The Radio Hotel– Diversity–A Deployable Advantage

By Rick Hiller -- W5RH

Getting the most contacts out of your Ham radio station is, typically, the main "fun" reason we got into this hobby in the first place. Our stations start out simple and then we build them up until they are a complex meld of technology, innovative ideas and sweat (especially here in Houston). Some improvements to the station are expensive, some are quite time consuming and others might be both. We really enjoy those improvements that are simple and that give us options. In the area of HF propagation, we are given many opportunities to exercise our options.

Some HF signals reflected by the ionosphere come in at a high angle, some (DX mostly) come in at a low angle, some with horizontal polarization, some with vertical polarization and some with ever-changing polarization, which leads to selective fading. We need to be able to receive them all for a better chance to improve our QSO rate/count. So, what is best to cope with these varying challenges? **Diversity.** Essentially, diversity means being ready for anything. High, low, vertical or horizontal. But how?

There are different types of diversity used – space, time, frequency, polarization, etc. Early commercial HF stations (RCA at Riverhead, NY, for example) used a multiple "Wave" antenna system designed by Drs. Beverage and Hansel. All antennas ran parallel, but they were separated by some distance. Each antenna was connected to a separate, custom receiver and the receiver outputs were combined to form a cohesive, coherent final audio output to the receiving operator.

Most Hams don't have the space for even one "Wave" antenna, let alone a half dozen, so Hams fall back to polarization diversity or even short space diversity. Listening on an 80 meter horizontal loop, for example, and also being able to switch to a vertical of some sort is one option. Or, receiving on a 40 meter vertical and being able to switch to a 20 meter dipole during fading periods. Yes, the 20 meter antenna is very reactive on 40 meters, and the signal strength (and noise) will be lower in amplitude but by doing so it could improve the signal to noise ratio (s/n) on a very noisy 40 meter band and that's just what it might take to receive the intelligence. That "pre-amp" button on your xcvr could bring those signals back up to normal listening level, but the s/n remains at the same ratio, so reception is maintained.

Ron, K5HM, gave me the low down on the Elecraft K3 and its' built in capability to take advantage of its' 2 independent receivers, each running on a different antenna and the two processed receiver outputs being delivered to the stereo-type headset being either 1) kept separate left and right or 2) combined into a mono left plus right. So the operator has multiple combinations of antennas, receivers, audio chains, etc. to get the best reception out of the system. This could also be accomplished by using 2 separate transceivers with audio mixed into a stereo headset – left and right channels.

I have always touted the benefits of 2 antennas, with each covering the same bands or overlapping on as many bands as possible. Being able to switch back and forth is an advantage. Maybe the signals are not stronger, but as stated above, the noise may be reduced substantially and the S/N ratio is improved. Some options for that second antenna are a TTFD (or other aperiodic array), a multiband vertical or a doublet with tuned feeders, etc. On receive the impedance match of the antenna system to the receiver is not as critical as it is on the transmitting side of things, so just throwing the switch to receive on another antenna might just do the trick.

Diversity might not work 100% of the time, but if it helps you make a few more contacts then it is well worth the effort; especially if it simply entails using an alternate antenna for receive. Look at **QST July 1994 - page 81** or **Ham Radio Magazine November 1979** for an in depth article on the subject.

Enjoy your hobby. GL ES 73 DE W5RH

Next time…. Inside those Tri-band, Yagi-Uda Traps

The purpose of ***The Radio Hotel*** *is to give you a practical kickstart into exploring the workings of antenna systems Google the buzz words and find out what they mean. Read up on antenna system theory to see how it all works together. You will be glad you did.*