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HAPPENINGS

From the ARRL:

*"Quantum Radio" May Offer
New Twist on Communicating
in Problematic Environments*

01/05/2018

Researchers at the National Institute of Standards and Technology (NIST) have demonstrated that quantum physics might enable communication and mapping in locations

where GPS, cell phones, and radio is not reliable or don't work at all, such as indoors, in urban canyons, underwater, and underground.

NIST **announced** the technology advance on January 2. The technology may have marine, military, and surveying applications. The NIST team is experimenting with very low frequency (VLF) digitally modulated magnetic signals, which propagate

farther through buildings, water, and soil than conventional electromagnetic signals at higher frequencies.

"The big issues with very low-frequency communications, including magnetic radio, are poor receiver sensitivity and extremely limited bandwidth of existing transmitters and receivers. This means the data rate is zilch," said NIST project leader Dave Howe, ADOMR.

"The best magnetic field sensitivity is obtained using quantum sensors. The increased sensitivity leads in principle to better range. The quantum approach also offers the possibility to get high-bandwidth communications like a cell-phone has. We need bandwidth to communicate with audio underwater and in other forbidding environments," he said.

VOLUME XLIV, NUMBER 2

SPURIOUS EMISSIONS

FEBRUARY, 2018

CLUB MINUTES

President Dave KU0R began the meeting at 1930 with the pledge of allegiance.

Following the pledge, visitors AW1B from Viera and WB2EZ were introduced.

No ailing members were identified.

The minutes for the January meeting were published in the newsletter. There was a motion to approve the meeting minutes, a second was heard and the January minutes were approved by acclamation.

Larry KK4WDD, our Treasurer, reported we have \$1633.58 in checking and \$1277.33 in the equipment fund.

A motion was heard to accept the meeting minutes for audit, a second was heard and the Treasurer's report was approved by acclamation.

Next, Vice President Viron N4VEP reported we have NBEMS training on Sunday in the EOC parking lot.

President Dave reported for the Technical Committee: Repeater 37 is in analog and 88 is in dual mode. The 220 repeater is also working well. DR2X will not be deployed in

the repeaters and DR1X will remain. The 37 will receive a repeater upgrade.

Our Emergency Coordinator, Les W9BCH, reported there will be a mini SET (Simulated Emergency Test) on the 14th and an exercise on the 24th in the parking lot of the EOC.

Steve N4UTQ reported for the Red Cross that our Space Coast Chapter is leading the nation in fire alarm installation.

Coming up is the Orlando Hamcation and Yaesu will be there to present a forum. The QRP group will meet on February 17, location to be determined. The MS walk will be the 10th of March at the Church in Viera and volunteers are needed. Plans are to meet starting around 7:00 AM to coordinate locations. The walk starts at 9:00 AM.

New Business: Central Net Replacement Project. Dave explained the elaborate set up that used to be at Ray Kassis' place and suggested that we upgrade our club station with equipment at a cost of over \$5000 for two stations, one at Wuesthoff Hospital and the other at the Red Cross facility. How to fund

this is unknown at this time. Treasurer Larry suggested that we figure out a funding plan prior to the beginning of equipment acquisition. Dave K4UZM suggested that someone donate an old car that we could raffle off to raise money.

The 50-50 ticket was found to be in the hands of Sam KJ4VGR.

Following the discussion, Chris Durso, AA4CD, made a presentation about multi-mode digital voice modems. These experimental and inexpensive amateur devices allow repeaters to operate all the common FM digital modes: DMR, D-Star, Fusion, and. P25. It takes the next user while scanning for activity but it cannot transmit in cross mode, and allows only one mode at the time.

A motion to adjourn occurred at 2050 and was moved and approved.

Respectfully Submitted

Steve Luchuk Secretary

HAPPENINGS

NIST researchers have demonstrated detection of digitally modulated magnetic signals by a magnetic-field sensor that relies on the quantum properties of rubidium atoms. The NIST technique varies magnetic fields to modulate or control the frequency — specifically, the horizontal and vertical positions of the signal's waveform — produced by the atoms.

NIST developed a direct current magnetometer that uses polarized light as a detector to measure the “spin” of rubidium atoms in a tiny glass cell induced by magnetic fields. Changes in the atoms' spin rate correspond to an oscillation in the dc magnetic fields, creating alternating current voltages at the light detector that are more useful for communications.

“Atoms offer very fast response plus very high sensitivity,” Howe said. “Classical communications involves a tradeoff between bandwidth and sensitivity. We can now get both with quantum sensors.” Howe speculated on an Amateur Radio application.

“The quantum radio is great fun, far better sensitivity than any other receiver, at room temperature, anyway,” Howe told ARRL. “The atoms in the gas cell replace the ‘antenna’ and detection in the classical sense. It would be nice to try modulation in the 2200-meter band using the quantum receiver for detection.” In the future, the NIST team plans to develop improved transmitters.

In the NIST tests, the sensor detected digitally modulated magnetic field signals with

strengths of 1 picotesla — one millionth of Earth's magnetic field strength — and at frequencies below 1 kHz.

To further improve performance, the NIST team is building and testing a custom quantum magnetometer. Like an atomic clock, the device will detect signals by switching between atoms' internal energy levels as well as other properties, Howe said. The researchers hope to extend the range of low-frequency magnetic field signals by boosting the sensor sensitivity, suppressing noise more effectively, and increasing and efficiently using the sensor's bandwidth.

The NIST strategy requires inventing an entirely new field, which combines quantum physics and low-frequency magnetic radio, Howe said.

The [Bouvet Island 3Y0Z DXpedition](#) team has issued an invitation to follow the team while it's on its way to the “most remote place on Earth.” The device uses Iridium satellite technology and will send a waypoint along the route every 30 minutes. These will appear on the Bouvet [MapShare](#) website, as the team travels to Chile and eastward on the vessel *Betanzos* on the 10 to 12-day journey across the South Atlantic to Bouvet.

A year-long operating event, “Science Milestones in the History of Radio,” is under way, sponsored by the Italian Amateur Radio Association (ARI) **Fidenza Radio Club**. Each month will highlight individuals who laid the foundations — theoretical and practical — for radio science. Awards are available for participating stations. More information at <http://www.arri.org/news/science-milestones-in-the-history-of-radio-event-is-under-way>

ON THE AIR

2018 Daytona 500 - Speedweeks
Feb 14-Feb 18, 0001Z-2359Z, N4DAB, Daytona Beach, FL. Daytona Beach CERT Amateur Radio Club. 14.265 14.070. Certificate & QSL. Daytona Beach CERT ARC, c/o Steve Szabo WB40MM, 536 Central Park Blvd, Ponce Inlet, FL 32127. 60th DAYTONA 500. For more information, contact Steve WB40MM at: wb40mm@arri.org www.daytonacert.net/?page_id=437

H L Hunley Commemorative Station N4HLH
Feb 17, 1400Z-2000Z, N4HLH, North Charleston, SC. Trident Amateur Radio Club. SSB: 28.462 14.262 7.262; CW 7.117 SSB. Certificate & QSL. Brian Freedman W4BFZ, PO Box 60732, North Charleston, SC 29419. Certificate is \$5 and SASE 9X12 envelope. For

QSL send card and SASE, International QSL add \$2 USD. tridenthams.org/hunley.htm

USS Midway Museum Ship Special Event: Mt Surabachi Flag Raising
Feb 10, 1700Z-2359Z, N6IWW, San Diego, CA. USS Midway (CV-41) Museum Ship. 14.320 7.250; PSK31 on 14.070; D-STAR on REF001C. QSL. USS Midway (CV-41) COMEDTRA, 910 N Harbor Drive, San Diego, CA 92101.

3W9DLE Vietnam
 Chuck, WODLE will be active as 3W9DLE, from Vietnam in February, March, April 2018. He will operate on HF Bands, CW, FT8, SSB including activity in ARRL DX CW Contest 17 - 18 February 2018 and Russian DX Contest 17 - 18 March 2018.
DPOGVN Neumayer III Station

Antarctica
 Matthias, DH5CW will be active from Neumayer III Station, IOTA AN-016, Antarctica, February 2018 - February 2019, as DPOGVN. He will operate on HF Bands.

TO7D FG/F6ITD Desirade Island
 Jean Pierre, F6ITD will be active from Desirade Island, IOTA NA-102, 29 January - 15 March 2018, as FG/F6ITD. He will operate on 160 - 6m SSB, CW, Digital modes

.GUADELOUPE, FG. Operator F6APE is QRV as FG4KH until February 13. Activity is on the HF bands. This includes being an entry in the REF CW contest. QSL via F1DUZ.

COMOROS, D6. Giovanni, IK5BCM, Giuseppe, IK5CBE and Giovanni, IK5CRH will be QRV as D68I from

January 29 to February 10. Activity will be on 80 to 10 meters using CW, SSB and various digital modes. QSL via IK5CRH.

School Club Roundup

Winter/Spring Term: February 12-16, 2018Objective: To exchange QSO information with club stations that are part of an elementary, middle, high school or college. Non-school clubs and individuals are encouraged to participate. More information at <http://www.arri.org/school-club-roundup>

CANADA, VE. Pierre, VE3KTB and Alex, VE1RUS will be QRV as VY0ERC from Nunavut, Ellesmere Island, IOTA NA-008, from February 4 to April 1. Activity will be in their spare time mostly on 40 and 20 meters using CW, SSB and various digital modes. QSL via M00XO.

A Conversation on Radio by Steve Luchuck, N4UTQ

A lot of us started our radio interests with CB radio. When CB radio became a trend, it was exciting and we learned how to talk to each other on the radio. Citizens Band radio had an aura about it because truckers had an extensive lingo you had to learn and it was a bit rebellious since one of the objectives was to evade the unpopular 55 mph speed limit. Another thing the CB era brought us was friends that we met on the radio. Once you got to know some of the other CB'ers when you talked on the air, you developed radio skills such as knowing when it is time to turn the transmit over to your radio partner. We also developed a skill known as rotation when there were more than two stations participating in the QSO. While in a QSO on the CB radio we would unconsciously drop the lingo and just talk like we do in person and on the telephone. So a lot of us with a CB background, learned how to talk casually on the radio.

When I graduated to ham radio, all of my experience talking on CB radio transferred to amateur radio, barring the exception of the lingo used on CB. I was not active on the 2m radio because while I was a member of the club, I did not feel like I had a lot in common with these older fellows. I did not talk much on my 2m radio that I had in my car until I started listening to these two guys that were on their way to work at the same time that I was in my car going to work also. When I first got into ham radio, I put a 2m radio in the car and had it programmed for the 37 repeater and whenever I was in the car, I had it on. Listening to these two other guys' conversation was normally very interesting and I was absorbing good information from these guys. One morning they were talking about a computer problem that I was all too familiar with and it was evident that neither of them had considered the effect that results when the hard drive is full. I had to inject myself into the con-

versation and from that day on, I was part of the drive to work with these new friends.

One day my new buddy asked me if I was coming to the club meeting and he encouraged me to come just so that we could meet. I came to the meeting and it was Andy W4PRK that pointed my new friend out, and the rest is history how I became active in the club.

The point of this article is there is an art of the casual conversation on the radio, such that most of us are totally unaware of, that military, government and law enforcement folks joining our ranks, have yet to master the casual QSO. One thing that annoys me the most is having a QSO with someone and you have a long transmission and all they can come back with is ROGER THAT. A ROGER THAT response is strong evidence that this QSO is one sided and should conclude immediately.

Years ago there was a new club member that would call anyone throwing out their call sign on the 37 repeater and then expect the other station to do all the talking. Conversation on the radio is a two way street folks. Both sides need to contribute and introduce new topics to discuss. Back when we had the auto patch there was one club member that you never heard talking to anyone else on the repeater and only used the autopatch to call home once in a while. One day the repeater troll called the autopatch guy and what an uncomfortable QSO that was.

When you talk on the radio to another station, it should be no different than talking to someone face to face. There are lots of things to talk about, and I was going to list them, but that list is way too long. Just talk

about what the last thing that you accomplished in amateur radio. Conversation is an art, for most of us its not that hard but it needs to be practiced often regardless of what ever mode you use.



W1AW CW PRACTICE TRANSMISSIONS

7 PM EST Slow CW : 5-15 WPM
Mon, Wed, Fri

7 PM EST Fast CW: 35-10 WPM
Tue, Thu

FREQUENCIES:

1.8025, 3.5815, 7.0475,
14.0475, 18.0975, 21.0675,
28.0675, 50.350, 147.555.



Editor's Note:

Send comments about the Newsletter or to contribute information or articles to the Editor's email address:

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