NVARC
Nashoba Valley
Amateur Radio Club

SIGNAL

SPECIAL SERVICE CLUB

de N1NC

January 2006 Volume 15 Number 1

This Month's Meeting

This month's meeting program is "Members Short Subjects." There are three confirmed presentations.

Last Month's Meeting

The December meeting opened with a slide show of pictures from the ISS contact accompanied by the audio of the contact.

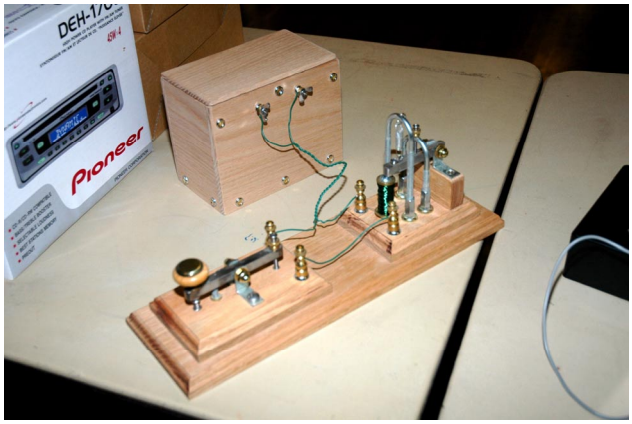
Stan opened the meeting with announcements.
Boston Marathon calling for volunteers.
Straight Key Night Dec 31 to Jan 1.

Stan passed out ARISS patches, donated by Hawthorne Brook School, to the participants. Les N1SV, Joel W1JMM, Gary K1YTS, Larry KB1ESR, Stan KD1LE, Bob W1XP received patches. Dick KB1MBR was not present to receive his patch.

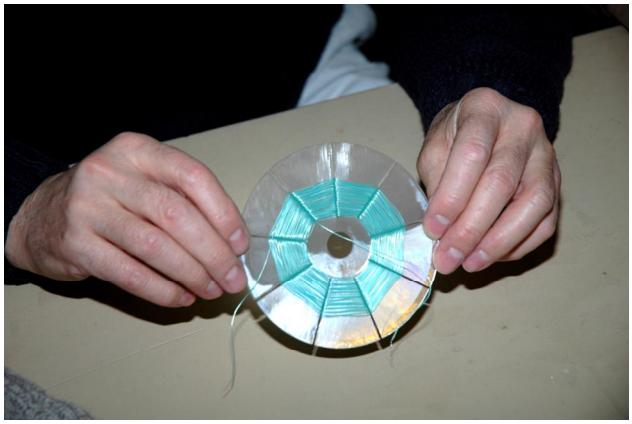
Peter N1ZRG presented Stan with a certificate from the Board and Officers on behalf of the membership for his efforts coordinating the Hawthorne Brook ISS contact.

The meeting program was the annual Homebrew Night. Many brought their homebrew projects for us to see.

Leo K1LK showed a woodworking and metal project straight key and sounder he built with his daughter for a school project. He also showed a single tube receiver he built.



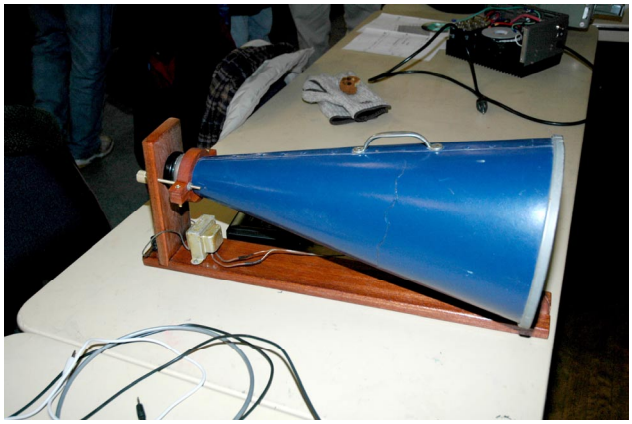
Phil KB1JKL showed a spider coil (below) he wound for a future radio project.



He also showed a high current 13.8 volt power supply he was building based on a torroid power transformer to power his rigs.

Jim W1TRC showed an ultrasonic powerline arc detector (below) he designed for identifying power line noise sources caused by arcing. Jim has experience using the device finding 14 powerline problems near his home. There is a QST article coming on it tentatively in March 2006.

Peter KB1LZH showed his soundcard interface and talked about his interest in PSK31.



Above is a High Z speaker made from a headphone and megaphone built by Earl WR1Y. Earl also had a book on building such old time “speakers”.

John KB1HDO showed his waterproof APRS system (below) in a bucket. John used the device at the Head of the Charles Regatta.

Bob W1XP showed the bandpass filters that he designed and were kitted as a club project for last Field Day. He showed a bandpass curve of a filter made with a new TenTec Vector Network Analyzer that is a card you add to your PC. He showed a large loop antenna (below) and matching circuit he built for the new experimental band around 135 KHz. He also showed a Z bridge for the MF antenna.

Larry KB1ESR brought pictures of his work at the Groton Lost Lake Fire Station Emergency Operations Center. Larry designed and had fabricated a triangular mount to support five or six antennas for the EOC located at the fire station. The show included pictures of the 65 foot pole Groton Electric erected.

Stan brought the wire reel system he built for RG-8 cable and an example of using standard store bought plastic reels for RG-58 coax. He showed a map of the GIS fire hydrant project he did for the town of Pepperell. He also had a kit project for an AZ-EL computer interface for rotator control used for the ISS contact.

ARRL members can give your outgoing QSL cards to Bob W1XP and the club will pick up the cost of getting them to the League.

Present at the December meeting were Phil KB1JKL, John KB1HDO, Dennis K1LGQ, Rod WA1TAC, Joel W1JMM, Bob W1XP, Larry KB1ESR, Peter KB1LZH, Leo K1LK, Stan KD1LE, Les N1SV, Skip K1NKR, Jim W1TRC, Earl WR1Y, Gary K1YTS, Bob AB1CV, Peter N1ZRG.

Letters to the Editor

Dear Stan

I rarely (maybe never?) have written a "letter to the editor". In this case however I must give "kudos" to all of you who provided, on short notice, all the equipment, antennas, software, training, operational help, et al., for the students of Townsend's Hawthorne School, in contacting the ISS.

Having belonged to three ARC's since first licensed, we are constantly amazed at the extraordinary energy and expertise of NVARC, especially when the total membership, the smallest, is taken into account.

As an 82 year old "schoolman" your willingness to expose our middle schoolers to the wonders of ham radio, is worthy of the highest praise. The December Signal and the e-mail recounting the origins of the event and its successful conclusion were exceedingly well done.

Hope to be on the Net tonight and at the 12/15 meeting.

73's Sincerely
Don Purcell AB1DS

Board Meeting Notes

The Board Meeting took place January 12 at the KD1LE QTH.

10 copies of Now Your Talking were purchased. Two copies were given to Hawthorne Brook School.

Tee shirts for ARISS crew were donated by the Hawthorne Brook Middle School and will be awarded at the regular meeting.

Les showed the ISS update for the Webpage for comments. The new pages should be available by the regular meeting.

Stan attended the January planning meeting for the Parker Classic Road Race on Devens and reported it will be May 21st.

There was a general discussion about Field Day and the need to get someone to volunteer to be coordinator. We also discussed how many and what type of stations we might want to run. The discussion was tabled pending a volunteer to run the event.

Ralph reported the Groton Road Race would be April 30th.

Speakers and Programs for the spring.

Ralph gave the Treasurers Report which is later in the newsletter.

NVARC Website

Les N1SV has been updating the Website. The top page now includes a link to an ISS contact page. This page has expanded description of the Hawthorne Brook School project and links to photos and the contact audio. Check it out.

Advertisements

Tell them you saw it in the Signal. Advertisers should contact the NVARC Treasurer for information.

2006 Flea Markets and Conventions

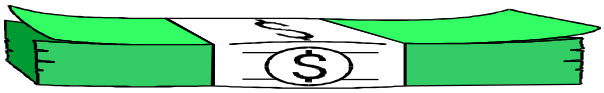
February
18 Algonquin, Marlboro
Marlborough Middle School
March
26 Spring Flea Market, Framingham

April
8 IRS Hamfest and Flea Market
9 Londonderry, NH

Treasurers Report

Income for December was $70 in membership dues, $28.15 from bank savings interest, and $24 for newsletter advertising. Expenses were $15.60 for newsletter postage leaving a net income of $106.55 for the month.

We used $108.52 from the Community Fund for expenses for the Hawthorne Brook ISS contact and $149.60 to purchase 10 copies of Now You're Talking to distribute to potential new hams, including two that were donated to Hawthorne Brook.



Current balances:

General fund	$4556.19
Community fund	$2071.83

Welcome to new member Jim Hanson W1TRC. Jim came to our November meeting at the invitation of Pete KB1LZH and brought his ultrasonic power line arc detector (to appear in QST) to the December home brew meeting at the request of Rod WA1TAC. Jim has also known Russ WR1Y for a long time. Jim lives in Maynard. He lists DX among his special interests.

As of 12 January we have 60 current members and five renewals outstanding. Please check your newsletter mailing label for your expiration date. If you pick up the newsletter from the Web site only I will send you a reminder by email if your renewal is overdue.

If you are not yet an ARRL member, please consider joining. Your support of ARRL gives you access to special members-only material on the ARRL Web site and helps ARRL in its efforts to show how Amateur Radio benefits the public. It's easy to join or renew your ARRL membership through the Club. We pay the postage and the ARRL gives the Club a commission for every new membership and renewal that we handle. Hand me your check for the full ARRL amount made out to NVARC and I will do the rest.

NVARC Club Net

The club net meets on the 442.900 repeater. Recent participants include Dave N1MNX, Bob W1XP, Bob AB1CV, Joel W1JMM, John KB1HDO, Larry KB1ESR, Skip K1NKR, Gary K1YTS, Ralph KD1SM, Stan KD1LE, Don AB1DS, Les N1SV, Dick KB1MBR, and Peter KB1LZH. Recent discussions are ISS wrap up, repeater work, meeting information, tools needed.

The net is a good place to bring information for the club and questions or discussions. The net meets at 8:00 PM Monday evenings on the 442.900 N1MNX repeater.

Adopt A Highway

The last cleanup was November 19, 2005. We held the cleanup directly after our Saturday breakfast. There was a good turnout and if there is general agreement we may continue this in the spring. At the cleanup were Erik W1ZBT, John KB1HDO, Leo K1LK, Bruce K1BG, Larry KB1ESR, Peter N1ZRG, Peter KB1LZH, and Stan KD1LE. With the great turnout we scoured our two miles and picked up 17 bags of trash and some miscellaneous items, hubcaps, vinyl siding, and a penny.

We meet at the Nashua River common at 9:00 AM. Our clean up day is Saturday after breakfast.

The next road cleanup is Sunday April 23rd 2006.

Property Manager Report

The club has the following equipment.

kd1le	Stan Pozerski	15 Trash stabbers
kd1le	Stan Pozerski	32 Safety Vests
kd1le	Stan Pozerski	20 Pair White Cotton Gloves
kd1le	Stan Pozerski	1 Set of NVARC letters
kd1le	Stan Pozerski	3 5' brown folding tables
kd1sm	Ralph Swick	1 Swingline M711 Stapler
kd1sm	Ralph Swick	1 NVARC banner 3'x5'
kd1sm	Ralph Swick	1 Trash stabbers
wr1y	Earl Russell	1 Badge punch

kb1hdo	John Griswold	1 Kenwood TS-451 transceiver SN 61000025
ka1rv	Peter Nordberg	1 Cushcraft R-7 antenna
kb1hdo	John Griswold	1 Astron RS-35M power supply SN 9506184
n1zrg	Peter Nordberg	2 Code Practice Oscillators
kd1le	Stan Pozerski	1 Code Practice Oscillator
kd1le	Stan Pozerski	1 MFJ MFJ557 keyer

ARRL Letter

SOLE SURVIVING WEST VIRGINIA MINER KC8VKZ STILL CRITICAL

The only survivor of the January 3 mine explosion in Tallmansville, West Virginia is Randal McCloy Jr, KC8VKZ, of Philippi, West Virginia. At press time, he was listed in critical condition at Allegheny General Hospital in Pittsburgh, where he is undergoing specialized treatment. Hams may wish to send a note of support on a QSL card to Randal McCloy Jr, KC8VKZ, PO Box 223, Philippi, WV 26435. -- tnx Randy Padawer, K7RAN

HAMS AID FIGHT AGAINST TEXAS GRASS FIRES

Amateur Radio Emergency Service and other Amateur Radio operators from the West Texas Section, and especially the Abilene vicinity, were called to assist with communications during the last week of 2005 when the wildfires struck Cross Plains, Texas, in the southeastern portion of neighboring Callahan County.

"There was no cell service because the connection to the cell tower was burned," said Bill Shaw, KJ5DX, the ARRL Emergency Coordinator in nearby Taylor County. "There was one landline phone working at the church where the Cross Plains Red Cross shelter was set up."

Amateur Radio operators established communication via UHF and VHF radios between the Cross Plains Shelter, Brownwood Red Cross Shelter, and Abilene Red Cross headquarters. A team of 14 radio amateurs was on hand during this emergency.

"We kept up 24 hour communications for Wednesday, Thursday, and Friday until noon via ham radio," Shaw explained. "The fire started as a grass fire about noontime on December 27, and quickly escalated into a raging wildfire that was fed by 45 mph winds."

Unfortunately, the fire quickly spread toward town about 3 miles away, and it burned the area that is about 4 to 6 miles east-west and 2 to 3 miles north-south in size.

"About 31 fire departments fought fires until about 5:00 the next morning," Shaw said. As a result of this fire, almost 8,000 acres burned, 152 homes were damaged, and that represents 25 to 30 per cent of the homes in Cross Plains. Over a hundred of those homes were completely destroyed.

Wildfires have also been burning in drought-stricken Oklahoma and New Mexico.

WEEKENDS BEST TIME TO CATCH NA1SS ON THE AIR

The best time to catch International Space Station (ISS) Expedition 12 Commander Bill McArthur, KC5ACR, on the air from NA1SS is during a weekend. Now about halfway through his six-month duty tour, McArthur already has more than 300 casual contacts in his log, and he's eager to up the count.

"Weekends seem to be Bill's favorite time to operate," says Amateur Radio on the International Space Station (ARISS) Ham Radio Project Engineer Kenneth Ransom, N5VHO. "The weekend has few scheduled activities, so the crew may operate anywhere from 0800 until 2200 UTC."

But Ransom says McArthur also operates in his free time on weekdays, and that includes his lunch hour, scheduled around 1200 to 1400 UTC. "Bill has occasionally operated in this time during the week," he told ARRL.

The crew's work day ends about 1930 UTC, but McArthur and crewmate Valery Tokarev usually stay up for another couple of hours. The crew sleeps from2130 until 0630 UTC.

McArthur recently completed Worked All Continents (WAC) from space, including the "traditional ARISS" requirement to work Antarctica.

"We clearly share a lot in common," McArthur told Chuck Kimball, N0MHJ, at Palmer Station's KC4AAC during their 2-meter contact December 17. "You know, e have this bond. Just our hostile environments are a little bit different."

McArthur's still trying to earn Worked All States (WAS) and DXCC from space and as 2005 drew to a close already had logged 37 states and 38 DXCC entities.

Responding to questions regarding the legitimacy of a DXCC earned from a spacecraft circling 220 miles

above Earth, ARRL Membership Services Manager Wayne Mills, N7NG, concedes that while McArthur's efforts don't have that much to do with traditional DXCC, they won't devalue the efforts of those earning the award from Earth either.

"While rules are very important, particularly in defining the DXCC program, other concepts can, and often do, transcend mere rules," he said. "Think of this as more of a public relations opportunity."

In addition, McArthur has been averaging two ARISS school group contacts as his schedule permits. Not since Expedition 3--when there were three people aboard the ISS for each crew increment--has a crew member done this on a regular basis.

The NA1SS worldwide voice and packet downlink frequency is 145.800 MHz. In Regions 2 and 3 (the Americas, and the Pacific), the voice uplink is 144.49 MHz. In Region 1 (Europe, Central Asia and Africa), the voice uplink is 145.20 MHz. The worldwide packet uplink is 145.99 MHz.

When NA1SS is in crossband FM repeater mode, the worldwide downlink is 145.80 MHz, and the uplink is 437.80 MHz. All frequencies are subject to Doppler shift. The Science@NASA Web site provides location information for the ISS <http//science.nasa.gov/temp/StationLoc.html>.

ASTRONAUTS DON'T SPEND MUCH TIME IN SPACE, ISS COMMANDER TELLS STUDENTS

International Space Station Expedition 12 Commander Bill McArthur, KC5ACR, really enjoys being an astronaut. But he told students at Sanderson High School in Texas December 8 that, although he's been an astronaut for a while now and really enjoys it, he really hasn't spent all that much of his career in space.

"I've been an astronaut for 15 years now, and this is only the fourth time I've flown in space," McArthur told the students via the space station's NA1SS. "So it's a great job, but there's much more to it than just being in space."

But being in space and navigating by floating around in microgravity is "just really neat" he told another questioner. Still, being part of a two-person crew for six months aboard the ISS does put astronauts on the spot, McArthur explained in another reply.

"We're under a lot of pressure to be able to complete our work up here," McArthur said. "It's so expensive to send people into space that we want to be successful at everything we do." He went on to say that being away from their families for so long also is a source of stress for the ISS crew, although he noted that the crew members can stay in daily touch with their families via telephone and e-mail.

Down the road, he said--perhaps as soon as next year--ISS crews may again consist of three people and perhaps, eventually, as many as six. The ISS has been limited to two-person crews while the shuttle fleet remains grounded.

Despite the downsides of long-term space travel, McArthur made it clear that he loves being aboard the ISS. "I love it in space, if it wasn't for the fact that my family was on the ground I would never want to leave," he said.

Ten high schoolers took part in the event, and Sanderson math teacher Amy Carman, KD5HYB, served as the control operator for the nearly 10-minute direct VHF contact. In all, McArthur answered 18 of the students' questions. Before the contact, the students got to see a videotape of a recent space walk and discussed it in their science classes.

Four members of the Big Bend Amateur Radio Club provided and set up all the equipment needed to make the contact a reality. An audience of approximately 25 students, teachers, parents, local dignitaries and others looked on, and reporters from four newspapers covered the ARISS contact.

On December 15, students at Mt Carmel High School in San Diego, California, had the opportunity to interview McArthur via Amateur Radio. Replying to one question, McArthur said most movie portrayals about life in space have not been very accurate because they don't capture what it's like to work in microgravity. He also said the astronauts and cosmonauts themselves are the most important research subjects. "We ourselves are the experiments," he said.

McArthur told the California high schoolers that the danger of meteorite damage to the ISS is low, although he said the ISS has encountered them. "They have, fortunately, been very, very small and never penetrated the skin of the vehicle," he pointed out. "There is a certain amount of 'space dust,' so we see it more in erosion or in delicate equipment like our solar panels."

Students yelled "Thank you!" to McArthur as the ISS went out of radio range.

The direct VHF contact between KG6EQU and NA1SS ran about six and one-half minutes. Both school group contacts were arranged by the Amateur

Radio on the International Space Station (ARISS) program. ARISS is an educational outreach, with US participation by ARRL, AMSAT and NASA.

ISS COMMANDER SHOOTING FOR WAC, WAS AND MAYBE DXCC FROM SPACE

ISS Expedition 12 Commander Bill McArthur, KC5ACR, has proven to be one of the more active Amateur Radio on the International Space Station (ARISS) operators among ham radio operators who have occupied the space station. Early in his ISS duty tour, McArthur got on the air from NA1SS for Scouting's Jamboree On The Air (JOTA) event in October, but he's also been available during his off hours to make some quick, casual QSOs on 2 meters as well. In fact, McArthur's having so much fun operating from space that he's hoping to complete Worked All Continents (WAC), Worked All States (WAS) and maybe even DXCC from space.

"Bill McArthur continues to be active on voice and now has a couple of personal goals he is trying to achieve," says ARISS Ham Radio Project Engineer Kenneth Ransom, N5VHO. "He is trying to talk to someone in every state in the United States. According to his log, he has managed to work 37 states so far." In addition, Ransom says, McArthur wants to work as many countries as he can.

"He's off to a good start with 28 DXCC entities in his log as of December 12," he said. "These contacts have been with amateur stations on every continent with the exception of Antarctica." That contact could happen this weekend, however. Although the IARU does not require WAC applicants to have worked Antarctica, Ransom says that ARISS tradition calls for an Antarctica QSO to achieve WAC from space "since the astronauts seem to have an unfair advantage."

Expedition 9 astronaut Mike Fincke, KE5AIT, became the first ISS crew member to contact all seven of the world's continents via Amateur Radio from NA1SS. Fincke worked KC4AAC at Antarctica's Palmer Research Station for his last contact.

States on McArthur's most-needed list are Alaska, Hawaii, Idaho, Missouri, New Hampshire, New Mexico, North Dakota, Pennsylvania, Rhode Island, South Dakota, Vermont, Virginia and Washington.

"The list of DXCC entities is just starting to grow, so he needs a lot right now," Ransom conceded this week. "I figure he can get it if we are able to add a handful of smaller entities." Ransom says he hasn't included ARISS school group contacts in his counts and hopes McArthur will achieve his goals without them. "We won't know the official results for months after the mission," he added.

McArthur is about halfway through his approximately six-month duty tour aboard the ISS. He and crewmate Valery Tokarev will return to Earth in April.

During Thanksgiving week, McArthur reportedly made some three dozen casual contacts, most of them over North America and a few over Europe and New Zealand. Nine-year-old Mattie Clausen, AE7MC, of Oregon recently enjoyed her third QSO with McArthur, and the two now are on a first-name basis. McArthur made contacts with stations in the US on December 6. He also had QSOs with Australia, New Zealand and the US on December 11.

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The Amateur Radio on the International Space Station (ARISS) <http://www.rac.ca/ariss> program is an international educational outreach with US participation by ARRL, AMSAT and NASA.

EASTERN MASSACHUSETTS ARES AND SKYWARN ACTIVATE FOR MAJOR NOR'EASTER

Near-blizzard conditions and high winds December 9 in Eastern Massachusetts prompted ARES and SKYWARN teams to activate in Eastern Massachusetts December 9. The New England "nor'easter," initially predicted to drop only moderate amounts of snow across the region, quickly and briefly turned ugly, says Eastern Massachusetts ARES Section Emergency Coordinator Rob Macedo, KD1CY, who also serves as SKYWARN Coordinator for the National Weather Service (NWS) office in Taunton.

"We had a nor'easter intensify rapidly and bring hurricane-force winds to Southeast New England with Cape Cod and the Islands hardest hit, causing an ARES activation for shelter operations," Macedo told ARRL. "The storm also brought near-blizzard conditions to the region and caused major travel disruptions during the Friday evening commute."

Macedo says that as the storm made its closest approach to Eastern Massachusetts, it strengthened rapidly, leading to widespread thunderstorms coupled with extremely heavy snowfall over the region and whiteout conditions. A plane arriving in Boston's Logan Airport from Baltimore was struck by lightning, but the aircraft landed safely, and no one was injured.

"Portions of Eastern Massachusetts had snowfall rates in the 5 to 7-inch-per-hour range," he said, "resulting in up to 17 inches of snow in the hardest-hit areas of the region." The National Weather Service said the 8.6 inches of snow that fell December 9 at Boston's Logan Airport exceeded the previous record for that date--4.6 inches set in 1978.

NWS Taunton said the nor'easter became a severe short-term winter storm affecting both eastern Massachusetts and Rhode Island. "The extreme rapid intensification of low pressure as it moved through Buzzards and Cape Cod bays between 1 PM and 3 PM, then out to sea, created a short-term near-blizzard scene during mid-afternoon like no other in recent memory with damaging wind, whiteout conditions and about an hour of thunderstorms for many within and just east of the Interstate 95 corridor," the weather summary said.

SKYWARN operations at NWS Taunton got under way at 3:30 that afternoon following reports of hurricane-force winds and excessive snowfall rates. "Reports from Cape Cod ARES-SKYWARN told of downed trees, power lines and utility poles," Macedo said. "Minor structural damage to homes was also reported along with coastal flooding."

Amateur Radio SKYWARN spotters on Cape Cod and the Islands reported winds as high as 96 MPH in Eastham--before the wind instrument was struck by a fallen tree. SKYWARN teams measured wind gusts of 50 to 70 MPH elsewhere in Southeastern New England with damage to trees and power lines.

Power outages lasted between 18 and 36 hours over a good portion of Cape Cod and the Islands. At the peak of the storm, 150,000 people were reported without electricity on Cape Cod and the Islands and along Massachusetts' South Shore. Up to 75,000 people remained without power for much of the following day.

The foul weather caused huge traffic delays and dangerous travel conditions during the Friday afternoon commute. But high winds posed the greatest hazard. Because of the hurricane-force winds on Cape Code, Cape Cod ARES activated at the request of the American Red Cross to provide support for Red Cross shelters there. ARES members established communication paths between the Cape Cod Red Cross chapter headquarters in Hyannis and shelters Chatham, Eastham and Brewster through the next morning. In Brewster, cell phone and landline phone coverage was spotty, and Amateur Radio operators provided communication between that shelter and the Red Cross headquarters from late Saturday morning through mid-morning Sunday.

Amateur Radio volunteers handled requests for cots, blankets and food. By the evening of December 10, a temporary base station was set up at the shelter to provide easy communication between the shelter and Red Cross headquarters via the 146.955 repeater in Barnstable.

About a dozen repeaters across Eastern Massachusetts played a role in the operation, including EchoLink and IRLP-linked repeaters and stations through the use of the New England Network.

"The quick-hitting nature of the storm tested the ability of Eastern Massachusetts ARES and SKYWARN to react quickly to a rapidly intensifying winter storm that brought hurricane force winds and near blizzard conditions to the region," Macedo said. "ARES and SKYWARN in Eastern Massachusetts came through by providing timely severe-weather reporting to NWS Taunton for the protection of life and property and support for Cape Cod Red Cross in shelter operations."

The National Weather Service, which included several reports from radio amateurs in its forecast summaries, extended its appreciation to SKYWARN spotters among others.

Contest Calendar and DXpeditions

The information for a DXpedition can be quite detailed and may include bands, dates, number of stations, and times of day they plan to work certain continents so I can not list it all here. But if a country or prefix is of interest you can get more information at www.425dxn.org.

January

14-15	North American QSO Party CW
21-22	UK DX RTTY Contest
	North American QSO Party SSB
21-23	ARRL January VHF Sweepstakes
28-29	CQ 160 Meter Contest CW

February

4-5	Vermont QSO Party
	10-10 Intl Winter QSO Phone
	Mexico Intl RTTY Contest
5-6	Delaware QSO Party
11-12	CQ Worldwide RTTY WPX Contest
18-19	ARRL International DX Contest
24-25	Russian PSK WW Contest
25-26	CW Worldwide 160 Meter SSB
	North American QSO Party

DXpeditions

Call	Location	Until
9V1CW	Singapore	2008
5H3HK	Tanzania	March 2006
T68G	Afghanistan	March 2007
ZD8I	Ascension Is	March 2006

NVARC

Nashoba Valley

Amateur Radio Club

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http://www.n1nc.org/

Meetings are held on the 3rd Thursday of the month - 7:30 p.m. - Pepperell Community Ctr. Talk-in
146.490 simplex
442.900 + 100Hz Repeater
147.345 + 100 Hz Repeater
53.890 – 100Hz Repeater

This newsletter is published monthly. Submissions, corrections and inquiries should be directed to the newsletter editor. Articles and graphics in most IBM-PC formats are OK.

Nashoba Valley Amateur Radio Club

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