



News from

# The GLORIOUS SOCIETY OF THE WORMHOLE

July 2023

## Hello Worms

We will broadcast the meeting on the repeater and Zoom video. I am moving the directions to the meeting place and Zoom to the end of the newsletter, you all have seen them enough.

We will have donuts, water and soft drinks (probably only root beer). Bring, your coffee and lunch if you want! We will not be cooking but we have access to the Chamber of Commerce kitchen which has a microwave and a toaster oven so you can heat up/cook what you bring.

## **\*HYDROGEN POWER DRONE FLIES FIVE HOURS\***

*HACKADAY* by Lewin Day

Multicopter drones have become a regular part of daily life, serving as everything from camera platforms to inspection tools and weapons of war. The vast majority run on lithium rechargeable batteries, with corresponding limits on flight time. A company called Hylium hopes to change all that with a [hydrogen-powered drone that can fly for up to five hours](#).

The drone uses a hydrogen fuel cell to provide electricity to run the drone's motors and other electronic systems. Thanks to the energy density advantage of hydrogen versus lithium batteries, the flight time can be greatly extended compared to conventional battery-only drones. Details are scant, but the company has gone to some lengths to build out the product beyond a simple tech demonstrator, too. Hylium touts useful features like the short five-minute refueling time. The drone also reportedly features a night vision camera and the capability to transmit video over distances up to 10 kilometers, though some of the video of these features appears to be stock footage.

Hylium claims the liquid hydrogen canister used for the drone is drop-safe in the event of a problem. Notably, the video suggests the company tested this by dropping the canister concerningly close to an active motorway, but from what we see, nothing went awry.

A drone that can fly for five hours would be particularly useful for autonomous surveillance and inspection roles. The additional loiter time would be advantageous in these roles. [We've seen other aero experimenters exploring the use of hydrogen fuel cells, too.](#)

To see the video goto: <https://hackaday.com/2023/05/18/drone-flies-for-five-hours-with-hydrogen-fuel-cell/>

## **\*LOCATING NOISE AND REDUCING NOISE\***

Ralph WD0EJA

This article will consider a way to locating sources of noise. A follow up article will consider reducing the noise reception when operating.

Noise is easily generated by a variety of electronic devices. Switching power supplies are noise producing, especially the wall wart style. Other devices as dimmer switches , energy savors for appliances, lighting and more. These items have the potential of producing high noise levels particularly on 40, 80 and 160 meters.

One technique is to use a portable AM broadcast receiver to locate the noise. This is a good start due to the ferrite antenna in the radio. It is Bi-Directional, helping to locate the noise with the directivity of the antenna.

However, it would be more affective to locate the noise on the band you are wanting to use. Therefore, making a ferrite antenna that resonated on the band you are analyzing is not difficult, but can be more affective.

I needed to locate a power line noise that was some distance away. The antenna was made from seven ferrite cylinders. 1.125" long by .5625" (9/16") diameter. The cylinders were secured end to end by a plastic dowel through the bore of the cylinder. A small screw tapped on each side, then a fender washer that pulled the cylinders together by tightening the screws.

Next, a #28 magnet wire was rapped on and across the complete ferrite assembly at a 1/2" spacing. The two leads from each end were connected to a variable capacitor from a discarded radio.

Another winding is added at the center of the rod. At about 3 turns the impedance will average around 23 ohms. This winding is connected to a SO-239. Impedance is not critical since it is used for reception only. However, you may want to add a few more turns to match it closer to 50 ohms.

Depending on the range of the variable capacitor, you can tune to the 80 and 40 meter bands. When connected to a receiver, adjust the variable capacitor for maximum, signal or noise.

As you rotate the antenna you will have two strong sides and two nulls. This will give you a direction the noise is in. However, you have two choices since it is bi-directional. One direction will take you to the noise. Using it in your home can be done with a length of coax, long enough to make your measurement.

Using a portable HF receiver, you can search for noise at farther distances. I was able to locate a power line noise about 1/8 mile away.

You can acquire 1/2" ferrite rods in a variety of lengths. This will make it easier to construct and may offer more directivity.

A follow up article will be using the antenna for a lower noise reception.

73,  
Ralph WD0EJA  
BILAL COMPANY

## **\*WHAT HAPPENED TO HOME NUCLEAR REACTORS? \***

*How-To-Geek* by Sydney Butler

Years ago, news about Toshiba's 4S small modular reactor (SMR) stirred our imaginations and made us wonder if we'd be powering our homes with personal nuclear power plants. But where are these futuristic energy sources now, and are they still coming?

You might be surprised to learn that home nuclear reactors aren't entirely new. Small-scale nuclear reactors have powered remote research stations, [military bases](#), and [spacecraft](#). However, it wasn't until the 21st century that they began to be considered for residential use.

The global demand for clean, reliable, and sustainable energy sources drove the shift toward residential applications. As the world sought alternatives to coal and oil, nuclear power emerged as a viable option, leading to the development of small modular reactors that are compact, easily transportable, and scalable.

Toshiba's [4S reactor](#) is perhaps the most well-known example of SMR technology to date. Introduced in the late 2000s, this sodium-cooled fast reactor was designed to generate up to 10 megawatts of electricity to power a small town or around 3,000 homes. The "4S" acronym stands for "Super-Safe, Small, and Simple," emphasizing the reactor's safety features, compact size, and user-friendly operation.

When it was announced, the 4S reactor generated a lot of excitement, as it offered the possibility of bringing nuclear power to remote communities without requiring extensive infrastructure. However, despite a few test deployments, the 4S reactor never really achieved widespread adoption.

Although the Toshiba 4S didn't revolutionize the energy sector, SMR technology is far from obsolete. In fact, it has experienced a resurgence in recent years. Companies like [NuScale Power](#), [Rolls-Royce](#), and even [General Electric](#) have created their own SMR designs, and these reactors are gradually entering the market.

Numerous countries are also investing in SMR research and development, with governments acknowledging the technology's potential to help achieve their clean energy objectives. For instance, the US Department of Energy has allocated large sums for [SMR-related projects](#), and other nations like the UK and [Canada](#) are following suit.

While the idea of owning a home nuclear reactor is undoubtedly thrilling, we have to keep our expectations in check. The SMRs currently under development are primarily intended for use in remote areas, military installations, and industrial settings.

However, as the technology continues to evolve and regulatory frameworks adapt to accommodate smaller reactors, it's not far-fetched to envision a future where communities and neighborhoods share SMR-generated power. This would enable a decentralized and resilient energy grid, reducing our dependence on large-scale power plants and extensive transmission lines.

Even though you may not be installing a home nuclear reactor in the near future, the technology is very much alive and progressing. As the world keeps seeking clean, sustainable energy solutions, SMRs could play a pivotal role in fulfilling our needs. Who knows? Perhaps one day, your house will be powered by a mini nuclear plant. For now, you may have to turn to the [sun](#) for independent power. Hey, technically that's nuclear fusion!

**\*POWER BEAMED FROM SPACE\***

*reviewgeek* by CORY GUNTHER

The California Institute of Technology (Caltech) says for the first time, it successfully [beamed solar power](#) wirelessly from space back down to Earth. The team recently completed its first major test after launching a space solar power prototype into orbit earlier this year.

Caltech's Space Solar Power Project launched the Space Solar Power Demonstrator (SSPD-1) into orbit with the goal of harvesting space solar power, then transmitting it back to us Earthlings. This week it successfully finished its first power transfer experiment using the Microwave Array for Power-transfer Low-orbit Experiment (MAPLE) prototype aboard the SSPD-1.

If that sounds wild, it's because it is. MAPLE captured solar power in space and shot it down to a receiver at Caltech's campus in Pasadena. The group outfitted a large receiver on the rooftop of its Gordan and Betty Moore Laboratory of Engineering for the job.

*“Through the experiments we have run so far, we received confirmation that MAPLE can transmit power successfully to receivers in space. We have also been able to program the array to direct its energy toward Earth, which we detected here at Caltech. We had, of course, tested it on Earth, but now we know that it can survive the trip to space and operate there,”* said team lead Ali Hajimiri.

According to Caltech, the entire system was built using low-cost silicon technologies, and a massive array of flexible, lightweight microwave power transmitters did the rest. Those transmitters can beam the power to other desired locations, so long as there's a receiver ready to capture it.

It's still early in these tests, but the implications are enormous. For one, the sun has unlimited solar power as long as you can capture and distribute it. And two, imagine being able to draw power from space and then send it to remote regions that wouldn't otherwise have proper infrastructure or during natural disasters. Or even a [solar-powered car](#).

It's a small step for space solar power, but an important one. Who knows, one day these receivers can gather all that solar power to charge our [self-driving electric vehicles](#).

## **\*HOW TO CHECK AIR QUALITY ANYWHERE\***

*How-To-Geek* by Chris Hoffman

How unhealthy is the air outside right now? You don't need your own sensor to find out. Here's how to find out how bad the smoke, [pollen](#), and pollution in your local area—or anywhere else.

These services all show Air Quality Index numbers. The higher the number, the more pollution in the air right now.

Note that different countries use different Air Quality Index systems. If you're not in the USA, you will have to look up your country's Air Quality Index standard.

In the USA, here's what the numbers mean:

| Color  | Air Quality Index (AQI) | Level of Health Concern        |
|--------|-------------------------|--------------------------------|
| Green  | 0 to 50                 | Good                           |
| Yellow | 51 to 100               | Moderate                       |
| Orange | 101 to 150              | Unhealthy for Sensitive Groups |
| Red    | 151 to 200              | Unhealthy                      |
| Purple | 201 to 300              | Very Unhealthy                 |
| Maroon | 301 to 500              | Hazardous                      |

### Timely Crowd-Sourced Reports: PurpleAir

While there are a number of ways to get official numbers from standardized government sensors—and we'll explain those in a bit—there's one way to get more timely results.

[PurpleAir](#) shows more localized air quality numbers. They're much more current but are crowd-sourced from sensors set up by individuals. Individual sensors in an area may not be positioned accurately. But, if you look at an area with multiple sensors, the average will show you a fairly complete picture.

Just head to [the PurpleAir map](#) and search for your local area (or another area you want information about.)

If a particular sensor is too high or low compared to its surrounding ones, you should ignore it. That said, the sensors in your area should point to an average reading that's reasonably accurate in the moment. They may even suggest differences from neighborhood to neighborhood in your city.

PurpleAir sensors show US AQI numbers even when they're located in other countries, so you can look across the globe and compare readings in multiple countries, if you like.

You can also check the official numbers reported by your government. In the US, these numbers are provided by the EPA and its partners. They're updated hourly and come from a fewer number of more precisely accurate sensors.

That's convenient, but they won't show you the most timely air quality details if it's changing quickly or how the air quality differs from neighborhood to neighborhood in your city.

To find these numbers in the USA, Canada, and Mexico you can use the [AirNow](#) website. Plug in a location and you'll see the air quality in your area. (For other countries, you will need to find a website with data for your country.)

[AirNow also offers a map](#) that shows air quality across North America.

For convenience, you can quickly find these numbers via smartphone apps. On your iPhone, [both the Maps and Weather apps show air quality information](#). You can see your local air quality information or view another area in the map and see its local air quality. (This is not available in all countries.)

On Android, you can [ask Google Assistant about the air quality for your local area](#) or another area. (Again, Google Assistant does not support this in every country.) You can also install a third-party app that displays this information.

Both Apple and Google's apps show the same official information you'd find on AirNow and on government websites. For crowd-sourced information, turn to PurpleAir.

## **\*PHONE BATTERIES MUST BE REPLACEABLE\***

*INFOPACKETS* by John Lister

Phone manufacturers may soon have to offer replaceable batteries in handsets. The rules have been approved by European politicians but could create enough hassle for manufacturers that they follow the measures worldwide.

The change, approved overwhelmingly by the European Parliament, is part of an overall package to reduce the environmental impact of batteries. Other measures include minimum requirements for the levels of recycled material in new batteries along with the amount of material that can be recovered when the batteries go to waste.

The precise wording has yet to be finalized, but the announcement of the vote referred to a requirement of "Designing portable batteries in appliances in such a way that consumers can themselves easily remove and replace them." (Source: [europa.eu](#))

The vote was on a regulation meaning that once its formally published, it automatically has legal effect in 27 countries. However, it's likely there will be a delayed deadline before the replaceable battery requirement takes effect in new devices.

Phone manufacturers will be left with three choices: abandon much of the European market; produce different handsets for Europe and elsewhere; or make batteries replaceable for all handsets. Apple already faces a similar choice over forthcoming European rules that require a USB charging port rather than just Apple's proprietary Lightning charge format. (Source: [techspot.com](http://techspot.com))

The topic of battery replacement has proven controversial, with manufacturers arguing that they don't want the risk of people putting low quality third-party batteries in phones and creating a safety risk. Critics believe manufacturers are more interested in making money by requiring users to pay for an expensive replacement service or even buying a new handset when battery life starts degrading.

Being able to hold on to phones for longer could extend the environmental benefits of the new rules as it could reduce demand for all materials in handsets, not just the battery.

The new European measures also have special requirements for high-capacity batteries such as those used in electric vehicles including bikes and scooters. They'll need to come with details of their carbon footprint plus a "digital passport" that tracks how they were manufactured.



### **\*CLUB MEETING and ZOOM\***

The meeting time is 1100 on Saturday morning at the Lurie Civic Building on the St Petersburg College campus in Seminole. Turn west at the light at 113<sup>th</sup> St N and about 92<sup>nd</sup> Ave N. It's the first building on the north side. Here is a link to a Google map: [Google Maps](#). There are a few parking spots in front the Chamber building but double parking is fine since we will be able to find the owner to move his vehicle if necessary. Alternately if you go another 100 yards past you can park in the college parking lot. Below is the Zoom information, same as last month. The ZOOM meeting is limited to 40 minutes so I will start it early and restart it to cover the whole meeting.

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Topic: Bill Williams' Zoom Meeting  
Time: This is a recurring meeting Meet anytime



Join Zoom Meeting

<https://zoom.us/j/2737114584?pwd=d1BETHVOQ21vWWZlZ0YQOFIWWtldz09>

Meeting ID: 273 711 4584

Passcode: worm

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**\*CLUB NETS\***

Check in on the club net Thursdays at 1930 and 2000 (or at the end of the 2M net). 2M at 146.850 – with a tone of 146.2. Our 6M net runs after our regular 2M net on 53.150 – 1MHz offset 146.2 tone.



**\*LOCAL NETS\***

**MONDAY**

|                       |                             |                 |
|-----------------------|-----------------------------|-----------------|
| 1830 147.060+ no tone | St Pete ARC daily net       | St Petersburg   |
| 1900 144.210 USB      | CARS, vertical polarization | Clearwater      |
| 1900 147.135 +146.2   | Zephyrhills ARC             | Zephyrhills     |
| 2000 147.165+ 136.5   | Brandon ARS                 | from Brandon    |
| 2000 50.135           | Pinellas ARK                | Pinellas County |
| 2030 NI4CE system     | EAGLE Net, NTS traffic net, | NI4CE system    |
| 2030 145.450          | Pinellas ARK                | Pinellas County |

**TUESDAY**

|                      |                       |                    |
|----------------------|-----------------------|--------------------|
| 1830 147.060 no tone | St Pete ARC daily net | from St Petersburg |
| 1900 50.200 USB      | 6M net                | Brandon ARS        |
| 1900 28.365 USB      | 10M Net               | Clearwater         |
| 1900 NI4CE system    | WCF Section VHF ARES  | NI4CE system       |

|                                    |   |              |
|------------------------------------|---|--------------|
| 1930 145.170 & 442.4 both pl 156.7 | Pinellas ACS net  | Clearwater   |
| 1930 444.900 +141.3                | Sheriff's Tactical ARC  | Tampa        |
| 2000 NI4CE system                  | WCF Skywarn net   | NI4CE system |
| 2000 147.105+ 146.2                | Tampa ARC net   | from Tampa   |
| 2000 28.365 USB                    | simplex   | Brandon ARS  |
| 2030 NI4CE system                  | EAGLE Net, NTS traffic net  | NI4CE system |
| 2100 28.465 USB                    | 10/10 net   | from Orlando |
| 1900 146.490 simplex               | 3 <sup>RD</sup> Tuesday monthly, Hillsborough Co ARES simplex Net |              |

### WEDNESDAY

|                      |  |                    |
|----------------------|--|--------------------|
| 1830 147.060 no tone | St Pete ARC daily net  | from St Petersburg |
| 1900 147.165 + 136.5 | Humpday Net  | from Bandon        |
| 1930 52.020 simplex  | Suncoast 6'ers   | from St Petersburg |
| 1930 NI4CE system    | WCF Section Digital Info Ne  | NI4CE system       |
| 2000 147.105 146.2   | Greater Tampa CERT net   | from Tampa         |
| 2000 146.97- 146.2   | Clearwater ARS   | from Clearwater    |
| 2030 NI4CE system    | EAGLE Net, NTS traffic net   | NI4CE system       |
| 2100 NI4CE system    | Tampa Bay Traders Net  | non-affiliated     |
| 0000-2359 HF Winlink | Winlink Wednesday Net<br><a href="https://winlinkwednesday.net/reminder.html">https://winlinkwednesday.net/reminder.html</a> |                    |

### THURSDAY

|                       |                         |                    |
|-----------------------|-------------------------|--------------------|
| 1800 146.52 simplex   | Hillsborough ARES/RACES | North Tampa        |
| 1830 147.060 no tone  | St Pete ARC daily net   | from St Petersburg |
| 1900 444.750 +146.2   | Fusion net              | from Tampa         |
| 1915 224.660- no tone | St Pete ARC             | from St Petersburg |
| 1930 146.6385 -127.3  | Lakeland ARC            | from Lakeland      |
| 1930 444.225 + 146.2  | Hillsborough ARES/RACES | from Tampa         |

|                         |                            |                  |
|-------------------------|----------------------------|------------------|
| 1930 146.850- 146.2     | Wormhole                   | from Pinellas Co |
| 2000 53.150 –1MHz 146.2 | Wormhole                   | from Pinellas Co |
| 2030 NI4CE system       | EAGLE Net, NTS traffic net | NI4CE system     |

**FRIDAY**

|                      |                            |                    |
|----------------------|----------------------------|--------------------|
| 1830 147.060 no tone | St Pete ARC daily net      | from St Petersburg |
| 1900 3.830 LSB       | Brandon 80M Net            | from Brandon       |
| 2030 NI4CE system    | EAGLE Net, NTS traffic net | NI4CE system       |

**SATURDAY**

|                                |                            |                    |
|--------------------------------|----------------------------|--------------------|
| 0730 3.940 (7.281 Alt.)+/- QRM | WCF Section HF Net         | from WCF           |
| 1830 147.060 no tone           | St Pete ARC daily net      | from St Petersburg |
| 2030 NI4CE system              | EAGLE Net, NTS traffic net | NI4CE system       |

**SUNDAY**

|                      |                            |                      |
|----------------------|----------------------------|----------------------|
| 0800 3.933           | Florida Traders Net        | non-affiliated       |
| 1830 147.060 no tone | St Pete ARC daily net      | from St Petersburg   |
| 1930 NI4CE system    | WCF Section Net            | NI4CE system         |
| 2000 147.550 simplex | 550 Simplex Net            | Pinellas County      |
| 2030 NI4CE system    | EAGLE Net, NTS traffic net | NI4CE system         |
| 2100 144.210 USB     | Clearwater ARS             | vertical orientation |



**\*FOR SALE / WANTED\***

Anyone having something for sale or who might be looking for an item let me know. I will not print phone numbers or email addresses unless specifically told to since this newsletter might end up on the web. The exception is when I get the information off the web. If you are a member of the Wormhole then you can ask club members for the persons contact information. If you are not a member ... why not? OK, if you are not a member you can contact me at the email address at the end of this newsletter, I will give you the information to contact the person

involved. If you want to see anything here and you are coming to the meeting let the seller know, maybe he can bring it.

FOR SALE,

See Bill AG4QX for the following: most from SK estate, make me an offer.

\*Heathkit HD-1215 Phone patch \$15 looks ok

\*Drake WV-5 wattmeter \$90 looks ok

\*Heath Cantenna dummy load, 1 gal oil load, oil a little low, \$50

This stuff is from Ray KD4HUW

\*Icom AH-4 antenna tuner \$175.00

\*MFJ-616 Speech Intelligibility Enhancer \$90.00

Dean W8IM wants to make room in his closet.

352-255-1431 or w8im @arrl.net or the Wormhole and SPA\*RC nets

\*Meade 2080AT -LNT refracting telescope, little used original owner, original box, tripod, manual, some extra lenses, complete. \$100.00.

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## \*HAMFESTS\*

### 2023

#### August 19

**TARCFest** TARC Clubhouse, 22<sup>nd</sup> St at the river, \$5 entry including tailgate, a few inside tables reserved in advance, talkin on 147.105 +146.2, license testing after, more info at <http://hamclub.org/>

#### October 21

Bradenton, MARCIFest 2023, 2113 Morgan Johnson Road, talkin 146.820 – 100.0, for more info goto <https://www.manatee-arc.org/> contact Michael Ryan K4CVL at 941-376-6453

#### December 8 & 9

**Plant City, the 2023 Tampa Bay Hamfest and West Central Florida Section Convention**, Friday and Saturday, at the Strawberry Festival grounds, admission \$10, 16x40ft tailgate space \$10, electric \$10, for information contact Bill Williams AG4QX, [chairman@fgcarc.org](mailto:chairman@fgcarc.org) or go to <http://www.tampabayhamfest.org> or you can just ask me, Jim or Dee at a meeting ;-)

# 2024

**February 9-11** **Orlando Hamcation**, Central Florida Fairgrounds, 4603 West Colonial Drive, Tickets \$20 in advance, \$25 after Dec 21 and at the door. Talk-in 146.760 - PL 103.5 analog or Fusion. Also D-Star is on 146.820 -, all the information at [www.hamcation.com](http://www.hamcation.com) or call 407-841-0874. There is also an AM low power Information Station on AM 610.

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|                           |   |
|---------------------------|---|
| Mid January               | Adventure Run, Honeymoon Island   |
| Last full weekend January | Winter Field Day <a href="https://www.winterfieldday.com/">https://www.winterfieldday.com/</a>  |
| Late January              | Gasparilla celebration  |
| Late February             | West Central Florida Tech Conference<br><a href="http://arrlwcfc.org/wcf-special-events/wcftechconference/">http://arrlwcfc.org/wcf-special-events/wcftechconference/</a> |
| March                     | MS 150 Citrus Tour bike ride<br><a href="http://www.citrustour.org/register.php">http://www.citrustour.org/register.php</a>   |
| March/April               | MS Walks  |
| March/April               | Mass Casualty Exercises   |
| Late April                | Southeastern VHF Society Conference,<br><a href="http://www.svhfs.org">http://www.svhfs.org</a>   |
| Late April                | Florida QSO Party   |
| Mid May                   | March For Babies (was March of Dimes)<br><a href="https://www.marchforbabies.org/Registration/Events">https://www.marchforbabies.org/Registration/Events</a>              |
| Mid May                   | Annual Armed Forces Crossband Test  |
| Mid-May                   | Florida Hurricane Exercise  |
| Late May                  | Dayton Hamfest  |
| May, Memorial Day Weekend | Wormfest  |
| First weekend in June     | Museum Ships on the Air   |
| Fourth weekend in June    | Field Day<br><a href="http://www.arrl.org/contests/announcements/fd/">http://www.arrl.org/contests/announcements/fd/</a>  |
| July 3/4                  | Midnight Run in Largo<br><a href="http://www.kiwanismidnightrun.com/">http://www.kiwanismidnightrun.com/</a>  |
| Third weekend in August   | International Lighthouse/Lightship Week<br><a href="https://illw.net/">https://illw.net/</a>  |
| September                 | Run for All Children's  |

October, 3<sup>rd</sup> weekend

JOTA, Scout Jamboree-on-the-AIR (around 14.280MHz)

Early December

ALS bike ride in Walsingham Park

December, Second weekend

Tampa Bay Hamfest <http://www.fgcarc.org/>

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### **\*YOUR WORMHOLE OFFICERS\***

Bill AG4QX is President and editor of this newsletter, the Vice President position is open, Treasurer is Jim KD4MZL, Paul KA4IOX is the Secretary, Dee N4GD is the Repeater Trustee and Mike KV0OOM is our webmaster.

### **\*YOUR WORMHOLE REPEATERS\***

53.150 -1Mz PL 146.2

442.625 +5Mz PL 146.2

146.850 - 600Kz PL 146.2

The Wormhole 2M and 440 repeaters are both now dual mode Yaesu DR-2X. FM analog as always and Yaesu Fusion, a C4FM digital mode.

The Wormhole website is at: <http://www.TheWormholeSociety.org>.

West Central Florida Section website: <http://www.arrlwcf.org/>.

The ARRL website is at: <http://www.arrl.org/>

This newsletter is written for The Glorious Society of the Wormhole, an ARRL affiliated amateur radio club located around the Seminole section of Pinellas County Florida. Anyone wishing to be added or removed from The Glorious Society of the Wormhole mailings please write to me at the address below and thy will be done.

73,

Bill Williams

AG4QX

[ag4qx AT arrl DOT net](mailto:ag4qx AT arrl DOT net)