# CAARA NEWS

**Cape Ann Amateur Radio Association**
**Gloucester, Massachusetts**
**SEPTEMBER- 2025 EDITION**

## PRESIDENT'S COLUMN

**By Brandon- NQ1W**

Greetings CAARA Members,
As we transition from the warmth of summer into the crisp air of early autumn, I want to extend a sincere thank you to all the members who made time to attend our special meeting in August to hear about and vote on the updated bylaws. Your engagement and participation are what make CAARA such a strong and vibrant community. The proposed changes were unanimously accepted by all members present at the meeting, with two no votes and two yes votes from those voting remotely. We thank you for your help in bringing our bylaws into the current era and helping to keep the club running smoothly and robustly.

Speaking of engagement, our annual meeting is just around the corner! Please mark your calendars for September 13th 2025 at noon. This is a crucial meeting where we will be electing our officers and directors for the upcoming year. Your vote matters, and your presence helps shape the future of our club. We look forward to seeing a great turnout.

You may have noticed some recent changes to our regular members' meeting format. These adjustments are designed to foster even greater camaraderie and make sure every member, new and seasoned, feels connected. We hope this new approach will encourage all of you to bring forward fresh ideas, discuss club business, propose new activities, and truly contribute to the dynamic spirit of CAARA. We will still be having food and demonstrations. We hope the new format will only make the members meeting more fun and dynamic.

On that note, I want to formally recognize a recent shift in our officer team. Larry Beaulieu, AJ1Z, has graciously stepped down as Vice President. We extend our deepest gratitude to Larry for his dedicated service in that role. His character and dedication to the club has been exemplary. Larry is such a committed and active part of our club. He is not going anywhere. Because of Larry's generosity we are thrilled to welcome Brian Lloyd, KC1SOO, as our new Vice President! Brian will be leading the charge with our new member meeting format, and we're confident he'll do an excellent job. Many of you know Brian from his dedicated service as a club director, his fantastic work heading the entertainment committee, and, of course, as a regular and reliable net controller on our popular 6pm 2m Net. We're excited for the energy and ideas Brian brings to this new role.

For those looking for more on-air fun, don't forget to check in on K1TT Jim Barber's ever-popular 6m simplex "fishnet" on Thursdays at 7:30 PM on 50.2 MHz USB. It's a great opportunity to test your 6m capabilities and for some relaxed rag-chewing. Everyone can have a chance to test out your 6m setup! And keep your ears peeled – there's a strong rumor circulating about a new 2m Simplex Net coming soon! More details on that to follow.

We've had a truly fun and vibrant year, filled with learning, operating, and great fellowship. I am personally very excited for what the next year holds, including plans for an activation of the iconic Hammond Castle in Gloucester. These activities are made possible by your enthusiasm and participation.

Thank you again for making CAARA such a wonderful club. We are really looking forward to seeing many of you at the annual members' meeting.

73,

Brandon Hockle, NQ1W

President

Cape Ann Amateur Radio Association (CAARA)

**CAARA Newsletter**
**Cape Ann Amateur Radio Association**
***6 Stanwood Street***
***Gloucester, MA 01930***

CAARA Newsletter is a monthly publication of the Cape Ann Amateur Radio Association (CAARA).

It is the policy of the editor to publish all material submitted by the membership provided such material is in good taste, relevant to amateur radio and of interest to CAARA members, and space is available. Material is accepted on a first come, first serve basis. Articles and other materials may be submitted by internet to Jon at jpcrockport@gmail.com . If possible, material should be in Word format. Material may also be submitted as hard copy to Jon-K1TP or any Club Officer.

All material published in the CAARA Newsletter may be reproduced for non-commercial use provided such use credits both the CAARA and the author of the article. Copyrighted material will not be accepted without accompanying written permission to publish.

The opinions expressed in the CAARA Newsletter are solely those of the editor or other contributors and do not necessarily reflect the opinions of either the Board of Directors or membership of CAARA.

Jon Cunningham- K1TP Editor
Dean Burgess- KB1PGH Reporter



## Welcome to CAARA:

CAARA, an ARRL affiliated club, operates the 2 meter W1GLO repeater on 145.130 MHz with antennas located on the ATT cell tower in the Blackburn Industrial Complex in Gloucester Massachusetts. It has an average effective radius of 60 miles, and serves Eastern Massachusetts, Cape Cod, Rhode Island, Southern New Hampshire, and maritime mobile stations.

CAARA also operates the W1GLO repeater on 224.900 located at the CAARA clubhouse.

The 443.700 repeater is now on the ATT cell tower in the Blackburn Industrial Complex with greatly enhanced performance running in fusion mode and linked to 10 other repeaters in the New England area.

The Association is one of the few amateur radio clubs that has its own clubhouse. Located at 6 Stanwood Street in Gloucester, with a variety of HF stations with beam, vertical, or G5RV antennas.

Amateur radio exams are held on REQUEST at the CAARA clubhouse. Anyone who is considering a new license or an upgrade, is welcome to test with us. Currently pre-registration is necessary. Contact the head of our VE team Bill Poulin- WZ1L if you have any questions about monthly testing.

Monthly member meetings are held on the second Saturday of each month at noon except for July and August.

Each Sunday evening at 9:00 PM, the club operates a 2 meter fm net on 145.130. This is an open and informal net which disseminates club news and prepares operators for emergency communications work. All are invited to check into the net as club membership is not a requirement.

The club is open every Wednesday from 10- Noon for CAARA members and interested parties to stop by and socialize, as well as use the extensive collection of ham radio gear.

**This newsletter is published under the auspices of the Cape Ann Amateur Radio Association (CAARA), However, all content is the work of individual contributors and may contain ideas, opinions or views not necessarily shared or supported by the CAARA Board of Directors or the membership.**

# THE EMCOMM MINUTE

By Dean- KB1PGH

The month of September is FEMA`s National Preparedness Month so I though I would give everyone a few reminders, tips and websites for Emergency preparedness. So I think we can look at this in two ways. We can plan for the big disasters that may never come and we can plan for the smaller events that happen more often. So lets start with looking at how to get ready for the major disasters.

So they may not happen too much around here in New England but how do you prepare to either have to evacuate your home for a few days or shelter in place for a few days? So FEMA says that we should have a plan to be able to sustain ourselves for 72 hours during a disaster. So imagine something happens right now and you have to evacuate your house? It`s always good to think of the things that you would never think happen. Say a terrorist attack or a man made disaster or something completely random. So if you had to leave right now what would you need to take with you?

FEMA does have a website called http://www.ready.gov that has a lot of information of disaster preparedness. So if you had to leave you would need the basics-food, water, medicine, power for phones and tablets, cash, clothing etc.

One good idea is to make a "Bug Out" bag that you can grab and go. So lets say you had to drive a good distance away from where you are right now.

Do you have enough gas in your car? I keep a 5 gallons of gas in my garage that I can use just in case. Just think of everyone trying to go to the gas stations all at once or the power being out and they can`t pump gas? So I keep the gas in my garage and just put it in my cars gas tank every 6 months and buy new gas as a back up.

The next big thing to being prepared is electrical power whether you have to evacuate or not. This also applies to the more common power outages we see every day. There are two things you can do. So for your home you can save your pennies and buy a back up generator or buy a big amp hour deep cycle battery with a power inverter to power stuff.

At least think of how to power your refrigerator and to recharge your phones and tablets and even keep a few lights on. So if you have to evacuate think of how you would power your phones and tablets with no power.

I have a few rechargeable power banks in my go kits and my car just in case. I even have one that has solar panels that flip out to recharge itself.

One other aspect of disaster preparedness is food and water. If you had to evacuate right now do you have enough food and water to last at least 3 days? I have a plastic bin in my basement that I can throw in my car which has 3 days of freeze dried meals with a case of spring water and a mini stove to cook the food.

One last thing-if the power is out how do you pay for stuff for a couple days? The banks will be closed and the ATM`s won`t work. So I keep $50 in dollar bills in my bug out bag as a back up.

If your a ham radio operator you can also make a bug out bag for at least a HT and a scanner to monitor your local public service agencies. At least think of how you would grab your HT ,a extra battery and a charger and a frequency list to monitor the local repeaters.

So I think you guys get the point. So 99 % of the time nothing happens but when it does just a little planning goes a long way to keeping you and you family safe .So let`s focus on the more everyday things that happen around your house for emergency preparedness.

Of course each house should have at least one smoke and carbon dioxide detector on each floor. So when was the past time you checked them to see if they work and when was the last time you changed the batteries in them? So put a note to do exactly that every 6 months.

So how many of you have at least one working fire extinguisher in your home or even in your car for that matter? One other basic necessity is to have a decent first aid kit. Put one in your car as well.

The next is lighting when the power goes out. Have at least a decent flashlight on each floor or a LED lantern . I would recommend the NEBO brand of flashlights and the ANKER brand for power banks.

Oh- and make sure that if you do have flashlights that the batteries are not dead in them from sitting there for months not being used. I will also go back to the power being out at home.

Save your pennies and buy a back up generator to power your fridge to keep the food form spoiling and to power your phones and tablets. So you guys get the point-please take a little time to get ready for the unexpected.

If you really want to get into disaster preparedness take a minute and go on Youtube and type in underground bunkers and preppers. It`s a hoot to watch how far people will go and how much money they will spend. So I though I would share a few websites that you can buy Emergency Preparedness supplies.

beprepared.com
mypatriotsupply.com
redcross.org
redfora.com
emergencykits.com
thereadystore.com
4patriots.com

# SWR and Wires

by Curtis- AA3JE

It takes a long while to get an antenna right. Oops, that's not true if you buy one of the expensive ones, assemble it properly taking careful measurements, and set it up perfectly in the exact right location. If you buy a wire antenna, hang it up, and start transmitting, you will have problems. Or at least I do. Most ham antennas are "resonant", which means that they are the right electrical length for the frequency selected, like the strings of a musical instrument. If not, some of the electrical energy runs back along the feed line, and in the worse cases back into the shack and back into the transmitter. Left uncorrected for two long, or at too high power, it either gives the owner painful electrical shocks, or burns out the final transistors.

SWR is measured in numbers. 1 is good, 2 is fair, 20 is terrible.

Tube type transmitters can handle a lot of mismatches, as the process of tuning the transmitter tunes out a lot of mismatches, but transistor types can't. So in the modern era most hams have a transmitter matching system, either built into the radio or as a separate box between the transmitter and the antenna.

Which is what I have. A nice one. . It automatically senses the SWR and clicks and clacks, throwing coils and capacitors into and across the transmission line until the apparent electrical length of the antenna and feed line are correct. But things work best, if the transmatch does not have to work too hard. So it's best to get things almost right without it.

Which leads to the process of tuning the antenna. The actual length and the "electrical" length of an antenna are actually almost never equal. So you use the formulas in the books or the antenna documentation to get the expected length, then cut it a little long. Then the dance of the SWR begins. One plugs in an SWR meter (for the right frequency range) into the line, sets the power to minimum (One can also use an antenna analyzer if you have one), then transmits for a second or two. Then you cut off a few inches, and test again.

If you have help, this is easy, you cut, yell, the friend calls back (repeat). If not, you cut, run in, check, run out, cut, (repeat." Most tuners can easily handle SWRs of 2:1 or less, so if you get there, stop.

In my case, the problem is the far end in the woods. It ends at a bit of rope, which runs to a pulley and a weight. That allows the antenna to avoid breaking when the tree moves. It also is just the stuff that squirrels think is perfect nesting material. So I am transmitting along, happy, content, and the transmatch starts whirring and clicking and it's time to get meter, check the SWR, utter a muffled curse, go out and find the ladder, some more rope, and fix the damage.

There is more and better written about antenna tuning and SWR in the handbook and on the Internet, but the basic rule is look out for squirrels.


By Kevin- K1KL

The CAARA 6 O'clock Net, now operating continuously for 5+ years, continues to draw a good crowd of "regulars" and an increasing number of new check-ins and stop-bys. The success of this net is largely due to having 3 excellent and consistent net controllers. Nightly check-ins typically range from 10 to 20 participants.
The current schedule has Brian, KC1SOO as the Monday evening NC, Paul, KC1HHK as the Wednesday evening controller, and Fred, WA1ESU as the Friday NC.

Mondays and Wednesdays offer a rich program of discussion topics, many ham and radio-related and others of a historical and cultural nature. Fridays are more of an open mic format and current topics are regularly introduced by the NC and participants.

Here is a sampling of recent topics : National Radio Day, What Antennas Are You Using?, World Calligraphy Day, Remembering Robin Williams, Who Has the Best Lobster Roll?, What Have You Done on 6-Meters?, Ham Radio Operating Awards, World Whistleblower Day, ISS and SSTV, How to Sleep Better, The Best HTs, 163 year-old Telegraph Service Shuts Down, Anniversary of Marconi Radio Patent. And, that's not all in just July and August!

The recent action of the CAARA Board of Directors to recognize the 6 O'clock Net as a Club Activity pleased everyone associated with the Net. The Net serves as a recruiting vehicle for new Club members, as well as a means to keep participants informed about Club activities, meetings, and news.

While a Club Activity, the Net strives to welcome non-club-members and all of the licensed ham community. CAARA is justifiably proud of the history and the service of the 6 O'clock Net as an integral part of the Cape Ann region (and beyond) ham community.

If you haven't checked in recently, what are you waiting for?

# NEW 6 METER FISH NET

The 6-meter Fish Net meets every Thursday being run by Jim- K1TT and his Facebook group named Radio Active Cape Ann.

Join us at 7:30 PM on 50.200 MHz for the Six Meter Fish Net. This net is simplex so it is likely you will hear some stations but not others. If you are not hearing anyone, please stand by until you do. We will have several stations working as relays.

# 7 Surprising Facts You Might Not Know About Antennas

Antennas are metallic structures used to capture and transmit radio electromagnetic waves. They come in all shapes and sizes, from the five-nanometer DNA Nanoantenna created by Université de Montréal researchers to monitor the structural change of proteins to the 1,640-foot Huge FAST Telescope located in Guizhou, China.

More than just metal rods, antennas are essential components in various technologies, including radio, television, cell phones, Wi-Fi, radar, and satellite communication. There are dipole antennas, parabolic antennas, Yagi-Uda antennas, helical antennas, microstrip antennas, and omnidirectional antennas, to name but a few.

One type of antenna – the loop antenna – has been used by thieves to extend the radio connection between key fobs and a car over several hundred feet, allowing them to start the car and drive it as far away as a tank of gas will take them, according to GPS Leaders.

Another novel use of antennas, according to Barron's, is to pilot unmanned, Starlink-equipped narco-submarines from Colombia across the Caribbean Sea to Central America and Mexico. These cocaine-smuggling subs aren't the first instance of a cartel using Starlink to its advantage. According to Barron's, "A whopping $4.25 billion in meth was seized on a ship near India (in 2024), and the boat was being operated remotely using a Starlink connection" as well.

But not all of the unusual uses of antennas are nefarious – some are downright inspirational. Here, we take a look at seven unusual uses of them, and we even throw in a bonus fun fact just for kicks.

Antennas Aiding Disaster Relief

Researchers from Stanford University and the American University of Beirut have developed an innovative, lightweight, portable antenna that can reliably connect to both satellites and terrestrial devices, offering a vital tool for disaster response teams and humanitarian organizations.

In the immediate aftermath of disasters like earthquakes or floods, the failure of traditional communication infrastructure, such as damaged cell towers or downed radio masts, critically impedes rescue efforts. This new antenna directly addresses those failures, enabling rapid deployment of impromptu communications to coordinate emergency response and connect with isolated survivors.

Unlike conventional metallic satellite dishes, which are heavy and demand considerable power, the newly developed antenna is small, light (about 39g), and requires no extra energy to switch between two stable configurations: one optimized for targeted satellite communications and the other for omnidirectional ground connectivity.

According to Stanford, it achieves this flexibility by employing a unique design based on counter-rotating helical strips made from fiber-reinforced composites, allowing easy transformation between operational modes merely by pulling or compressing its structure.

Publication of the design in Nature Communications demonstrates its validity as a suitable solution for post-disaster scenarios, especially in regions where resources and infrastructure are limited or compromised. Field tests showed successful performance for both point-to-point terrestrial connectivity and satellite localization within the crucial L-band frequency range frequently utilized in emergency communications.

Importantly, such passive, reconfigurable antennas lower the technological entry barrier for responders and reduce logistical burdens during high-stress rescue operations, underscoring their potential to transform humanitarian aid and resilience strategies in the face of increasingly frequent natural disasters.

Beverage Antennas In Vietnam

During the Vietnam War, the U.S. Marines made strategic use of "commo wire" to create Beverage antennas—very long, low-to-the-ground wire antennas—enabling reliable and secure communication between forward bases and command centers. Typically, these antennas extended for several wavelengths and were positioned only a few feet above the ground.

According to Ham Radio Outside the Box, the Marines deliberately engineered these Beverage antennas to be inefficient: by terminating the wire with resistors

(around 600 ohms), they further increased lossiness, which limited the effective communication range.

This intentional inefficiency was a tactical advantage. By severely restricting the range, transmissions became much harder for North Vietnamese intercept units to detect or exploit, thus maintaining operational security for nearby command communications.

Beverage antennas, though not optimal for powerful long-range signals, provided a low-profile, easily concealed antenna that could be deployed while crawling, reducing exposure to enemy observation or attack. Their construction using readily available wire also made them both practical and low-cost for field operations.

Military documentation and antenna engineering studies confirm that, although Beverage antennas generally have a mere 1.5% efficiency as transmit antennas, their highly directional and easily adaptable design provides key security and stealth benefits in a contested, electronics-rich environment such as Vietnam. Modern analyses emphasize that radio communication during the Vietnam War depended on a mix of technological improvisation and strategic awareness of signal vulnerabilities, with the Vietnam War depended on a mix of technological improvisation and strategic awareness of signal vulnerabilities, with the Marines' use of inefficient Beverage antennas exemplifying this balancing act.

Antenna As A Metamaterial Design

Metamaterials, artificially engineered materials with extraordinary electromagnetic properties, are transforming the landscape of antenna design. A recent breakthrough by Lockheed Martin and Penn State highlights this trend: the creation of a compact antenna using metamaterial concepts to overcome the long-standing limitations of conventional antennas for satellite and GPS applications. This antenna features a hexagonal shape and is specifically optimized for use in arrays, enabling higher gain and more efficient performance when multiple antennas are deployed together. Compared to traditional circular designs, the hexagonal configuration results in better array packing and an additional increase in gain.

The integration of metamaterials into the antenna structure results in significant improvements in both gain (up to 25%) and aperture efficiency, with added robustness and reduced weight, critical for aerospace and satellite environments. Furthermore, according to the National Center for Biotechnology Information, this new antenna offers dual-band capability, enabling efficient operation at two key frequencies needed for GPS systems.

The use of carefully designed metamaterial elements empowers engineers to precisely manipulate electromagnetic wave propagation, yielding antennas that are not only more compact and lightweight but also capable of enhanced multi-band functionality and improved resistance to interference.

Research at Penn State's Computational Electromagnetics and Antennas Research Lab (CEARL) has played a pivotal role in these advancements, leveraging advanced optimization and simulation to refine these metamaterial-enabled designs. The resulting antennas are poised to provide substantial benefits for next-generation GPS and communication satellites, promising enhanced reliability, efficiency, and reduced payload mass – all critical factors for modern aerospace and defense systems.

DIY Antennas From Everyday Items

The creative construction of DIY antennas using commonplace items such as aluminum foil and wire glue exemplifies the ingenuity found among amateur radio and television enthusiasts. Recent practical guides and engineering experiments have confirmed the effectiveness of such homemade designs.

For example, one project detailed the process of building a deep-fringe TV antenna out of plywood, corrugated cardboard, heavy-duty aluminum foil, and 12-gauge copper wire, with wire glue providing the critical electrical connection between foil and wiring, Wire Glue Projects writes. The antenna's structure deliberately connects the "director" and "reflector" elements, both to boost reception gain and to shield against noisy interference from nearby electronics – a testament to the nuanced understanding many amateurs bring to their builds.

Academic and research communities echo this spirit of innovation, experimenting with flexible and scalable techniques for antenna fabrication. Researchers at Columbia University have advanced the field by developing "knitted" RF metasurface antennas from off-the-shelf yarn, integrating electromagnetic

functionality into ultra-lightweight and foldable textiles. These antennas represent a significant evolution of the core DIY philosophy by leveraging everyday materials yet advancing performance and flexibility.

Parallel antenna configurations, inspired by the pioneering work of John Winegard, credited as the "father of the modern TV antenna," remain a recurring theme in both hobbyist and academic contexts. Leveraging multiple antennas improves signal quality and reception diversity, as demonstrated in both engineering theory and practical radio setups, according to Princeton University.

The continued development of both simple homemade and sophisticated research antennas underscores the accessibility and adaptability of antenna technology for personal and experimental use, blurring the boundary between amateur ingenuity and academic advancement.

Antenna Man

DXing – receiving distant radio or television signals – remains a vibrant hobby within the amateur radio community, inspiring enthusiasts like "Antenna Man" to experiment with various equipment and antenna designs. Many amateur radio operators, or "hams," trace their passion for DXing back to early experiences with makeshift antennas, such as using a coat hanger to pull in faraway stations, according to SWLing.

This creative approach exemplifies the spirit of experimentation that underpins amateur radio and has led hobbyists to increasingly sophisticated setups, like high-gain antennas mounted on towers, for greater signal reach and clarity.

DXing is more than just a pastime; it is a means of expanding knowledge about radio wave propagation and improving technical skills, adds The National Association for Amateur Radio. Organizations such as the American Radio Relay League (ARRL) host annual contests that encourage participants to contact distant stations, deepening their understanding of atmospheric conditions and antenna performance. The integration of digital technology and the rise of software-defined radios have further broadened the horizons for DXers, making it easier for individuals to monitor, analyze, and log distant signals.

Academic collaborations, like those promoted by the HamSCI initiative, bring together scientists, students, and radio enthusiasts to study ionospheric phenomena using DXing techniques. These partnerships exemplify the growing recognition of amateur radio's value for both personal achievement and scientific advancement. Current research also highlights how DXing fosters innovation and learning within the amateur radio community, bridging the gap between casual listening and advanced signal experimentation.

The Human Body As An Antenna

Recent studies confirm that the human body can function as an antenna when exposed to high-frequency electromagnetic fields, absorbing, scattering, and even radiating electromagnetic energy. Researchers have numerically modeled scenarios where the body is near a high-frequency (HF) vehicular antenna and have shown that a portion of the incident energy is indeed radiated away by the human body, while the rest is absorbed and dissipated as heat through biological tissues, according to Frontiers.

Specific absorption rate (SAR) values are used to assess how much electromagnetic energy is converted into heat within the body, and these remain essential metrics for understanding exposure and safety. The electrical properties (permittivity and conductivity) of skin, fat, and muscle influence how the body interacts with electromagnetic fields, and the overall absorption and radiation characteristics vary with frequency, tissue composition, and proximity to the EM source.

Apart from absorption (which results in heat dissipation), the human body can facilitate energy transfer in near-field communication scenarios. For example, recent research in wearable technology demonstrates how placing antennas in contact with the skin improves performance, as the human body modifies the antenna's load and can enhance the radiation efficiency and pattern, writes Nature.

Additionally, writes MDPI, experiments show that ambient electromagnetic wave energy can sometimes be harvested using the human body as a passive conductor or antenna to power ultra-low energy wearable electronics. These findings underscore the complexity of the body's interaction with electromagnetic fields and emphasize the need for ongoing safety monitoring, particularly as more devices operate nearby at higher frequencies.

Stealth Antenna

Some ham radio operators creatively integrate stealth antennas into residential environments by disguising them as common architectural elements such as gutters or downspouts. This approach allows operators to comply with restrictive homeowner association (HOA) rules that often prohibit visible antennas and avoid attracting unwanted attention from neighbors or local authorities.

According to Scribd, stealth antennas are intentionally designed to be inconspicuous, using thin wires or disguising the antenna as everyday objects like flagpoles, roof vents, or weather vanes, or even installing them indoors (e.g., in attics) to maintain a low profile while still achieving effective radio communication.

The need for stealth antennas arises not only from HOA restrictions but also from other social considerations, such as maintaining good neighborly relations or dealing with space constraints in urban and suburban settings. Given that traditional antennas can be large and visually prominent, disguising antennas as part of the household infrastructure enables ham radio operators to continue their hobby within regulated environments without compromising performance. Magnetic loops and small transmitting loops are popular indoor or semi-hidden antenna types for such applications.

Recent advances have produced specialized stealth antenna kits and designs that retain high performance while remaining covert, such as broadband VHF/UHF antennas that avoid the bulky radials typically associated with antenna setups, enhancing both stealth and functionality, Heathkit writes. The trend toward stealth antennas reflects a broader adaptive strategy among amateur radio enthusiasts to balance technical needs with regulatory and community constraints, demonstrating innovation in antenna technology integration within residential areas.

Bonus Fun Fact: The Origin Of The Word Antenna

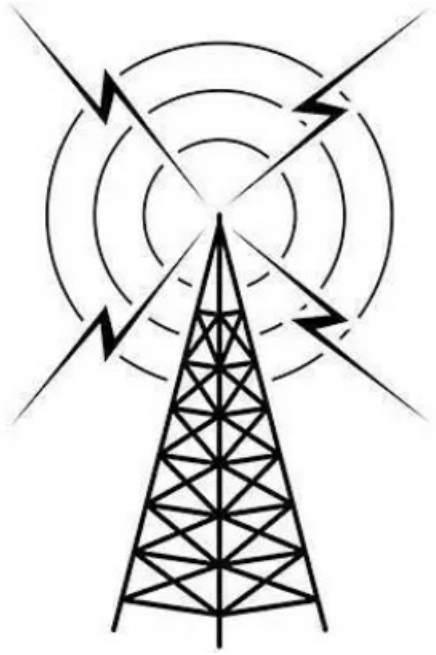
The word antenna in wireless communication is attributed to the Italian inventor Guglielmo Marconi, who conducted wireless experiments in 1895 using a long wire “aerial” suspended from a pole. Marconi's use of this apparatus led to the term “antenna” being associated with the Italian word for a tent pole, l'antenna centrale.

This was a shift from earlier terminology, where such devices were referred to simply as “terminals” in wireless telegraphy. Marconi’s prominence and successful wireless demonstrations helped popularize the term, which then spread among wireless researchers and the public alike.

The Latin origin of the word “antenna” means “sail yard” (the horizontal spar used in sailing to hold a sail), which influenced its Italian usage to mean a pole or rod. Marconi’s choice of the word might have reflected the physical resemblance of his wireless aerial to a sailing yard or the tent poles from which the wire was suspended. This terminology then evolved and solidified in the context of radio and wireless technologies.

Before Marconi, the earliest radio antennas were conceived by Heinrich Hertz in the late 19th century for demonstrating electromagnetic waves, but these were not termed antennas at the time. Marconi’s experiments and commercial developments, particularly his 1895 transmission work near Bologna, brought the concept and the term “antenna” firmly into usage for the radiating and receiving elements in wireless communication devices.

Thus, the word antenna in the wireless context is a result of Marconi’s practical innovations and linguistic adaptation from Italian and Latin maritime terminology to modern radio technology.



# Icom Unveils New IC-7300MK2 HF / 50 / (70) MHz Transceiver


Icom has introduced the new IC-7300MK2, HF / 50 / (70*) MHz transceiver at the JARL Ham Fair 2025 (August 23–24, 2025). Initial shipments are planned by the end of 2025.

The IC-7300MK2 is the next-generation compact HF transceiver, building on the worldwide success of IC-7300 which is sold over 100,000 units globally.

**Enhanced Performance**

Improved RMDR and Phase Noise performance, reducing adjacent-signal blockingCarefully selected components and optimized DC power designRX standby current consumption reduced by about 23%, lowering heat generationFirsts for Icom HF radios

HDMI™ port for connecting to a large external displayBuilt-in CW decoder — decode Morse Code without a PCOther Highlights

Separate receive antenna connector for RX antennas, filters, and preampsUSB Type-C™ with dual virtual COM ports for simultaneous FT8 and logging operationBuilt-in LAN for easy remote operation with optional RS-BA1— no server PC requiredSupports newly allocated 5 MHz band (Europe Version)Packed with features for serious operators, the IC-7300MK2 is ideal for contesting and DX hunting.

# ARISS Project

**By Jeff- KC1JSN**

'ARISS, or Amateur Radio on the International Space Station, is a program that allows students to communicate with astronauts aboard the ISS using amateur radio. Its goal is to inspire interest in science, technology, engineering, and mathematics (STEM) through direct interaction with space missions'. Somewhat recently I had the opportunity to participate in an ARISS project, as part of an amateur radio team that supported a local school in making their first ever contact with the International Space Station using Amateur Radio. It was a great learning experience, a lot of work and full of lessons learned. I thought it might be helpful to outline what was involved in the project, how things went and what was learned in case anyone was similarly inclined. I am not going into the weeds on amateur satellite radio, every club has experts at this technology and I am certainly not one of them. I am describing the experience from a project and volunteer perspective.

I was not involved in the genesis of the project, when the possibility of having K-12 students asking questions of an astronaut aboard the ISS using Amateur Radio was first broached and the question of "should we try to do this" was asked. The school had an Amateur Radio team lead, someone who had a relationship with the school already who made it easy to support the necessary early steps. Included in these steps was explaining to the school what was involved in applying to ARISS and more importantly how to make good on the commitment if approved. The ARISS side was represented by an ARRL member local to the school (New England Region) who outlined what the expectations were of the school and the types of ARISS contacts that would be considered; mainly installing a full amateur satellite system at the school or using a preexisting satellite station already approved by ARISS and connecting to that station remotely via the Internet. The school was also briefed on the public outreach, marketing, press and local dignitary requirements of ARISS (they want as much press as possible to support their efforts and to promote Amateur Radio and STEM).

I joined the project shortly after the school decided to move forward and was involved

with the process of taking part in interviews, providing information by answering specific ARISS questions and passing the overall sanity check. The rest of the radio team was soon filled out and represented the technical aspects of the project, to include reviewing the ARISS required station architecture, filling out the station plan and procuring the materials through to the installation and test phases. In addition to the radio team, the school was required to provide a Project Owner, Marketing and Outreach person, A/V and Network person and administrative support. The overall Project Manager was assigned by ARISS and was an ARRL engineering and logistics representative who brought along an associate to support the marketing and outreach efforts. The ARRL folks were experienced, having supported many ARISS contacts for schools worldwide and provided a roadmap, structure and go/no-go decisions throughout.

After several weeks of Zoom calls and discussions, the school was approved for an ARISS contact and an installation of a complete Amateur satellite station. As you might already imagine, this was no normal project that we all might encounter in the business world where the three-legged stool of Cost, Schedule and Quality had to be managed to a profitable outcome. Amateur Radio (key word: Amateur) lends itself to creativity and nimbleness while ARISS and the ARRL with deference to NASA's need for perfection require strict adherence to requirements and design and a commitment to deadlines that most hams find counterintuitive, at least in the hobby setting. We were specifically told "don't think like Ham, don't use what you have on hand" etc. This might sound like a business world project but the element of cost and profitability doesn't come into play. The 'customer', in this case ARISS/ARRL/NASA doesn't care about how much cost is incurred, only about schedule and quality. Coming from my perspective as a Project Manager and Engineer, the challenge was melding the hobbyist aspect of Amateur Radio, the necessarily strict world of the project's stakeholders and the winding road to pull success out of the many roadblocks, challenges and seemingly inevitable failures. I'm leaning into this aspect of the project because it took the most creative thinking and was the biggest challenge. Bringing together hobbyists, school employees and students and

interfacing with the strictest ‘customer’ was needed for success. Oh, and building a great station.

ARISS has a very strict station design for contacts and the provided goal of the radio team was to adhere to it. Specific radios, antennas, software, cables and more were already included in the architecture we were provided and, all things being equal, building the required station would have been straightforward. It would have to be a fully redundant dual station, two stations completely independent of each other, the Primary with a 2m/70cm Yagi antenna setup with azimuth and elevation control which would be moved by the SATPC32 software (installed on a laptop) automatically. The backup station would use the same model radio with a vertical dual band antenna as a backup. RF cable maximum length and type were predetermined. However, all things were not equal when it came to the station requirements; cost would be a factor after all. The school was private and the cost of the system was to be borne by donors and benefactors. As we researched each component of the station; radios, antennas, rotor controller, software and PCs, the thousands of dollars were adding up so quickly that the first possible point of risk for the project would be the cost. Addressing cost was managed from two directions, revisiting the architecture and the budget. While the budget was not fixed or tracked seriously there was paralyzing sticker shock and where the architecture of the station was fixed it turned out there was a willingness of the stakeholders to discuss options.

As mentioned, ARISS wants certainty that the station has no glaring risks of failure and variations from the standard design gave them pause. The first change requested came with the antennas. The ones recommended were very expensive and an alternative, a LEO-Pack system was cost effective with slightly less performance. The LEO-pack also included the rotors and while adequate for the smaller antennas were not up to the station architecture specs. After a lengthy review it was decided that we could move forward with the LEO-pack if we agreed that the station would need to be tested for performance before being approved. This was risky because there likely was not enough time to build the station and rebuild it again. Cost won out as the bigger concern so we went with the

LEO-Pack and it passed the on-air tests with the ARISS POC. Other architecture elements such as linear amplifiers for the backup station were eliminated as the ARISS POC said they were not required, just ‘nice to have’. It became necessary to look at each aspect of the standard architecture to determine what was really required and what could be discussed.

With costs somewhat under control building the station was mostly seamless. There were four of us on the radio team and we each brought different expertise, schedules and physical abilities. The LEO-pack was built and set up first at the lead’s home where it was tested and offered practice with radio and software setup, hands-on opportunities for building and operating the station and making/fixing mistakes early. A great idea to build the redundant station in a transportable case was offered by the lead and really helped when the operation was moved to the school. It kept power, cabling and equipment fixed and sturdy.

One team member had satellite experience and was able to navigate the SATPC32 and SATPC32-ISS software, laptop and IC-9700 settings. I can’t overstate how detailed these steps were, having never operated satellite before I could see so many areas ripe for misconfiguration. Having a satellite SME was also important when it came to defining expectations. How much impact was the change in antennas really going to have on the exact use case of an ISS contact? What ISS passes offered the best chance of a long contact? We installed the two IC-9700s, power supplies and battery switches, rotor controller, antenna polarity switch and other peripherals in the case and used it exclusively for testing and practice. Challenges with the software were mitigated by help from the software author and other satellite operators and our own SME. Some issues were resolved through trial and error. In a few months the station was ready to transport to the school. It didn’t take all of that time to build it but hobbyist availability models and school schedules allowed extra time. The station was ready far ahead of when the school was ready for it.

Moving the station to the school, which included disassembling and reassembling the antennas, would have been straightforward, all things being equal (you know where this

is going). The plan all along was to install the antennas on the roof of the school. This gave us the best view of the horizon and protection from idle hands. It also supported something I haven't mentioned yet: the agreed upon plan with the school was always to leave the station in place after the ISS contact so the school could start a ham radio club and a permanent antenna installation was the only option that would support the goal. The station would be located in the auditorium on the day of the contact but could not be there up until then. A large closet was chosen as a temporary location for testing and as a permanent radio club spot. The routing of the cables was determined to be the same for the closet and the auditorium with some cable moving just before the event. The cable length was not to exceed 100' per the ARISS spec and would not. Until the building inspector for the town paid a visit and in a fit of self-importance decided he should have been notified before any work was done (FCC rules to the contrary were provided and ignored). The project was at risk because the inspector demanded that the antennas be removed from the roof immediately and the school asked us to do just that, having been threatened with revocation of their occupancy permit for the upcoming school year. ARISS was not pleased and determined that the alternate means of contact, an Internet connection to an existing satellite station, would be used if this change was even approved.

With considerable input, tenacity (maybe stubbornness) and involvement from the radio team we were able to avert disaster. The inspector was appeased by being asked what it would take for him to approve the installation. The changes were minor and did not impact the performance of the station except that he requested the antennas be moved and in order to stay within the 100' cable length we had to install a new conduit to the roof. ARISS was still concerned about the schedule and thought we would not be able to reinstall the antennas and test the station in time. We were given a deadline to do so and met it, with a final prove-it-to-me test on air. We were free to move forward. ARISS had offered the possibility of installing the antennas on the ground for the event and they were never fully in favor of the roof installation feeling it was too complicated and time consuming. The school had a driveway completely encircling it and other businesses used

the same driveway. The ground for the temporary antenna would have required running the cable over the driveway and having it be driven over by trucks and busses and of course it would be a tripping hazard so we prevailed in keeping the antennas on the roof. We were now ready for the day of the contact.

A note here; I have naturally focused on the amateur radio side of the project. In parallel with our effort was the community and communications effort. The benefit of a private school is that there is no school board or town impact, no permissions to get (save for the building inspector) and it allows flexibility of approach. The downside seems to have been the very busy schedule of those who were tasked with outreach, Internet and A/V systems and social media work and coordination with the radio team. Many times the school's POC was behind schedule or hadn't started working on action items that ARISS considered just as important as the station itself. Mostly as last minute pushes some local politicians, newspapers and TV stations were contacted. A live stream was secured and the A/V person from the school worked well with us to interface the station's audio to his system, the stage mics and the Internet livestream feed. I included this because it was very possible that the contact could have been cancelled for reasons not having to do with the station's readiness.

The day of the ISS contact was the one thing that did go seamlessly. The station was moved to the auditorium the night before and no issues occurred with any equipment or cabling. The up and downlink frequencies were provided last minute for security reasons and nobody outside of the radio team was allowed to see or record the radio displays. This day was about the kids, K-12 who had been coached on how to ask questions and pass it on to the next student. Several dry runs had been done with the kids, I got to act the part of the astronaut by hiding in the school with a 2m HT as the kids asked questions. The kids were terrific, funny and articulate. The astronaut was patient and informative. The minutes leading up to the contact were tense. There was a map showing when the ISS would be in view of the antennas. After a few calls to the ISS with no response we were getting worried but after a quick change of antenna polarity and a little more patience we had contact. The signal was strong and clear throughout,

we held the contact for a few minutes past what was expected and all of the questions were asked and answered with enough time left for questions from a teacher and radio operator. The event was covered in the local newspaper and by two Boston TV outlets. ARISS and the ARRL POC was especially pleased, having been in attendance and even allowed that our modified station architecture would be considered going forward as a solution for cost-sensitive projects.

The after-contact activities got messy. Whether it was project fatigue or the lure of a future ISS contact the school drifted away from the ham radio club goal. An agreed upon plan to replace the backup satellite station with a complete HF station for the club was scrapped due to apparent lack of interest and focus. The radio team offered to man the station until the first teacher got licensed, as several had said they wanted to do but there was no response to our outreach. Progress may have occurred after the year plus since my last efforts at engagement, I hope so since we spent so much time trying to engage youth in the hobby and it is a big part of the overall ARISS/ARRL goal. I don't know if the ARRL POC tried to keep things moving on the school club front. The ARRL POC made several attempts to engage teachers and students prior to the contact such as inviting them to his own station and mentoring license exams. Our radio team provided an HF demonstration at the school which several students enjoyed. During the project timeline however, the coordination with the students evaporated. We offered the chance for kids to help with every phase of the project and despite assurances from the teachers none ever showed up. Some students with video gear recorded our test setup and interviewed us but that was just used for the lead up to the contact as filler material. I can only emphasize my opinion that had the radio team been allowed to do more than just build and operate the station (per order of ARISS) we could have drafted and executed a plan to ensure continued interest. One example: had the students visited the ARRL POC's station as an example of what they could look forward to, they and their parents would have been overwhelmed by the scale and cost of this half-million dollar station, it would have been like showing a prospective young pilot trainee an F35 to start.

The radio team really came together to make the project a success. There were bumps in

the road that any club should keep in mind given the demographic of the hobby and the fact that it is a hobby. At times the expectations of the team members became too strict and unreasonable. A volunteer is just that – this was not a signed employment contract guaranteeing hours per day or days per week. And yes, if you are volunteering for a project with strict schedules you can expect some extra requests so as long as you are clear about your availability and limitations, as we all were, you should be fine. You won't keep volunteers for long if they are made to feel unvalued or criticized openly because they weren't available on a particular Tuesday at exactly 9 AM. Personally, I made some fast friendships as a result of my involvement and that is beyond valuation. I honestly would not work on the next project at this particular school but have reached out to ARISS and volunteered to be part of their team. In keeping with the project's personality, ARISS met with me personally in Orlando and Dayton and said they appreciated my offer and welcomed my participation followed by silence. After a few follow-ups I gave up, volunteering isn't something you should have to chase and it made me wary of what it might be like to be on that team. I would look forward to helping a different school with projects and we all could look into youth engagements. It might be an area the club can focus on going forward.

# Vintage Radio and Communications Museum

By Dean- KB1PGH

So I was with my family for a couple of days in Windsor CT and we were looking for things to do and I saw on Google Maps a place called the Vintage Radio and Communications Museum . So I had never heard of the place before other than W1AW being in Newington CT. So we decided to check it out.

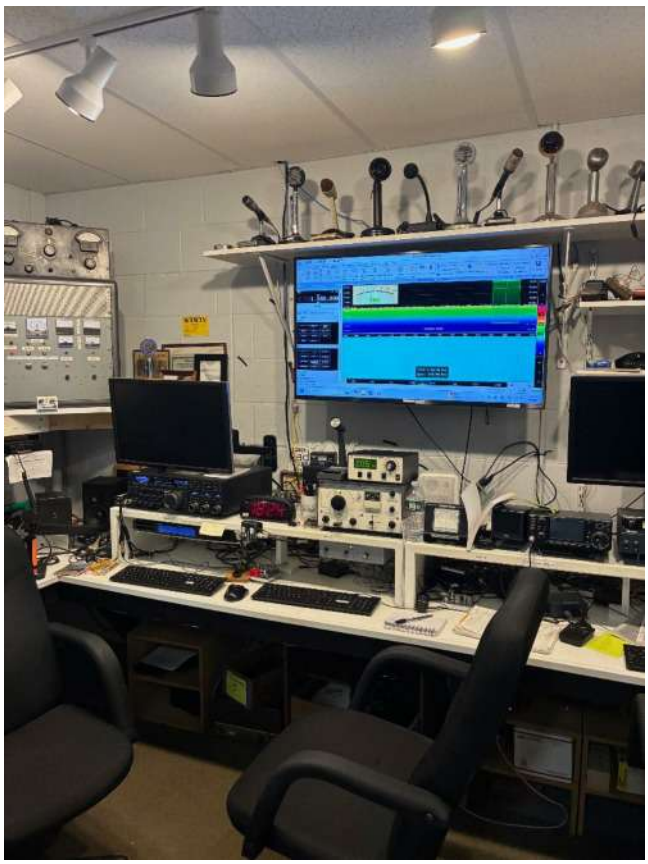
So I have to say that we were blown away by the place and I would highly recommend that anyone who is interested in radio and communications please do yourself a favor and visit the museum. It had everything that you could imagine for the history of radio and communications.

It starts on one end with the very early days of radio and goes through time all the way up to the 70`s. The museum had old telephones and radios and even a small tesla coil. It had old tube style televisions and old military radios. It had old AM and FM transmitters and tubes and Juke Boxes.

The amazing thing is that most of everything in the museum actually works! There is so much to see I can`t cover it all. The museum also has two working amateur radio stations! As you can see in the photos the small tesla coil and my son cliffy using the old style phones and the Juke Box from the 70`s.

The place is open from Thursday to Sunday and they give guided tours. It costs $10 per person and if you are a citizen of Connecticut it is free and it is well worth it. Their website is vrcmct.org . The people there were super friendly and very informative and if you are looking for something to do I highly recommend it. It`s a great lesson of radio and communications going back in time.

# Vintage Radio and Communications Museum



# Ham Radio Users Explain Why They're Worried About AST SpaceMobile's Satellite Plans

AST SpaceMobile's attempt to justify its use of the amateur radio band for its satellites has done little to assuage concerns from the ham radio community.

"AST is again economical with the truth," an amateur radio operator in Germany named Mario Lorenz wrote to the FCC on Friday.

AST SpaceMobile wants to use the 430 to 440MHz bands outside the US to control and track its constellation of 248 satellites, which promise to beam cellular connectivity to smartphones across the globe. However, these bands have long been allocated to amateur radio operations, raising fears that AST's operations will create widespread interference.

On Tuesday, Texas-based AST defended using the radio band, telling the FCC that any radio interference should be minimal. It would use the 430 to 440MHz band for "very limited, non-routine" use, such as for "emergency operations when other frequency bands are unavailable."

However, the amateur radio community says AST is already using those bands. On Friday, AMSAT-Deutschland sent a letter to the FCC that says amateur radio users have detected signals from AST's satellites over the radio bands.

The claim is therefore either a misrepresentation or a deliberate falsehood," AMSAT-Deutschland wrote. In particular, AST's BlueWalker-3 satellite was spotted using the radio band up until July 23 as the amateur radio community began campaigning against the spectrum use.

Ironically, AMSAT-Deutschland operates as a group devoted to the advancement of satellite communications, along with amateur radio satellites. In the letter, the group even noted: "We applaud AST SpaceMobile's ambitious goals. However, innovation must not come at the expense of internationally recognized and community-supported amateur radio services."

AMSAT-Deutschland also tells PCMag the clash with AST has hit a nerve with the amateur radio community over concerns it could "set a precedent" if the FCC greenlights the company's use of the 430 to 440MHz bands for satellite control. In addition, the group is worried that the FCC is "effectively shifting the resulting interference risks to other countries."

"If similar authorizations are granted to other commercial operators, the 430-440 MHz band could gradually become unusable for amateur radio. What is framed as 'exceptional use' today risks becoming the norm tomorrow — to the detriment of a long-standing and diverse community of amateur radio users," the group said.

"It also raises questions about AST's technical maturity," the group added. "Other large-scale satellite operators — such as SpaceX, with over 6,000 Starlink satellites in orbit — appear to manage TT&C (Telemetry, Tracking, and Command) functions without resorting to use of the amateur UHF band."

AST didn't immediately respond to a request for comment. But the company submitted a third-party analysis to the FCC that claims to show the risk of interference to be "extremely unlikely" to amateur radio operations.

However, Mario Lorenz, the amateur radio user who helped kick off the protest campaign, told the FCC on Friday that the third-party analysis was flawed. "Yet again, AST tries to get away with handing in only half the homework it was supposed to do," Lorenz wrote. "Despite its title, the study addresses only a single scenario of interference in the AMATEUR RADIO SATELLITE service," not amateur radio use on the ground.

# To all CAARA Members,

As a reminder, the September Members meeting is when we will elect the officers and board members to fill any open slots. The Nominating Committee, after discussions with current and past officers and board members as well as other CAARA members, has completed its work and has generated our recommended slate for the open officer and board member positions.

Our slate for 2025 is:

## Current Officers and Board Members:

**Officers:**

President - Brandon Hockle

Vice President - Brian Lloyd

Treasurer - Jon Cunningham

Co-Treasurer - Larry Swift

Clerk - Cutter Herlihy

**Board Members**

Peter Leighton

Kevin Lyons

Bill Poulin

Neil Weisenfeld

Tom Stephenson

Paul Kruger

Jake Hurd


## This is the 2025 slate for 2025 election is:

**Officers:**

President - Brandon Hockle

Treasurer - Jon Cunningham

**Board Members**

Peter Leighton

Kevin Lyons

Bill Poulin

Neil Weisenfeld


What a difference a few years make, note the new upgrades to the club…refinished floor, new furniture, and new ham radio gear.