# MOUNTAIN SPARK GAPS

**NPARC—The Radio Club for the Watchung Mountain Area**

**Website: http://www.nparc.org**
**Club Calls: N2XJ, W2FMI**
**Facebook: New Providence Amateur Radio Club ((NPARC)**

VOLUME 50 NO.11 November

# UPCOMING EVENTS

## Regular Meetings

12/14 & 12/21?
Monday 7:30
NP Community Center

**Holiday Luncheon**
**12/5/15**

**Kids Day 1/3/16**
**Check The Website**

## Meeting Schedule

**Regular Meeting:** 7:30—9:00 PM
**2nd Monday of each month** at the
NP Senior & Adult Center
15 East Forth Street
New Providence

**Informal Project Meeting:** 7:30—9:00 PM
**4th Monday of each month**
**Same location**
**Everyone is Welcome**
If a normal meeting night is a holiday, we usually meet the following night.
Call one of the contacts below or check the web site

## Club Officers for 2015

President: KC2WUF David Bean
973-747-6116
Vice President:K2UI Jim Stekas
973-377-4180
Secretary: KD2EKN Tim Farrell
908-244-6202
Treasurer: K2YG Dave Barr
908-277-4283
Activities: W2PTP Paul Wolfmeyer
201-404-6914

## On the Air Activities

Club Operating Frequency
145.750 MHz FM Simplex

Sunday Night Phone Net
Murray Hill Repeater (W2LI) at 9:00 PM
Transmit on 147.855 MHz
With PL tone of 141.3 Hz
Receive on 147.255 MHz
Net Control K2AL

Digital Net
First & Third Mondays 9 PM
Details as announced.

## Club Internet Address

Website:http://www.nparc.org
Webmaster K2MUN David Berkley
Reflector: nparc@mailman.qth.net
Contact K2UI, Jim


## MOUNTAIN SPARK GAPS

Published Monthly by NPARC, Inc.
The Watchung Mountain Area Radio Club
P.O. Box 813
New Providence, NJ 07974



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Contributing Editors:
WB2QOQ Rick Anderson
WB2EDO Jim Brown


Climatological Data for New Providence for October 2015

The following information is provided by Rick, WB2QOQ, who has been recording daily weather events at his station for the past 34 years.

**TEMPERATURE -**
Maximum temperature this October, 76 deg. F (October 9)
Last October(2014) maximum was 77 deg. F.
Average Maximum temperature this October, 62.4 deg. F
Minimum temperature for this October, 28 deg. F (October 19)
Last October(2014) minimum was 35 deg. F.
Average Minimum temperature this October, 44.7 deg. F
Minimum diurnal temperature range, 6 deg.(51 -45 deg.) 10/3
Maximum diurnal temperature range, 24 deg. (71-47 deg.) 10/12

Average temperature this October, 53.6 deg. F
Average temperature last October, 56.4 deg. F

**PRECIPITATION -**
Total precipitation this October - 4.87" rain
Total precipitation last October - 4.21"

Maximum one day precip. event this October; October 28, 2.13" rain.
Measurable rain fell on 7 days this October, 15 days last October.

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Rick Anderson
11/10/15
243 Mountain Ave.
New Providence, NJ
(908)464-8912
rick243@comcast.net

**Lat = 40 degrees, 41.7 minutes North**
**Long = 74 degrees, 23.4 minutes West**
Elevation: 380 ft.
CoCoRaHS Network Station #NJ-UN-10

# HOLIDAY LUNCHEON

December 5th, at the same location as last year: Chimney Rock Inn, immediately to the west side of the bridge just inside Gillette from Berkeley Heights on Valley Road (Springfield Ave in Berkeley Heights).

Here are the choices for entrees. **You do not choose now; orders are taken at the tables.**

Chicken Française w/Linguine,
Sliced Steak w/French Fries
Chicken Parmesan w/Linguine,
Capellini Monaco w/Shrimp (capellini is very thin spaghetti),
Penne in Vodka Sauce

A variety of pizza appetizers in included, as is unlimited soda, coffee and tea. We've kept the cost to the same as last year by omitting desert. The cost is $28 per person. Liquor, beer and wine are the responsibility of each attendee.

We do need to know how many will be attending by Thanksgiving, so don't delay. Please bring a check made to NPARC for $28 (times how many your party includes) to the next meeting or two, or mail same to me at 29 Montrose Ave, Summit, NJ 07901. Questions via e-mail or my cell phone, 908-403-0877.

Dave Barr, K2YG
Treasurer, NPARC

# KIDS DAY

## Sunday 1/3/2016

## NP Community Center

## 2:00 PM to 4:00 PM
## Setup starts at Noon
## The more help the better!

# Coming Soon to a Repeater Near You …

Jim Stekas - K2UI

The WW2 years were ones of great technical leaps in radio technology. Among them was the development of VHF and UHF radio systems using FM, deployed widely in the South Pacific island campaign. After the war, commercial Land Mobile Radio (LMR) systems were quick to adopt FM and Motorola deployed FM based systems throughout the 50's and 60's. Ham's stuck with AM, (Ancient Modulation.)

Things changed for hams when LMR started to fill up their spectrum allocation. In 1963, the FCC mandated a migration to narrowband FM (5kHz deviation) and a channel spacing of 25kHz. By 1970, hams were awash in surplus Motorola gear that was "easily" modified for the ham bands. Once the FCC allowed hams to use repeaters 2m mobile FM exploded. LMR saw improvements in capacity through frequency sharing and trunking in the 1980's, but except for PL tones, none of the technology advances found their way into ham radio.

Over the last 20 years there has been a big economic and regulatory push in the LMR world to reduce channel bandwidth and increase the number of channels available. As of Jan 1, 2013, the FCC required all communication from 150-512 MHz to operate in a 12.5 kHz bandwidth. The idea is to migrate from a 25 kHz channel spacing to a 12.5 kHz spacing. Existing licensees keep their frequencies, but channels +/- 12.5 kHz are available for allocation to new licensees. To meet the increased efficiency targets, new LMR standards followed the path of cellular telephony and switched from analog FM to digital audio (and data).

Today, LMR technology is again making its way into the ham bands in the form of Digital Mobile Radio (DMR.) DMR is an European LMR standard that is widely deployed in the U.S. and around the world. (Motorola's sells DMR radios and systems under the MotoTurbo name.) Here are some of the key features of DMR …

**Voice / Data**: Supports a mixture of voice and data up to a total of 9600bps.
**Digital Modulation**: DMR uses 4FSK modulation, sending 4800 2-bit symbols per second. Each symbol starts life as an analog level from the set { -3 -1 +1 +3 }. When fed into an FM modulator, each level is translated into one of four frequencies, hence 4FSK. The frequency shift between adjacent levels is 1296Hz.
**Multi-Rate Vocoder**: DMR uses the AMBE+2 vocoder which supports full-rate (7200 bps) and half-rate (3600 bps) coding. The "official" vocoder is proprietary and must be licensed.
**TDMA**: The first generation of DMR, Tier 1, uses the full rate vocoder. In Tier 2, the channel is split into two 4800bps streams with alternating frames. The two streams (time slots) can be used to support two simultaneous users on a split frequency repeater, or a full duplex connection on a single frequency.
**Protocol Layers**: DMR uses a layered protocol to transport data and voice traffic as well as a rich set of "call processing" messages to set up connections and grant access to mobiles. Many protocol features parallel those found in cellular networks.
**Forward Error Correction**: Reed-Solomon and block Turbo codes.
**Talk Groups**: Talk Groups allow repeater resources to be shared dynamically by different pools of users. On a single repeater with Police, Fire, and EMT talk groups, each group would effectively have its own virtual repeater.

**Bridging**: DMR repeaters can be networked together to allow communications spanning multiple repeaters. This is much more than EchoLink since it must transport all the different DMR frame types to support end-to-end communication.

The DMR-MARC (Motorola Amateur Radio Club) worldwide ham radio network with 500 repeaters and 21000 registered users in 45 countries. This is a DMR Tier 2 network built using commercial mobiles, repeaters, and bridges. Talk Groups are allocated for different languages, local regions, interest groups, etc. DMR-MARC has a significant footprint in the US, Europe and Australia, but only a handful of repeaters exist in Africa, South America and Asia. There is not a single repeater in NJ, so DMR-MARC coverage in our area is non-existent.

Good DMR handhelds run about $400, about the same price as a good dual-band handheld. Cheap Chinese radios are also available for about $150. Typically, the handheld vendor will program it with the frequency of your LMR license and the Talk Groups and Color Codes (a digital PL) of your network. This is apparently an non-trivial exercise and you will need to surf around to collect the tools and expertise to program the correct "Codeplugs".

A DMR basestation costs about $2000, but don't expect compatibility between basestations from different vendors. The DMR specifications do not define how DMR basestations should communicate with each other. Motorola (i.e. DMR-MARC) uses a proprietary protocol called IPSC which allows up to 15 repeaters to be connected together over an IP network. Expanding beyond 15 repeaters or adding repeaters from other vendors requires a C-Bridge (price not published, so it isn't cheap.)

Does it make sense to migrate VHF and UHF repeaters to DMR? Sure, in some cases.

On the plus side DMR allows a quadrupling of repeater capacity, single-frequency repeaters (i.e. no diplexers), better mobile battery life, short messaging, repeater networking, and the ability to identify and block interfering mobiles.

On the other hand, the half-rate DMR vocoder is a big step down in voice quality from FM, and its hard to justify the expense of replacing a working FM repeater with a new DMR repeater and handhelds. But for new repeaters, DMR could be a good choice. It adds new features and it's reduced bandwidth makes it easier for the frequency coordinator to find a non-interfering frequency.

Another digital technology vying to replace analog FM is D-STAR, a development by Japanese ham equipment manufacturers. Next month we will give an overview of D-STAR and compare it to DMR.

**References**


en.wikipedia.org/wiki/Digital_mobile_radio Wiki overview with links.
www.qsl.net/kb9mwr/projects/dv/apco25/Digital-Radio-Standards.pdf Good overview of digital LMR standards.
www.dmr-marc.net/ The Motorola Amateur Radio Club TRBO DMR Network.

www.wa8kim.com/files/Intro-DMR-2103.pdf DMR presentation at Dayton Hamvention

www.rtl-sdr.com/tag/dmr/ Decoding DMR with a DVB-TV dongle.

# SCIENTIFIC TIDBITS

## A Bouncing Camera Ball

This is a really great idea put to a practical use. A bouncing camera ball can help first responders gauge hazards before entering a building. Bounce Imaging has created a rubber ball with 6 wide-angle video cameras, LED lights and microprocessor. When thrown into a building, the cameras snap pictures at a rate of two shots per second that are wirelessly sent to a laptop or smartphone outside the building. This gadget has got to be really helpful to firemen who have to enter burning buildings or rescue units having to entire uncertain environments.

## Several Things Cause Memory Loss

A Montreal Geriatric University study shows that drugs found in many seniors' medicine cabinets may affect memory. Up to 90% of people over 65 take at least 1 prescription medication. The medicines most likely to affect memory and attention span are over-the-counter drugs for insomnia, anxiety, itching or allergies. The results support an American Geriatric Society recommendation last spring that seniors should avoid all sleeping pills, 1st generation antihistamines (allergy drugs) and some antidepressants. It is a blessing that pain medications were not on this list.

## Hornet Color used in Sola Cell

Scientists in Israel and the United Kingdom have built an electricity-generating solar cell using a pigment from the oriental hornet stating it represents a technically and economically feasible alternative to today's silicon-based solar technology. They reported extracting a yellow pigment call xanthopterin from the hornet's shell and inserting it into a solar cell that uses dyes to absorb light. The shell's structure also traps in light instead of reflecting it. Let us see how far this can go. I would love to have them explain how they extract the die from the hornet.

## Hooray!!

A sensor in handicap parking spots can alert parking attendants when a non-handicapped driver parks in a restricted spot. The system by Car Parking Technologies alerts an attendant when a car without a handicap sensor tag enters a handicap spot. How about alerting the police?? It is about time this type of gadget came to the market. The disabled community is delighted.

Jim WB2EDO