HAMATEUR CHATTER

The Milwaukee Radio Amateurs Club

August 2012, Volume 20, Issue 8

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

ARRL Newsline

Mars Rover *Curiosity* Successfully Lands on Red Planet

The Jet Propulsion Laboratory (JPL) confirmed that the rover *Curiosity*, after a 36 week space flight, landed successfully on Mars at 10:32 PM PDT on August 5 (0532 UTC August 6). Built by JPL and launched on November 26, 2011, the 2000 pound machine features something on its wheels that radio amateurs are sure to appreciate: Morse code.

The wheel's on Mars' newest resident feature Morse code. [Photo courtesy of NASA/JPL]

If you look carefully at *Curiosity*'s wheels, you might notice that along with treads, there are square and rectangular holes that have an interesting pattern. According to JPL Rover Mechanical Engineering Team Manager Richard Rainen, these holes actually have a purpose: odometer markers. "We will be looking at the visual odometer markers that we have on the wheels," he explained in a video. "There are asymmetric patterns, actually holes, inside the wheels of the rover that will leave an imprint on the surface of Mars. We're going to be looking at these imprints and verifying that it has traversed the distance it expects to traverse. If it looks like it's not traversing, even though the wheels are going, that is an indication that the vehicle is getting stuck and it will stop and call back home."

But in 2007 -- when the *Curiosity* team at JPL was putting together the rover -- its wheel cleats had a raised pattern with the letters "JPL," leaving a little stamp of the rover's birthplace everywhere it rolled. "At the time, I asked whether the real rover would have those wheels, and they said, no, they weren't going to get to advertise JPL with each turn of each of the rover's six wheels; the real rover would have some other pattern," said Emily Lakdawalla of The Planetary Society in her blog. Lakdawalla is the organization's Science and Technology Coordinator. "*Curiosity* didn't need holes in its wheels for attaching to any lander -- there isn't one. So the engineers got to make the markers in any shape they wanted to."

So what pattern did JPL choose to put on *Curiosity*'s wheels? One that Lakdawalla called "very amusing. The holes are in a pattern of short squares and longer rectangles -- almost like dots and dashes. Morse code." And what does it spell out in Morse code? JPL.

J . - - -
P . - - .
L . - . .

"Today, the wheels of *Curiosity* have begun to blaze the trail for human footprints on Mars," said NASA Administrator Charles Bolden in a press release. "*Curiosity*, the most sophisticated rover ever built, is now on the surface of the Red Planet, where it will seek to answer age-old questions about whether life ever existed on Mars -- or if the planet can sustain life in the future.

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Drought conditions worsen in southern half of Wisconsin

July 17, 2012 by the Central Office

50 counties now at increased fire danger levels

MADISON – The continued lack of significant rainfall in the southern half of Wisconsin has increased drought conditions and raised the fire danger to extreme, very high or high in 50 southern and central counties.

The lack of rain is lowering water levels on streams and rivers, making navigation more difficult and increasing the number of fish kills. There have been reports of private wells going dry, and some municipalities are placing restrictions on water use. The hot temperatures and low water levels are increasing the risk of blue-green algae outbreaks and concentrating waterfowl in areas that have been known to have outbreaks of botulism.

"The drought is affecting everyone – with farm crops in jeopardy, fire danger, and well impacts, and more," said Department of Natural Resources Secretary Cathy Stepp. "DNR is doing everything it can to share information and expedite approvals for wells and pumping when we can without endangering the long term health of natural resources. Our hearts go out to people struggling with the dry conditions."

The Department of Natural Resources has launched a new Web page intended to help the public find drought-related DNR information and assistance. People can go to dnr.wi.gov and search for the keyword "drought."

Fire conditions

Fire danger levels as of July 17 were at extreme in 25 southern counties and very high or high in another 25 central counties. DNR fire control officials have been responding to 10 to 15 fires a day, and since June 1 there have been more than 275 fires. A 40-acre fire closed a westbound lane of Interstate 90-94 Monday. An Army National Guard helicopter assisted in fire suppressing the fire with water drops.

"With these tinder dry conditions, equipment caused fires have become the number one cause of fires, mostly with hot vehicle exhaust systems or farm equipment," says Trent Marty, DNR fire prevention director.

Emergency burning restrictions remain in place in all or parts of 19 counties. The restrictions prohibit any outdoor burning -- outside of fire rings in campgrounds -- smoking outdoors or disposal of ash or charcoal. In addition, even campfires within fire rings have been banned at four state park and forest properties including Southern and Lapham Peak units of Kettle Moraine State Forest, Richard Bong State Recreation Area and Big Foot Beach State Park. Park officials caution that without rain soon, the fire prohibitions may be expanded to other properties.

Water concerns

DNR officials are receiving and reviewing applications for emergency permits to pump water for crop irrigation from lakes and rivers. DNR is approving permits for irrigation from lakes and rivers where the withdrawal will not have a negative impact on fisheries or other aquatic life or on other users. of the waterway.

The agency has been receiving six to 10 applications a day for new high capacity wells for irrigating crops and is approving the applications where the new wells will not have a negative impact on other private wells. To date there have been numerous reports of private wells going dry, but as of yet no reports of municipal wells going dry.

State dam safety officials are notifying dam operators of their responsibility to maintain a minimal flow of water below dams, as some operators have reportedly begun to hold water back to maintain water levels on lakes, flowages and impoundments.

"Dam operators need to ensure they maintain minimal flow from their dams to ensure fish health and to ensure there is adequate flow for the dilution of wastewater from municipal treatment plants and other industries and operations downstream," said Bill Sturtevant, state dam safety engineer.

Fish kills

State fisheries biologists have entered more than 31 verified fish kills since the beginning of June, with more being investigated.

"The earlier fish kills were primarily due to low water levels resulting in low dissolved oxygen levels," says Paul Cunningham, DNR fisheries habitat coordinator, "but lately we've seen more thermal-related fish kills. The water has just gotten too hot for many of our cold-water species like northern pike."

Fisheries biologists have started to deny some applications for chemical control of aquatic weeds, because of the additional stress the control may have on fish populations.

Beach and swimming concerns

The hot, dry weather is fueling excessive algae growth as the increased water temperature speeds up cell growth and division. Blue-green algae, which are found naturally in Wisconsin lakes and can produce toxins that pose a health threat to people, animal and pets, are becoming a problem in waters with a history of blooms, like Lake Winnebago and Tainter/Menomin lakes, but are in places where blooms are normally not a problem, DNR water leaders report.

DNR staff are fielding more calls on the algae Cladophora from property owners and beachgoers all along the Lake Michigan coast, says Steve Galarneau, who directs the DNR Office of the Great Lakes. The algae, naturally found in Lake Michigan, breaks off from the rocks on the lake bottom and washes ashore, where it smells and looks foul as the algae and aquatic life it carries decompose.

Zebra mussels and quagga mussels proliferating in Lake Michigan are helping create the conditions for more of the algae to grow, along with the warm water temperatures and sunny skies. "Cladophora has been a problem for decades. There are good blocks of time and bad blocks of time during a year, and this is a particularly bad period of time," he says. "We empathize with people concerned about how it looks and smells. We encourage people to avoid swimming through cladophora or coming in contact with the algae that's washed ashore because it may harbor harmful bacteria."

Boating safety

With low water levels on lakes and rivers (USGS Wisconsint streamflow) (exit DNR), boaters need to be especially cautious of navigational hazards that may not have been apparent with higher water

Severe Weather Preparedness

levels. Stumps and sand and rock bars may all be closer to the surface, especially on river systems. The Rock and Wisconsin rivers in particular are very low and navigation is difficult in some stretches.

Wildlife health concerns

U.S. Fish and Wildlife Service staff have collected approximately 50 dead birds, primarily mallards, wood ducks and teal as well as pelicans, shore birds, and great blue herons on the northern end of Horicon Marsh. Specimens have been submitted to the National Wildlife Heath Center for confirmation, but officials highly suspect that botulism is the cause. They will be conducting daily monitoring of other state and federal wildlife areas where botulism has caused waterfowl deaths in the past.

FOR MORE INFORMATION CONTACT: Bill Cosh, DNR spokesperson – 608-267-2773 or check the DNR drought Web page of a list of contacts by subject

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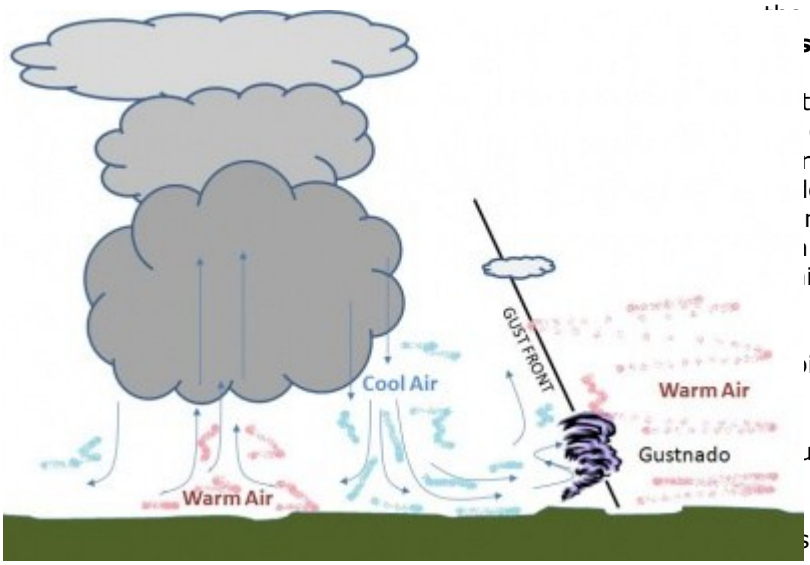
GustNado

Description
Strong downdrafts of rain/Hail cooled air from the advancing edge of a Thunderstorm create strong, straight line, winds ahead of the storm. The leading edge of this mass of cooled air, where it meets warmer surface air, is called the Gust Front. The gust front may be 2 or 3 nautical miles ahead of the storm.
If the wind speed is in excess of 60 kts, then surface friction, which disturbs the straight line flow, can cause the formation of a spinning vortex at the Gust Front. The vortex starts from the ground upwards and can reach 300 feet in height, normally made visible by dust and debris. This vortex is known as a **Gustnado**.



Although the name is derived from a combination of "Gust Front" and "Tornado", a **Gustnado** is not a Tornado. A Tornado is associated with the warm and powerful updrafts which feed the cloud, forms from and is connected to the base of the Cumulonimbus cloud, and the rotation is driven by the mesocyclonic rotation of the cloud itself. A gustnado is not connected to the cloud base, is associated with the cool downdrafts ahead of, and occasionally behind, the storm, and are shortlived in duration.
It is rare for an aircraft to encounter a Gustnado in flight because of the shortlived and shallow nature of the phenomenon, and also because pilots are wary of the greater dangers associated with microbursts and cumulonimbus clouds and so stay well clear of such storms. An aircraft is most likely to encounter a Gustnado on take-off or landing.

Effects

Turbulence. The degree of turbulence experienced by an aircraft encountering a Gustnado depends on the severity of the vortex and the size of the aircraft. Generally speaking, given that most Gustnadoes are of limited intensity, large commercial jet aircraft will not experience more than rough air when encountering a Gustnado on approach. However, the consequence of encountering a Gustnado for a light aircraft may well be loss of control.

Damage to Aircraft and Airport Infrastructure. Winds of 100 kts or more have been associated with Gustnadoes and significant damage to buildings, comunications infrastructure, and parked aircraft is possible.

Defences
Wind Shear prediction systems can give advance warning of a Gust Front or Microburst associated with an approaching Cumulonimbus cell.

Gustnado II

Though the word **gustnado** sounds a bit like Texmex food it truly is a quite common feature associated to thunderstorm gust fronts. Gustnadoes, short for gust-front tornadoes, are small, weak and short lived spin-ups typically occurring on leading edge of thunderstorm downdrafts, known as the **st front**.

torm's downdraft is caused by rain- or hail-cooled air flowout of the **thunderstorm** and if it gets a little kink it will rt to rotate, becoming a tornadic vortex. Now, if the gustlo picks up enough dust or debris it will be visible as a rong debris cloud or **dust whirl** near the ground. They are way the little brothers of a tornado, only that you can get ilar features without a thunderstorm present, e.g. along leading edge of cold-fronts or **air-mass boundaries**.

ically, they last for a few seconds and do not extend into thunderstorm's cloud base. Whereas **tornadoes** (picture) always connected to a thunderstorm's (or supercell's) dbase, commonly known as **wall cloud**. However, there credible reports of gustnadoes developing a connection to **shelf cloud** of a thunderstorm and lasting for 15 minutes so. Therefore gustnadoes are frequently mis-reported as tornadoes, sometimes even in official storm reports.

What are voltage controlled oscillators?

A voltage controlled oscillator or as more commonly known, a vco, is an oscillator where the principal variable or tuning element is a varactor diode. The voltage controlled oscillator is tuned across its band by a "clean" dc voltage applied to the varactor diode to vary the net capacitance applied to the tuned circuit.

A practical example of voltage controlled oscillators

Here I'm going to use a very practical example where one of my readers has a requirement for a voltage controlled oscillator operating at 1.8 - 2.0 Mhz (amateur radio band 160M). This is to be part of a frequency synthesizer, although a vco isn't always associated with a frequency synthesizer.
The very high costs and difficulties encountered when buying quality variable capacitors today often make vco's an extremely attractive alternative. As an alternative all you need is an extremely stable BUT very clean source of dc power, a varactor diode and a high quality potentiometer - usually a 10 turn type. Please note that circuit Q tends to be somewhat degraded by using varactor diodes instead of variable capacitors.
For people who are confused at this point allow me to explain. Diodes when they have a reverse voltage applied exhibit the characteristics of a capacitor. Altering the voltage alters the capacitance. Common diodes such as 1N914 and 1N4004 can be used but more commonly we use varactor diodes specifically manufactured for vco use e.g. Motorola's MVAM115, Philips BB112 and BB212. They are also sometimes called tuner diodes.
The design requirements asked for were:-
(a) frequency coverage 1.8 - 2.0 Mhz

(b) voltage controlled by a frequency synthesizer with an output level sufficient to drive the input of a Phase Locked Loop (PLL)

(c) a further buffered output for a digital frequency readout.

(d) another buffered out put to drive succeeding amplifier stages.

Because in this example the ultimate frequency stability is determined by the reference crystal in the frequency synthesizer there can be some relaxation of stability standards. The buffered outputs will be covered under buffer amplifiers.

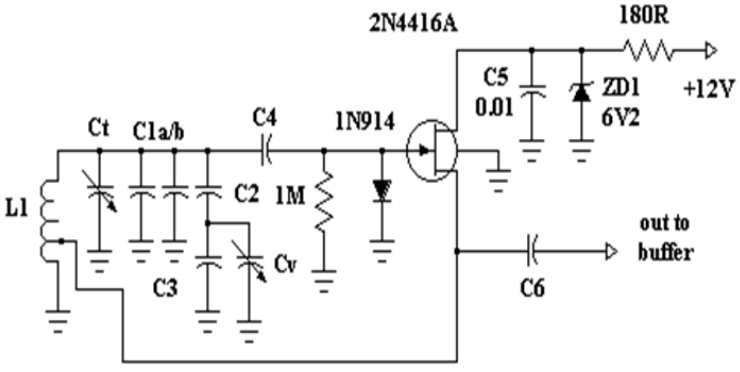


Figure 1 - schematic of a hartley oscillator

Varactor Diode Tuning

Here Cv the variable capacitor, could be replaced by a suitable varactor diode as a tuning diode and in actual fact our reader has on hand a Motorola MVAM115 varactor. This I think is nearly similar to my Philips BB112 diode. So we will rehash the above figure 1 to accommodate varactor diode tuning instead of using a conventional variable capacitor.

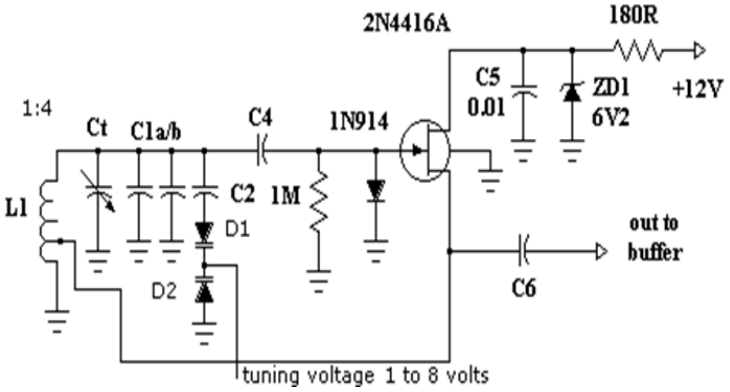


Figure 2 - schematic of a varactor tuned Hartley oscillator

Now I've left Ct and C1 a/b all in the circuit. In this application of a frequency synthesizer they are unlikely to be necessary. To tune from 1.8 to 2.0 Mhz which is a frequency swing of 2 / 1.8 = 1.111 - which when squared means we need a capacitance ratio of 1.234 to 1
That means the ratio of minimum combined capacitance in the circuit to maximum combined capacitance in the circuit must change by 1.234 to 1.
Looking back at the tutorial on oscillators I said the inductor should have a reactance of about 180 ohms. So around the frequency of interest I expect an inductor of about 15 uH to be used for L1 in Fig 2.
You should be used to calculating LC numbers by now but L X C at 1.8 Mhz = 7818 and at 2 Mhz it works out about 6332. Dividing both by our 15 uH inductor we get a Cmin of 422 pF and Cmax of 520 pf. Which incidentally if you check 520 / 422 = 1.232:1 So the variation of C is 520 - 422 = 98pF swing.
For synthesizers or any voltage tuning you should have the largest voltage swing possible. This minimizes the effects of noise voltage on the tuning voltage. My BB112 diode can be operated ideally from 1V to 8V. That means we can tune the 200 Khz (2.0 - 1.8) with a variation of 8 - 1 = 7 volts. It follows 7v / 200 Khz = 35 uV/Hz. If our noise level is below this then the tuning can't be varied or fm'ed by noise.
At 8V my diode exhibits a capacitance of around 28 pF while at 1V the capacitance is about 500 pF.

Diodes Back-To-Back

You will note I have two diodes back-to-back in series in Fig 2. Although this in effect divides total varactor diode capacitance by two it eliminates the nasty effect of the rf present in the tank circuit driving a single diode into conduction on peaks which will increase the bias voltage, this also gives rise to harmonics.

It follows that my varactor diode capacitance now swings a net approximate 14 pF up to 250 pF when the bias voltage is varied from 8 volts down to 1 volt. You can of course go below 1V for higher capacitance but I tend to be conservative and generally do not go below 1V very much.
Now we have a net swing of 250 - 14 or 236 pF. You will recall above I said "the variation of C is 520 - 422 = 98pF swing" so how do I reduce a 236 pF swing down to a 98 pF swing? Look at capacitor C2 which is in series with both varactor diodes, does this not reduce the net capacitance?

Calculating Net Capacitance

This is a simple mathematical problem (Oh God - not again <G>). In this case we can use the formula C2 = [(Ca * Cb) / (Ca - Cb)] where Ca = existing C or in this case 236 pF and Cb = desired C or 98 pF. Now this isn't terribly accurate but you finish up in the ball park. Plugging those numbers into our sums we get C2 = [(235 * 98) / (236 - 98)] or 23030 / 137 = 168 pF.
Bearing in mind with a vco and the voltage swings involved, you can get a fair bit of leeway and that each varactor diode varies greatly from predicted data of capacitance versus voltage. That means a lot of this is guesswork or suck-and-see. Technically it means it's all determined "empirically". All of that just says we will use a 180 pF capacitor for C2.

Using a 180 pF capacitor for C2 and putting it in series with D1 and D2 we get at 1 volt D1 = 500 pF, D2 = 500 pF and C2 = 180 pF. Net result = 1 / [(1 / 500) + (1 / 500) + (1 / 180)] which is about 105 pf.
Similarly at 8 volts we get D1 = 28 pF, D2 = 28 pF and C2 = 180 pF. Net result = 1 /[(1 / 28) + (1 / 28) + (1 / 180)] which is about 13 pf.

It follows the swing now becomes 13 pf to 105 pF or a net 92 pF which is near enough for this exercise. I had said very much earlier "by using our 15 uH inductor we get a Cmin of 422 pF and Cmax of 520 pf. Which incidentally if you check 520 / 422 = 1.232:1 So the variation of C is 520 - 422 = 98pF swing". How do we get near this requirement?

If we need Cmax of 520 pF and our series connection gives us 105 pF we need an extra 520 - 105 = 415 pF. On the other hand Cmin required is 422 pF and the series connection provides 13 pf we need 422 - 13 = 409 pF. It can be seen if we allow a trimmer of say 25 pF for Ct, which is the suggested trimmer in figure 2 - (that is Ct can varied from say 5 to 25 pF) - and we allow the combination C1 a/b to be a total of around 390 pF we have obviously achieved our goal. Is this not cool?

For our inductor L1 I would use a toroid although if you have access to a variable inductor you could use it. An air cored inductor most likely would be too large to consider. Suitable toroids of the Amidon / Micrometals type would at 2 Mhz be the T50-2 type which would require about 55 turns of #26 wire or even the T68-2 type requiring about 51 turns of #24 wire. Both gauges mentioned are those which will conveniently fit around the core.

No matter your frequency range of interest the basic principles outlined above will more or less still apply.

Tuning Diode Voltage

For a frequency synthesizer the tuning voltage is derived from the low pass filter of the PLL and you don't need to worry about it. On the other hand when you have an application of replacing a variable capacitor and manually tuning with say a ten turn potentiometer you need to be very careful about the "quality" of the voltage. It MUST be clean!
Below in Figure 3 is a suggested schematic for deriving suitable tuning voltages.

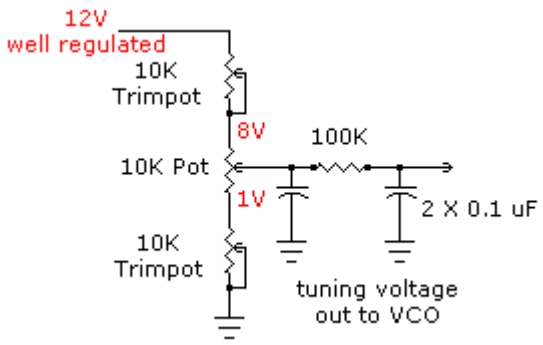


Figure 3 - schematic of deriving varactor diode tuning voltage

The 10K pot is your 5 or 10 turn "quality" potentiometer for tuning, the upper and lower trim pots (set and forget) allow you to adjust the voltage range of your choice that your tuning potentiometer will see. Again use "quality" trimpots. The 100K resistor and the two 0.1 uF capacitors are further filtering. Obviously there is considerable interaction between the trimpots and potentiometer so expect a lot of juggling back and forth.

If you wished, in some applications, both trimpots could be replaced by fixed resistors. It is simply a matter of using ohms law.

MC12149 Low power voltage controlled oscillator buffer

For higher frequencies consider the MC12149. It is intended for applications requiring high frequency signal generation up to 1300 MHz. An external tank circuit is used to determine the desired frequency of operation. The VCO is realized using an emitter–coupled pair topology. The MC12149 can be used with an integrated PLL IC such as the MC12202 1.1 GHz Frequency Synthesizer to realize a complete PLL sub–system. The device is specified to operate over a voltage supply range of 2.7 to 5.5 V. It has a typical current consumption of 15 mA at 3.0 V which makes it attractive for battery operated handheld systems.

74HC4046 phase-locked-loop

The 74HC4046 phase-locked-loop which is an integrated circuit contains a voltage controlled oscillator and will work as high as 17 Mhz.

With the 74HC4046 VCO, its tuning range is determined by one external capacitor C1 (between C1A and C1B) and one external resistor R1 (between R1 and GND) or two external

The Experimenters Bench Continued

resistors R1 and R2 (between R1 and GND, and R2 and GND). Resistor R1 and capacitor C1 determine the frequency range of the VCO. Resistor R2 enables the VCO to have a frequency offset if required. Look at the 74HC4046 page.

VCO modeling and simulation in WinSPICE3

I'm grateful to a fellow Australian Simon Harpham for supplying me with a link to this site, Silicon Devices (UK) Limited. *"This note shows how a simple VCO model maybe created, then simulated to show its functionality to quite a complex level using a relatively simple test-bench implemented in a readily available SPICE simulator by using a few simple mathematical formulae...."*

Early Radio: Military Communications

Attacks on MAG-16, Hill 22

Despite the Marines' extension of their TAORs, the enemy still had the ability to mount well-coordinated hit-and-run attacks, similar to the I July Da Nang raid. On the evening of 27-28 October, the VC struck the newly built Marble Mountain helicopter facility on the Tiensha Peninsula and the Chu Lai SATS field.

- At Chu Lai, the infiltrators entered the Marine base from the northwest and split into two groups. According to the MAG-12 commander, Colonel Leslie E. Brown, the first knowledge the Marines had of the attack was when they heard machine gun fire and satchel charges blowing up. Brown recalled:
. a couple of the airplanes were on fire, and the sappers had gotten through intact .... they were barefooted and had on a loin cloth and it was kind of a John Wayne dramatic effect. They had Thompson submachine guns and they were spraying the airplanes with the Tommy guns and . . . throwing satchel charges into tail pipes . . . Some went off and some didn't, but the net effect was that the machine gun fire caused leaks in the fuel tanks, so that JP fuel was drenching the whole area .... and in the middle of that, the airplanes were on fire."

The Marines killed 15 of the force of 20 VC, but not before the attackers had destroyed two A-4s and severely damaged six more. General Karch, the Chu Lai Base Coordinator, remembered that when he arrived "Les Brown . . . was on the scene and the armament crews were going up and down the flight line disarming bombs . . . I couldn't give Brown too much credit for the job he and his crews did there that night-- it was fabulous."
The Communist attack on Marble Mountain was larger and better coordinated. A VC raiding party of approximately 90 men quietly assembled in a village just to the northwest of the Marble Mountain Air facility. Under cover of 60mm mortar fire, four demolition teams struck at the Marble Mountain airstrip and a hospital being constructed by the Seabees. At least six of the enemy, armed with Bangalore torpedoes and grenades, reached the MAG-16 parking ramp.
Colonel O'Connor, the MAG-16 commander, remembered:
I awoke to the sound of explosions shortly after midnight . . . arriving at the group command post, I received a phone call from General McCutcheon. He was warning me that the airfield at Chu Lai had been attacked and to be on the alert. I told him no one was asleep at Marble Mountain, as we had also been under attack for about 15 minutes.
After leaving the command post, Colonel O'Connor drove to the aircraft parking ramp where "Helicopters were burning all over . . . .VMO-2 was practically wiped out." Before the VC could be stopped they destroyed 19 helicopters and damaged 35, 11 of them severely.* Across the road, much of the hospital, which was nearing completion, was heavily damaged. After 30 minutes, the Viet Cong withdrew, leaving behind 17 dead and four wounded. American casualties were three killed and 91 wounded.
During the attack, Lieutenant Colonel Verle E. Ludwig's 1st Battalion, 9th Marines, south of Marble Mountain, came under small arms fire, but apparently this was a feint designed to fix the unit in its defensive positions. All units at Da Nang went on full alert, but the damage had been done.

The VC attacking forces at both Chu Lai and Da Nang were not ordinary guerrillas. "There were indications that these troops were from hardcore main force VC units, although the VC unit which attacked Marble Mountain was better trained than the one which hit Chu Lai. Captain Hoa, the Hoa Vang District Chief, believed that the enemy group which attacked Da Nang was North Vietnamese, but the four prisoners captured by the Marines there came from small hamlets in Quang Nam and Quang Tin Provinces.

Early Radio: Military Communications

The enemy had been well equipped for the mission. At Marble Mountain, Marines recovered a considerable stock of fragmentation, concussion, and thermite grenades, as well as three Bangalore torpedoes, several Chinese Communist B-40 antitank rockets, and miscellaneous ammunition. The American troops also captured several weapons, a 7.62mm AK assault rifle, two .43 caliber automatic weapons, and a 7.62mm Tokarev automatic pistol."

One of the more significant aspects of the events of 28 October was an attack which did not occur. The enemy had also planned to hit the main airfield at Da Nang. Two separate occurrences may have frustrated this attack. General Walt's staff received word on 27 October that a VC main force battalion was moving out of its base in "Happy Valley," 10 miles southwest of Da Nang, and heading towards the base. At 1930, division artillery fired 680 rounds into the area. Later intelligence reports indicated that the shells hit the VC unit, forcing it to disperse.

Shortly afterward, a 9th Marines squad ambushed a strong VC force near the An Tu hamlet, five miles south of Da Nang. The Marine patrol, 11 Marines and a Navy corpsman from Company I, 3rd Battalion, 9th Marines, had arrived at the ambush site after dark. By 1945 they had established their positions; only 13 minutes later the Marines heard movement along the trail. The squad leader, Sergeant John A. Anderson, ordered his troops to hold fire until the enemy was at pointblank range. Seven VC had passed the site of the most forward Marine before Anderson triggered the ambush. At this moment, the VC were only six to seven feet away from the Marine's M-60 machine gun position. The machine gunner initiated the engagement with a long burst, followed by heavy fire from all the weapons of the rest of the squad. This volley killed all seven VC.

The seven dead were only the advance party for a larger enemy force which moved forward to engage the Marines. Sergeant Anderson fired several M-79 rounds at the muzzle flashes of the approaching VC. The firefight continued for another minute, but then the enemy began to disengage. Sergeant Anderson realized that his troops had to get out of the area; he was outnumbered. The squad leader ordered his men to count the dead VC before leaving; they counted 15. The Marines moved out to their battalion's position, but during the return two squad members were wounded by Viet Cong firing from a dike. Anderson called for fire support and after 60 rounds of 81mm mortar fire hit on the enemy position, the VC stopped firing. At first light the next day, 28 October, Company I sent two platoons to search the ambush site more thoroughly. Of the 15 known VC dead only two bodies were found.

General Walt and his staff believed that Sergeant Andersen's patrol probably had foiled an attack on the airbase. Apparently the patrol had intercepted a VC company from the same unit that carried out the Marble Mountain attack:

This belief is supported by the fact that the company was moving in the direction of the Da Nang base, and time and distance being considered, the time of the attack on the Marble Mountain Air Facility.

Two days after the airfield attacks, the Viet Cong attempted another probe of the Marine defenses, not at the base area, but against the defensive perimeter on Hill 22, south of the Tuy Loan River, manned by the Marines of Company A, 1st Battalion, 1st Marines. The action began at 0100, 30 October, "Captain Charles Ward, at the time the 9th Marines S-2, debriefed the Anderson patrol. He recalled that the VC advance party had been preceded by a point element carrying candles and flashlights to give the appearance of villagers returning home. According to Ward, Andersen's men had seen the point men but "were uncertain as what to do--after all, the men wore villagers' clothing, held lighted candles, and the ambush location was on a well-travelled trail leading to Highway I only 200-250 meters away and was only 100 meters from occupied huts. The question became academic when the main body traipsed into the squad's position. So surprised was Anderson by the unexpected appearance of the column of men on the trail, he almost forgot to give the order to the machine gunner." Ward concluded his remarks with the observation that "reportedly this was Sgt Anderson's first combat patrol." LtCol Charles Ward, Comments on draft MS, dtd 270ct76 (Vietnam Comment File).

When 10-15 VC walked into a squad ambush 1,000 meters south of the hill. The Marines opened fire and killed three of the enemy, but the squad had not been able to maintain communications with the company and was unable to notify the company commander of the contact. All was quiet for about two hours, when suddenly approximately 25 enemy enveloped the Marine squad, killing three and wounding six." At 0315 the rest of the VC force attacked the main Marine positions on Hill 22. Enemy troops, supported by two recoilless rifles, penetrated about a third of the northwestern perimeter, capturing three M-60 machine guns, two 3.5-inch rocket launchers, and one 60mm mortar. They also gained access to the company's ammunition bunker.

Lieutenant Colonel Harold A. Hatch, who had assumed command of the 1st Battalion on 27 September, immediately sent reinforcements and ammunition to Company A.

Early Radio: Military Communications

One resupply helicopter was "so fully loaded that it barely could get off the ground" and its "rotor wash blew the supply tent down." The battalion commander also called for supporting artillery fire and close air support.

About 45 minutes after the enemy had launched the main attack on Hill 22, three UH-34s landed Sergeant Russell L. Kees' 13-man squad from Company C on the hill. Kees stated, "The VC were everywhere; in the tents, on the tents, and in the trenches." Supported by air, artillery, and mortars, the Company A commander. Captain John A. Maxwell, rallied the Marines; they counterattacked and drove off the enemy. Marines casualties were 16 dead and 41 wounded, while the Communists left behind 47 bodies and one wounded."

Marine air accounted for a few more enemy when the VC unit tried to cross the eastern bank of the Song Yen three miles south of Hill 22. The Marine pilots reported destroying 10 boats and seeing 10 bodies in the water. "Villagers in the area told the American troops that the Viet Cong forced them to bury several bodies, apparently casualties of the Hill 22 fight.

The VC had planned the operation thoroughly. They hit the critical portions of the perimeter and knew exactly which bunker contained ammunition. American intelligence sources discovered that the VC unit involved in the attack was the R-20 battalion which had just completed training. The Hill 22 attack was apparently its final training exercise.

Colonel O'Connor observed that the destruction of the helicopters at Marble Mountain resulted in "a 43 percent loss of division mobility" and that it ' 'put a crimp in division plans for several months afterward." Col Thomas J. O'Connor, Comments on draft MS, dtd 27Nov76 (Vietnam Comment File). As a result of the attacks on MAG-16 Lima Company was transferred from Chu Lai to the MAG-16 Hilo base for security. We stayed there until a few days before Harvest Moon OP. We had a very wet Thanksgiving at MAG-16, there were a lot of washed out fox holes due to the Monsoon rains, which had really kicked into gear during November 65.

Even the VC were bogged down in the rain, as I recall, there were no more attacks on **the Hilo bases the rest of the year.**

Next Regular Meeting

The next meeting will be on Thursday, September 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.

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:

September 29th, 2012—AES– 9:30 am to 11:30 am.

October 27th, 2012—AES 9:30 am to 11:30 am.

November 24th, 2012—AES 9:30 am to 11:30 am.

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

Area Swapfests

August 25th, Sixteenth Annual Circus City Swapfest
Location: Baraboo, WI
ARRL Hamfest, Sponsor: Yellow Thunder Amateur Radio Club Website: http://www.yellowthunder.org

Sept. 15th, Radio Expo Location: Belvidere, IL
ARRL Hamfest
Sponsor: Chicago FM Club
Website: http://www.chicagofmclub.org

Oct. 14th SEWFARS Swapfest Location: Hubertus, WI
ARRL Hamfest, Sponsor: Southeastern Wisconsin FM Amateur Repeater Society
Website: http://www.sewfars.com

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, Box 240545, Milwaukee, WI 53223

Email may be sent to: **w9rh@arrl.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 ± 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)

An ARRL Affiliated Club

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- ARES Walworth ARRL News Line

Mon.8:00 PM 146.445 Emergency Net

Mon.8:00 PM 146.865- ARES Net Walworth

Mon.8:45 PM 147.165- ARRL Audio News

Mon. 9:15 PM 444.125+ Waukesha ARES Net

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

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

Tue. 7:00 PM 145.130 MAARS Trivia Net

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

Wed. 8:00 PM 145.130 MAARS Amateur Radio Newsline

Wed. 9:00 PM 145.130 MAARS IRLP SwapNet d FM-38 Repeaters (IRLP 9624)

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 146.91 Swap Net