

# Nacogdoches Amateur Radio Club

## 2020 CLUB OFFICERS

Pres: Bill Rascher - KT5TE

Vice Pres: Steve Bartlett-WB5IDY

Sec/Treas: Army Curtis - AE5P

Visit our web site at

<https://w5nac.com/>

## MISSION STATEMENT

The Mission of the Nacogdoches Amateur Radio Club is to support and promote Amateur Radio by public service, offering training to unlicensed interested parties and licensed Amateurs, mutual support of other Amateurs, engaging events that promote Amateur radio to the general public and other Amateur radio operators, and continuing fellowship by regularly scheduled organized meetings and events and having fun.



## DECEMBER MINUTES

The December meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on December 4th. **Vice-President Bill KT5TE** opened the meeting at 6:00 p.m. in the Lunch Room of Christ Episcopal School. Fourteen members and five guests were present. Each person present introduced them self. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

It was announced that due to our next regular

meeting falling on New Year's Day, the meeting would be postponed one week until January 8<sup>th</sup>.

Arrangements for the ARRL January VHF Contest will be made via email. Any members wishing to participate should contact AE5P.

Meeting was closed at 6:11 p.m.

This being our annual Christmas Party / meeting / pot luck supper / White Elephant Auction, Tom W5TV offered a blessing and we all partook of the pot luck supper. These just getting better and better every year, and this year was truly outstanding.

The annual White Elephant Auction was conducted by Don W5COX, who did his usual outstanding job,

realizing a total of \$399 to add to the club coffers.

Many thanks to all the folks who worked so hard to make this event such a success. Excellent team work!

### **Dues for 2020 are now due!**

Dues are just \$20 a year for all licensed hams in a family. You can pay the Treasurer at any meeting, weekly lunch, or VE testing session, or via snail mail to his home address. Make checks payable to NARC.

## **FROM THE PRESIDENT**

My wife and I are very lucky people. For our entire lives we've been fortunate to have never been bored. From reading to gardening to working with our horses there is always something to keep us busy. This is especially true for the start of 2020.

Winter has become ham radio project time for me, and boy do I have a slew stacked up. Let's see what I have on the agenda:

1. KX1 80m module & bios upgrade.

Thank you, Tom W5TV, for permitting me to purchase your KX1! :-)

2. Build the K2 100 watt amp & antenna tuner to be installed in an EC2 case.

3. Start the XV222 to go with the XV144.

4. Finish the XV50 to go with the XV144 and XV222. ;-)

To complete the stack I need to find a XV432.

5. Climb the tower and remount the repaired TailTwister T-2XR rotator.

6. Finish grounding the truck's exhaust. Boy, does it ever radiate noise...

7. Redo the VHF/UHF antenna setup for the truck. Contesting! :-)

8. Finally, label the cables in the shack. All the silver sharpie is disappearing, and I have a new unused DYMO label printer I bought 6 years ago.

Now throw in some contests and events so I won't be distracted by what is going on in the news.

January is a good month for contests, so check out <https://www.contestcalendar.com/> and have some fun. Even if the radios are messing up while roving during our VHF/UHF contest the food & company is always good, so come join us. If you are unable to join us

check out the Special Event Stations in January QST. There is bound to be one station that will pique your interest.

73, Bill KT5TE

[bill@watershipfarm.com](mailto:bill@watershipfarm.com)

## FROM THE VP CHAIR

### Economical Battery Backup

Living in the country comes with periodic power outages. Sleeping with a CPAP demands some sort of backup power and dragging out the generator at 3 am during a rain storm to power my equipment is something I just can't convince my wife to do! So, an easy and affordable battery backup system that could live in my bedroom became a priority project. Oh yeah, it can run my ham radios too!

This project has not only powered my nighttime

breathing equipment, but can run our Wi-Fi mesh network, living room TV and antenna amplifier as well as several LED lamps. This system can also run my VHF and HF base stations for several hours and can be charged with solar panels if you feel your inner-prepper side coming out.

The heart of this system is a 35 amp-hour deep cycle battery typically used for motorized wheel chairs. While a full size 105 amp-hr battery would obviously give you extended usage, they are not as portable and do not fit into any reasonable container where you can install different plug-in portals. The 35 amp-hr battery is AGM so no acid spills or hydrogen gas emissions. A 400 watt (800 watt peak) square wave inverter is also an added bonus allowing the flexibility of powering both 120v AC and 12v DC devices. The portable system has a 12v cigarette lighter outlet, a 5v USB outlet, and a power pole connector for the ham radios. All

outlets are independently fused. A digital on-demand volt meter gives you both battery voltage and percent of charge indicators with little current draw.

The whole collection is housed in an inexpensive HDPE ammo box with a pigtail that connects to a trickle charger. The box has an easy carry handle and the weight of the whole system is not prohibitive.

In an effort to maintain international relations (and save some bucks) most of the components were purchased at Harbor Freight or ordered on-line via eBay. I'm sure several families in China greatly appreciated my component selections. You can decide to Americanize the parts list if you feel so inclined. Most of the Harbor Freight items can be bought for 20% less with their weekly coupon.

Amateur radio operators don't need a schematic showing how to connect positive and negative wires to a battery, so I

will spare you the technical sketches. I will offer a few build comments for consideration:

1. This is really a floating ground system and there is a school of thought that both the positive and negative sides of each circuit will need a fuse - you decide.

2. Each outlet needs independent fusing (not one central battery fuse) with amperage limits matching the load for the type of the outlet. I originally used in-line fuses but I am upgrading to a fuse block.

3. I chose to leave the inverter connection using the alligator clamps. Some inverters have current drain even when not in use and with clips, I am able to quickly disconnect the inverter when not in use. A future upgrade will include 10ga wire and Anderson connectors in place of the clamps.

4. A 35 amp-hour battery should not be drained much below the 15 amp-hour level before recharging. With a 20

amp-hour operating capacity, you can easily calculate the use time available if you know the voltage and wattage of the load  

$$((20\text{ah}/(\text{wattage}/\text{voltage})) = \text{hours of use}$$

5. This smaller AGM battery should be slow charged with a 2 amp or less charger.

6. The inverter has a fan and may need air circulation during maximum loads. Cracking the lid seems to work just fine. My inverter sits loose in the box.

7. The charger comes with a pigtail that can be pulled outside the lid with it closed. The charging transformer does not fit in the box.

Parts list: (\$175 cost, or \$150 using discount coupons)

12v 35 amp-hr sealed battery \$69.99 Harbor Freight

Tactical Ammo/Utility Box \$8.99 Harbor Freight

12v Battery Float Charger \$21.99 Harbor Freight

400/800 watt Cen-Tech Inverter \$29.99 Harbor Freight

12v cigarette lighter socket \$5.49 eBay

12v to 5v dual USB socket \$5.99 eBay

Chassis mount power pole socket \$9.95 eBay

6-way blade fuse block \$10.96 eBay

LCD digital volt meter \$7.34 eBay

Female crimp-on blade connectors

14 gage red and black stranded wire





73, Steve WB5IDY

[bartlett.steve58@gmail.com](mailto:bartlett.steve58@gmail.com)

## NOTES FROM OUR EC

2019 is about done. I hope everyone had a great Holiday and Christmas Season. It has been an interesting year. Look for a separate column next month reviewing 2019 and the After Action Report from the North Texas Section for the Simulated Emergency Test.

Was Santa good to you? A new radio that goes from DC to daylight with all the modes including all the digital stuff, or maybe that new skywire with 20db gain in only 20 feet of wire? No, I'm not doing April Fool's yet.

Rusty, thank you for bringing me a plate from the Christmas potluck. Yes, that was very good grazing.

Have you made some resolutions for the New Year? What radio activities will you try in the new year? Dr. Tom, should we have a 6m DXpedition to Alaska to

help you finish? That might be fun.

Expect we will try some additional things in the coming year. Put the Columbia Event, Field Day and the SET on your calendars.

Please remember to participate in our local nets on Mondays and Thursdays and, if you are capable, the Winlink session on Wednesday.

Have a wonderful and happy 2020.

73 de John Chapman  
KC5MIB

[jlchapman2@juno.com](mailto:jlchapman2@juno.com)

## VE TESTING

Our next VE testing is scheduled for **Wednesday January 15 at 7:00 p.m.** in the Lunch Room of Christ Episcopal Church School.

Applicants should bring a picture ID, the original and a copy of their current

Amateur license, the original of any CSCE's and \$15 to cover the cost of the exam(s). Correct change is always very much appreciated.

More information is available on the club website at <https://w5nac.com/about/testing/>

73 de AE5P.

email: [ae5p@arrl.net](mailto:ae5p@arrl.net)

## NEW HAMS

At our VE testing session in December, we had one applicant. Kevin Chatham from Lufkin who successfully passed his Tech exam. Congratulations Kevin.

## TWO METER CLUB NETS

Remember to join us each week for the two meter nets sponsored by NARC. Each **MONDAY** is the **NARC ARES/RACES** net,

at 8:00 p.m. on the club's 146.84 repeater (PL 141.3). Second, on **THURSDAY** evenings at 8:00 p.m. is the **Deep East Texas Skywarn Emergency Weather Net** on the 147.32 repeater (PL 141.3). Please join us for one or both.

## BOOK RAFFLE

Each month, we give away a book on a topic of interest to Amateur Radio operators. Everyone present at the meeting will receive one ticket. A ticket will be drawn at the end of the meeting for the book of the month.

The book for January will be **"The Quad Antenna"** by **Bob Haviland W4MB**. You must be present at the meeting to win.

## NEXT MEETING

With the obvious conflict of the first Wednesday in January and New Year's Day, the next meeting will be on the **SECOND**

Wednesday, January 8<sup>th</sup>, 7:00 P.M. in the Christ Episcopal Church School lunch room. I have it on good authority that the callsign signs many of us purchased at the White Elephant Auction in December will be available for pickup at our next meeting.

## UPCOMING EVENTS OF NOTE

Mark your calendars for the following events coming up in the next few months. Full information on these events and much more can be found at <http://www.hornucopia.com/contestcal/contestcal.html>

Note that all dates shown here are local, CST dates while all contest logging uses UTC dates and times.

### ARRL RTTY ROUNDUP

Jan 4-5, 2020

<http://www.arrl.org/rtty-roundup>

### NAQP CW

Jan 11-12, 2020

<http://www.ncjweb.com/NAQP-Rules.pdf>

### ARRL JANUARY VHF

Jan 18-19, 2020

<http://www.arrl.org/january-vhf>

### NAQP SSB

Jan 18-19, 2020

<http://www.arrl.org/january-vhf>

### SHUTTLE COLUMBIA SPECIAL EVENT K5C

Feb 1-2, 2020

### CQ WW RTTY WPX

Feb 8-9, 2020

<http://www.cqwprrtty.com/rules.htm>

### ARRL Inter. DX, CW

Feb 15-16, 2020

<http://www.arrl.org/arrl-dx>

### NAQP, RTTY

Feb 29-Mar 1, 2020

<http://www.ncjweb.com/NAQP-Rules.pdf>

### ARRL Inter. DX, SSB

Mar 7-8, 2020

<http://www.arrl.org/arrl-dx>

### CQ WW WPX, SSB

Mar 28-29, 2020

<http://www.cqwp.com/rules.htm>

### SAN JACINTO DAY SPECIAL EVENT K5T

Apr 25-26, 2020

## The Sunspot Cycle and Amateur Radio

by

Thomas Atchison W5TV

As you know Robert Judy, KD5FEE, has been sending us information concerning sunspots and where we are in the 11-year sunspot cycle. I plan to use this note to consider some of the history of the sunspot cycle and how it may impact our communication using amateur radio.

What we call the solar cycle is related to the periodic behavior of the Sun. Since the Sun is a ball of electrically-charged gas that is in constant motion, this movement generates powerful magnetic fields. These magnetic fields establish a North and South Pole for the Sun. The magnetic fields on the Sun are changing and, in fact, these changes will periodically cause the poles to switch places i.e. flip. You might think that the motion of the magnetic fields would be chaotic; however, they exhibit a periodic behavior that seems to repeat about every 11 years. The periodicity is not always exactly 11 years, but may range over 9 to 14 years. I believe the average is about 11.8 years. Let me mention that the Stephen F. Austin State University Planetarium has an excellent program regarding the Sun that will show on January 11, January 18 and January 25, 2020. These programs are on **Saturday** at 4:30 and 7:00 p.m. This program discusses the behavior of the magnetic fields in the Sun. For a map of the location of the Planetarium see Fig. 1.

The solar cycles are usually measured from one minimum to the next. The periodic behavior of the Sun with respect to the number and size of sunspots based on the observations of Rudolf Wolf beginning in the middle 1700s provided the beginning of our study of the Solar Cycle. Following the numbering scheme of Wolf, the 1755-1766 cycle is traditionally numbered "1". Wolf created a standard sunspot number index, the Wolf index, which continues to be used today. In the 1800s it was noted that sunspots appeared at different solar latitudes at different parts of the solar cycle. In the early 1900s it was discovered that sunspots were strongly magnetized and that the magnetic polarity is constant throughout a cycle. It was also found that the magnetic polarity is opposite across the equator throughout a cycle and that it reverses itself from one cycle to the next. In 1961 it was discovered that the solar surface is magnetized outside of sunspots and that this magnetic field is a dipole that undergoes polarity reversals with the same period as the sunspot cycle. One model described the Sun's oscillatory magnetic field as having a quasi-steady periodicity of 22 years.

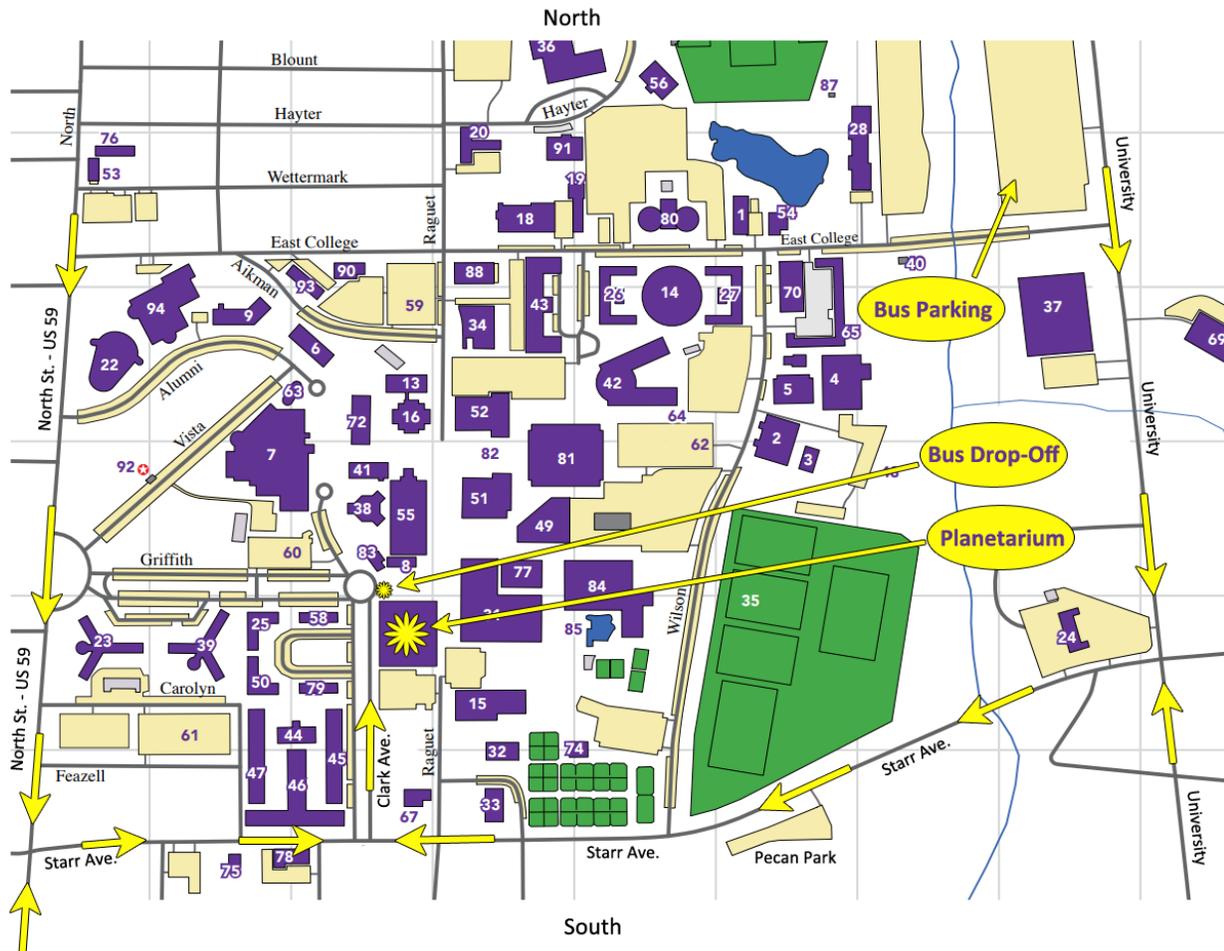


Fig. 1

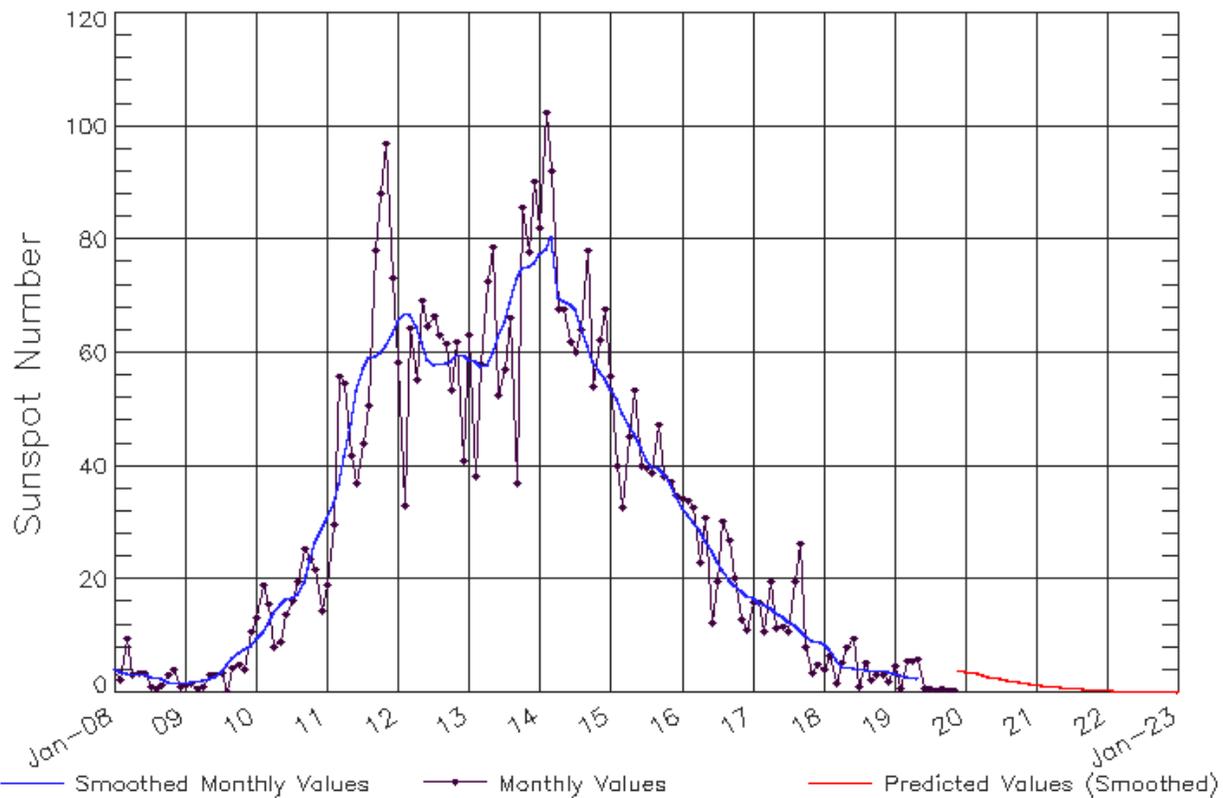
The number of sunspots on the Sun has an effect on the levels of radiation emitted by the sun and this radiation impacts the ionosphere around the earth. Our amateur radio signals interact with objects and the media in which they travel. In particular, these waves may be reflected, refracted or diffracted depending on the level of ionization of the ionosphere and the frequency of our signals.

As we have already observed, the number of sunspots on the surface of the sun varies with time. Sometimes there may be a large number of sunspots and at other times there may be none. At the peak of a solar cycle (more sunspots) conditions on the amateur radio bands at higher frequencies are very good and stations can communicate over greater distances. However, at times when there are few or no sunspots radio communication is much more limited. This behavior is extremely important on frequencies below 30 MHz.

Most people who make predictions regarding the sunspot cycles believe that we are near a minimum at the present time. In fact we recently had a period of several weeks with no sunspots. As the number of sunspots becomes smaller we have less F layer propagation on frequencies above 25 MHz. Frequencies above 15 MHz may be open from time to time and 20 meters may be open during daylight hours but not much at night. In some cases conditions on 160 and 80 meters improve because there is less D layer absorption. We are currently near the bottom of solar cycle 24. The Space Weather Prediction Center of NOAA (<https://www.swpc.noaa.gov/products/solar-cycle-progression>) has produced a graph of cycle 24 updated December 8, 2019, that is shown in Fig. 2 below. The maximum number of sunspots for cycle 24 was in 2014 with a peak sunspot count of over 100. The black line represents the monthly averaged data and the blue line represents a 13-month smoothed version of the monthly averaged data. The forecast for the rest of the solar cycle is given by the red line. If you control-left click on the following URL it will take you to an interesting article on Solar Activity and HF Propagation.

[https://www.qrparci.org/resource/FDIM81.pdf\(link is external\)](https://www.qrparci.org/resource/FDIM81.pdf(link%20is%20external))

ISES Solar Cycle Sunspot Number Progression  
Observed data through Nov 2019



Updated 2019 Dec 9

NOAA/SWPC Boulder, CO USA

Fig. 2

## WINLINK - Part 1

by  
Army Curtis AE5P

For the past several months, we have been discussing repeaters, with the emphasis on FM voice. Let's shift a little and talk about one form of digital repeater. NARC has a Winlink/Packet repeater, located on the top of the Fredonia Hotel. Actually, it is more than just a simple repeater; it is a Winlink iGate.

So, what is Winlink and what is a Winlink iGate repeater?

Let's back up a little and review how Winlink came to be. Back in the early days of computers, before the internet and before Windows and Mac, computers were much simpler than what we have today. A popular operating system back then was CP/M (Control Program/Monitor), originally developed by Digital Research, Inc. for the Intel 8080/8085 based computers of the time (mid 1070's). Wanting to put these new contraptions to use, a number of folks used them to provide computerized bulletin board systems (BBS), which allowed users to call the system via a telephone modem to leave and retrieve messages. Modems in those days operated at the blinding speed of 300 baud, which allowed you to go have lunch or dinner while you waited for your messages to be retrieved. Without the internet, if you wanted a BBS you wrote the software for it yourself. I remember doing just that in the late 70's, writing the program in a programming language called simply BASIC. The system wasn't fast or fancy, but it worked and was the forerunner to systems like Facebook that are so popular today.

Many of these early BBS systems were developed and managed by Hams. New and faster computers became available, as did faster modems with 1200, 2400 and 9600 baud popular offerings. Then the internet was developed and the entire world changed. With the internet came the ubiquitous email, web sites, and special interest groups (SIGs). A popular provider of the time was CompuServe which some of our readers may remember.

While the internet and many of the systems associated with it were being developed and improved by commercial interests, Hams were also busy coming up with ways to use Amateur Radio to provide somewhat related services. All of this was brand new back then, and many very basic questions were trying to be answered. A leader in the Ham

Radio world at that time was TAPR (Tucson Amateur Packet Radio), founded in 1981 by a group of Hams interested in developing a Terminal Node Controller (TNC) for Amateur Radio use. Their work was the basis for defining a protocol for sending and receiving data in a digital format that has been adopted by Hams and commercial interests alike. TAPR is still very active today in pushing the state of the art in digital techniques and systems.

Hams, being the curious experimenters that we are, wanted to use their radios to communicate rather than the telephone. In the early 80's, Hams were using radio to communicate with their BBS systems, much as they had done in the 70's using the telephone network. This was done primarily on 2 meters using Packet Radio. The FCC put some new rules into effect that limited the data speeds that could be used on the Ham bands, with 1200 baud becoming the defacto standard speed for 2 meters. In the 80's and 90's, some extensive Amateur Radio Packet Radio networks were developed and actively used by thousands of Hams. When the internet became widely available in the 90's, Packet Radio systems began to disappear much as phone patches did with the advent of cell phones.

But the pioneering work done largely by Hams in the 70's and 80's in developing and defining packet radio standards laid the groundwork for communicating on the internet. Again, as happened in the 80's with Hams developing methods to use their radios instead of the telephone network, Hams began developing methods to use their radios instead of the internet. The packet radio networks did an excellent job, but were very slow compared to the speeds available with the internet. But the internet was not available everywhere, and internet outages were very common in the beginning. Indeed, it was many years before more than a single fiber optics cable was available to users here in Nacogdoches, and it seemed like every backhoe between Nacogdoches and Houston was very adept at finding and breaking that cable.

Businesses and public service agencies were becoming very dependent on the internet, and has been the case for many, many years, when communications fail, people turn to the Hams for help.

We will continue this discussion next month. Stay tuned.