July 2009 Volume 7-2009

Nacogdoches Amateur Radio Club

MISSION STATEMENT

The Mission of the Nacogdoches Amateur Radio Club is to support and promote Amateur Radio by public service, offering training to unlicensed interested parties and licensed amateurs, mutual support of other amateurs, engaging events that promote amateur radio to the general public and other amateur radio operators, and continuing fellowship by regularly scheduled organized meetings and events.

JULY MINUTES

The July meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on July 1st. Twenty-seven members and seven guests were present. **President Lon, AE5BN**, opened the meeting at 7:00 p.m. in the Parish Hall of Christ Episcopal Church. Each person present introduced himself. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

Jerry, K5JLW, gave a report on HamCom in Plano.

Lon, AE5BN/R, gave a report on the ARRL VHF contest. Several club members participated in the contest. **Marshall – K5QE**, reported a score of 1,365,000 points, a new high for him. **Andy – KE5EXX/R**, reported that the transmission in his van failed, cutting his contest weekend short.

Army – AE5P, reported on the NARC Field Day.

Bob – K5ME, reported on the Lufkin Field Day.

Andy – KE5EXX, reported on the Field Day at N5YA.

The CQ VHF contest is coming up July 18-19.

Club newsletters back several years have been added to the club web site:
http://www.w5nac.com

Please join me in welcoming our newest member, **Ruth KF5BWY**. Ruth is the daughter of club member **Richard, KE5TCU**.

Meeting was adjourned at 7:35 p.m.

Show and Tell:
K5JLW – pneumatic antenna launcher.

Program:
Mark – W5TXR gave his long anticipated program on effective receiver sensitivity.

HAMMING IT UP

CQ, CQ, CQ this is Alpha Echo Five Bravo November Rover in Echo Mike Two One. Whew, we did the CQ VHF Contest rove and was it a trip. John and I went in my Toyota Highlander and we logged a little over 800 miles that weekend. I thought the bands were terrible and it seemed like a whole lot of folks we normally hear just weren't on the air. I learned a lot this time out. I realize that single loops are good enough to talk to Marshall but aren't quite good enough for everyone else. I need to think about stacked loops for 2m and possibly more power too. I now have a trailer hitch on the Highlander so maybe I can figure out a mast type setup. I was very impressed with the receiver on my Yaesu FT-857D. I believe that this is one heck of a radio for the price you pay. We did use our headphones for almost the whole time. I resisted the idea of wearing them for a long time in the rover but they really help when picking out signals versus the external speaker. I could hear some very faint signals although I couldn't necessarily talk to them. I would like to thank everyone who took the time to talk to us. Every little bit helps. We had a real good time and really enjoyed ourselves.

John and I operated as AE5BN/R and had:
Grids Activated: 12
QSO's 6M: 54
2M: 55
Mults: 84
Claimed score: 13,776.

Army and Jonathon operated as AE5P/R and had:
Grids Activated: 12
QSO's 6M: 56
2M: 66
Mults: 94
Claimed score: 17,672.

Dustin and Amanda operated as K5RNT/R and had:
Grids Activated: 16
QSO's 6M: 33
2M: 97
Mults: 94
Claimed Score: 21,338

Dustin and Amanda did an outstanding job. They deserve a pat on the back for all the hard work they put into getting that high a score. I believe that will be a new record in our region.

See you all at the meeting.

73, this is AE5BN Lon.

email: ae5bn@arrl.net

VP's CORNER

The next meeting of the Nacogdoches Amateur Club is on Wednesday, August 5, at 7:00 p.m. at Christ's Episcopal Church. Marshall Williams, K5QE, has the program for the meeting. He will talk about building a 6-meter antenna. The 6-meter band has been open several times over the past few weeks, so consider getting on. I have worked several stations that were only running about 10 watts. When the 'Magic Band' is open it doesn't take a lot of power.

If you have 'Show and Tell' items, please bring them to the meeting. Folks are always interested in what is new around the club.

See you at the meeting!

73, Tom W5TV

email: w5tv@arrl.net

VE TESTING

Our next VE testing is scheduled for Wednesday, August 19th at 7:00 p.m. in the Parish Hall of Christ Episcopal Church. Applicants should bring a picture ID, the original and a copy of their current Amateur license, the original of any CSCE's and $15 to cover the cost of the exam(s). Correct change is always very much appreciated. 73 de AE5P

email: ae5p@arrl.net

CLUB NETS

Remember to join us each week for the 2-meter nets sponsored by NARC. Each MONDAY is the NARC ARES/RACES net, at 8:00 p.m. on the club's 146.84 repeater (PL 141.3). Second, on THURSDAY evenings at 8:00 p.m. is the Deep East Texas Skywarn Net on the 147.32 repeater (PL 141.3). Please join us for one or both. We are always looking for folks who would like to become net control operators. If you are interested, please contact any of the existing net controls. We will be pleased to help you in any way we can.

NEXT MEETING

The next meeting will be on Wednesday August 5th at 7:00 p.m. in the Parish Hall of Christ Episcopal Church. The church is at the corner of Starr and Mound Streets in Nacogdoches. If you have items for show and tell, please bring them. Hope to see y'all there.

BASIC ANTENNAS PART 9

by

Thomas Atchison W5TV

The energy supplied to an antenna is dissipated in the form of radio wave radiation and in heat losses in the wire and near-by dielectrics. We consider the radiated energy as the useful part. The more radiated energy

we have the more efficient the antenna is considered to be. As we supply power to the antenna it is dissipated in an amount given by the formula

$$P = I^2(R_0 + R) \qquad (1)$$

where I is the current in the antenna, R_0 is the radiation resistance, and R is the ohmic resistance.

The radiation resistance is basically the 'load' resistance at the feed point of an antenna. It is determined by the geometry of the antenna, not by the materials of which it is made. Two major factors that affect radiation resistance are 1) the location of the antenna with respect to other objects, particularly the earth, and 2) the length/diameter ratio of the material used. It can be thought of as the equivalent resistance to a resistor in the same circuit. For a center fed resonant dipole in free-space and made of infinitely thin wire, the radiation resistance is about 73 ohms. This is, of course, an idealized antenna. For most practical wire dipoles the radiation resistance is about 65 ohms.

The ohmic resistance for an antenna is the resistance that is inherent in the materials used to construct the antenna. Power is dissipated in the form of heat due to ohmic resistance.

The efficiency of an antenna is measured by taking the ratio of the power radiated from the antenna to the total power in the system. The power radiated is given by

$$P_{rad} = I^2 R_0 \qquad (2)$$

where R_0 is the radiation resistance of the antenna.

The total power in the system is given by formula (1) above. Therefore, the efficiency is given by

$$Eff = \frac{P_{rad}}{P} = \frac{I^2 R_0}{I^2 (R_0 + R)}.$$

This results in the formula

$$Eff = \frac{R_0}{R_0 + R}.$$

For example if we have a radiation resistance of 65 ohms and an ohmic resistance of 5 ohms, the efficiency is

$$\frac{65}{65+5} = 0.93$$

or 93%. Most of our power is being radiated from the antenna.

Now let's return to a quarter wave vertical antenna whose bottom end is near the ground but insulated from it. In order to get the kind of radiation pattern we described in Part 8, we need to be over a good ground system. The ideal grounding system for a vertical antenna would consist of about 120 wires, each at least a half-wavelength long, extending radially from the base of the antenna and equally spaced around a circle. A system like that would be the practical equivalent of a perfectly conducting ground and it has negligible ground

resistance. This is not a very practical system for an amateur in most cases. The ground resistance increases rapidly when the number of radials is reduced. What effect does this increased ground resistance have on the vertical antenna?

As we mentioned above, the efficiency of an antenna is measured by taking the ratio of the radiation resistance to the total resistance. The total resistance includes the radiation resistance, resistance in conductors and dielectrics, and the resistance of the grounding system. The latter is usually called the ground resistance. The radiation resistance of a vertical antenna that is fed at the base of the antenna may be on the order of 10 ohms or less.
If the radiation resistance is 10 ohms and the ground resistance is 20 ohms then the efficiency is 33%. This is not an unusual situation for a vertical antenna with a small number of radials.

It has also been found that as the number of radials is reduced the length required for optimum results with a particular number of radials decreases. That is, if only a small number of radials can be used there is no need in extending them out a half wavelength.

In general, a large number of radials of shorter length are better than a few long radials.

The measurement of ground resistance of a vertical antenna at a particular frequency is very difficult. The power loss in the ground depends on the concentration of current near the base of the antenna, and this depends on the antenna height. Typical values of ground resistance for a small radial system, say 15 or less, have been measured to be from 5 ohms to 30 ohms. These relate to antenna heights from 1/16 to $\frac{1}{4}$ wavelength. Note that even a ground resistance of 5 ohms results in efficiency of only 66% for the vertical we discussed above.