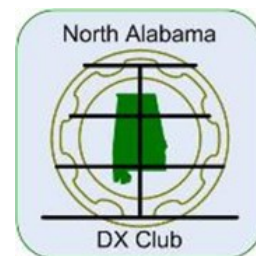


The LongPath

March 2022 — Volume 46 Issue 3

A North Alabama DX Club Publication



Contents:

From the President

Why Should I Care
About Sun-
spots?

What is a QSO?

Stock Certificates:
A Documented
History of Ra-
dio

New Propagation
Software

The SWR on My
Coax is 1.5.
That's Way Too
High!

Products in the
Spotlight

Club Business and
Announce-
ments

Upcoming DX Con-
tests

DXpeditions in
March 2022

Contributors:

AC4G

AI4QT

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NN4NT

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From the President

By Bob DePierre, K8KI

This month I had to spend more time on membership activities: finding new members and the dues increase to support DXpeditions. We're a small club, but we have a real need for new members each year. We depend on that new blood.

If you look at the member roster page on our website, you'll see a couple of codes on the right after each name. Of course, it takes constant effort to keep this page up to date, but the second to right column shows whether the person is a regular, inactive, or emeritus member. We only have one living emeritus member. We'd like everyone to be a regular member, which means your dues are up to date. If your dues lapse, you become inactive, but we won't cross you off the list...ever. The last column shows the last year you paid dues, which is hopefully 2022. We'll just code folks who are not current as inactive, as of about April 1. I see a few names ...

We've been discussing the budget a lot lately, and I think it's pretty much under control now. There have been a number of changes. We're moving away from the higher rent venues for the DX Banquet, and lowering the price as a result. We intend to make a profit on the banquet, with the intention

of better supporting DXpeditions...we hope. In order to meet our targets, the membership tells me that it's time to raise the dues by \$5. Now the dues are spelled out in the Constitution Bylaws and there are rules for how we must make the changes. We'll make the Long Path notice this month, and next month we'll vote on it, with the change to take place then, assuming the measure passes.

So, a word to the wise, you might want to pay your dues before they go up.

We're still looking at those 5 venues for the DX Banquet. There is a preferable one. I had thought free beer would be an incentive, but it didn't turn out to be, so we won't do that.

Our presentation this time will come from Steve Werner/AG4W, titled "EME Journey." Steve recently wrote a 7-page article for CQ Magazine on the subject. A British club saw it and asked him to do a presentation for them on Zoom, which he did. So, you know this is a pretty popular discussion. I have been following Steve on his EME adventures for quite a while, and I am impressed. He has met more engineering problems and extreme challenges than others would see in a lifetime. He has burned up coax, meters, and preamps,

From the President (continued)

all with a homemade LDMOS amp. The path loss is over 250dB, and the moon is a moving target. How can something as crazy as this even be remotely possible? Come on out and listen to this!

So, let's have the next NADXC club meeting on Tuesday, March 8, at the Museum of Information Explosion at 1806 University. The Zoom sign-on will be exactly the same as in the past. I'll send members the Zoom invitation on Sunday just before the meeting. Again, remember to pick up



The Museum of Information Explosion

your dinner on the way over. I'll get a few of you to help set up the tables and we'll just eat here. I'll open the doors by 5:45. The meeting will start at 6:30, and the program by 7:00.

Why Should I Care About Sunspots?

By Rob Suggs, NN4NT

You really shouldn't. It's not the sunspots that drive the ionosphere. It's not even the Solar Flux Index (SFI) aka F10.7 solar radio flux at 10.7 cm wavelength (2800 MHz). But those are pretty good proxies for what you should really care about, solar extreme ultraviolet radiation or EUV. That's the stuff that matters for good propagation. When there are more sunspots as we are seeing now that cycle 25 is on the rise, there is generally more EUV emission from the Sun. When the SFI is higher, there is generally more EUV emission from the Sun. Both of those are easily observed from the ground so they are used to tell us what is going on "up there" above the atmosphere. We have satellites to make the observations of EUV now but that wasn't always the case so we had to rely on the ground-observable proxies. The EUV doesn't make it to the surface of the Earth (thankfully) but is absorbed at

about 200-400 km altitude, not coincidentally where the F layer of the ionosphere occurs. It is the EUV photons that interact with the upper atmospheric oxygen and nitrogen, ejecting their electrons. We can rattle those electrons with our

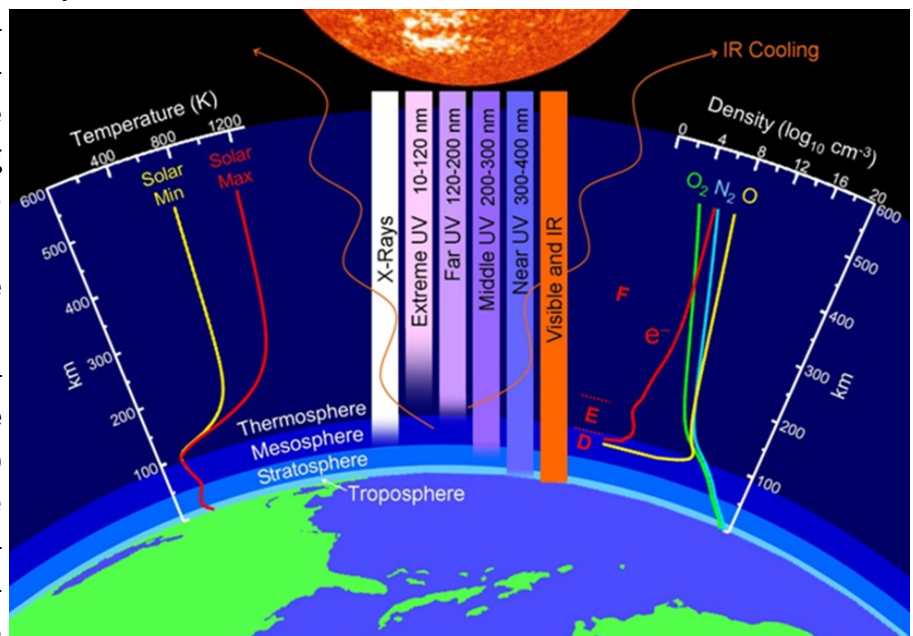


Figure 1 – Depth of penetration of various wavelengths of solar radiation into Earth's atmosphere. Note that the EUV is absorbed high in the atmosphere and X-rays make it deeper.

(This photo from <https://www.pinterest.com/pin/393994667376163139/>)

Why Should I Care About Sunspots? (continued)

RF bending our signals to make HF contacts.

So as the solar cycle progresses, we get more EUV and a denser ionosphere leading to better HF propagation, especially on the higher bands. But there is also bad news in increasing solar activity: the chances for X-ray flares increase. X-rays penetrate deeper into the atmosphere, ionizing it at around 80 km and generating the D-layer. Because of the higher density of neutral atoms and the greater the chances of collision of those electrons wiggled by your RF signals, there is more absorption especially at the lower frequencies of 40 and 80 m. If there is a substantial X-ray flare, there could be a blackout of propagation at these frequencies. If it is a really big X-ray flare all the HF bands could be blacked out. Here is a link to the NOAA model of this: [https://](https://www.swpc.noaa.gov/products/d-region-absorption-predictions-d-rap)

www.swpc.noaa.gov/products/d-region-absorption-predictions-d-rap and an example of a big one is shown in Figure 2. The good news is that X-ray flares are usually short-lived and once they are over the electrons are quickly reunited with their ions and the absorption goes away. Also, if the Sun isn't up, the D-layer for our part of the world isn't bothered and neither is our local RF propagation.

So where does that "good for DX" UV radiation come from? The areas around sunspots have strong magnetic fields and a lot of stored energy in the charged particles. This heats the Sun's chromosphere and lower corona in the vicinity of those spots generating more EUV radiation. That propagates to Earth, jacking up the F layer and making hams smile. Figure 3 shows the Sun in various wavelengths so you can see how the darker sunspots in visible light are actually very bright in EUV and X-rays.

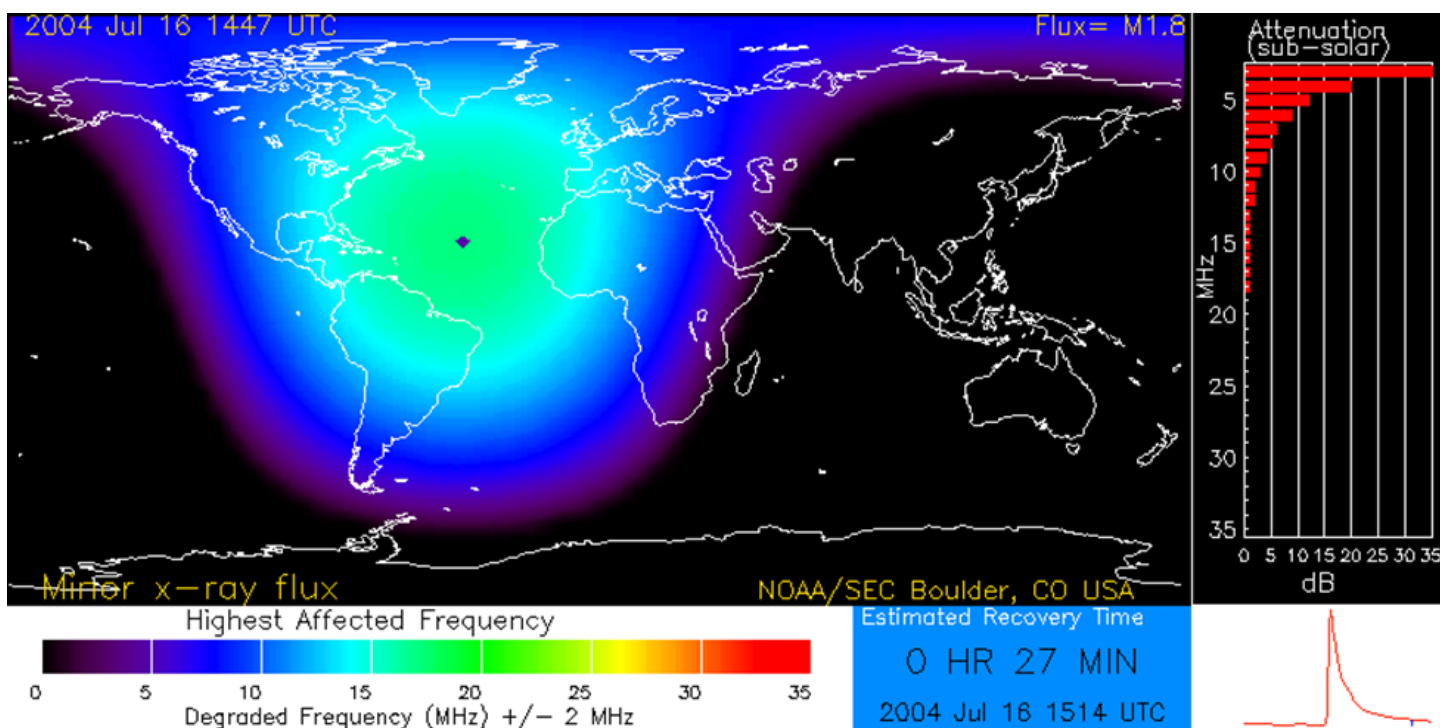


Figure 2 – Model of shortwave fade due to a solar X-ray flare in July 2004. Color indicates maximum frequency of degradation. The right panel shows dB of attenuation as a function of frequency. It is obviously noon over the mid-Atlantic.

Why Should I Care About Sunspots? (continued)

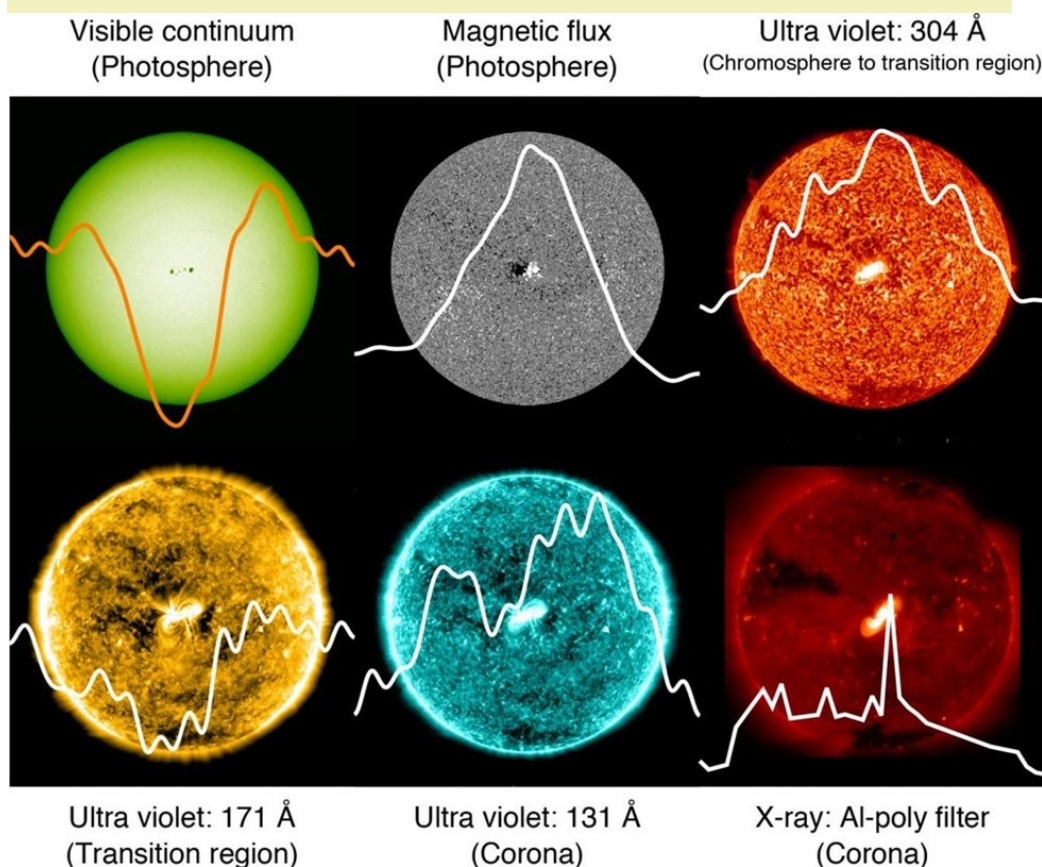


Figure 3 – The images show a group of sunspots in different wavelengths. The graphs are the time history of that solar radiation as the sunspots crossed the disc of the Sun (ISAS/NAOJ).

(This photo from https://astronomycommunity.nature.com/cdn-cgi/image/quality=90/https://images.zapnito.com/uploads/7xcc0QAQTyal84ZGRVHp_245602_web.jpg)

There is a lot of real-time data and explanations of the various phenomena that affect HF propagation at <https://www.swpc.noaa.gov/communities/radio-communications>. Check it out next time you get on the air and see if you can hear the difference when the solar activity is higher. To track the solar cycle progress, check out <https://www.nasa.gov/msfcsolar>. It is generated by my team at MSFC. The 50th percentile is the most likely outcome. NOAA has a similar forecast at <https://www.swpc.noaa.gov/products/solar-cycle-progression>. Note that the predictions are 13-month smoothed averages while the jagged curves are observed monthly averages.

What is a QSO?

By Bruce Smith, AC4G

Many years ago, I remember when I initially began chasing DX to increase my DXCC country count, I was on the air quite often, sometimes giving up quality time with my family when I should have been with them, perhaps helping with some homework or playing with the children. Chasing DX can be contagious, especially if you are seeking the coveted ARRL DXCC Award, the Worked All Zones Award, the IARU Worked All Continents

Award, or some of the CQ Awards. In doing so, sometimes some would stoop low finding a rare DX station who would only operate in a “net” with a net control station in charge. The net control would ask for the last two letters of your callsign, putting each ham needing this country on a list, and giving each DX ham operator (DX'er) a chance to “work” the DX station. Many hated doing this because this could get you a reputation of being

What is a QSO? (continued)

called a “net lizard”. Who wanted this reputation? But I admit, I have done this to check off those super rare DX countries on my DXCC list. The process to do this would require the station needing the DX to send their callsign and signal report. Many times, the net control would stress the signal report or sending the signal report a few times. If the DX or the station did not get the signal report correct, the net control would shout out in an embarrassing tone to the station needing a new country, “Not a valid QSO! Next station - Golf Charlie your turn! Give the DX station a call!” Well, this had me often wondering what information constitutes a valid ham radio contactor QSO. Over the years, I have heard a few comments defining a valid QSO, but they were often different to a small degree. Let’s spend a few minutes to discuss this curious topic.

First of all, I believe we would all agree that both ham stations need to log their callsigns, date and time of the QSO, the frequency or band, and the mode. What other information is pertinent to have a valid QSO? When I hear a DX station calling CQ, I respond by providing my callsign. He repeats my call and usually gives me a 599 (if operating CW) or 59 (if operating SSB). I respond by giving him a report and say “Thanks -73!” There is no reason to give their callsign because the DX station is rapidly making QSOS before the propagation changes or drops. The question is, “Did I make the log?” In the past, I had to send a card after the Dxpedition. Once in a while I got the dreaded “not in the log”. In the current world we live in, I can use CLUBLOG or the DX station’s web site and get instant gratification knowing that I made the log in real-time and almost real-time. If I am not in the log, I can work the station where I missed them before they pack-up and leave the

DXCC entity. What if I inaccurately logged their signal report? For OQRS, it does not matter. OQRS does not require a signal report. Knowing the net control station wants a good signal report, but OQRS does not need a signal report, the question still remains, “What information should be used to make a valid QSO?”

In the March 1957 edition of QST Magazine, “The World Above 50Mc” article, Edward Tilton, W1HDQ wrote the following:

“As amateurs we are presumed to be engaged in communication. This implies exchange of information, not just identification of one another. Thus, a reasonable definition of a QSO, for amateur purposes, would seem to be an exchange of useful information.

The minimum exchange for two-way work to be considered a contact has been fairly well standardized on a two-stage procedure: positive identification of calls at both ends, and the complete exchange of signal reports. The latter is about the shortest item of information that can be transmitted between two stations that will have any meaning at all. The form varies with various operating activities, but the basic idea of mutual exchange remains in all.”

Even though Edward Tilton, W1HDQ has defined a valid QSO way back in 1957, I take issue and can provide some modern-day operating events that eliminate the signal report, that are still considered valid QSOS. Let’s look at some examples of exchanges requiring signal reports and other examples that do not require signal reports in the exchange of valid QSOS.

This past weekend’s ARRL International DX CW Contest required signal report and state for US operators, while DX stations provided a signal report and power. The exchanges in this particular contest required both forms of exchange infor-

What is a QSO? (continued)

mation (not only signal report) to make a valid QSO because of the difference in location.

The upcoming North Carolina QSO Party (NCQP) requires the following information to have a valid exchange. Per the NCQP rules, In-state stations work everyone, send callsign, and NC county. Out-of-state stations work NC stations only and send callsign and state/province, or DX. Sending signal report (i.e., 59) is optional meaning not required or necessary, but can be sent.

Many VHF contests require only a 4-character grid square for the exchange. A signal report is not required. There are several contests requiring only the grid square. For example, the recent ARRL January VHF Contest is one contest that requires US and Canadian stations work as many amateur stations in as many different 2 degrees X 1 degree Maidenhead grid squares as possible using frequencies above 50 Mhz. Stations outside the US & Canada must work stations in the US and Canada. The exchange is only the 4-character grid square.

The exchange for the North American QSO Parties requires North American stations to send their name plus state/DC/province/country and non-North American stations to send only their name. A signal report is not exchanged.

For the Worked All Continents Award, the IARU HF Manager's Handbook and the VHF Manager's Handbook both state "a definition for a valid QSO is: A valid contact is one where both operators during the contact have" the following:

1. Mutually identified each other (callsign of both stations at each end)
2. Received a report, and

3. Received a confirmation of the successful identification and the reception of the report. (Initiating station says QSL or thanks to confirm report)

Logbook of the World (LoTW) managed by the ARRL, which is used for DXCC awards, states, "A QSO submitted to LoTW must at minimum specify"

1. Your QSO partner's callsign
2. The date and time at which the QSO started, in UTC
3. The band on which the QSO was made
4. The mode or mode group with which the QSO was made
5. If the QSO was made via a satellite, its propagation mode must be set to "SAT", and it must specify the name of the satellite used.

We can see that signal report is not necessary, only the information previously shown to get a QSO match in the LoTW system.

For the last example, many of us who have been using WSJT-X software to make FT4/FT8/JT65 QSOs, the September 2018 issue confirms what completes the QSO exchange. The software is setup to send the three IARU exchange pieces of information, but is not limited to that information. Joe Taylor, W1JT states, if you receive a RRR or RR73, this is a definite acknowledgement that all of your information was received and the QSO is officially complete. Users of WSJT-X know that signal reports and/or 4-character grid square information and/or a station state can be sent and received when making contacts. WSJT-X software has the necessary exchange protocol for different operations (DX/contests/EME) imbedded in the software.

In conclusion, even though in the past I may have assumed that a valid QSO must include a signal report, I hope this article has conveyed the true understanding that the exchange of a QSO can vary depending on the situation. The "exchange of information" depends on the situation and the rules of the contest. Many contests do not require signal reports. QSO exchanges can include merely names, grid squares, state, etc. It is incumbent on the ham operator/DXer/

What is a QSO? (continued)

contester to know what information is required for any situation. If you are operating on a DX net, then perhaps the signal report is mandatory. If you work DX, the DX station will listen for their signal report after acknowledging your callsign and sending a signal re-

port to you. If you are in a contest, review the rules because a signal report may not be necessary as previously discussed. I have never found anything anywhere that states that exchanging “73” is required in making a valid QSO. If “73” is exchanged, accept it as a cordial method to wish best wishes to each other confirming the contact. I trust we all better understand what a valid QSO exchange consists of.

Stock Certificates: A Documented History of Radio

By Wil Robertson, AI4QT



The vignette depicts the Roman Messenger God Mercury

The neat aspect of our amateur radio service, since officially it is considered a service not a hobby after all, is that our radio interests allow us to explore areas that can then turn into a hobby, or even hobbies in the classic sense. For clarification, here is the difference between a hobby and our radio service. Tinkering with, or building our radios would be considered the hobby, whereas being on the airwaves to communicate would be the radio service. Of course, if you prefer to call ham radio a hobby this is fine, even though it is legally defined as a “service” by the Federal Communications Commission.

As radio became common in the early twentieth century, radio enthusiasts started collecting and accumulating a hodgepodge of items relating to radio. Accumulations of capacitors, tubes, condensers, coils, and wires may not have

been considered a hobby but it was the beginning of the hobby of home-brewing radio equipment. Eventually, the exchanging of QSL cards and collecting the stamps from envelopes which contained the cards, became a hobby in the traditional sense for many hams.

One’s interest then, in radio, can open other areas that we can pursue to enrich the whole radio experience. An area of radio I developed into a hobby in the last few years is the collecting of redeemed stock certificates depicting the history and advancement of radio and communication. When I began my radio thematic collection of stock certificates a few years back, I discovered quickly that this niche of collecting old stock certificates had a name—Scripophily. The word is derived by combining two words from English and Greek. The prefix “scrip” refers to an ownership

Stock Certificates: A Documented History of Radio (continued)

and the suffix “philos” references love.

Today it is uncommon for corporations to print actual paper stock certificates since these too, have become electronic statements. However, there are sources where you can purchase vintage and redeemed stock certificates of corporations depicting the advancement of radio communication.

Most stock certificates can be acquired at modest costs through eBay or other online merchants like Ghosts of Wall Street and George LaBarre Gallery. There are rare and highly collectable

“radio” stocks such as RCA or De Forest Radio Company which command a premium and are sought after by die-hard collectors.

Occasionally, stock certificates are found in families as inheritance. Some certificates may have no value other than the paper they are printed on. Some certificates may appear to be worthless and have no value as a security but they may still have value as a collectible. Examples of these would be the early computer game manufacturer, Atari, or an early computer manufacturer such as Apple, especially those issued when John Sculley was the CEO of Apple Computer.

Stock certificates are miniature works of art. If you look closely at a certificate, you will no-



A premium price for an Apple Computer Stock with CEO's John Sculley's name is a sought after certificate even when redeemed. John Sculley was CEO when Steve Jobs left the company for a few years before Jobs again came back to Apple.

Stock Certificates: A Documented History of Radio (continued)

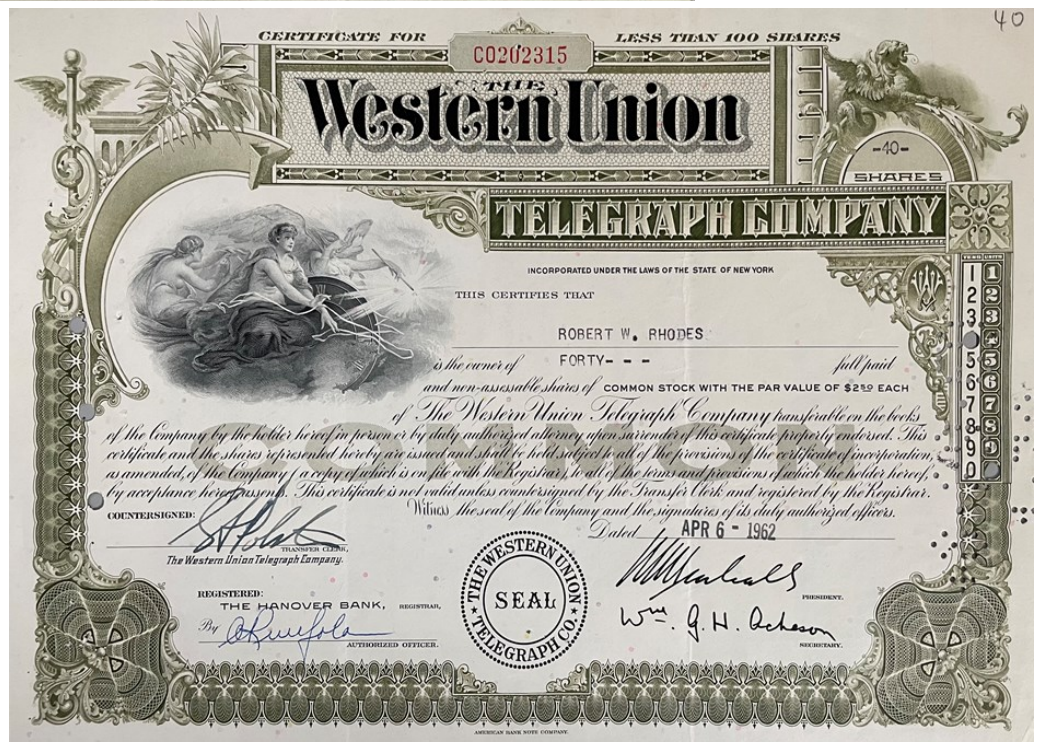
tice that many are engraved and embossed like currency. As you study the engravings on the certificate you can get an idea of what a particular corporation is trying to portray, which is usually a message of strength and industry.

These are a few of the stock certificates I own depicting the interesting story of radio's history.



Marconi Wireless Telegraph Company: In the early days of telegraphy at sea, most shipping lines contracted with the Marconi Company to transmit and receive telegraph messages. As a side, the telegraph operators on the R.M.S. Titanic were employees of Marconi Telegraph and not the White Star Line which owned and operated the Titanic.

Western Union Telegraph Company was at one time the premiere telegraph company in the world. Although Western Union transmitted its last telegram on January 27, 2006, it still exists in 2022 as a financial services company. What many may not know is that Ezra Cornell, the founder of Western Union, was also the founder of the New York university which bears his name. Yes, that is right, Cornell University.



Stock Certificates: A Documented History of Radio (continued)



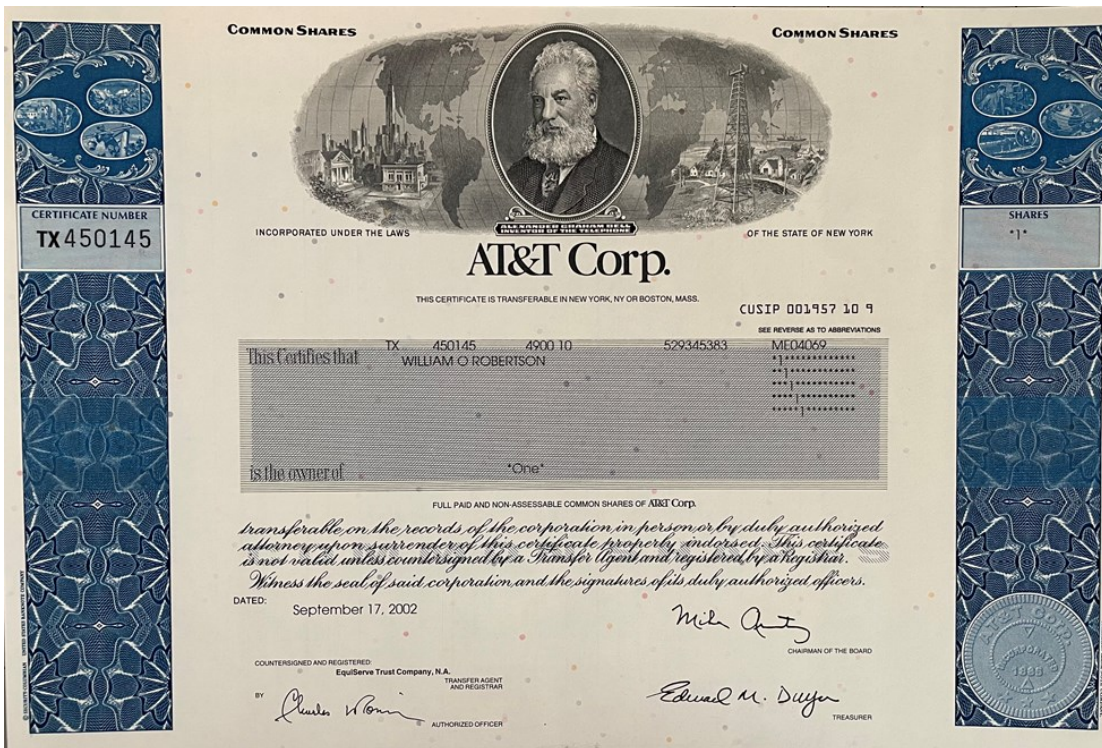
Collins Radio Company
The company today exists as Collins Aerospace. If you have been a radio amateur for any length of time you will have heard of this manufacturer. Although their amateur radio line was discontinued decades ago, Collins was, and still is known for the quality of their electronics and avionics.

Motorola, Inc. The company is now defunct, having emerged as several reiterations in recent years. Motorola was a leader in mobile communications from the start. As early as the 1930s, Motorola began selling AM radios to be installed in automobiles. Around this time also, police departments were beginning to install Motorola "radiophones" in patrol cars.



An interesting tidbit concerning the origin of the name, Motorola. "Motor" was referenced to motor car and "ola" was referenced to Victrola—as in the generic name for early phonographs. Ola was also a popular suffix of many companies during the 1930s. Examples being Radiola (a tabletop radio from RCA) and Victor Victrola Electrola (a console radio/phonograph from the late 1920s to early 1930s).

Stock Certificates: A Documented History of Radio (continued)



AT&T (Atlantic Telephone & Telegraph)

In many ways the telephone and telegraph are interrelated with a rich history contributing to technologies which ham operators helped contribute. Most non hams do not ponder to consider that the pervasive cell phone is an actual radio device. Then again, I doubt many non-hams even think to consider that a garage door opener or a microwave is a

Years ago, you could easily purchase one share of stock in a company without being charged a huge broker fee. Redeemed stock certificates can still be purchased at modest costs. This certificate shows Mr. Alexander Bell himself.

radio too—and to our consternation as hams, so are wall-warts!

In summary, a corporation's stock certificate, especially those contributing to the development of radio, or electronics in general, when framed and displayed, can definitely add an additional interest to our radio passion.

New Propagation Software

By Bob DePierre, K8KI

We have found a variety of methods to predict and portray HF propagation. There are good software programs to graphically predict the future, and even to “now-cast” (predict what is going to happen today based on what happened yesterday). But I haven't seen one to show me what is happening now, based on data that is happening now. Until I read an article by Pete Smith/N4ZR in

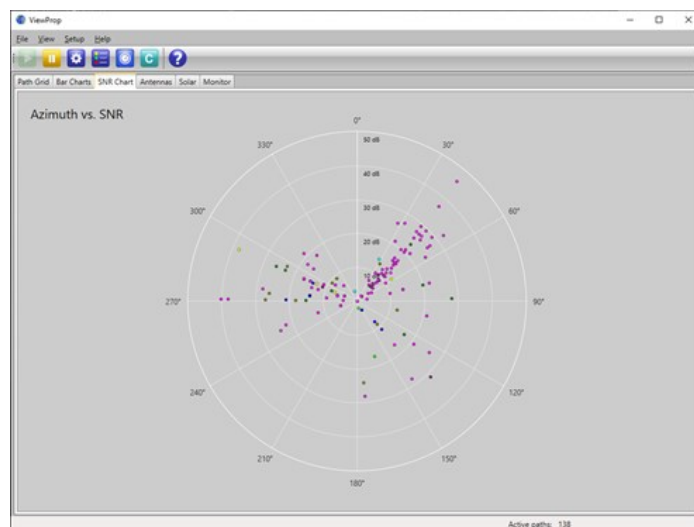
the Jan/Feb 2022 issue of the National Contest Journal. I recommend reading it, online as necessary.

The software is called ViewProp and is available for download by members of the developer's IO group. You can join here: <https://groups.io/g/viewprop/>. The program integrates nicely with DX Atlas, an excellent ham radio map

New Propagation Software (continued)

of the world.

When the program first comes up, you just hit the “Go” button and the table below starts populating at a rate of about one per second from telnet for the reverse beacon network, RBN aggregators, CW Skimmers, and AR clusters. I sorted the list below, for example by band (descending), and then by signal-to-noise (SNR) ratio (descending). There are some very useful graphics available. The one below plots each spot by azimuth and SNR. I can tell the spots to timeout when I’d like, 10 minutes, for example, so I can be sure they are all very recent. If I’m in a contest, I can quickly see what direction I should be pointing my antenna. I can also see which bands are most



Above: Spots plotted by azimuth and SNR

active.

The DX Atlas map is the one I watch the most. In the azimuthal mode, I can tell it where I’m located so my location will always be the center of the projection. In the figure on the next

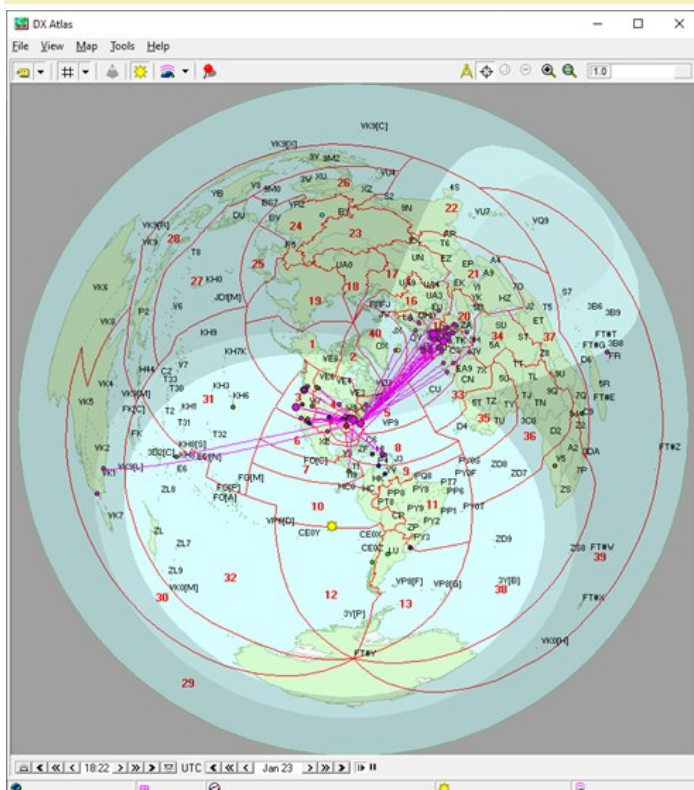
DE	Freq	Band	DX	SNR	WPM	Type	Ct	CQ	ITU	Pfx	DXCC	Location	St
OH0K/6	3557.5	80m	N4ANE	14	19	CW+	EU	15	18	OH6	OH0	Aland Islands	
BD8CS	3526.0	80m	N3RA	3	26	CW+	AS	24	44	BD8	BY	China	
KD7YZ	7017.0	40m	W0ECS	38	22	CW	NA	4	7	W0	K	USA	
KD7YZ	7120.0	40m	K85EBB	13	12	CW	NA	4	7	K85	K	USA	
3V8SS	7024.0	40m	K30GN	12	25	CW+	AF	33	37	3V8	3V	Tunisia	
AC0C-1	7051.7	40m	K7GUD	7	15	CW	NA	3	6	K7	K	USA	
W4KAZ	10111.9	30m	C8RVD	28	35	CW	AF	37	53	C8	C9	Mozambique	
W4KAZ	10111.9	30m	II7WRTC	26	35	CW	EU	15	28	II7	I	Italy	
K4PP	10129.9	30m	WRSU	26	30	CW	NA	4	7	WRS	K	USA	
K7EK	10124.9	30m	N5XE	23	27	CW	NA	4	7	N5	K	USA	
HG8A	10106.0	30m	N1BUG	23	24	CW+	EU	15	28	HG8	HA	Hungary	
W4AX	10122.0	30m	W3IL	20	25	CW	NA	5	8	W3	K	USA	
KP2RUM	10122.0	30m	W3IL	17	25	CW+	NA	8	11	KP2	KP2	US Virgin Islands	
K07SS	10122.0	30m	W3IL	15	25	CW+	NA	3	6	K07	K	USA	
W4KAZ	10110.0	30m	E74ZZ	11	25	CW	EU	15	28	E74	E7	Bosnia-Herzegovin	
K3PA-1	10113.0	30m	K6EE	8	18	CW	NA	3	6	K6	K	USA	
W4KAZ	10112.9	30m	OK2AN	6	24	CW	EU	15	28	OK2	OK	Czech Republic	
K07SS	14054.0	20m	N2BXC	40	14	CW+	NA	3	6	K07	K	USA	
K07SS-7	14054.0	20m	N2BXC	38	14	CW+	NA	3	6	K07	K	USA	
PA1T	14021.5	20m	W420AX	37	24	CW+	EU	14	27	PA1	PA	Netherlands	
AC0C-1	14050.2	20m	NP4IW	34	16	CW	NA	8	11	NP4	KP4	Puerto Rico	
W1NT-2	14043.4	20m	N5BO	32	23	CW+	NA	5	8	W1	K	USA	
VE2WJ	14043.4	20m	N5BO	31	23	CW+	NA	5	9	VE2	VE	Canada	
K1TTT	14043.4	20m	N5BO	29	23	CW+	NA	5	8	K1	K	USA	
K9TM-4	14028.2	20m	K9QVB	29	33	CW	NA	4	8	K9	K	USA	

page, I told it to draw lines from me to all of the 20m spots. In this case you can see strong propagation to Europe, and just a few to Australia. Of course, you can also see the grayline superimposed on the map. But I also told it the beam width for my antenna, which is now pointed at 045°, as you can see. Now I can see at a glance the total coverage for my antenna!

There are more settings available than I can describe here, and some that I don’t even understand...yet. I need a better sense of when to change bands, so as to make best use of my time. I have also used programs HamCap, IonoProbe, and ITS HF Prop. Take a look at these and let me know what you think.

The table can be sorted using various criteria. SNR is used above.

New Propagation Software (continued)



Above: DX Atlas map view of spots

2022 NADXC Officers and Directors

President	Bob De Pierre, K8KI
Vice-President	Steve Molo, KI4KWR
Sec./Treasurer	Chris Reed, AI4U
Directors:	Bruce Smith, AC4G Fred Kepner, K3FRK
(Ex-Officio)	Steve Werner, AG4W

How to Join

Come to a club meeting or send in an application by mail (form on www.NADXC.org)

This edition of The LongPath published by:
Fred Kepner, K3FRK

The SWR on My Coax is 1.5. That's Way Too High!

By Bob DePierre, K8KI

How many times have you heard this complaint? Is it valid? Have you ever wondered how high is too high? Figuring it out isn't all that hard. All the explanations are in the ARRL Handbook for any year. For the book I used, the full explanation takes less than two pages. The algebra for the equations might be a bit tedious if you are working them out by hand, but I just copied them into an Excel spreadsheet. Easy!

If you know your SWR and transmit power, you can find the reflected power from:

$$SWR = \frac{1 + \sqrt{\frac{P_f}{P_r}}}{1 - \sqrt{\frac{P_f}{P_r}}}$$

P_f is your forward power and P_r is the reflected power. Let's assume your forward power is 100 watts, you have no transmission line losses (fat chance of that), and that you are operating in the HF region. Your reflected power versus SWR would look like this:

P_r	SWR
0.1	1.07
1	1.22
11	1.99
20	2.62
40	4.44
50	5.83

The SWR on My Coax is 1.5. That's Way Too High! (continued)

Actually, this equation is valid no matter what frequency you are using, although other factors complexify it as the frequency goes up. I can't tell you how safe you need to be with your equipment, but at an SWR = 2.0, the reflected power will be 11 watts. Similarly, for an SWR=1.22, your reflected power will be 1 watt. Can your 100-watt transmitter withstand this?

Now let's include transmission line losses. Try a mid-HF frequency of 10MHz where the line losses are published. Assume a 100-foot piece of RG-213, and an SWR=1.5.

I looked in both my 2012 and 2020 ARRL Handbooks and found the formula for the total mismatched line losses to be on page 20.5 (equation 11) of both books. It's a little long to show here, but you won't have trouble finding it no matter what year handbook you may have.

For this case, your line losses would be 0.43dB, or 9.4 watts, going out 100 ft to your antenna. Using the above equation, your load would

reflect 3.6 watts back toward your transmitter.

Your radiated power is then $100\text{w} - 9.4 - 3.6 = 87$ watts. That reflected power would lose another 0.43dB on the return trip, but in this case that would amount to 0.3 watts. So, the actual power incident at your transmitter would be $3.6 - 0.3 = 3.3$ watts.

3.3 watts hitting your transmitter doesn't sound like a lot considering your forward power was 100 watts into a SWR=1.5. Yet I often hear other hams complaining about their SWR being that high. That's about 1/3 of the forward line loss.

Many hams buy expensive antenna tuners to avoid this problem. Yet if you have an SWR=1.5, after installing the tuner you still have SWR=1.5 on the line and your antenna won't work any better. Your line losses don't change as well. And you spent all that money to protect yourself from 3.3 watts.

This situation is generally always true at HF, but the story is totally different at VHF and up. I can send my SWR spreadsheet to anyone who wants it.

Products in the Spotlight

By Steve Molo, KI4KWR

RigExpert STICK PRO

One of my most popular antenna analyzers has become the RigExpert line but one in particular is often SOLD OUT online, the STICK PRO. Also available is the STICK 230, which only covers up to 230mhz. Many have asked for UHF coverage and RigExpert met the demand right away. This analyzer uses an 18650 battery for long use, not like older units that use AA batteries and last less than an hour at times. One of the biggest advantages of the new unit is the fact you can use

the Bluetooth and software on your cellphone and capture readings. Specifications have been listed and the review I did last year on the analyzer with HamRadio2.0 showed the high demand for a handheld tester, and this meets that.

Frequency range: 0.1 to 600 MHz

Frequency entry: 1 KHz resolution

Measurement for 25, 50, 75, 100, 150, 200, 300, 450, and 600-Ohm systems

SWR measurement range: 1 to 100 in numerical modes, 1 to 10 in chart modes

Products in the Spotlight (continued)

R and X range: 0...2000, -2000...2000

Display modes: SWR, return loss, R, X, Z, L, C, Magnitude and Phase Angle at a single frequency, SWR chart, 100 points. SWR chart at fixed HAM bands by IARU Regions, 100 points, Multi mode – to check your multiband antenna promptly, Cable tools (Velocity factor & Cable length measurer, Stub tuner, Cable loss chart, Cable impedance chart), TDR.

Connector: N-type.

Output signal shape: square, 0.1 to 600 MHz

Output power: -10 dBm (at 50 Ohm load).

Power:

One 3.7V Li-Ion battery, type 18650

When the analyzer is connected to a PC or a DC adapter with a USB socket, it takes power from these sources

Interfaces:

220×220 color TFT display

2×3 keys on the water-proof keypad

English menus and help screens

USB connection to a personal computer

Bluetooth: v.4.2

BLE Single-mode, Class B

Dimensions: 185 mm x 40 mm x 33 mm (7,3 in x 1,6 in x 1,3 in)

Operating temperature: 0...40 °C (32...104 °F)

Weight: 185 g (6,5 Oz) with battery



Right: RigExpert
STICK PRO

Magnetic Loop Antennas

ICOM AL-705

Magnetic loop antennas have been very popular lately in the QRP and 100 watts (or less) market.

The first one I will cover is the Icom AL-705, a 40-10m magnetic loop antenna. Icom reached out to Alpha Antenna and partnered with them for this very successful build. With a max power of 20w on SSB and 10w on CW/Digital, it is a good match for the IC-705, only going up to 10w on 13.8 volts of power. Everything is included with the package: 15 ft of coax with BNC and PL-259 connectors on the ends.



Above: ICOM AL-705

Chameleon F-LOOP3

Another popular magnetic loop antenna on the market is the F-LOOP3 from Chameleon. This antenna works from 80 to 10m and has a diameter of 3ft.

Loop antennas have been used for years in professional defense, military, diplomatic and ship-board communications which require robust and reliable general coverage for radio communica-

Products in the Spotlight (continued)

tions. Magnetic loops provide amazing performance from an antenna that requires no ground plane for efficient operation. For this reason, these antennas are great for those radio operators hamstrung by their HOA, requiring them to use small whips with little to no success.

This is an exciting new product from Chameleon Antenna. Easily deployable HF magnetic loop antennas, also called small transmitting loops, have been routinely used for many years in military, diplomatic, and shipboard HF communication links, where robust and reliable general coverage radio communication is a necessity. These antennas have only recently become commercially available for amateur radio. The real practical advantage of the small loop, compared to a short vertical whip tuned against earth or a full-sized vertical antenna, is the loop's freedom from dependence on a ground plane and earth for achieving efficient operation; this unique characteristic has profound significance for portable or restricted space antennas. In comparison, the bottom of a vertically oriented loop does not need to be more than a loop diameter above ground, making it very easy to install in a restricted space location. There is no significant improvement in sky wave propagation performance when a small

loop is installed high; all that matters is the loop is substantially clear of objects in the immediate area and oriented towards the desired direction of radiation.

Field trials of the CHA F-LOOP 3.0 demonstrated that an indoor magnetic loop antenna was only around one to two S-units lower, on both transmit and receive, than outdoor full size quarter wave vertical antenna. Remarkable for an antenna that is only less than three foot in diameter and covers 3.5 MHz to 29.7 MHz (80 – 10-meter ham bands)! The magnetic loop is different from typical antennas because it emphasizes the magnetic part of the radio wave (H field) rather than the electric part (E field) of the radio wave. It also has a high Q resonance of around 17 KHz on 40 meters, providing immunity from interference outside the bandpass.



Above: Chameleon F-LOOP3

Club Business and Announcements

Financial Report

Beginning balance on February 1st	\$7,525.44
Deposit – sale of donated rotor	\$300.00
PayPal balance (awaiting transfer)	\$675.32
Ending balance on February 28th	\$8,500.76

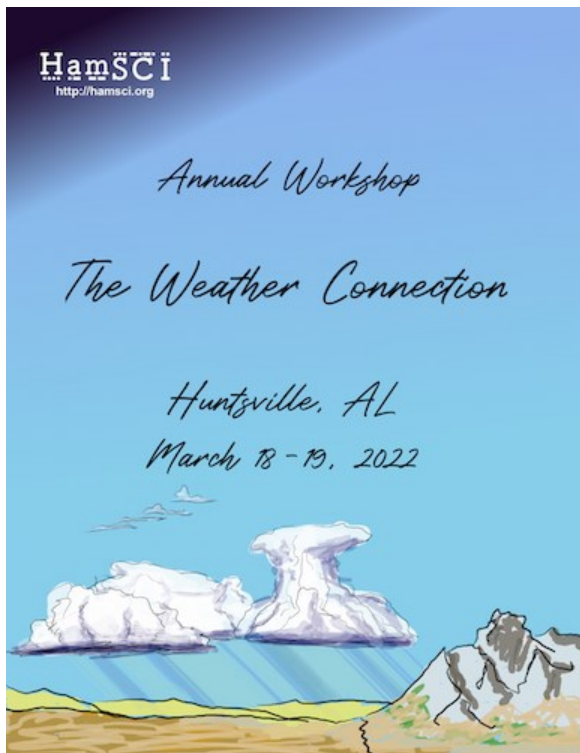
Proposed Changes to NADXC Bylaws

A vote will occur at the April 12th meeting regarding whether to amend the bylaws in order to increase the annual dues. The current Constitution and Bylaws can be read here: <https://www.nadxc.org/constitution-by-laws/>

Club Business and Announcements (continued)

The proposed modification to the “Dues” section of the Bylaws reads:

“Annual dues for Regular membership in the NADXC shall be \$20, or \$25 for households where more than one Regular member of the same family resides.”



HamSCI Workshop 18-19 March 2022 at the US Space and Rocket Center

The HamSCI community will be meeting in Huntsville on Friday and Saturday 18-19 March. The workshop info is here:

<https://hamsci.org/hamsci2022>

The program for the workshop is here: <https://hamsci.org/hamsci-2022-program>

Friday is comprised of technical talks on a variety of subjects on ionospheric physics and related ham radio/citizen science investigations. There are numerous talks on hardware and exper-

imental techniques including the Personal Space Weather Station being developed by National Science Foundation funding of HamSCI.

Saturday morning has 2 invited tutorials including one by Dr. Tamitha Skov, the Space Weather Woman. There will be a poster paper session and hardware demos Saturday afternoon.

The NASA MSFC Amateur Radio Club will be operating special event station NN4SA from the workshop venue. Workshop participants will be welcome to get on the air.

There is a banquet on Friday night and a reception Saturday night at the Marriott.

The in-person registration and payment form is available at <https://scranton.advancementform.com/universal/hamsci-workshop-2022/enter> and is open until Monday 7 March. Free virtual participation signups will be available shortly.

An advertisement for GigaParts Technology Superstore. The top half shows a large, modern building with the GigaParts logo on the roof. In front of the building is a blue car with the GigaParts logo. To the right of the building are two walkie-talkies and a car stereo. Below the building image is a row of logos for various brands: YAESU, KENWOOD, ICOM, MFJ, C★MET, ALINCO, and HELIX. The bottom half of the ad features the GigaParts logo in large blue letters, followed by the tagline 'Technology Superstore'. Below that is the text 'Everything you need for your next Ham Radio Project!' and 'Rope • Coax • Connectors • Tools'. At the very bottom, there is a contact section with a phone icon, the number (256) 535-4442, a website icon, the URL www.gigaparts.com, a location pin icon, and the address 1426-B Paramount Dr, Huntsville, AL 35806.

Upcoming DX Contests

By Chuck Lewis, N4NM

ARRL International DX Contest (SSB), 160 – 10m



Mar. 5, 0000Z to Mar. 6, 2359Z

Exchange: RS plus St/Pr. DX sends RS + power

See page 72, Mar. QST or www.arrl.org/arrl-dx

Exchange: RS(T) + serial #; or RS(T) + Oblast #

See page 72, Mar. QST or www.rdx.org

UBA Spring Contest, SSB (SSB), 80 Meters



Mar. 20, 0700Z to Mar 20, 1100Z

Exchange: RS, Serial, UBA section (if any)

See page 72, Mar. QST or www.uba.be/hf/contest-rules

UBA Spring Contest, CW (CW), 80 Meters



Mar 6, 0700Z to Mar 6, 1100Z

Exchange: RS, Serial, UBA section (if any)

See page 72, Mar. QST or www.uba.be/hf/contest-rules

CQWW WPX Contest (PH), 160 – 10 meters



Mar 26, 0000Z to Mar 27, 2359Z

Exchange: RS plus Serial #.

See page 72, Mar. QST or www.cqwp.com/rules.htm

Stew Perry Topband Challenge, (CW), 160 Meters



Mar 12, 1500Z to Mar 13, 1500Z

Exchange: 4-Character grid square

See page 72, Mar. QST or <http://www.kkn.net/stew/>

OTHER Contests

Tesla Memorial Contest, 1800Z Mar. 12 to 0559Z Mar.13

YB DX RTTY Contest, 0000Z Mar 12 to 3259 Mar 12

South American 10 Meter Contest, 1200Z Mar 12 to 1200Z Mar 13

Worldwide Sideband Activity Contest, 0100 Apr 5 to 0159 Apr 5

SP DX Contest 1500Z, April 2 to 1500Z April 3

EA RTTY Contest, 1200Z April 2 to 1200Z April 3

JIDX CW Contest, 0700Z, April 9 to 1300Z April 10

OK/OM DX Contest, 1300Z April 9 to 1200Z, April 10

Dates & times often change or are misprinted in the journals; beware.

BARTG HF RTTY Contest, (DIG), 80 – 10 Meters



Mar 19, 0200Z to Mar 21, 0159Z

Exchange: RST plus 3-digit S.N. plus 4-digit UTC time.

See page 72, Mar. QST or www.bartg.org.uk



Russian DX Contest (PH/CW), 160 - 10 Meters

Mar 19, 1200Z to Mar 20, 1200Z

DXpeditions in March 2022

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Start Date	End Date	DXCC Entity	Call	QSL via	Info
2022 Mar01	2022 Mar07	St Lucia	J68HZ	LoTW	By J68HZ J69DS KA4RRU WA4PGM W0CN; 160-10m; QSL via K9HZ direct
2022 Mar01	2022 Mar17	Curacao	PJ2	LoTW	By DK5ON as PJ2/DK5ON; 160-6m; SSB CW + digital, incl FT8/4; QSL via Club Log OQRS or
2022 Mar01	2022 Mar31	Austral Is	FO		By SP5EAQ fm Rimatara I (IOTA OC-050); HF; SSB; Covid permitting
2022 Mar02	2022 Mar09	Sri Lanka	4S7KKG	Club Log OQRS	By DC0KK fm IOTA AS-003; HF; mainly CW + digital; QSL OK via DC0KK
2022 Mar02	2022 Mar09	Sri Lanka	4S7DRG		By DK9DR fm IOTA AS-003; HF; mainly SSB FT8
2022 Mar03	2022 Mar10	Antigua & Barbuda	V26K	LoTW	By AA3B; HF; QRV for ARRL DX SSB; QSL via AA3B (B/d), Club Log OQRS
2022 Mar04	2022 Mar18	Maldives	8Q7CQ	M00XO	By G0VJG fm Innahura I; 80-6m, incl 60m; mainly SSB
ARRL International DX Contest, Phone (Mar 5-6, 2022)					
2022 Mar05	2022 Mar10	Belize	V31BN	LoTW	By K0KQ fm IOTA NA-003; FT8
2022 Mar05	2022 Mar12	Madeira	CT9	LoTW	By DJ9KM as CT9/DJ9KM and DD8ZX as CT9/DD8ZX fm IOTA AF-014; mainly FT8 RTTY
2022 Mar06	2022 Mar12	Saba & St Eustatius		LoTW	By K3TRM as PJ5/K3TRM fm St Eustatius; 40-10m; SSB RTTY FT + satellites; QSL via K3TRM,
2022 Mar05	2022 Mar10	Belize	V31BN	W0BCN	By W0BCN; HF; SSB CW FT8; wires, vertical
2022 Mar07	2022 Mar14	Uganda	5X1XA	LoTW	By G3XAO fm Kampala; HF; QRV for BERU Contest; QSL via G3SWH
2022 Mar07	2022 Mar21	Turks & Caicos	VP5	LoTW	By K0KQ as VP5/K0KQ fm Grand Turk I; HF; FT8
2022 Mar09	2022 Mar18	Gambia	C56DF	Club Log OQRS	By G3XTT; 80-10m; wires; QRV for BERU Contest; QSL via G3XTT direct
2022 Mar12	2022 Mar13	Cayman Is	ZF2CA	G4CWH Direct	By G4CWH; QRV for BERU Contest; also before abnd after; 160-10m; CW SSB
2022 Mar16	2022 Mar18	Comoros	D60AB	K6ZO	By K6ZO; HF
2022 Mar18	2022 Mar22	Mayotte	FH	K6ZO	By K6ZO; HF
CW WPX Contest, SSB (Mar 26-27, 2022)					
2022 Mar22	2022 Mar29	Comoros	D60AB	K6ZO	By K6ZO; HF

