

Trees as Antennas

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The article in the November 2002 issue of Inspire entitled, "A Natural VLF Antenna" by Shawn Korgan reminded me of some experimenting with the idea that I did in the mid 70's. What sparked the interest in the idea was the work that was done by the U.S. Army during the Vietnam War. I still have four of the reports that were published on the topic. The reports were released to the public from the United States Army Electronics Command (ECOM), and are listed below.

1. "The Effects of Foliation on Transmission from a Toroid-coupled Tree", ECOM Report No. 3473, September 1971
2. "Signal Propagation at 400 kHz using an Oak Tree with a HEMAC as an Antenna", ECOM Report No. 3504, November 1971
3. "Performance of Trees as Radio Antennas in Tropical Jungle Forests", ECOM Report No. 3534, February 1972
4. "Utilization as RF-Antennas of Live and of Lifeless Structures in Natural and in Man Made Jungles", ECOM Report No. 4133, June 1973

It is worth noting that the Army found that the trees seemed to be less sensitive to static than a vertical whip, so the signal to noise ratio might be favorable even if the signal was not higher amplitude. Also, Report #4 above concluded that a lifeless structure (telephone pole for instance) was generally superior in signal level to a live tree or the military whip antenna. Most of us would probably never have thought to try a pole.

If you want to experiment with these structures, for use say on the ham bands, you might plan on putting some effort into some sort of matching network. The Army used a toroid wrapped around the tree with some success. This technique is worth trying if you want to transmit from the tree. If you just want to receive VLF, the problem should not be quite so difficult. The tree or telephone pole looks like a pure reactance at low frequencies so don't worry about matching to the normal 50 ohm impedance. For receive you might try a movable tap (move the nail up and down the tree) and a differential capacitor network coupling the tree to a very high impedance receiver, like the VLF-3. Be careful that you do not drive a copper or copper plated nail into a tree and leave it there, it may kill your tree. A stainless screw about 3 inches long would be a better choice. As I recall, that sort of configuration seemed to work quite well. I used a tunable Krohnite high pass/low pass filter and a good preamp designed for piezoelectric phono cartridges as a VLF receiver with some success. I would combine any system with the grounding advice given by Shawn Korgan. I hope anyone who tries trees and poles will report what they did and the results they got to the group. As I recall, there were more reports on this topic issued by ECOM. Does anyone have them?