a simplex frequency – not a repeater!) and don't forget to identify.

There you have it – a backup antenna to extend the range of your radio (and conserve battery life). And, you built it yourself in 20 minutes!

For additional ideas on this topic, see: **http://www.hamuniverse.com/vertbazooka.html**.

The Vertical Bazooka Antenna
A half wave antenna made of RG-8U coax housed in plastic conduit pipe.

Exposed Center part of Coax

$$Length = \frac{7500}{Frequency}$$
(Cm)

Feedpoint

Braid folded backwards over coax

$$Length = \frac{7500}{Frequency} \times Velocity\ Factor$$
(Cm)

Mounting Gap

$$Length > \frac{3750}{frequency}$$
(Cm)

Housing is 1/2" ID Plastic conduit
Mount to mast with clamps or U-bolts.

Wire-tie holds antenna in housing

RG-8U Coax with PL259 male and double ended SO239 female for feedline hookup.
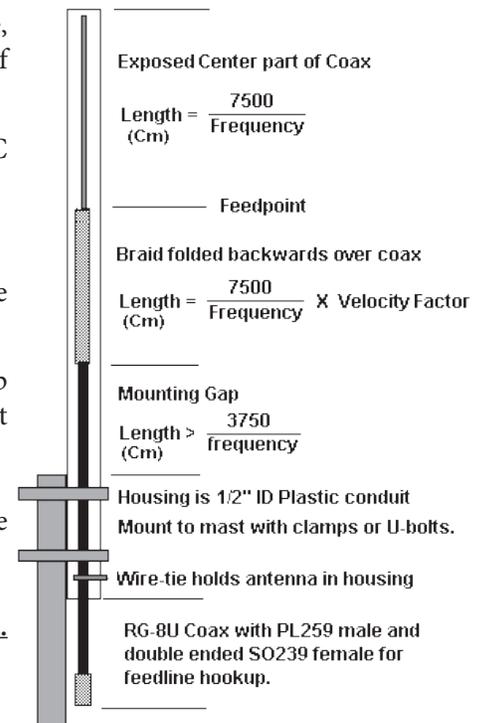
Telecommunications - From There to Here: 1867 to 1893

- **1867 - Signal lamps:** In 1867, the first dots and dashes were flashed by signal lamps at sea. The idea was that of British Admiral Phillip Colomb, who took the design of signal lamp inventor Arthur C.W. Aldis and implemented this method of communication as well as his own code in order for the ships in his fleet to easily communicate. This code was similar to Morse code, but eventually, Morse code became more widely used.

- **1876 - Telephones:** The year 1876 was a big one for Alexander Graham Bell. Having come to the U.S. as a teacher for the deaf, he had been trying to figure out a way to transmit speech electronically. Despite little support from his friends, he successfully invented the telephone in March of 1876.

- **1877 - Acoustic phonograph:** Inventor Thomas Alva Edison made incredible strides in sound recording and transmission when he completed the first acoustic phonograph in August of 1877. He had been trying to improve and finalize the model for the telephone when he realized that by attaching a needle to the phonograph diaphragm and a tin-foil cylinder on which the needle could record spoken words, he could record and play back sounds.

- **1880 - Telephony via light-beam photophones:** In 1880, Alexander Graham Bell took the money he'd received for successfully creating the telephone, set up a lab and got to work improving his invention. The fruit of his labor was the photophone, a device capable of transmitting sound in a beam of light. In essence, Bell had made the first wireless call in history!

Alexander Graham Bell makes the first long distance call from New York to Chicago in 1872.

"If you wish to understand the Universe, think of energy, frequency and vibration."
~ Nikola Tesla
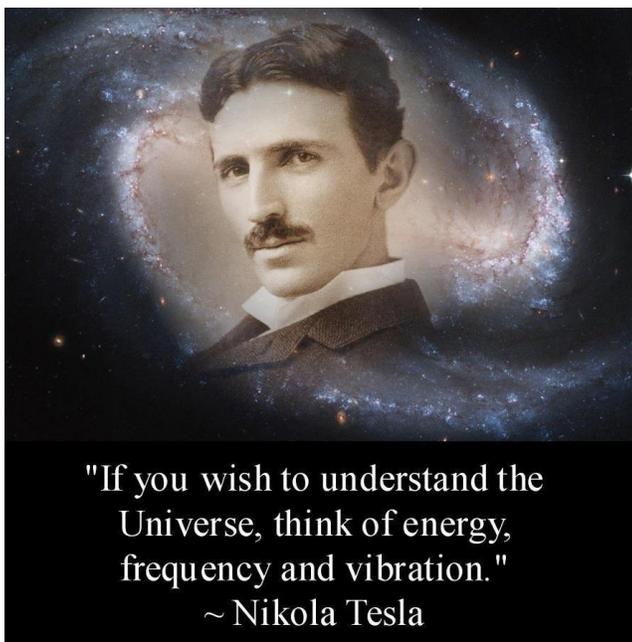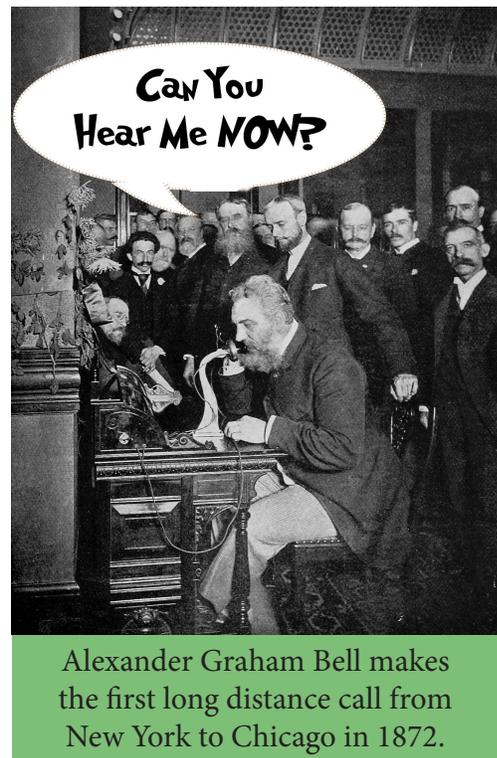
- **1893 - Wireless telegraphy:** Nikola Tesla was the first to successfully transmit radio waves wirelessly through a transmitter in 1893. He patented his work, which was lucky because shortly after that, Guglielmo Marconi, another inventor, alleged that Tesla had copied his work. During the legal battle that ensued, this was found to be untrue. Tesla continued to experiment with wireless transmission and attempted to create a more efficient light bulb.

- **1896 - Radio:** Undaunted by his defeat in the U.S. courts, Marconi kept working on his own versions of wireless transmission of sound. In 1896, he sent his first long-distance wireless transmission. The signal was sent over a distance of 2 kilometers. The recipient of this signal waved a white kerchief to show that it had been received. This earned Marconi a place in the history books as the man who gave us the first radio.

- **1915 - First North American transcontinental telephone calling:** Alexander Graham Bell is back in the history books again after making the first coast-to-coast call by phone to his assistant in January 1915. It was the first long-distance call made in history from a land-line. It has significance because it made long-distance communication all over the country a reality.

It's Time to Renewal Your EGARA Membership

KEEP CALM AND RENEW YOUR MEMBERSHIP

EGARA depends on your support! So please take a moment now to renew your 2016 membership.

Dues remain just $15 for an individual membership and $25 for a family membership.

Your dues allow EGARA to provide you and the community with many benefits that pay dividends all year long, including:

- **Monthly membership meetings** with topics designed to enhance your knowledge of amateur radio;

- **Annual Field Day** with a great chance to practice your emergency operating skills, temporary station setup, and more! It's a great learning experience, and a lot of fun;

- **Club Repeaters** available to members to extend the reach of their radios.

- **VE Test Sessions** where you can upgrade your license;

- **Hamfest!** A chance to meet other hams and find great deals from equipment vendors! Plus, learn about advances in amateur radio, enjoy demonstrations, win prizes and more!

- **Elmers** to help you learn. Senior members of EGARA are a great resource for answering your questions and helping you hone your ham radio skills;

- **Emergency Services** are a foundation of ham radio and EGARA. When emergency communications are needed, EGARA is there to help.

Print and clip the handy form below and send your 2016 membership dues to:

Steve VanSickle, EGARA Treasurer - 3010 Tibbits Avenue - Troy, NY 12180-7019 --
Please make checks payable to *EGARA*
Thanks for your support!

2016 EGARA Membership
(please print clearly)

Name:_____   Call Sign:_____

Address:_____   Zip Code:_____

City:_____   State:_____

Phone:_____   Email:_____

Membership type: Individual ($15) _____   Family($25) _____   Amount Enclosed:_____

Membership Renewal _____   New Membership_____

On the Beam
News & Notes

ARRL Gets New CEO
Tom Gallagher to Replace Retiring David Sumner

Tom Gallagher, NY2RF, of West Palm Beach, Florida, will succeed David Sumner, K1ZZ, as the chief executive officer of ARRL, effective April 18.

As CEO, Gallagher will oversee all activities at ARRL Headquarters in Newington, Connecticut. Meeting in a special webinar session on January 25, all 15 ARRL Directors voted to elect Gallagher as CEO and Secretary, positions that Sumner will relinquish on April 18.

Gallagher will join the ARRL staff as CEO-Elect on February 29, and a transition period will follow.

Licensed in Pennsylvania in 1966 as WA3GRF (and later N4GRF in North Carolina), Gallagher is a member of the West Palm Beach Amateur Radio Group. He describes himself as "an incurable HF DXer and inveterate tinkerer." He credits his first visit to The Franklin Institute's Amateur Radio station, W3TKQ, in 1963 for inspiring his interest in ham radio.

He plans to return to Connecticut, where he had lived previously for 13 years in New Canaan.

147.27 Club Repeater Back in Service

EGARA's repeater on 147.27 mhz was returned to service on January 21st, including its ECHO link capabilities. The repairs are thanks to Club President Tom Scorsone, KC2FCP, who also serves as the repeater's custodian.

The fix took a great deal of time to complete due to limited access to the equipment. Repairs were also longer than anticipated because of the time involved diagnosing the problem by our repeater gurus. Eventually the fault was traced to transmission line issues.

The repeater site itself is located near Memorial Hospital in Albany, with its antenna atop a 180 foot tower. It operates on 147.27mhz and uses PL 94.8 for access.

Tom will explain proper use of the repeater and its Echo Link capabilities at the February membership meeting.

Tom Scorsone points to the newly repaired repeater in Albany.

ARRL Gets Help Fighting Repeater Interference Problems

New York Congressman Peter King has asked FCC Chairman Tom Wheeler to put some Enforcement Bureau heat on those interfering with various radio communication services -- including Amateur Radio repeaters -- in the Hudson Valley and the Greater New York City area. ARRL Hudson Division Director Mike Lisenco, N2YBB, and General Counsel Chris Imlay, W3KD, met with King, a Republican representing New York's 2nd District, to discuss the interference issue. King is also among the original of the 118 cosponsors of the Amateur Radio Parity Act (H.R. 1301) in the US House.

HELLO WORLD

If you've been yearning for learning Morse Code, EGARA will begin holding code classes following its monthly membership meetings. The first code class will be held after the March 9th meeting. If you'd like to participate, please RSVP Tom Scorsone at:

kc2fcp@nycap.rr.com

Telecommunications - From There to Here: 1927 to 1964

Philo Farnsworth was idealistic about television when he was working on it, believing it would wipe out war, end ignorance and promote literacy. He thought it was an educational tool. He didn't quite see 'The Beverly Hillbillies" as a product of his invention.

- **1927 - Television:** Philo T. Farnsworth made media history on September 7, 1927, when he demonstrated the first working television set. He had been working on a method to transmit images: What he discovered was that you could encode radio waves with an image and then project them back onto the screen. This gave us the first television prototype.

- **1927 - First U.K.-U.S. radio-telephone service:** The first radio-telephone service from the U.K. to the U.S. was established in January of 1927. The phones were initially radio phones, so there were some issues with fading and interference. Initially, it was only one circuit and received about 2,000 calls a year, and the cost for three minutes of conversation time was nearly $10.

- **1930 - First experimental videophones:** In 1930, AT&T had decided to create a two-way experimental videophone they called the Iconophone. This allowed people to see, hear, and respond to those they were speaking to in real time. The idea, although different, did not meet with much commercial success.

- **1934 - First commercial radio-telephone service, U.S.-Japan:** The first radio telephone calls from the U.S. to Japan were first made in 1934. This enabled people to speak across the Pacific Ocean for the first time. Unfortunately, due to the distance, the quality of the calls was not great. There tended to be a lot of fading and interference.

- **1936 - World's first public videophone network:** The world, now in the throes of World War II, sees the first public videophone network installed in Nazi Germany in March of 1936 during a trade fair. It was for use by "Aryans only" for a limited time each day from 8 a.m. until 8 p.m. It was left installed there even after the trade show was over.

- **1946 - Limited-capacity mobile telephone service for automobiles:** In June of 1946, the first telephone call was made from an automobile phone. The design had been put together by Southwestern Bell. Due to the cost of installation and the small volume of calls, it wasn't a very extensive mobile network.

- **1956 - Transatlantic telephone cable:** The first 36-circuit transatlantic telephone cable was installed in 1956. The cable stretched from Newfoundland to Scotland. This now made phone calls much less expensive than the older radio telephone system.

- **1962 - Commercial telecommunications satellite:** The Communications Satellite Act was officially passed in 1962, allowing telecommunications to finally go into space. AT&T was in the process of constructing their satellites, and two short years later, they would have put six telecommunications satellites into orbit.

- **1964 - Fiber-optic telecommunications:** In 1964, Charles Kao and George Hockham published a paper that proved that fiber-optic communication could be possible as long as the fibers used to transmit the information were free of impurities. This discovery reopened the door Alexander Graham Bell had first created with his photophone, allowing sound to be transmitted over beams of light.

Telecommunications - From There to Here: 1965 to Present

- **1965 - First North American public videophone network:** In 1965, the first picturephone service began in trials. These phones were called "Mod I" picturephone sets, and in July of that year, Union Carbide Corporation began trials for the first picturephone network. In December of the same year, AT&T also began similar trials in some of their networks.

- **1969 - Computer networking:** In October of 1969, the first data traveled between nodes of the ARPANET, a predecessor of the Internet. This was the first computer network and was invented by Charley Kline and Bill Duvall.

- **1973 - First modern-era mobile phone:** Inventor Martin Cooper placed the first cellular mobile call in 1973 to his rival at Bell Labs, Joel Engel. The first mobile phone had a maximum talk time of 30 minutes, and it took a year for the battery to recharge. The phone would eventually be a prototype for Motorola's first mobile phones.

- **1979 - INMARSAT ship-to-shore satellite communications:** The year 1979 was a big leap forward for maritime communications. The International Maritime Satellite Organization (INMARSAT) was established to provide marine vessels with reliable communication for increased safety and communication for sailors and passengers who needed to speak to someone on shore.

- **1981- First mobile phone network:** The first commercially automated cellular network was launched in Japan in 1981. The network was originally launched only in Tokyo in 1979 and then was expanded. Simultaneously, the Nordic Mobile Telephone system was also established in Denmark, Finland, Norway, and Sweden.

- **1982 - SMTP email:** Prior to 1982, the Internet was highly secure and comprised of limited network clusters between military, corporate, and some university research facilities. In 1982, Jonathan Postel wrote the Simple Mail Transfer Protocol and shifted the focus of the Internet from security to reliability using the networks as relay stations to send electronic mail to the recipient through cooperative hosts.

- **1983 - Internet:** On January 1, 1983, the Internet was officially born. ARPANET officially switched its old network control protocols (NCP) and Transmission Control Protocol/Internet Protocol (TCP/IP) became standard.

- **1998 - Mobile satellite hand-held phones:** The first canopy of 64 satellites was put into place by a company called Iridium in 1998. They also produced the first hand-held satellite phones, which were smaller and less cumbersome than the earlier "bag" phones. This revolutionized mobile telecommunications and would lead to the modern smartphone.

- **2003 - VoIP Internet telephony:** In 2003, phone calls were now capable of being transmitted over a computer through Internet protocols. This meant that long-distance charges were not applicable, as callers would use already-established computer networks.

2007 - Apple iPhone Introduced: Apple introduces the iPhone and revolutionizes the mobile phone industry. More than 74 million iPhone would be sold in the next 4.5 years.

2009 - Digital television: Digital HDTV becomes the broadcast standard in the U.S. and other parts of the world, opening the door to web-based TV services.

2016 - Globalization: Of the 6.6 billion people on the planet, more than 5 billion use mobile phones.

Nuff said.

EGARA February & March Meetings to Explore New Technologies

February 10, 2016 - N-BEAMS

February's EGARA meeting will explore **Narrow Band Emergency Messaging System** - better known as "N-beams" in the trade. John Fritze, K2QY, is scheduled to give us an overview of the system and the a suite of software programs that are designed for point-to-point, fast, error-free, emergency messaging up to or over 100 miles distant. In addition, the system takes up a very minimum of space on the ham bands.

The system is designed primarily for use on the two-meter band, or on HF with NVIS antennas, where there is a minimum of fading (QSB) to slow down message transfers. In hilly regions, if two meters is not workable over the distances required, NVIS antennas on HF can be employed instead.

The computer sound card is used as the modem, and other than a simple interface connection between the computer and transceiver, no additional hardware is needed. Versions are available for a variety of operating systems, including Windows (XP or later), Mac OS X, Free-BSD, and Linux.

John current serves as President of the Albany Amateur Radio Association, Secretary Albany County Amateur Communications Emergency Services, Radio Officer of Albany County RACES and Albany County Emergency Coordinator

March 9, 2016 - Fusion Repeaters

David Galletly, KM2O, will join us at the March meeting to explain Yaesu System Fusion repeaters which features one radio for analog as well as digital communications. This exciting technology allows you to key up a repeater with your FM rig or a digital rig and it will automatically figure out what input it is receiving.

Several area repeaters either have or are in process of installing Yaesu System Fusion repeaters. System Fusion provides a pathway to amateur digital radio that does not make present VHF/UHF equipment obsolete while opening doors to new ways of operating. Dave will present a video and discussion of this system.

Dave has been licensed since 1998 and serves as Section Emergency Coordinator for the Eastern New York section of the ARRL. He is also a Field Instructor and Field Examiner for emergency communications as well as a VE.

January VE Session Produces Three New Hams and Six Upgrades

EGARA President & VE Tom Scorsone, KC2FCP, explains test procedures to the applicants. The test session was held at the East Greenbush Community Library.

The VE team scores test results. Nine passed their license exams.

John Jacangelo of Averill Park (above) scored big, passing both his Technician and General tests during the session.

EGARA member Peter Mattice, KD2JKV, (right) picked up his General class ticket. Congratulaions to all!
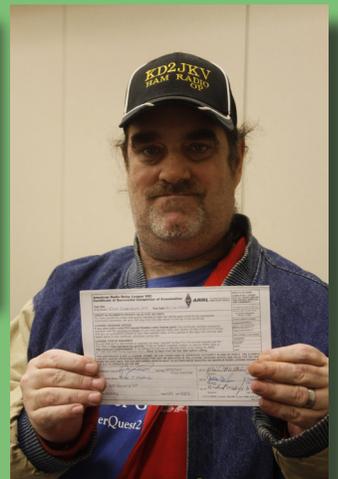
CALENDAR

February 10, 2906 - EGARA Monthly Meeting, East Greenbush Masonic Hall, 710 Columbia Turnpike (Route 9/20), East Greenbush, at 7:00 pm

February 12-14 -- ARRL National Convention, Orlando, Florida

March 9 - EGARA Monthly Meeting @ 7:00 pm

May 14, 2016 @ 8 am to 1 pm- 13th Annual Hamfest, East Greenbush Fire House, 68 Phillips Road.

June 25-26, 2016 - 2016 Field Day - East Greenbush Masonic Temple.

Ham It Up
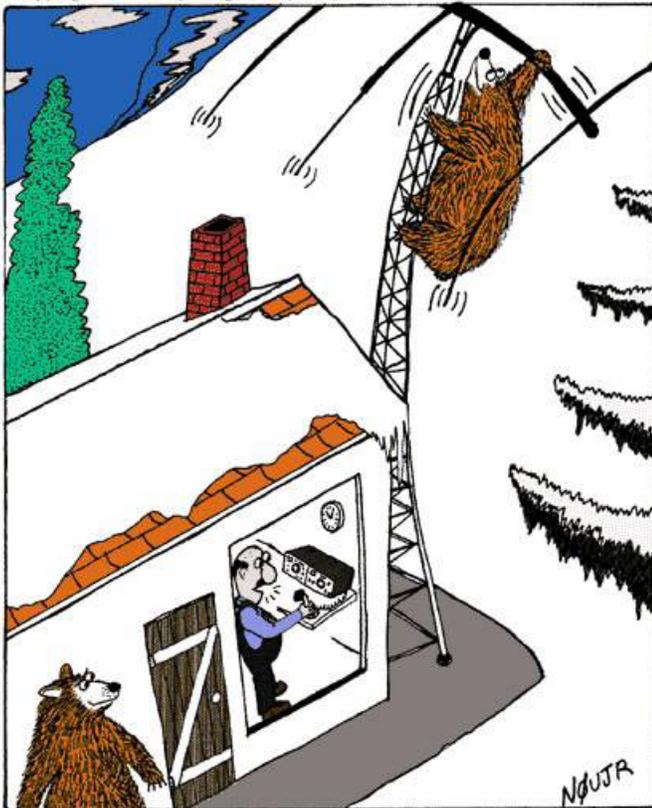
"Hang on Tom, my SWR is going crazy... I'm going to step outside to check my antenna..."

For Sale

DStar Gear for Sale - 1st system includes: *ICOM 5100 - Bluetooth card - Bracket MBA2 - DVAP 2 Meter - RT prog sft*.   2nd system includes: *ICOM 51 Plus HT - BP271 battery - BC202 02 drop in chg - HM 75LS spk mic - Data cbl 2350LU - RT prog sft*.

Originally paid $1,030 for 1st system and $730 for 2nd. Both available for $1,300! Or make a reasonable offer. Will also sell systems separately. Contact: Stan, WA2UET at **WA2UET@taconic.net** for info any of gear listed above. Includes manuals and software.

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Wanted to Buy

Any old broadcast radios for possible restoration, any brand, style, preferably tubes models.   Contact: Steve WB2HPR **326-0902**.

Looking for a 6 meter radio for around $60.
Please contact Peter by email at: **KD2JKV@arrl.net**

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Looking to Buy, Sell or Swap?
Send your info W2RBJ@outlook.com

The East Greenbush Amateur Radio Association

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