WB8IMY

ECLECTIC TECHNOLOGY

Your Own D-STAR "Hot Spot"

To get the most out of D-STAR, you need more than a transceiver. You need a D-STAR repeater to spread your signal throughout the local area and potentially link you into the global D-STAR network. The ability to connect to the network is particularly attractive because it allows you to talk to distant D-STAR users, even those on the other side of the world, with nothing more than a D-STAR handheld such as the ICOM IC-92AD.

A D-STAR repeater is an expensive proposition, though. Unless someone happens to be flush with cash, it usually requires a group effort to gather the necessary funding and set up the system. So until you or your friends put a D-STAR machine on the air, you're locked out of the network, right?

Not necessarily.

Thanks to the folks who run the W9ARP repeater system Web site in Lafayette, Indiana (**http://w9arp.com**), I've become aware of an innovative alternative — a D-STAR *hot spot*. A hot spot is not a D-STAR repeater. Instead, it behaves more like a simplex node familiar to users of EchoLink and IRLP.

See Figure 1. A D-STAR hot spot consists of a 2 meter or 70 cm analog FM transceiver with 9600 baud data capability (there are lots of these rigs available at affordable prices), a *Windows* PC running the hot spot software and an Internet connection. The heart of the hot spot is a GMSK node adapter designed by Satoshi Yasuda, 7M3TJZ. The adapter is strictly a homebrew project; Satoshi is selling the PC boards at his Web site at **http://d-star.dyndns.org/rig.html.en**, but the builder has to source the parts. The hot spot software, along with a lot of helpful setup information, is available by joining the free GMSK node adapter group on Yahoo at **http://groups.yahoo.com/group/gmsk_dv_node/**.

With the hot spot up and running, the digital transmissions from your D-STAR radio will be received by the analog FM rig, decoded and passed to the D-STAR network via the Internet. Anything coming back from the network will be transmitted to your D-STAR radio as a data stream from the analog radio. You'll be able to listen to, and talk on, any D-STAR repeater that's connected to the Internet and running *DPlus* software (quite a few systems are configured this way).

With the analog FM transceiver connected to a decent antenna, your simplex hot spot should be capable of good local coverage. This is hardly a replacement for a D-STAR repeater, but it is a useful substitute until one shows up in your area.

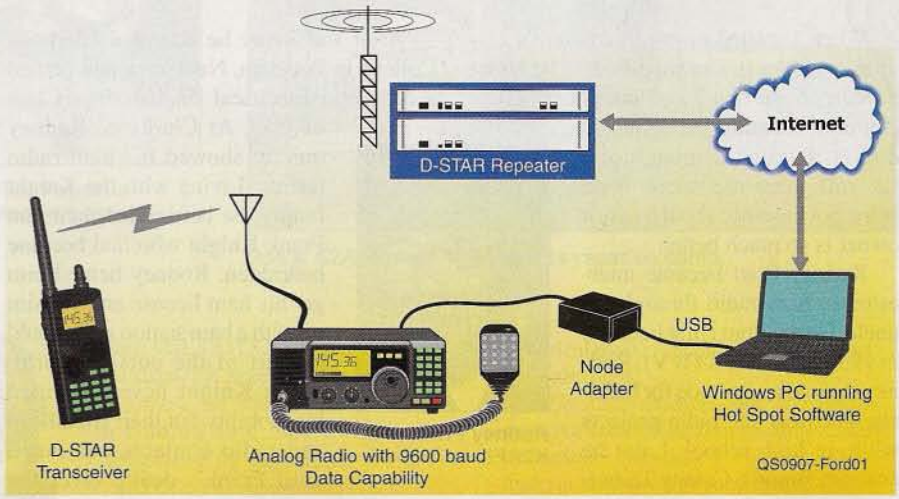

Figure 1 — A D-STAR hot spot consists of an analog FM transceiver with 9600 baud data capability, a *Windows* PC running the hot spot software and an Internet connection. Thanks to the hot spot, the digital transmissions from your D-STAR radio will be received by the analog FM rig, decoded and passed to the D-STAR network via the Internet.

Twisted Radio Waves

Some portions of the RF spectrum are becoming crowded, and spectrum being the finite resource that it is, scientists and engineers are always looking for ways to squeeze more juice from the orange, so to speak.

Physicist Thomas Leyser at the Institute of Space Physics in Uppsala, Sweden, thinks he has discovered a method of transmission that can carry more digital information than is currently possible. The secret involves the creation of *twisted* radio beams.

Leyser and his co-workers created their first twisted radio beams at the High Frequency Active Aural Research Project (HAARP) facility in Alaska. They journeyed to HAARP because they needed to use its array of 360 separate antennas. They created the so-called "twisted" signal by firing the HAARP antennas in a staggered time sequence in a circular pattern instead of having all of them transmit the same signal at once. The time delay effectively rippled around the array so that the beam emerged as a helical wave front.

To confirm that the radio beam had this characteristic shape, the team studied the effects it had on the ionosphere above the array. "The twisted beams excited plasma turbulence in the ionosphere that was consistent with the ring-shaped beams and different from that excited by regular beams," Leyser said.

The twists remain coherent across vast distances and can store digital information encoded into the pitch of the twist. What's not yet clear is how much extra information can be transmitted using twisted beams. In theory, huge amounts of data could be sent, according to Leyser.

This might be an interesting subject for Amateur Radio research. Leyser says, for example, that a set of three dipoles on, say, 70 cm could be sequenced to create a twisted beam for high density data transmissions between fixed points. QST

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