The Lazy H antenna doesn't fall down on the job even though it's horizontal. N4PC reminds us that it's easy to build, fun to use, and boasts some respectable gain.

The Lazy H Antenna Packs A Punch

BY PAUL CARR*, N4PC

Here's the news from 97 West Point Road, Jacksonville, Alabama. After 25 years as an elementary school teacher, my XYL retired. The redecorating bug has bitten. The most recent focus of her efforts was the family den.

I have a small commercial mobile rig that occupies a space on the bookcase adjacent to my reclining chair. I must admit that the installation was not as neat as it might have been, so I took it upon myself to "clean up the mess" in my corner of the den. I restricted myself to only one antenna to satisfy my casual operating desires at this location. This gave me

*97 West Point Road, Jacksonville, AL 36265

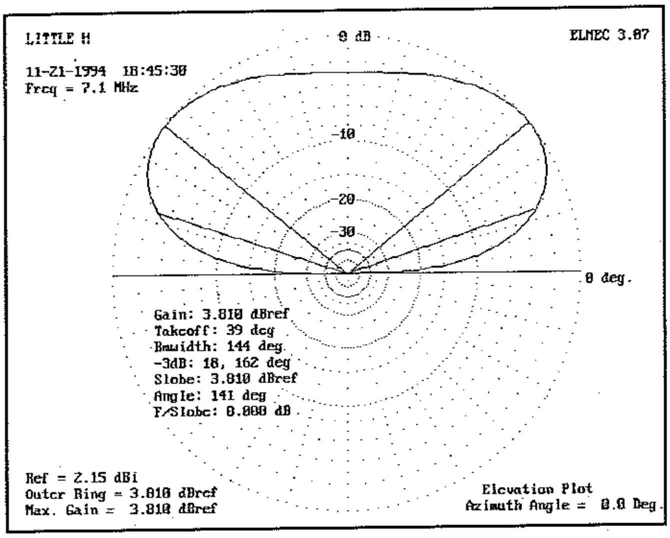

Fig. 1(A)– The 40 meter vertical pattern.

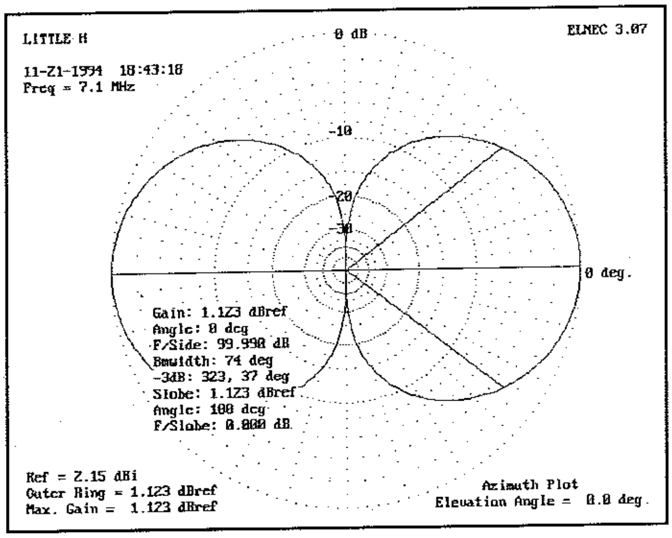

Fig. 1(B)– The 40 meter horizontal pattern.

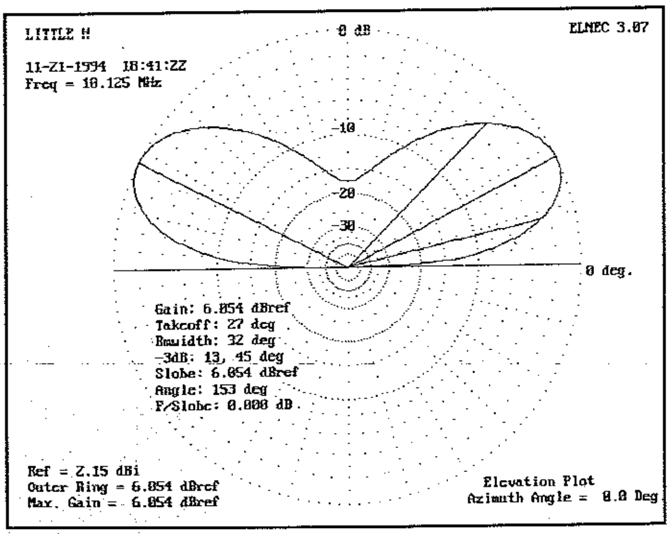

Fig. 2(A)– The 30 meter vertical pattern.

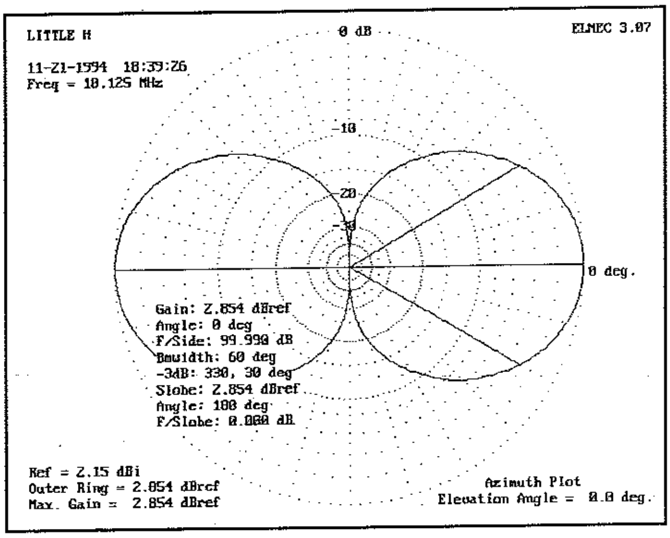

Fig. 2(B)– The 30 meter horizontal pattern.

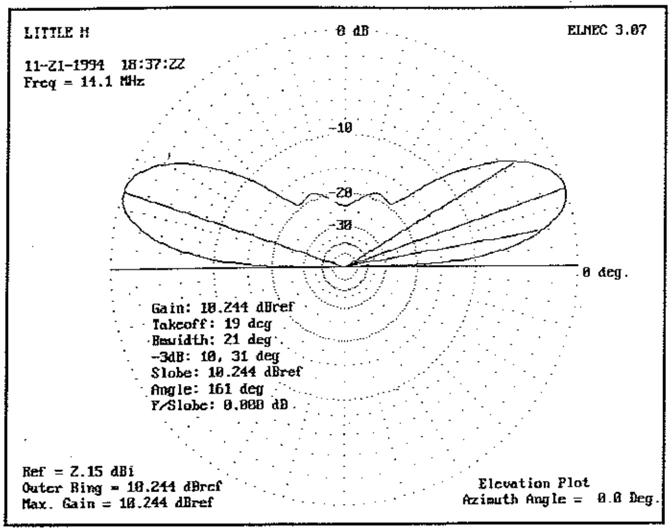

Fig. 3(A)– The 20 meter vertical pattern.

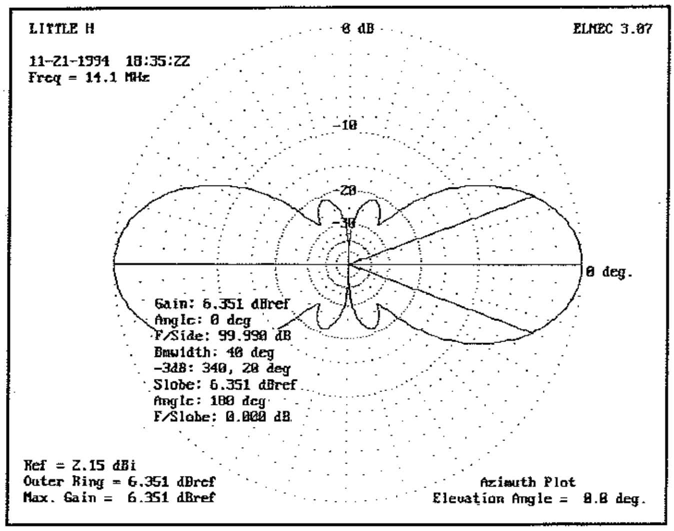

Fig. 3(B)– The 20 meter horizontal pattern.

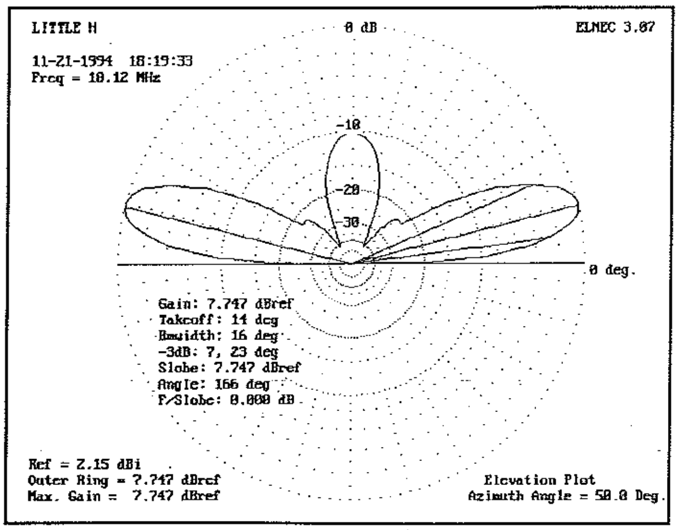

Fig. 4(A)– The 17 meter vertical pattern.

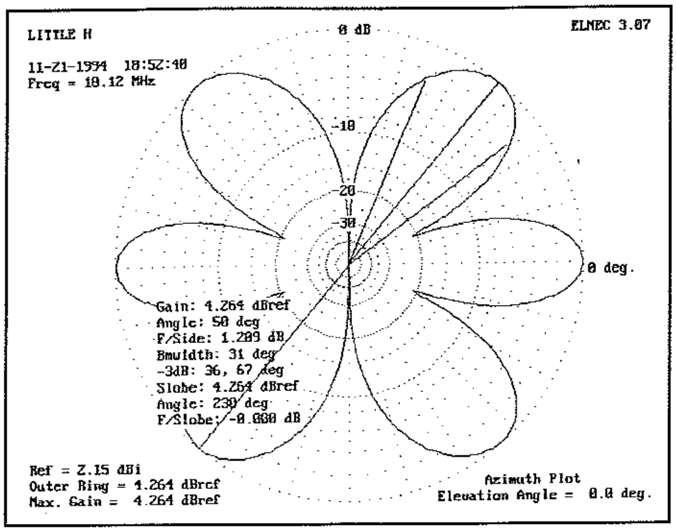

Fig. 4(B)– The 17 meter horizontal pattern.

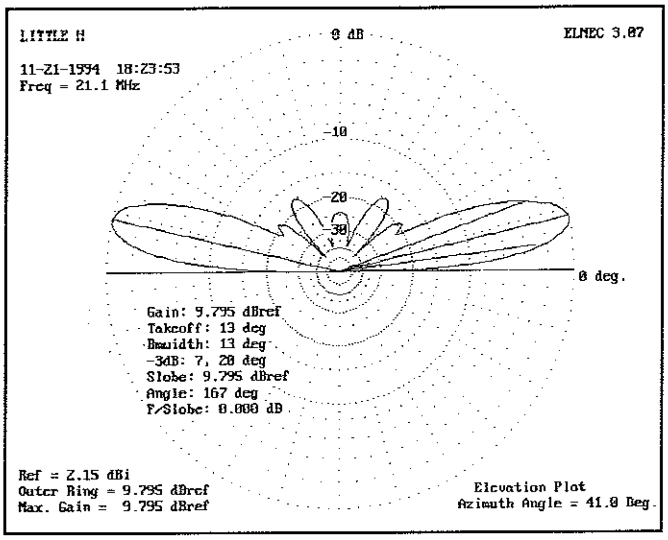

Fig. 5(A)– The 15 meter vertical pattern.

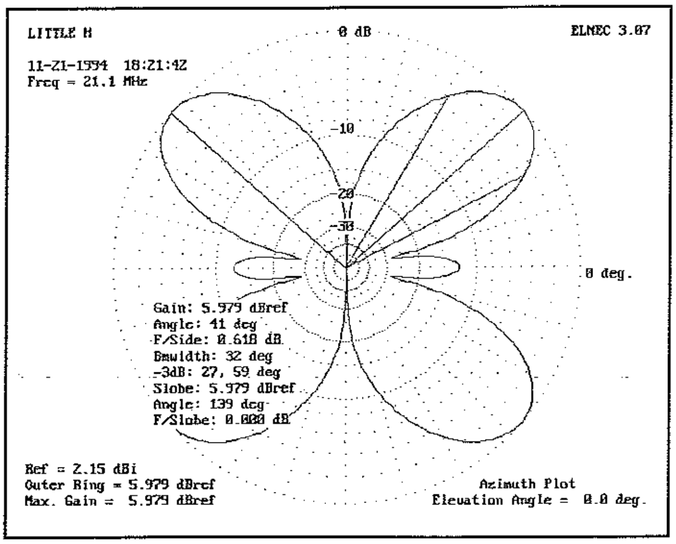

Fig. 5(B)– The 15 meter horizontal pattern.

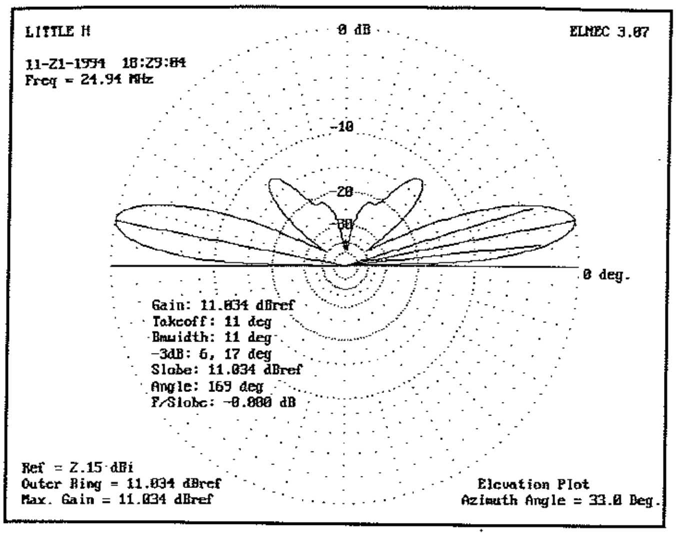

Fig. 6(A)– The 12 meter vertical pattern.

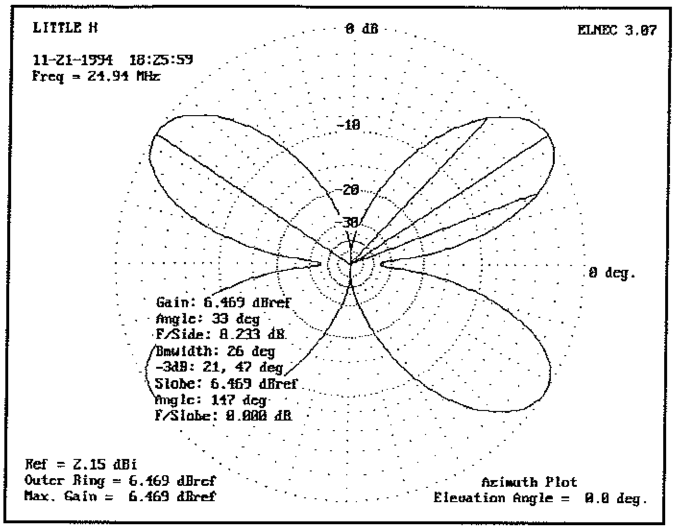

Fig. 6(B)– The 12 meter horizontal pattern.

the opportunity to design another antenna and make the installation domestically acceptable. Here then is the result of that effort.

Why A Lazy H?

Let me take a moment for a bit of antenna theory. The Lazy H is a member of the dipole family of antennas. The most widely known antenna in this family is the half-wave dipole. This antenna produces the familiar "figure 8" pattern. This basic pattern is maintained until the length of the antenna exceeds one wavelength, at which point the pattern begins to produce side lobes.

We can use this fact to sculptor the radiation pattern to suit our needs. If we put two dipoles into a properly phased array, we can attain good gain and maintain the desired pattern. This is the basic philosophy I used for the antenna described here.

Antenna Patterns

Let me give you a few specifics about the parameters used in generating the antenna patterns. The top wire was modeled at 60 feet above average ground, and the bottom wire was 33 feet below at a height of 27 feet. The wires were 78.5 feet with both wires fed in phase. The horizontal patterns were generated in free space, and the vertical patterns used the real ground option. This gives us a fairly realistic gain figure that we can discuss, and an anticipated vertical launch angle. I used Roy Lewallen's ELNEC analysis program. The wires are routed from top to bottom on each pattern (see figs. 1– 7).

My favorite band of operation from my auxiliary location is 17 meters. I wanted an antenna with multiple lobes that would produce gain in the desired directions. The antenna described here has six lobes and produces a predicted free-space gain of about 4 dBd. That was the primary goal, and it was readily attained.

The spacing of 33 feet between the radiating conductors was chosen to take advantage of the gain available in this configuration. For 20 meters the estimated gain over a dipole in free space is better than 6 dBd. There are some multi-element beams that can't claim this figure. From the on-the-air tests, I have no reason to doubt this computer estimate.

I have generated patterns for the antenna from 40 through 10 meters. In the interest of brevity, I will allow you to make your own evaluation.

Construction Details

Construction of the antenna is very simple. Here's how to proceed.

Start by cutting two pieces of wire to a length of 78.5 feet. Next fold each wire back on itself and cut them again. You

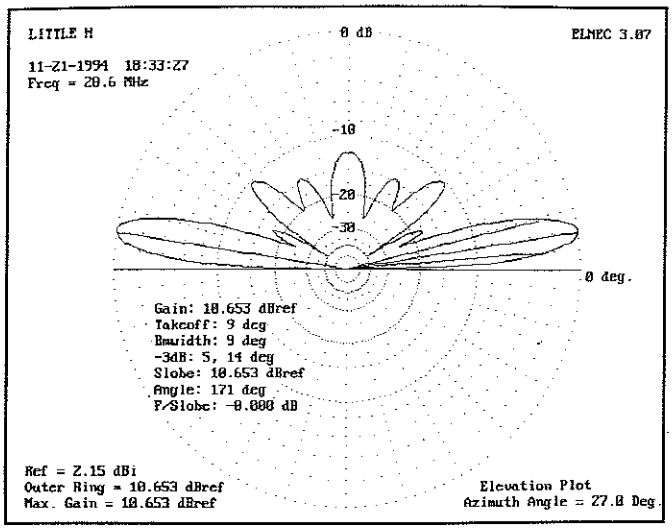

Fig. 7(A)– The 10 meter vertical pattern.

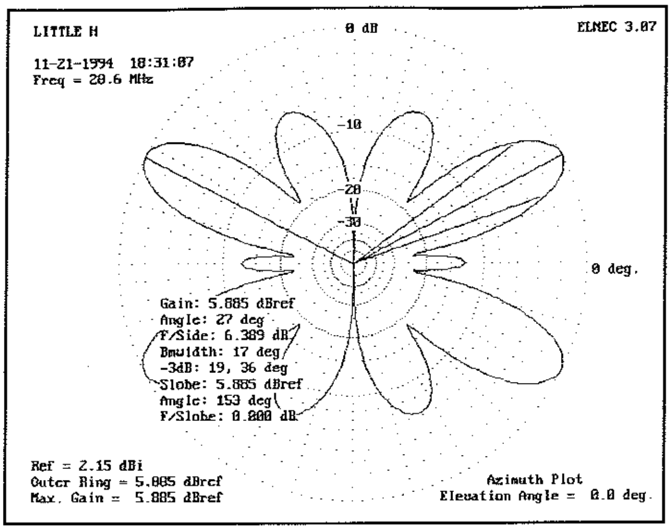

Fig. 7(B)– The 10 meter horizontal pattern.

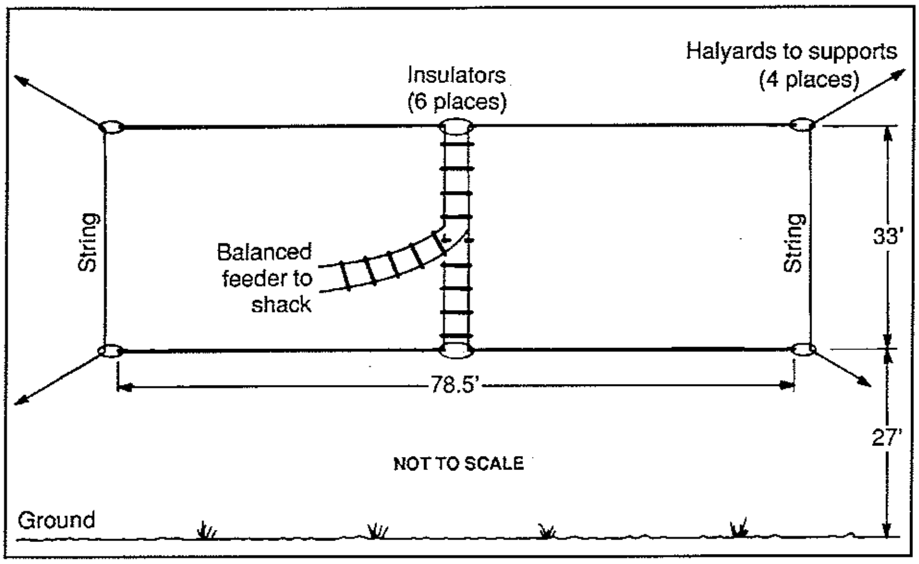

Fig. 8– Construction details of the Lazy H antenna.

now have four pieces of wire approximately 39 feet in length. These will become the two dipoles for the array. Place an insulator in the middle and at each end of the dipole element. Make a second dipole identical to the first.

Now cut 33 feet of balanced transmission line to use as the phasing harness. (I used 450 ohm insulated ladder line, but any balanced feed line that will handle the power will suffice.) Fold the balanced line back on itself to locate the center and remove the insulation if necessary. This will be the feedline attachment point. Lay the phasing line flat on the ground and solder it to wire extending to the center insulator just as if you were building a dipole element. To verify that everything is okay, take an ohmmeter and check continuity at the ends of the dipole elements. The ends of the antenna that will be on the same side of the array should show a very low resistance. Remember, the top and bottom elements must be in phase for the antenna to work properly.

We are almost finished. Connect a balanced feedline to the center of the phasing harness. Cut two pieces of nylon string to a length of 33 feet each. Tie these strings to the end insulators to ensure proper spacing when the antenna is in the air. Inspect all work. Verify that the phasing is proper and all soldered connections are well made. Check to see that the strings are tied properly. Make any corrections that are necessary. The antenna is ready to go into the air.

Antenna Placement

I am sure that you have your own favorite way of getting a wire into the air. For your consideration, here's the way that I accomplish the task. I use a sling-shot and a lead weight attached to the end of a monofilament line from a fishing reel. I fire the lead weight over the chosen branch of the support tree. I use the fishing line to pull a length of builder's twine across the branch. Then I attach a halyard to the builder's twine and pull the halyard across the branch. The halyard can then be used to pull the end of the antenna into its final position.

One word of caution: Be sure to have halyards attached to the ends of the bottom dipoles before you hoist the antenna into final position. This will be necessary for proper tension of the antenna array. When using a sling-shot, use caution. Remember, these devices can be very dangerous weapons. **SAFETY FIRST!** Route the end of the feedline to your operating position and attach to the balanced input of your transmatch. Now you are ready for the initial test.

On-The-Air Results

I have been very pleased with the antenna since its installation. It loads smoothly on all bands from 40 through 10 meters. I took special care to verify the predicted lobes on 17 meters, and they seem to be just as predicted by the antenna analysis program. Please remember the orientation of the lobes when choosing your support structures. I have my antenna placed in a north-south orientation and that seems to be ideal for my part of the world.

Afterthoughts

Although the Lazy H antenna has been around for many years, you may not be familiar with its characteristics. Some of the good points about the antenna: it's easy to build, it's inexpensive, it works well, and it can easily be tailored to fit specific needs. This may be just the antenna you have been looking for. ■