

HAMATEUR CHATTER

The Milwaukee Radio Amateurs Club

June 2013 Volume 21, Issue 6

One of the World's Oldest Continuously Active Radio Amateur Clubs—since 1917

Presidents' Letter

This weekend is Field Day with MRAC, MAARS and Gateway Technical College. We will again be setting up at Konkel Park located on 51st and Layton Ave. in Greenfield. This year because of the new Farmers Market, we will be located further east and south. This year AES is letting us use an FTDX-1200.

This is the new radio that was shown off in Dayton. Here is your chance to operate a very nice radio in real conditions. There will be plenty of chances to operate. Pat WW9R is willing to help anyone make their first CW contact. Our goal is to hang out and have a good time playing with radios. If you have something you would like to experiment with, bring it on out and let's try it. We will begin our setup on Friday at 1pm.

The June meeting will be our last meeting until September. We are expecting to give a presentation on APRS. We will explain what it can be used for and how you can get into it.

If you have any topics you would like to see covered at our meeting please let us know.

Just a reminder that July 6th is the South Milwaukee Hamfest. We will again have our club table in the flea market. Last year we took up 5 spaces and had a great showing. We even had a chance to talk with Bob Schmid WA9FBO from Scm. He is the designer of the club's repeater controller. This year we will again have a picnic with the MAARS group on Saturday August 10th 2013 at Greenfield Park area number 2. Brats and Hamburgers and refreshments will be provided. Please bring a dish to share with your fellow hams. We will again setup an HF radio to make contacts.



MRAC Officers:

Terms Expiring in 2014

- President – Dave, KA9WXN
- V-President– Dan, N9ASA
- Secretary – Mike, KC9CMT
- Treasurer – Joe, N9UX
- Director – Vacant

Terms Expiring in 2015

- Director – Al, KC9IJJ
- Director – Hal, KB9OZN

The Club Phone Number is: (414) 332-MRAC or

(414) 332- 6 7 2 2

Visit our website at:

www.w9rh.org

Mail correspondence to:

M. R. A. C.

**PO Box 26233
Milwaukee, WI**

53226-0233

Board of directors meeting called to order at 7:03 pm by Dave Shank, KA9WXN club president.

Director's present: Michael KC9CMT, Dave KA9WXN, Joe, N9UX, Al, KC9IJJ. Dan, N9ASA.

Absent: Hal, KB9OZN. There is one vacancy on the Board of Director's.

Preliminary discussions:

The Board of Director's minutes were accepted as published in the January Chatter by a motion forwarded by Mark, AB9CD seconded by Joe, N9UX. The Treasurers report was given by Joe, N9UX. The April balance ended with \$19,037.97 in our Club accounts. Dues and other income was deposited to our account during April. After April 1st, the renewal fee when to \$20 for the calendar year. The idea was forwarded by Dave, KA9WXN, club president, that the dues should be increased to \$20 per year. There are some static costs that the Club must pay monthly or yearly. The club's financial situation is good, and we have a responsibility to keep it that way. Even though our expenses are greater than contributions, the annual Hamfest makes up the difference in our accounts. The Treasurer, Joe, N9UX, does not see a pressing reason to change the dues rate. Al, KC9IJJ brought up the idea of offering the MAARS people a preferred rate to join the MRAC.

Meeting programs: The months meeting will be the annual Club auction. Dave, WB9BWP will be the host and auctioneer for the club membership meeting. Auction fliers should be sent out by Email to the Membership. The club Secretary will handle this during the next few days. There will be no membership meetings in July and August as has been the case for the past few years. The November presentation being discussed is about how to use and take measurements with an oscilloscope. Joe, N9UX knows someone that may be able to give this program at his work.

This is a program that the Board of Directors' has wanted to present for over a year. Many members have oscilloscopes and do not have the technical training to take measurements with these complicated devices. The October meeting falls on Halloween this year and is still open for suggestions. Jeff Annis, K9BS would be happy to give his antenna modeling presentation. A outing to a sporting event such as a Hockey game would be a great club function. There will also not be a meeting in December due to the holidays. The January meeting topic is still open. A presentation from the EAA, who have a large event each year in Oshkosh would make a good presentation. A presentation on Ham Radio programming software would be a good program.

Hamfest: We may be able to use a radio on loan from AES again this year. Al, KC9IJJ will have the "Disco" tent going again this year. We will be a block east of our normal location due to the Farmers Market taking our normal area. We will have a 1000ft diameter area east of the farmers market. Dave, KA9WXN has been in discussions with the Greenfield parks department to negotiate and secure the site. Mark, AB9CD will be renting a U-haul to haul their equipment to and from the MRAC/MAARS club Field day site.

Pat Hoppe will be with us from the Gateway Technical Institute in Racine with people from his student group. Dave, KA9WXN is talking to his employer about borrowing a tower and some other equipment for the event.

Special Project Committees & Committee reports:

Repeater Report: Dave, WB9BWP is the repeater trustee. The club would like more than one repeater trustee. We need to ask for volunteers at the membership meeting. Dave Karr is ready to start moving ahead on phone line issues. We want to port our phone line to Google voice. Ideally, we would not want a land line at the repeater site.

New Business: Officers were elected during the April election meeting. Al, KC9IJJ, and Hal, KB9OZN decided to accept nomination and were then elected by the membership to a new two year term on the MRAC Board of Director's. Dan, N9ASA has been voted to remain as club Vice-President for another term, as has Dave, KA9WXN, who will remain the club president. Joe, N9UX and Michael, KC9CMT have consented to remain in their present Club management positions. The club is planning to send another annual donation to the ARRL Spectrum Defense fund but was deferred until November of 2013. A donation to the church should be made as soon as possible. \$100 is the usual amount. A presentation setup at Discovery World is in the discussion stage. Doing something at the Robotics competition at the US Cellular Center has been talked about. Dave, KA9WXN will be looking into this. AE9EW, Dale is interested in joining the MRAC board of director's and our club president Dave, KA9WXN, will appoint him if he decides to proceed. The MRAC would like to have a special event station at Discovery world during the annual fireworks event on July 3rd, 2013.

The South Milwaukee Amateur radio club is having their annual swapfest in July. Does the club want to have a table at the swapfest? Ozaukee club is having a out of trunk swapfest in September. The MRAC will not be involved in this event. Does the club need a table at the MRC91 event in November. The Annual MRAC/MAARS picnic is on August 10th this year.

Ham radio is on the rise numbers wise, with more retirees and younger people entering the hobby, due to the influx of cheap Chinese Ham Radios for sale. The club needs PR and recruitment. Having a ARRL convention in Milwaukee, sponsored by the MRAC in conjunction with the club's 100th anniversary, would be a big event and draw people from all over the Midwest. It would take 5 years plus to organize a national convention. Our club the MRAC, should also be promoting the 10-10 club which is a nation wide club devoted to the 10 meter band.

Clubs throughout the country need to use the spectrum that they have been given. Both 440 & 220 are not used very often in the Milwaukee area. The club should promote the use of these bands to keep the spectrum alive. We already promote the 10-10 international radio club. Our renewal forms have been updated with the new address block information.

Special Projects: The club has some equipment it would like to sell, a Kenwood TS-430 plus power supply. We also would like to sell a two beams that did not move at the club swap-fest. Auction, the club will need lots of refreshments. The Board of Directors' turned down by a vote of 3-1 with 1 abstaining an offer of swapping the Radio package for a MFJ-269 antenna analyzer. The Kenwood radio was thought to be a better asset for the club to have around. The club will not be offering Ham Radio classes anytime in the near future. Classes are presently being given by the MRC91 group. The club is donating \$100 to the Lutheran Redemption Church where we hold our meetings.

Field Day: Pat Hoppe, with his group of students from Kenosha will be joining us at the MRAC field day site this year. They will be bringing their equipment and a van to the event. There is still some radio equipment that the MRAC owns that it would like to sell. A Kenwood TS-430 with power supply is one of the items. Also, the club has two HF beams that did not sell at the Hamfest.

A motion was made to adjourn the meeting at 8:48 pm by Dan, N9ASA seconded by Al, KC9IJJ. Meeting adjourned at 8:18 pm. The room was returned to an organized condition as it was when the room was opened.

J. Travis Baird (W9VQD) Award

This award is for those who MRAC member hams who have demonstrated a long-term commitment to promoting the amateur radio service.

In the years 2001-2002 the officers and directors of the Milwaukee Radio Amateurs' Club discussed and decided to create an award to recognize the achievements of MRAC members who have demonstrated a continuing long-term commitment to the amateur radio service. To that end the officers and board agreed to name the award the J. Travis Baird W9VQD Award.



Travis was a very active amateur, and supported the amateur radio service enthusiastically. He taught and elmered prospective and new hams. He was always willing to help those who sought his assistance. Travis also served in leadership positions within the MRAC organization.

It is in the tradition of Travis that this award was presented to Dave DeFebo, WB9BWP who tireless work for our club best exemplifies those qualities that deserve the recognition of the presentation of this most prestigious award.

Dave DeFebo our past president, long time member and mentor to all, received the **J. Travis Baird Award** at this past May's membership meeting. The Board of Directors' was unanimous when voting for the presentation of the award to Dave. The award plaque was donated by Mark, AB9CD and presented by Dave, KA9WXN our current president.

The only two recipients of this prestigious award are **Dick McNew, WB9PTC** (SK), and **Dave DeFebo WB9BWP**.



Dave DeFebo Accepts the J. Travis Baird Award

“When Thunder Roars...Go Indoors!”

(MADISON) – Every year, lightning kills more than 50 Americans and injures hundreds of others leaving them with lifelong pain and in some cases permanent neurological disabilities. Here in Wisconsin, 25 people have been killed and 208 injured as a result of lightning since 1982. You can protect yourself and your family by knowing these simple lightning safety facts and tips:

- If you hear thunder, you are in danger. Don't be fooled by blue skies. If you hear thunder, lightning is close enough to pose an immediate threat. Don't wait, seek shelter immediately. Remember: When Thunder Roars...Go Indoors!
- A fully enclosed building with wiring and plumbing offers the best protection. Sheds, picnic shelters and covered porches DO NOT protect you from lightning.
- If a building is not available get into a hard-topped metal vehicle and close all the windows.
- Stay inside a safe building or vehicle for at least 30 minutes after you hear the last clap of thunder.
- Don't use a corded phone except in an emergency. Cordless and cell phones are safe to use.
- Keep away from electrical equipment and wiring.
- Because water pipes conduct electricity, don't take a bath or shower or use other plumbing during a storm.
- Stay away from isolated tall trees, towers or utility poles. Lightning tends to strike taller object in an area.
- Get an Emergency Weather Radio. It will broadcast the latest forecast for thunderstorms. Remember, any thunderstorm, whether it is severe or not, can produce deadly lightning.

Act fast if someone is struck by lightning:

- Lightning victims don't carry an electric charge and are safe to touch and need urgent medical attention. Cardiac arrest is the immediate cause of death. Call 911 immediately.
- Give CPR if the person is unresponsive or not breathing. Use an Automatic External Defibrillator if one is available.
- If possible, move the victim to a safer place. Lightning can strike twice. Don't be a victim.

Lightning Facts:

- Lightning occurs in all thunderstorms; each year lightning strikes the United States 25 million times.
- Lightning often strikes the same place repeatedly, especially tall isolated objects.
- Most lightning victims are in open areas or near a tree.
- The energy from one lightning flash could light a 100-watt light bulb for more than 3 months.

- The air near a lightning strike is heated to 50,000°F—five times hotter than the surface of the sun!
- The rapid heating and cooling of the air near the lightning channel causes a shock wave which results in thunder.

Lightning Myths and Facts

Myth: Rubber tires on a car protect you from lightning by insulating you from the ground.

Fact: The metal roof and sides protect you, NOT the rubber tires. When lightning strikes a vehicle it goes through the metal frame into the ground. Don't lean on the vehicle doors during a thunderstorm.

Myth: If trapped outside and lightning is about to strike you should lie flat on the ground.

Fact: Lying flat increases your chance of being hit by a ground current. If you are caught outside in a thunderstorm keep moving toward a safe shelter.

Myth: If thunderstorms threaten while you are outside playing a game it is OK to finish before seeking shelter.

Fact: Many lightning casualties occur because people do not seek shelter soon enough. No game is worth death or lifelong injuries. Seek shelter immediately if you hear thunder. Adults are responsible for the safety of children.

Distributed by the Milwaukee Area Skywarn Association. Nonprofit and IRS 501(c)(3) tax exempt. Skywarn is the identification, evaluation, and reporting of dangerous weather. Everyone talks about the weather, but storm spotters do something about it. Fear is not an option. Visit us at: www.mke-skywarn.org Facebook, Twitter, Youtube. Zello channel: milwaukee-skywarn. Our best spotters always practice safety first.



Visual Convective Storm evidence



A rotating [wall cloud](#) with [rear flank downdraft](#) clear slot evident to its left rear.

Storm spotters are trained to discern whether a storm seen from a distance is a [supercell](#). They typically look to its rear, the main region of [updraft](#) and [inflow](#). Under the updraft is a rain-free base, and the next step of [tornadogenesis](#) is the formation of a rotating [wall cloud](#). The vast majority of intense tornadoes occur with a wall cloud on the backside of a supercell.

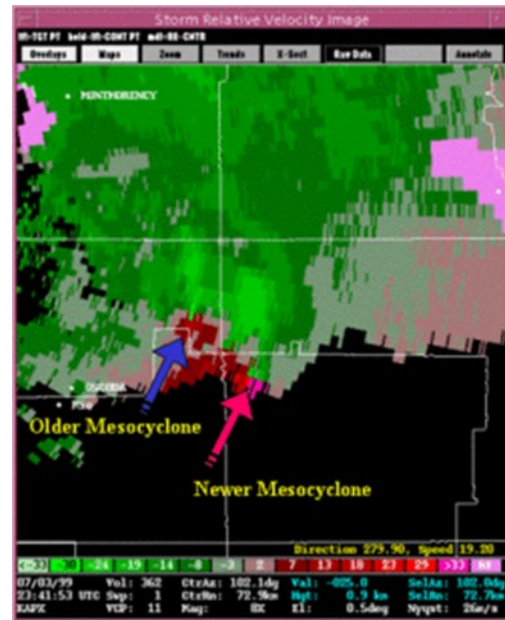
Evidence of a supercell comes from the storm's shape and structure, and [cloud tower](#) features such as a hard and vigorous updraft tower, a persistent and/or large [overshooting top](#), a hard anvil (especially when [backsheared](#) against strong upper level [winds](#)), and a corkscrew look or [striations](#). Under the storm and closer to where most tornadoes are found, evidence of a supercell and likelihood of a tornado includes inflow bands (particularly when curved) such as a "beaver tail", and other clues such as strength of inflow, warmth and moistness of inflow air, how outflow- or inflow-dominant a storm appears, and how far is the forward flank precipitation core from the wall cloud. Tornadogenesis is most likely at the interface of the updraft and [forward flank downdraft](#), and requires a "balance" between the outflow and inflow.

Only wall clouds that rotate spawn tornadoes, and usually precede the tornado by five to thirty minutes. Rotating wall clouds are the visual manifestation of a [mesocyclone](#). Barring a low-level boundary, tornadogenesis is highly unlikely unless a [rear flank downdraft](#) occurs, which is usually visibly evidenced by evaporation of [cloud](#) adjacent to a corner of a wall cloud. A tornado often occurs as this happens or shortly after; first, a [funnel cloud](#) dips and in nearly all cases by the time it reaches halfway down, a surface swirl has already developed, signifying a tornado is on the ground before condensation connects the surface circulation to the storm. Tornadoes may also occur without wall clouds, under flanking lines, and on the leading edge. Spotters monitor all areas of a storm and their surroundings.

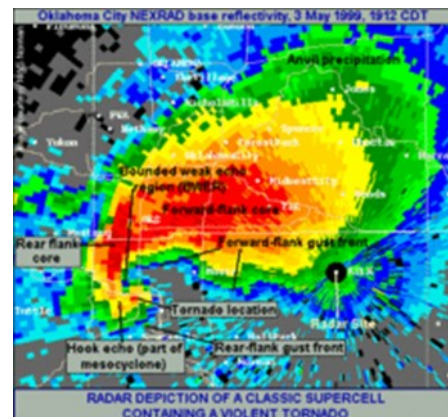
Convective Storm Radar Evidence

Today, most developed countries have a network of [weather radars](#), which remains the main method of detecting signatures likely associated with tornadoes and other severe phenomena as [hail](#) and [downbursts](#). Radar is always available, in places and times where spotters are not, and can also see features that spotters cannot, in the darkness of night and processes hidden within the cloud as well as invisible processes outside the cloud.

Tornados



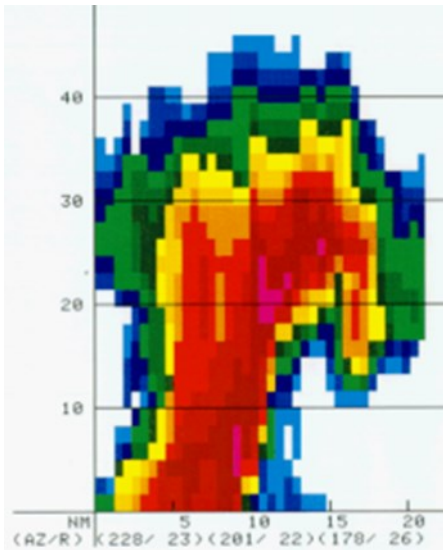
Doppler [NEXRAD](#) radar image of two [mesocyclones](#) with one [supercell](#) passing over Northern Michigan on July 3rd, 1999 at 23:41 UTC. Rotations is seen as small couplets of red (away) and green (toward) radial velocities. The thick circles represents 3D vortices which have been classified as mesocyclones near the ground by a detection algorithm. The left mesocyclone is associated with a tornado while to the right a larger area of rotation has developed.



A classic hook echo. The tornado associated with this echo was part of the [1999 Oklahoma tornado outbreak](#). It reached F5 strength on the [Fujita scale](#).



Severe Weather Preparedness



Vertical cross-section through a supercell exhibiting a Bounded Weak Echo Region

In short-term prediction and detection of tornadoes, [meteorologists](#) integrate radar data with reports from the field and knowledge of the meteorological environment. Radar analysis is augmented by automated detection systems called [algorithms](#). Meteorologists first look at the atmospheric environment as well as changes thereof, and once storms develop, storm motion and interaction with the environment.

An early step in a storm organizing into a tornado producer is the formation of a weak echo region (WER) with a [tilted up-draft](#). This is an area within the thunderstorm where precipitation should be occurring but is "pulled" aloft by a very strong updraft. The weak echo region is characterized by weak reflectivity with a sharp gradient to strong reflectivity above it and partially surrounding the sides. The region of the [precipitation](#) lofted above the WER is the echo overhang consisting of precipitation particles diverging from the storm's summit that descend as they are carried downwind. Within this area, a [bounded weak echo region \(BWER\)](#) may then form above and enclosing the WER. A BWER is found near the top of the updraft and nearly or completely surrounded by strong reflectivity, and is indicative of a supercell capable of cyclic tornadogenesis. A mesocyclone may descend or a tornado may form in the lower level of the storm simultaneously as the mesocyclone forms.

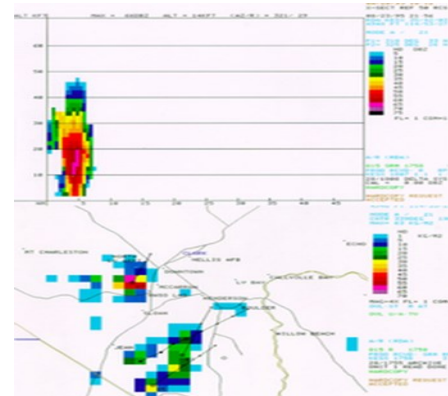
In [reflectivity](#) (precipitation intensity) data, a tight echo gradient (particularly on the inflow area) and a fan shape generally indicate a [supercell](#). A V-notch or "flying eagle echo" tend to be most pronounced with intense classic supercells, the type of supercell that produces most of the strongest, largest, and longest lived tornadoes. This is not to be confused with an inflow notch; which is a lower level indentation in the precipitation where there is little to no reflectivity, indicative of strong, organized inflow and a severe storm that is most likely a supercell. The rear inflow notch (or weak echo channel) occurs to the east or north of a mesocyclone and hook echo. Forward inflow notches also occur, particularly on high-precipitation supercells (HP) and quasi-linear convective systems (QLCS).

In the United States and a few other countries, [Doppler](#) capable weather radar stations are used. These devices are capable of measuring the radial [velocity](#), including radial [direction](#) (towards or away from the radar) of the winds in a storm, and so can spot evidence of rotation in storms from more than a hundred miles (160 km) away. A supercell is characterized by a mesocyclone, which is usually first observed in velocity data as a tight, cyclonic structure in the middle levels of the thunderstorm.

If it meets certain requirements of strength, duration, and [vorticity](#), it may trip the mesocyclone detection algorithm (MDA). Tornadic signatures are indicated by a cyclonic in-bound-outbound velocity couplet, where strong winds flowing in one direction and strong winds flowing in the opposite direction are occurring in very close proximity. The algorithm for this is the [tornadic vortex signature \(TVS\)](#). TVS often also forms first in the middle levels of the thunderstorm and may descend and tighten into a tornado. The TVS is smaller and found at lower level than the MDA, and usually is the tornado cyclone not the actual tornadic circulation. The TVS is, however, indicative of a likely tornado or an incipient tornado. The couplet and TVS typically precede tornado formation by 10–30 minutes but may occur at nearly the same time or precede the tornado by 45 minutes or more. The [hook echo](#) feature is formed as the [RFD](#) occludes precipitation around the mesocyclone and is also indicative of a probable tornado (tornadogenesis usually ensues shortly after the RFD reaches the surface).

After the implementation of the [WSR-88D](#) network in the U.S., the probability of detection of tornadoes increased substantially, the average lead time rose from four minutes to thirteen minutes, and a 2005 [NOAA](#) report estimates that as a result of improved warnings that there are 45 percent fewer fatalities and 40 percent fewer injuries annually. Dual-[polarization](#) radar, being implemented to the US [NEXRAD](#) network,^[11] may provide enhanced warning of tornadoes and severe winds and hail associated with the hook echo due to distinct precipitation drop characteristics. Polarimetric radar boosts precipitation observation and prediction, especially rainfall rates, hail detection, and distinguishing precipitation types. Proposed radar technologies, such as [phased array](#) and CASA, would further improve observations and forecasts by increasing the temporal and spatial resolution of scans in the former as well as providing low-level radar data over a wide area in the latter.

Hail, downburst and downpour



Severe Weather Preparedness

Vertical cross-section of a thunderstorm at the top and VIL value of 63 kg/m² with that cell at the bottom (red one), giving potential for hail, downpour, and/or downdraft. Hail forms in a very intense [updraft](#) in a supercell or a multicellular thunderstorm. As for tornadoes, BWER detection and a tilted updraft are indicative of that updraft but does not lead to predict hail. The presence of a [hail spike](#) in the reflectivity pattern is an important clue. It is an area of weak reflectivity extending away from the radar immediately behind a thunderstorm with hail. It is caused by radiation from the radar bouncing from hailstone to hailstone or the ground before being reflected back to the radar. The time delay between the backscattered radiation from the storm and the one with multiple paths causes the reflectivity from the hail to appear to come from a farther range than the actual storm.

However, this artifact is visible mostly for extremely large hail. What is needed is a knowledge of the water content in the thunderstorm, the freezing level and the height of the summit of the precipitation. One way of calculating the water content is to transform the reflectivities in rain rate at all levels in the clouds and to sum it up. This is done by an algorithm called [Vertically integrated liquid](#), or VIL. This value represents the total amount of liquid water in the cloud that is available. If the cloud would rain out completely, it would be the amount of rain falling on the ground and one can estimate with VIL the potential for [flash flood](#).

However, the reflectivities are greatly enhanced by hail and VIL is greatly overestimating the rain potential in presence of hail. On the other hand, [National Weather Service](#) meteorologists have found that the VIL density, that is to say VIL divided by the maximum height of the 18 [dBZ](#) in the cloud, is a good indicator of the presence of hail when it reach 3.5.^[17] This is a crude yes/no index and other algorithms have been developed involving VIL and the freezing level height.^[17] More recently, [dual polarization](#) of weather radar have shown promising direct detection of hail.

VIL can be used to estimate the potential for [downburst](#), too. A convective [downdraft](#) is linked to three forces in the vertical, namely perturbation pressure gradient force, buoyancy force and precipitation loading. The pressure gradient force was neglected as it has significant effect only on the updraft in supercells. With this assumption and other simplifications (e.g. requiring the environment of the air parcel to be static on the time scale of the downdraft). The resulting momentum equation is integrated over height to yield the [kinetic energy](#) of the parcel on descending to the surface and is found to be the negative [CAPE](#) of a dry air parcel injected into the storm, plus de motion of the convective cell. S. R. Stewart, from NWS, has published in 1991 an equation relating VIL and the echo tops that give the potential for surface gust using this concept.^[18] This is a predictive result that gives a certain lead time. With the Doppler velocity data, the meteorologist can see the downdraft and [gust fronts](#) happening, but since this a small scale feature, detection algorithms have been developed to point convergence and divergence areas under a thunderstorm on the radar display.

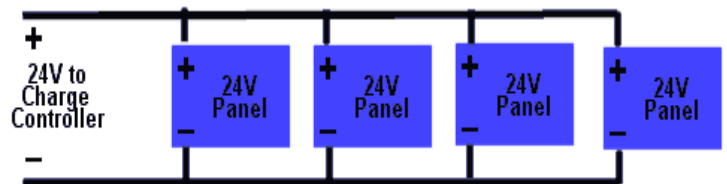
The Experimenters Bench

Wiring Your Solar Panels

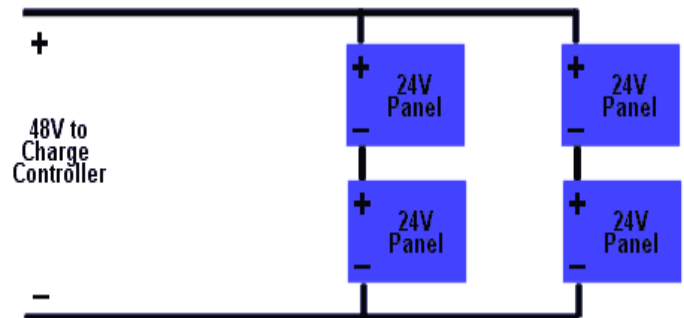
The first question to ask yourself is are you capable of doing this work or should you get an electrician to do it? However it should be within the capabilities of most DIYers

Question number two - do you need to wire the panels in series or parallel?

If your panels are 24 volt and your controller and batteries are 24 volt, then you would need to wire your panels in parallel- you would be connection all the positive connections together and separately connect all the negatives together.



You can connect pairs of panels in series (sometimes referred to as a string), connecting the positive terminal of one panel to the negative of the next, to increase the voltage. The effects of [Partial Shading](#) on overall efficiency should be taken into account when considering series wiring.



As you don't know how your system may develop in the future, it would be a good idea to buy your panels in even numbers, making it convenient to wire pairs in series if you want to change, say, from a 24 volt to a 48 volt system.

The next question to consider is the type of wire to use. We generally think of electricity flowing freely through an electric cable, however cables will have a resistance that will tend to restrict that flow to a small but possibly significant degree. This resistance will be proportional to the length of the cable (the longer the cable the greater the resistance), and inversely proportional to the cross sectional area (a fatter cable has less resistance)

The Experimenters Bench

Below is a table showing approximate resistances per meter length for different sizes of copper wire. (Resistance is measured in ohms)

Cable Cross Sectional Area mm ²	Approximate Equivalent American Gauge	Approx. Resistance per M Length ohms
1.5	16	0.012
2.5	14	0.007
6	10	0.003

So, how do we use this information?

Let's suppose the cables we connect to our [solar panels](#) are going to have a 1.5mm² cross sectional area and are going to be 20m in total length (10m each for positive and negative cables).

The total resistance of our cable will be $20 \times 0.012 = 0.24$ ohms

Let's suppose that our [solar panels](#) are going to be pushing out 20 amps of current, then we can use ohms law to calculate the "[voltage drop](#)" along these cables.

ohms law can be stated as: $V = I \times R$

Or, Voltage Drop = Current in amps x resistance in ohms

In our case above, the voltage drop is going to be $20 \times 0.24 = 4.8$ volts. This means that the voltage at the charge controller end of the cables will be 4.8 volts less than the voltage produced by the panels if a current of 20amps is flowing. This voltage drop is irrespective of the voltage we are using, it is caused by the current and the resistance.

If our panels are wired for a 24 volt system we would be looking at a voltage drop of 20% which is clearly unacceptable. Various different figures may be quoted as a maximum acceptable [voltage drop](#) but 2% sounds like a good target.

In our example above, 6mm² cable would still have caused a 5% voltage drop, so it would be worth considering larger cable still, or separate cables for each panel (each cable then carries a smaller current so there is a lower voltage drop, or mount the panels closer to the [charge controller](#) and batteries to reduce the cable length.

If you are still in the design stage of your system, you may consider using a higher voltage system. Panels producing the same wattage as those in our example above (20 amps x 24 volts = 480 watts) but wired to give 48 volts, will only be producing half the current (still the same power of 480 watts).

With only half the current flowing, the voltage drop will be half, and better still, with double the voltage, the percentage voltage drop is halved again, ie, the same cable will result in 1/4 of the % voltage drop that you would get with a 24 volt system of the same power.

This **Solar-Battery regulator** allows solar cell arrays to be connected to either *conventional lead-acid*, *sealed lead-acid*, or *lithium storage batteries* without fear of overcharging. It allows two different electrical loads to be driven from the batteries at two different charge states to maximize power usage efficiency.

The existing **power control circuit** in this fridge aims to avoid discharging a car battery by ensuring that it only runs down to a certain voltage. This means that it will only run for a short time after the engine is turned off. While a sensible precaution, this prevents efficient use of [solar power](#) to drive it.

The existing circuit also suffers from oscillation caused by voltage drops in the wiring from the unit to the power source, generally a cigarette lighter socket; Rather than switching off cleanly the load relay spends several tens of minutes clicking on and off uselessly as the car battery voltage slowly drops back from its on-charge voltage.

I wanted to be able to get some level of refrigeration for a few minutes even if the weather was not especially sunny. What I needed was a storage battery of a few amp-hours, a solar panel for charging, and a controller circuit to turn on the fridge when enough charge had built up for a few minutes operation. The original relay based power control circuit in the fridge was removed and the power input wired direct to the fan and Peltier effect cooling unit. The nominal current draw of the fridge is 4A.

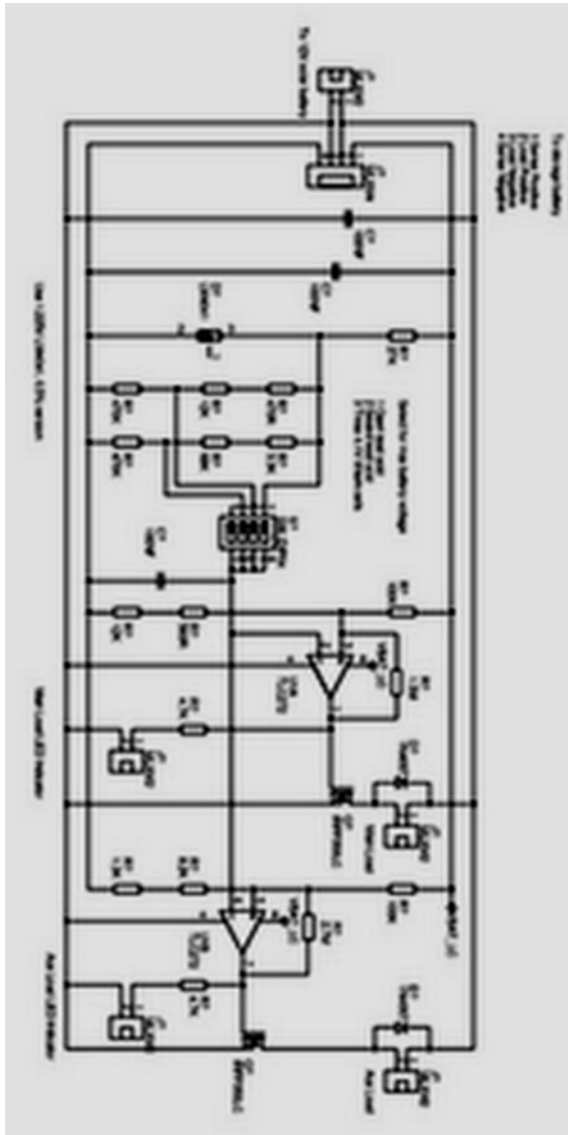
Batteries

There is space inside the regulator enclosure for about 7Amp-Hours worth of surplus mobile phone lithium batteries. Three 3.6V nominal voltage cells are wired in series which produces a battery of 10.8V, then multiple banks of three are wired in parallel. The voltage varies over the charge cycle from $3 \times 3.0 = 9.0V$ when fully discharged to $3 \times 4.1 = 12.3V$ which is the maximum allowable on-charge voltage. Higher voltages will destroy these cells. The 12.3V maximum charge voltage allows the battery to be charged from 12V solar panels and the 9.0V full discharge voltage allows most non-critical 12V equipment to run the batteries right down to empty without over-discharging them.

An external battery can be connected if needed but if it is a different technology the internal one must be disconnected first. The external battery may be lithium as described, conventional lead acid, or sealed lead acid and the appropriate voltages are selected on an internal DIP switch. The circuit is designed to draw very little current so that some charge can be accumulated even when the weather is quite dull.



Circuit Operation



In the actual device the transistors are bolted to the Aluminium case. The schematic diagram shown here represents how the circuit would be built if all components were on-board. Separate paths for load current and voltage sensing allow the battery voltage to be measured accurately even under loads of several amps.

The LM4041 provides an accurate low-power voltage reference for the sensing circuit. This 1.225V reference is used directly for the conventional lead-acid setting and via two alternative dividers for the sealed lead acid and lithium voltages. Using a 1% version for the voltage reference and 1% resistors in these dividers keeps us from going too far above the magic 4.1V limit on standard lithium cells without having a pesky trimmer, or worse, a set of trimmers. As the voltage across the battery rises under charge, the main load output will be switched on when a voltage some way above the fully discharged level is reached. If the load current exceeds the available [solar charge](#) current, the batteries will drain back down to the fully discharged state and the load will be disconnected again.

Some hysteresis avoids the load switching on and off too frequently, but this all depends on the available charge current, battery capacity and load current. If the charge current exceeds the load, the battery voltage will continue rising until the *full charge voltage* is reached. At this point the secondary load is turned on to prevent overcharging. If no secondary load is naturally available, one must be provided in the form of a resistor .

If the standard load current exceeds the maximum output of the solar array this is not needed. **IRF350LC MOSFETS** are used for load switching which allows loads of more than 10 amps to be switched. A dual CMOS rail-to-rail output op-amp is used which simplifies the calculation of the switching voltages. [LED indicators](#) drawing about 2mA each show which loads are turned on.

If [lead acid batteries](#) are used then its worth noting that there is no temperature compensation on the charge voltages, so it's best to keep them between 10 and 30 degrees C or the -2mV/K coefficient of this technology might result in overcharging of sealed gel units.

Switching Voltages

	Main Load V rising	Main Load V falling	Second Load V rising	Second Load V falling
Conventional Lead-Acid	11.00	10.37	14.10	13.00
Sealed Lead-Acid	10.77	10.10	13.79	13.30
Lithium	9.600	9.000	12.30	11.80



Tick Removal

A nurse discovered a safe, easy way to remove ticks where they automatically withdraw themselves when you follow her simple instructions. Read this one as it could save you from some major problems.

Tick Removal:

Spring is here and the ticks will soon be showing their heads.

Here is a good way to get them off you, your children, or your pets. Give it a try.

Please forward to anyone with children, hunters or dogs; or anyone who even steps outside in summer!

A School Nurse has written the info below--good enough to share--and it really works!

"I had a pediatrician tell me what she believes is the best way to remove a tick. This is great because it works in those places where it's sometimes difficult to get to with tweezers: between toes, in the middle of a head full of dark hair, etc."

"Apply a glob of liquid soap to a cotton ball. Cover the tick with the soap-soaked cotton ball and swab it for a few seconds (15-20); the tick will come out on its own and be stuck to the cotton ball when you lift it away.

This technique has worked every time I've used it (and that was frequently), and it's much less traumatic for the patient and easier for me.."

Unless someone is allergic to soap, I can't see that this would be damaging in any way. I even had my doctor's wife call me for advice because she had one stuck to her back and she couldn't reach it with tweezers. She used this method and immediately called me back to say, "It worked!"

Pass this on.....everyone needs this helpful hint.

Early Radio: Military Communications



BINH GIA – The Battle

06 March 2006

Michael Martin

"They're coming." - "Now they're almost here." - "They're here, they're here." Then over the radio comes a strange, haunting laugh – a fatalistic, almost giddy sound that echoes with a resolved hopelessness. "Never mind now. Here I am... I'm captured."

These were the final words that Lieutenant Paul L. Twomey, piloting a helicopter over the death and destruction of the Binh Gia battlefield, would hear from Sergeant Harold G. Bennett, a US Army Ranger advisor, as he, his RTO, PFC Charles E. Crafts, and his unit – the 33rd Vietnamese Ranger Battalion – were being overrun by a numerically superior Viet Cong force.

The date was the 31st December 1964. It was the first time that a major VC force had stood its ground and literally annihilated several of the elite South Vietnamese military units sent against it.

The significant impact of this bloody defeat on the troops of the Vietnamese armed forces was barely noted at the time. But in the months that followed both the American and the South Vietnamese military would come to realize that this action was the first sign of a changing Indochina conflict; the enemy had taken head on the South Vietnamese government's finest troops and had bested them, and for the first time he had remained on the battlefield to hold the ground that he had taken.

These momentous events would mean little to Bennett and the rest of the captured rangers. But only six months later, the announcement by the Viet Cong that US Army Ranger Sergeant Harold Bennett had been executed in retaliation for the South Vietnamese government's execution of two VC terrorists, would send a chill through the hearts of other American military men serving as advisors to the South Vietnamese military units in the field. It would also shatter the hopes and dreams of the Bennett family that he would some day be released, and it would cause strong feelings of anguish and concern to the families of other American POWs and MIAs.

The execution ended the life of Ranger / Paratrooper Harold G. Bennett, but not the untold story of his capture and torture he suffered prior to his death. Bennett's sojourn into the annals of Ranger history would begin on 29th December 1964, as he and his RTO, PFC Crafts, accompanied the 33rd Vietnamese Ranger Battalion (Biet Dong Quan) into the "hell" of Binh Gia.

The Battle of Binh Gia

1964 was the year of total commitment for the Communist forces in Vietnam; by then the die had been cast, and there was no longer any turning back if they were to succeed in their conquest of the South. Both the top Communist officials in Hanoi and those of the southern revolutionaries agreed on this.

A [step](#) up in both the training and the fighting soon took place – mostly in the Delta – with the size of the VC forces expanding from roughly 23,000 male and female guerrillas in January 1963, to a well trained, politically motivated army of approximately 56,000 soldiers by December 1964.

More and more, the intelligence maps of the South Vietnamese Military Command and [MACV](#) (Military Assistance Command Vietnam) were being covered with vast areas marked in "red" indicating enemy control.

After several successful ambushes against the Saigon military forces – on 9th December an entire company of M-113 armoured personnel carriers was destroyed by the VC – and with the volatile undercurrent of political unrest at the time, the Communists made the decision to [close](#) out the year with a major military victory to commemorate the fourth anniversary of the establishment of the [National Liberation Front](#) of South Vietnam (NLF).

Elements of the Viet Cong 9th Division (their first division size unit to become operational and fight in the South) were selected for this honour. Two regiments of the 9th (271st and 272nd) moved out of War Zones C & D and infiltrated into the coastal areas to receive logistical support from North Vietnam. The two units then regrouped and moved into the rubber and banana plantations surrounding the small village of Binh Gia, a strategic hamlet located about 67 Kilometers east of Saigon in Phuoc Tuy Province.

The VC moved in and out of the jungles probing and harassing the local villagers and [regional forces](#) troops for several days prior to their main attack. In the predawn hours of 28th December the Viet Cong regiments, led by the 514th Battalion, made a surprise assault on the village, first overrunning the outposts that protected it. After the successful attack the Communists held their positions and reinforced with fresh troops.

The villagers of Binh Gia were staunch, anti Communist Catholics, resettled from North Vietnam after 1954; they knew what it was like to live under the Hanoi regime and they made an all out effort to thwart the enemy's plans. During the South Vietnamese military's attempt to retake Binh Gia from the VC, South Vietnamese Air Force fighter/bombers and US Army helicopters were not allowed to strike the friendly village, enabling the enemy to successfully seek shelter under the numerous banana trees. So one night the villagers cut down all the trees, ruining their livelihood but denying the VC this source of concealment.

Unfortunately, the spirited efforts of the population of Binh Gia to defeat the Communists was overshadowed by the military disaster which befell the government troops ordered to recapture the town.

A reaction force was [requested](#) and a company of the 30th South Vietnamese Rangers was heli-lifted in to join up with a company of the 38th Rangers (Biet Dong Quan) that had been located at a sub-sector village about 3 Kilometers west of Binh Gia.

On the 29th the 33rd Rangers plus another company of the 30th Rangers were brought in by helicopters to help retake the village. They were caught in an L-shaped Viet Cong ambush from dug in positions across their front and on their flank. Supported by heavy machine guns and mortars, the enemy decimated the Ranger Battalion.

The next day saw the 38th Vietnamese Ranger Battalion combat assault into an area just south of Binh Gia. On the ground they immediately made contact and began counterattacking toward the village. The battle lasted most of the day with the Rangers unable to clear the enemy from their entrenched positions.

In the early morning hours of the 30th, the 4th Vietnamese Marine Battalion was sent in to reinforce the Rangers. By this time the Viet Cong had withdrawn to the northeast, and the Marines with their US advisors moved into Binh Gia, encountering no enemy opposition.

Later in the day a US Army helicopter attacking targets in the area was shot down and its crew were killed. Against the counsel of his senior US Marine advisor, the 4th Battalion commander ordered one of his companies to secure the crash site and recover the bodies of the dead crewmen. However, the company was ambushed after reaching the site by a large VC force using 82mm mortars, 57mm recoilless rifles, and .50 caliber machine guns.

Late in the morning on the 31st of December, the remaining three companies of the Marine Battalion went to the assistance of their beleaguered sister company, and were ambushed by a strong Communist Main Force unit of 1,200 to 1,800 soldiers after they pursued the enemy westward.

By late afternoon 29 of the 4th Battalion's 35 officers, including the Battalion commander, Major Nguyen Van Nho, were dead and the 326 man Battalion had suffered extremely high losses: 112 killed, 71 wounded and 13 missing. In addition, all four of the Battalion's US Marine advisors were among the wounded, and Captain Donald G. Cook, an OJT observer from the 3rd US Marine Division, was missing in action.

Unlike their usual pattern of behavior, the Viet Cong forces this time did not slip from the battlefield during the hours of darkness. Defiantly they held the field for four days. Binh Gia should have been an "eye opener" for the [ARVN](#) forces and their US advisors. For the first time Viet Cong forces had demonstrated that with adequate supplies from North Vietnam they could and would conduct large-scale ground battles with government forces. They had learned to skillfully combine guerrilla and conventional warfare into a style of warfare that would greet US military units a year later.

Into the Shadow of Death

In 1962 the US Marines developed Eagle [Flights](#), a concept of warfare that deployed helicopter borne ARVN ground units as quick reaction forces to contact points and battle sites. On the 29th December 1964 during an eagle flight into LZ Alpha, Ranger advisor Sergeant Harold G. Bennett, didn't have a clue of the impending catastrophe awaiting him and his Vietnamese Rangers.

Bennett was busy concentrating on the dense foliage beneath the flight of helicopters as the slicks – flying at tree top level – flew toward their landing zone outside Binh Gia. His RTO, PFC Charles E. Crafts, had checked the frequency on his radio and had called in for a commo check before lift-off. Both Rangers were now lost in their own thoughts as the "whup whup whup" of the chopper's rotor blades broke the eerie stillness of the sultry afternoon.

It was 1400 hours when the helicopters reached the LZ. The pilot of the lead ship glanced at his map and gave the thumbs up sign as they made their final approach. Seconds later, the Vietnamese Rangers and their two US advisors leaped from the open cabin and rushed madly into the nearby cover. They were in Indian country and the Indians were there waiting.

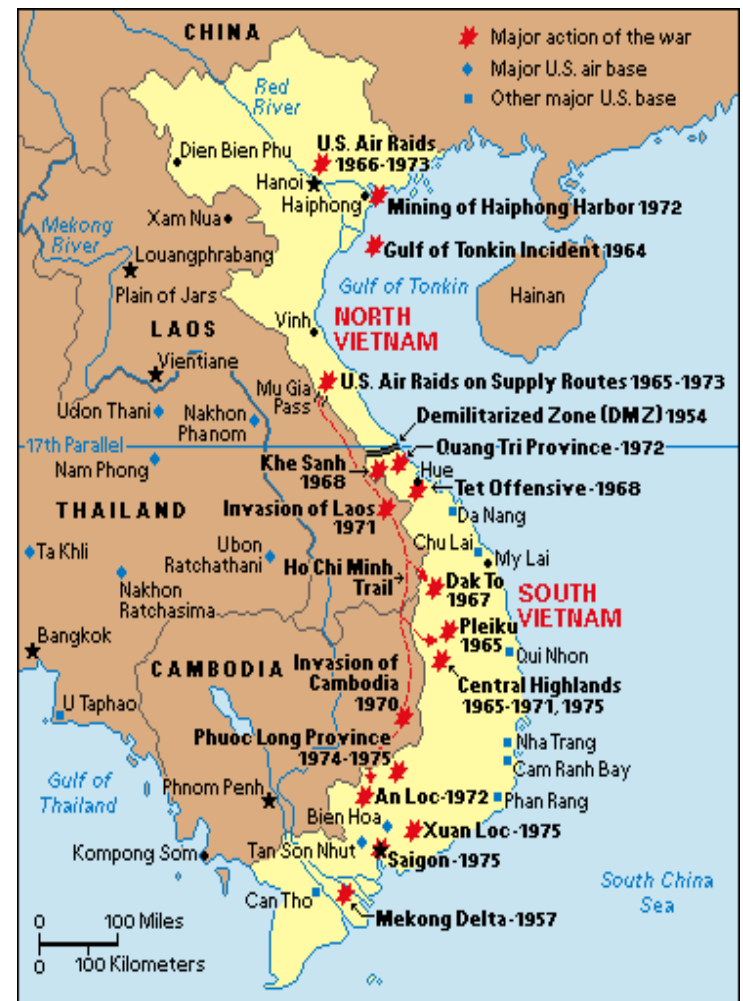
Bennett and Crafts were part of a 4 man advisory team attached to the Vietnamese 33rd Ranger Battalion located at Bien Hoa. Captain James E. Behnke and Lieutenant White were the other two American advisors. Their Battalion had been placed on alert status the day before, and now Bennett and Crafts were landing with 2nd Company comprising the first lift into Landing Zone Bravo on the second lift. He did not realize that he had seen the two enlisted members of his team for the last time.

After clearing the LZ the Rangers from 2nd Company moved nearly a thousand meters towards Binh Gia. Nearing the village they made light contact and began receiving sniper fire from the enemy. Calling for the supporting gun-ships, the Rangers were preparing to assault the enemy positions when from concealed positions to their front and on their flanks a large Viet Cong force opened up with heavy and light machine gun fire.

The Rangers had walked head on into a classical L shaped ambush. At the time, they failed to realize that they were engaged with regimental size units – the same regiments that would out maneuver and destroy the 4th Marine Battalion two days later.

By 1700 hours Bennett and Crafts and 10-12 Rangers were the only surviving members of 2nd Company. They were still fighting when the VC rushed in to overpower them. This was the moment US Army aviator Paul Twomey heard Bennett's last transmission. Twomey would vividly remember the Ranger advisor's words, just as he could never forget the flash of explosions around his helicopter, and the red tracers from the enemy machine guns crisscrossing his airspace. Twomey would also recall the rumors that he would later hear. "We heard that Sergeant Bennett really put up a hell of a fight while a prisoner. We heard that before his execution they tried to make him talk over Radio Hanoi, but he refused. That's what we heard."

Read **BINH GIA – The Battle part II** Continued Next Month.



PRECAUTIONARY/PREPAREDNESS ACTIONS...

A TORNADO MAY FORM AT ANY TIME...TAKE COVER NOW. ABANDON MOBILE HOMES AND VEHICLES FOR MORE SUBSTANTIAL SHELTER. AVOID WINDOWS.

THE SAFEST PLACE TO BE DURING A TORNADO IS UNDER A WORKBENCH OR OTHER PIECE OF STURDY FURNITURE. SEEK SHELTER ON THE LOWEST FLOOR OF THE BUILDING IN AN INTERIOR HALLWAY OR ROOM SUCH AS A CLOSET. USE BLANKETS OR PILLOWS TO COVER YOUR BODY AND ALWAYS STAY AWAY FROM WINDOWS.

IF IN MOBILE HOMES OR VEHICLES...EVACUATE THEM AND GET INSIDE A SUBSTANTIAL SHELTER. IF NO SHELTER IS AVAILABLE...LIE FLAT IN THE NEAREST DITCH OR OTHER LOW SPOT AND COVER YOUR HEAD WITH YOUR HANDS.

PLEASE FOLLOW OUR OFFICE ON BOTH FACEBOOK AND TWITTER FOR MORE INFORMATION ON SEVERE WEATHER AND TO RELAY WEATHER REPORTS AND PHOTOS.

WHEN A TORNADO WARNING IS ISSUED BASED ON DOPPLER RADAR...IT MEANS THAT STRONG ROTATION HAS BEEN DETECTED IN THE STORM. A TORNADO MAY ALREADY BE ON THE GROUND...OR IS EXPECTED TO DEVELOP SHORTLY.

IF YOU ARE IN THE PATH OF THIS DANGEROUS STORM... IF DRIVING...DO NOT SEEK SHELTER UNDER A HIGHWAY OVERPASS.

Name of Net, Frequency, Local Time	Net Manager
<u>Badger Weather Net (BWN)</u> 3984 kHz, 0500	<u>W9IXG</u>
<u>Badger Emergency Net (BEN)</u> 3985 kHz, 1200	<u>NX9K</u>
Wisconsin Side Band Net (WSBN) 3985 or 3982.5 kHz, 1700	<u>KB9KEG</u>
Wisconsin Novice Net (WNN) 3555 kHz, 1800	<u>KB9ROB</u>
Wisconsin Slow Speed Net (WSSN) 3555 kHz, Sn, T, Th, F, 1830	<u>NIKSN</u>
Wisconsin Intrastate Net - Early (WIN-E) 3555 kHz, 1900	<u>WB9ICH</u>
Wisconsin Intrastate Net - Late (WIN-L) 3555 kHz, 2200	<u>W9RTP</u>
<u>ARES/RACES Net</u> 3967.0 kHz, 0800 Sunday	<u>WB9WKO</u>
* Net Control Operator needed. Contact Net Manager for information.	

Next Regular Meeting

The next meeting will be on Thursday, June 27th at 7:00PM. We meet in the Fellowship Hall of Redemption Lutheran Church, 4057 N Mayfair Road. Use the south entrance. Access the MRAC Yahoo group for important details about the February Meeting.

Meeting Schedule:

June 27th, 2013

No meetings in July or August

Please do not call the church for information!

Club Nets

Please check in to our nets on Friday evenings.

Our ten meter SSB net is at **8:00 p.m.** at **28.490 MHz USB** Our two meter FM net follows at **9:00 p.m.** on our repeater at **145.390 MHz** with a minus offset and a **PL of 127.3 Hz.**

Visit our website at: www.w9rh.org

Or phone **(414) 332-MRAC** or **332 - 6722**

**Chatter Deadline**

The **DEADLINE** for items to be published in the **Chatter** is the **15th of each month**. If you have anything (announcements, stories, articles, photos, projects) for the 'Chatter, please get it to me before then.

You may contact me or Submit articles and materials by e-mail at: Kc9cmt@earthlink.net

or by Post to:

Michael B. Harris

807 Nicholson RD

South Milwaukee, WI 53172-1447

VE Testing:

No testing in June

July 27, 2013 - AES - 9:30 AM

ALL testing takes place at: Amateur Electronic Supply
5720 W. Good Hope Rd. Milwaukee, WI 53223

Area Swapfests

July 6th, 2013 [Swapfest '13](#) Location:

Oak Creek, WI Type: ARRL Hamfest

Sponsor: South Milwaukee ARC

Website: <http://www.qsl.net/wa9txe>

August 10th 2013 [6th Annual Racine Megacycle](#)

[Freefest 2013](#) Location: Sturtevant, WI

Type: ARRL Hamfest Sponsor: Racine Megacycle

Club Website: <http://www.w9udu.org>

August 24th 2013 [Circus City Swapfest](#)

Location: Baraboo, WI

Type: ARRL Hamfest Sponsor: Yellow Thunder ARC

Website: <http://yellowthunder.org>

MRAC Working Committees

95th Anniversary:

- Dave—KA9WXN

Net Committee:

- Open

Field Day

Dave—KA9WXN, Al—KC9IJJ

FM Simplex Contest

- Joe – N9UX
- Jeff – K9VS

Ticket drum and drawing

- Tom – N9UFJ
- Jackie – No Call

Newsletter Editor

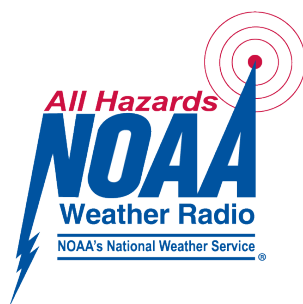
- Michael-KC9CMT

Webmaster

- Mark Tellier—AB9CD

Refreshments

- Hal—KB9OZN



Membership Information

The Hamateur Chatter is the newsletter of MRAC (Milwaukee Radio Amateurs' Club), a not for profit organization for the advancement of amateur radio and the maintenance of fraternalism and a high standard of conduct. MRAC Membership dues are \$17.00 per year and run on a calendar year starting January 1st. MRAC general membership meetings are normally held at 7:00PM the last Thursday of the month except for November when Thanksgiving falls on the last Thursday when the meeting moves forward 1 week to the 3rd Thursday and December, when the Christmas dinner takes the place of a regular meeting. Club Contact Information

Our website address <http://www.w9rh.org>

Telephone **(414) 332-MRAC (6722)**

Address correspondence to:

MRAC, PO Box 26233, Milwaukee, WI 53226-0233

Email may be sent to: w9rh@arrrl.net . Our YAHOO newsgroup:

<http://groups.yahoo.com/group/MRAC-W9RH/>

CLUB NETS:

- The Six Meter SSB net is Thursday at 8:00PM on 50.160 MHz USB
- Our Ten Meter SSB net is Friday at 8:00PM on 28.490 MHz \pm 5 KHz USB.
- Our Two Meter FM net follows the Ten meter net at 9:00PM on our repeater at 145.390MHz - offset (PL 127.3)



The HamChatter is a monthly publication of the Milwaukee Radio Amateurs' Club.

Serving Amateur Radio for Southeastern Wisconsin & Milwaukee County Club Call sign – W9RH

MRAC Website: <http://www.W9RH.org>

Editor: Michael B. Harris, Kc9cmt, kc9cmt@Earthlink.net

Milwaukee Area Nets

Mon.8:00 PM 3.994 Tech Net

Mon.8:00 PM 146.865- ARRL Newsline

Mon.8:00 PM 146.445 Emergency Net

Mon.8:00 PM 146.865- Walworth County ARES net

Mon.8:45 PM 147.165- ARRL Audio News

Mon. 8:00 PM 442.100+ Railroad net, also on EchoLink

Mon. 8:00 PM 442.975+ WARC W9CQ net also on EchoLink 576754

Mon. 9:15 PM 444.125+ Waukesha ARES Net on the 1st, 3rd, and 5th Monday of each month.

Mon. 9:00 PM 147.165- Milwaukee County ARES Net

Tue.9:00 AM 50.160 6 . Mtr 2nd Shifter's Net

Tues. 8:00 PM 145.390- General Class

Tue. 9:00 PM 145.130 MAARS Hand Shakers Net

Tue. 8:00 PM 7.035 A.F.A.R. (CW)

Wed. 8:00 PM 145.130 MAARS Amateur Radio Newsline

Wed. 8:00 PM 147.045+ West Allis ARC net

Wed. 8:00 PM 147.270+ Racine County ARES net

Wed. 9:00 PM MAARS SwapNet, AllStar link to FM-38

Thur. 8:00 PM 145.130- General Class

Thur. 8:00 PM 50.160, 6 Mtr SSB Net

Thur. 9:00 PM 146.910 Computer Net

Fri. 8:00 PM 28.490 MRAC W9RH 10 Mtr Net SSB

Fri. 9:00 PM 145.390 W9RH 2 Mtr. FM Net

Sat. 9:00 PM 146.910 Saturday Night Fun Net

Sun 8:30 AM 3.985 QCWA (Chapter 55) SSB net

Sun 9:00 AM 145.565 X-Country Simplex Group

Sun 8:00 PM 146.91 Information Net

Sun 8:00 PM 28.365 10/10 International Net (SSB)

Sun 9:00 PM 146.910 Swap Net

First Thursday of the month 8:00 PM 442.200+ Round Table Tech Net

2meter repeaters are offset by 600KHz - - 70 centimeter repeaters are offset by 5 MHz

