

# The Rochester VHF Group

# The VHF



# Journal

Volume 70, Issue 3

November 2016

The next regular meeting of the Rochester VHF Group will be Friday, November 11th at 7:30 PM located at Exelon Emergency Operations Facility in Macedon /Gananda. Doors open at 7PM Map and directions on last page.

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**Topic:** 400 W 6M Amplifier Project

### **RVHFG's Beacons**

| Band  | MHz      |
|-------|----------|
| 6m    | 50.078   |
| 2m    | 144.298  |
| 1.25m | 222.050  |
| 70cm  | 432.300  |
| 23cm  | 1296.257 |

Beacons Hosted at AWA Museum

**W2UTH 6 meter Skimmer**

<http://www.reversebeacon.net/dxsd1/dxsd1.php?f=0&c=W2UTH&t=de>

## **The Chairman Speaks!**

### **Dave Haliday K2DH**

Hello again, fellow VHF+ "addicts". Well, as I type this, I'm listening to a 6m opening! On a Tuesday evening (Halloween) in October/November! Pretty unusual! What a crazy year! Right now, I'm listening to W4IMD in EM84 as well as HI8W in the Dominican Republic. Pretty decent Sporadic E for a strange time of year!

The Board hasn't held a meeting as I type this- my bad, I'm late this month. But we'll get it done before the meeting, I'm sure.

This month's meeting will be a detailed discussion of the little "teaser" we presented to the club at the meeting last month, in regard to a club project of a 6m High Power Amplifier (HPA) for very little money. Jarred has done a good job of searching parts and acquiring some of the Harris TV amplifier modules and will present the project to the membership as a very cost effective way to get to the 350-400W power range with 5-6W from your transverter. I invite you to come to the meeting to get the details and join this project. I'm sure Jarred will have further details in his column in the Journal this month

Continued...

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# The Chairman Speaks!

**Continued...** The club beacons are still on my bench and not yet back on the air. A few things have slowed this project down a bit, one of which is our plan to add microwaves to the band group. I want finding the microwave beacons to be easy on the bands and to do that means reasonable power and effective antennas. An inquiry to the microwave reflector got plenty of responses to my question about antennas. We're going to use waveguide slot antennas for 3456, 5760, and 10368 MHz and have been offered them (for 3 and 5GHz) by W1GHZ of the NEWS group (we already have the 10GHz slot antenna, thanks to WB2BYP). However, it will take him some time to mill the slots in the guides, so that will slow down their addition. We were given a good enclosure for the antennas (again, from BYP), but I'm not entirely sure the 3 and 5GHz antennas will fit inside, as they tend to be fairly long. We'll see. I've received a crystal for the 10GHz oscillator and have it aging in the oscillator and am about to order one for the 5760 oscillator, as well. Bill, K2TER, donated the oscillator and it will give us a very stable 5760 signal. (Thank you so much, Bill!) I still hope for a mid-November install of the beacons, but maybe without 3456 and 5760 at that time.

A good, long-term solution to the meeting location problem still eludes us. As mentioned here last month, and at the meeting, we need to get serious about this. We'll be losing our temporary site in the next few months and that will not be a good thing for the club. If you have ANY suggestions or if you have contacts at any place you think might be suitable for our club (we're pretty harmless people, you know)- PLEASE follow it up or at the very least, let one of the club officers know of your thought so we can follow it up.

I officially renewed the club license (W2UTH) and applied for trusteeship of the license. That paperwork should come through in the next couple of weeks and we'll be all set for 10 more years. Wayne N2WK was quite fine with relinquishing control of the license. We appreciate his many years serving as the trustee- THANKS, Wayne!

That's it for now. Please plan to come to the November meeting on the 11<sup>th</sup> at Exelon in Macedon. Your support of the club project would be great and it would be great to have many strong 6m stations on for the E-skip season next year!

Meanwhile, back to the current 6m opening for me! CU on the bands

73,

Dave Hallidy K2DH

# Secretary Report

Freddie Sulyma, WB2GFZ

## Rochester VHF Group Meeting Minutes for 14 October 2016.

Dave (K2DH), called the meeting to order at 1931L. Dave welcomed everybody and all present introduced themselves. Dave asked for a motioned that meeting minutes and treasurer's report be accepted as written in October's journal. Dave (AE2DM) indicated that the Treasurer's report was in error and Freddie (WB2GFZ) acknowledge the error. Then the Secretary's report and Treasurer's report was accepted by Bob (W2CNS) and seconded by Dave (AE2DM) after acknowledging the error. A corrected version of the report has been included in this month's Treasurer's report.

### Attending:

Jarred (KF2MR), Chase Jackson (Guest), Freddie (WB2GFZ), Steve (KA1CNF), Dave (AE2DM), Bob (W2CNS), John (WB2BYP), Dave (K2DH), Bill (K2TER), Frank (K2OS), Jim (WB2YJH), Duncan (K2OEQ), Ken (N8KH) & Harry (W2HRY).

### Old Business:

- Dave (K2DH) reported the efforts to restore the failing Beacons that restoration activity was going well and is tentatively scheduled to be reestablished mid-November.
- The effort to locate a permanent meeting location was discussed. Both Bill (K2TER) & Freddie (WB2GFZ) are investigating potential meeting sites at their work locations.
- The up and coming club project (6 Meter Power Amplifier) was discussed and the November club meeting will highlight the hands on aspect for those desiring to procure a 6M amplifier.

### New Business:

- The club desires to reestablish an ARRL Club Affiliation. A review of the club's constitution will need to take place. Jarred (KF2MR) & Freddie (WB2GFZ) have agreed to champion this effort.
- A discussion to sponsor a VHF contest plaque took place (\$75). A motion to move forward was given by Frank (K2OS) and 2nded by Harry (W2HRY).
- A discussion regarding January Contest incentives took place. Mugs were made available for last year's event and Pins/Certificates are being considered.
- The club license is coming up for renewal and Dave's (K2DH) grid square will be applied when renewed

### Program:

Bill (K2TER) shared his experiences in taking on a highly ambitious project for his rover activities. He discussed the trials and tribulations of adding power and bands and improving the overall operability for his rover. His discussions of his rover migration from past and present was very interesting and inspiring.

## Rochester VHF Group Treasurer's Report (9/30/16-Revised)

### CHECKING/CASH ACCOUNT

|  |            |
|--|------------|
| Previous Balance (PP = \$5.77, Cash = \$530.83Cash, \$1989.62 Checking): | \$ 2526.22 |
| Dues \$10  |            |
| AL (K2MPE), Ken (W2UAD), Dave (AE2DM)                                    | \$ 30.00   |
| William (N3DSP) CHK# 1538 (\$10, Not On Statement)                       |            |
| Expenses:  |            |
| Beacon Repair Parts (Dave Hallidy)(Not On Statement)                     | \$ 109.49  |
| Picnic Food & Prep (Freddie Sulyma) (Not On Statement)                   | \$ 164.88  |
| Mugs & Hamfest Space, Chk# 1062  | \$ 240.00  |
| Current Balance (PP = \$5.77, Cash = \$560.83Cash, \$1749.62 Checking):  | \$ 2316.22 |

## Treasurer's Report (10/31/16)

### CHECKING/CASH ACCOUNT

|  |            |
|--|------------|
| Previous Balance (PP = \$5.77, Cash = \$560.83Cash, \$1749.62 Checking):   | \$ 2316.22 |
| Dues:  |            |
| Frank (K2OS), Ken (W2UAD), Dave (AE2DM)                                    | \$ 30.00   |
| William (N3DSP) CHK# 1538  | \$ 10.00   |
| PayPal – H. Hoffman, E. Tupis, H. Ramos, J. Reilich (\$9.91 * 4 = \$39.64) | \$ 39.64   |
| Expenses:  |            |
| Beacon Repair Parts (Dave Hallidy)   | \$ 109.49  |
| Picnic Food & Prep (Freddie Sulyma)  | \$ 164.88  |
| Current Balance (PP = \$45.41, Cash = \$590.83Cash, \$1485.25 Checking):   | \$ 2121.49 |

*Respectfully submitted,*

*Freddie Sulyma, WB2GFZ, Treasurer*

## Vice Chairman's Report

By Jarred Jackson, KF2MR

After our last meeting, I enjoyed a few hours participating in the NY QSO party. My goal this time was to make a few more CW contacts and I met that goal. After making a contact with a ham near NYC, he commented that he thinks every single ham in Monroe County was on the air as he had about 200 contacts from the county. Fun, but does not scratch my VHF+ itch. For that, I spent a weekend assembling a prototype of the 6m amplifier for the sake of discussion and testing. Initial testing went very well until my undersized dummy load failed. To hear more about what happened next, you will have to come to the meeting.

On November 11<sup>th</sup> we will have a unique experience as we review parts selection and design options for the 400W 6m amplifier project intended to be an active and practical discussion. Club members will be encouraged to review the specific parts used in the prototype, perhaps identify alternative parts, and source/cost information. A couple of laptops and Internet access will be available for research. We will meet at the Exelon Emergency Operations Facility in Macedon/Gananda. Doors open at 7pm and the meeting starts at 7:30. See the back of the journal for a map.

# New Kind of Supercapacitor Made Without Carbon

Energy storage device could deliver more power than current versions of this technology.

David L. Chandler | MIT News Office

October 10, 2016

Energy storage devices called supercapacitors have become a hot area of research, in part because they can be charged rapidly and deliver intense bursts of power. However, all supercapacitors currently use components made of carbon, which require high temperatures and harsh chemicals to produce.

Now researchers at MIT and elsewhere have for the first time developed a supercapacitor that uses no conductive carbon at all, and that could potentially produce more power than existing versions of this technology.

The team's findings are being reported in the journal *Nature Materials*, in a paper by Mircea Dincă, an MIT associate professor of chemistry; Yang Shao-Horn, the W.M. Keck Professor of Energy; and four others.

"We've found an entirely new class of materials for supercapacitors," Dincă says.

Dincă and his team have been exploring for years a class of materials called metal-organic frameworks, or MOFs, which are extremely porous, sponge-like structures. These materials have an extraordinarily large surface area for their size, much greater than the carbon materials do. That is an essential characteristic for supercapacitors, whose performance depends on their surface area. However, MOFs have a major drawback for such applications: They are not very electrically conductive, which is also an essential property for a material used in a capacitor.

"One of our long-term goals was to make these materials electrically conductive," Dincă says, even though doing so "was thought to be extremely difficult, if not impossible." But the material did exhibit another needed characteristic for such electrodes, which is that it conducts ions (atoms or molecules that carry a net electric charge) very well.

"All double-layer supercapacitors today are made from carbon," Dincă says. "They use carbon nanotubes, graphene, activated carbon, all shapes and forms, but nothing else besides carbon. So this is the first noncarbon, electrical double-layer supercapacitor."

One advantage of the material used in these experiments, technically known as  $\text{Ni}_3(\text{hexaiminotriphenylene})_2$ , is that it can be made under much less harsh conditions than those needed for the carbon-based materials, which require very high temperatures above 800 degrees Celsius and strong reagent chemicals for pretreatment.

The team says supercapacitors, with their ability to store relatively large amounts of power, could play an important role in making renewable energy sources practical for widespread deployment. They could provide grid-scale storage that could help match usage times with generation times, for example, or be used in electric vehicles and other applications.

The new devices produced by the team, even without any optimization of their characteristics, already match or exceed the performance of existing carbon-based versions in key parameters, such as their ability to withstand large numbers of charge/discharge cycles. Tests showed they lost less than 10 percent of their performance after 10,000 cycles, which is comparable to existing commercial supercapacitors.

But that's likely just the beginning, Dincă says. MOFs are a large class of materials whose characteristics can be tuned to a great extent by varying their chemical structure. Work on optimizing their molecular configurations to provide the most desirable attributes for this specific application is likely to lead to variations that could outperform any existing materials. "We have a new material to work with, and we haven't optimized it at all," he says. "It's completely tunable, and that's what's exciting."

While there has been much research on MOFs, most of it has been directed at uses that take advantage of the materials' record porosity, such as for storage of gases. "Our lab's discovery of highly electrically conductive MOFs opened up a whole new category of applications," Dincă says. Besides the new supercapacitor uses, the conductive MOFs could be useful for making electrochromic windows, which can be darkened with the flip of a switch, and chemoresistive sensors, which could be useful for detecting trace amounts of chemicals for medical or security applications.

While the MOF material has advantages in the simplicity and potentially low cost of manufacturing, the materials used to make it are more expensive than conventional carbon-based materials, Dincă says. "Carbon is dirt cheap. It's hard to find anything cheaper." But even if the material ends up being more expensive, if its performance is significantly better than that of carbon-based materials, it could find useful applications, he says.

This discovery is "very significant, from both a scientific and applications point of view," says Alexandru Vlad, a professor of chemistry at the Catholic University of Louvain in Belgium, who was not involved in this research. He adds that "the supercapacitor field was (but will not be anymore) dominated by activated carbons," because of their very high surface area and conductivity. But now, "here is the breakthrough provided by Dinca et al.: They could design a MOF with high surface area and high electrical conductivity, and thus completely challenge the supercapacitor value chain! There is essentially no more need of carbons for this highly demanded technology."

And a key advantage of that, he explains, is that "this work shows only the tip of the iceberg. With carbons we know pretty much everything, and the developments over the past years were modest and slow. But the MOF used by Dinca is one of the lowest-surface-area MOFs known, and some of these materials can reach up to three times more [surface area] than carbons. The capacity would then be astonishingly high, probably close to that of batteries, but with the power performance [the ability to deliver high power output] of supercapacitors."

The research team included former MIT postdoc Dennis Sheberla (now a postdoc at Harvard University), MIT graduate student John Bachman, Joseph Elias PhD '16, and Cheng-Jun Sun of Argonne National Laboratory. The work was supported by the U.S. Department of Energy through the Center for Excitonics, the Sloan Foundation, Research Corporation for Science Advancement, 3M, and the National Science Foundation.

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#### Journal Reference:

1. Dennis Sheberla, John C. Bachman, Joseph S. Elias, Cheng-Jun Sun, Yang Shao-Horn, Mircea Dincă. **Conductive MOF electrodes for stable supercapacitors with high areal capacitance.** *Nature Materials*, 2016; DOI: [10.1038/nmat4766](https://doi.org/10.1038/nmat4766)

## 2016 VHF+ Contest Calendar

| Event          | Date          | Local Time | Notes   |
|----------------|---------------|------------|---|
| EME Weekend #2 | 11/19 – 11/20 | See Moon   | <a href="http://www.arrl.org/eme-contest">http://www.arrl.org/eme-contest</a> |

## Classified Listings

No listings this month.

# Meeting Location and Directions

## Meeting Location

Exelon / Ginna Emergency Operations Facility  
1255 Research Forest  
Macedon NY 14502

