

HOTERA Update  
March 1, 2011

We've made a number of changes in HOTERA's equipment and operations since last Fall. In one way or another, they've affected every user of the system. Lloyd, K1LGJ, and I have also experimented with the 23cm DV and DD systems, and there are some interesting findings to report on from this area.

### Hardware Changes

We have made several changes in the hardware. Both of the original hard drives in the Gateway computer failed over the summer, probably because of the extreme heat in the building. The RAID configuration was replaced with a single, 30GB solid-state drive. This may not sound like a lot of storage, but at the time we were using less than 10GB of the 80GB rotating drives. Like most solid-state drives, the new one is rated for operation at up to 70°C, which gives us more than enough headroom to deal with summertime temperatures in the equipment building.

To ensure that we could restore the system quickly if the solid-state drive failed, Lloyd began doing regular image backups of the system drive from his home in Georgetown. This is tricky because it was necessary to shut down the Gateway software during the backup. If anything went wrong, he would have to go to the repeater site to re-start the Gateway.

Eventually, we decided to install a second drive in the Gateway computer. This would be used only for weekly image backups. To satisfy ourselves that this would work, we temporarily used a 70GB, 2½-inch USB drive. When this proved workable, we replaced the small drive with a second solid-state drive. This was installed as a serial ATA (SATA) device, and we quickly found problems doing an image backup to it. At this time, we're considering alternatives such as installing a separate SATA interface for the second drive or converting it to a USB device. If you're interested in knowing how this plays out (or in helping with the project), contact me or Lloyd...or wait for the next HOTERA update.

### 23cm DV and DD Tests

HOTERA has purchased an ID-1 transceiver for experiments with the 23cm DV and DD ports. (We also purchased a Comet 16-element yagi and thirty feet of LMR-400 coax, with N-connectors.) We borrowed additional ID-1s from two generous hams in the area, so that Lloyd could work out protocols for radio-to-radio communication, while I experimented with communication through the repeater.

There were several surprises here. The first was the excellent range we achieved with the 1.2 GHz radios. The high-gain, yagi antenna I used had to be accurately pointed at the repeater. Five or ten degrees of azimuthal error meant no access at a 15 mile range. Lloyd used a tri-band vertical and saw high signal strengths at his Sun City QTH, which is about 10 miles from Walburg. Most important, Steve, NU5D, in Temple, was able to use the DV repeater with moderate signal strengths from the Temple airport. His tests involved a 25-mile path.

Experiments with the 23cm DD (Internet/data) repeater produced even more interesting

results. Although ICOM advertises that the DD data rate is 128 kbps, we never saw speeds above 70 kbps. Of course, this is on par with a single ISDN telephone line, which was considered "fast" ten years ago, but it's slow by today's standards. Nevertheless, we were able to upload emails and pictures and download data from Web sites at acceptable rates. During emergencies, when we'll need to transmit health and welfare messages and read weather maps, the speed will be adequate.

The D-Star DD capability begs for comparisons with wireless data services which are being tried in Austin and other cities. One way to look at it: If every critical location in Williamson and Bell county were within a few miles or line-of-sight of most of the others, low-power, wireless routers would be adequate, and data speeds might be higher. Our rural counties present a different problem, though, because town-to-town distances are much greater than they are in Austin or its close-in suburbs. Being able to establish high-speed data paths over 20 to 30 mile paths could be very important during an emergency in which commercial wired and wireless services became overloaded or failed completely.

A lot of work remains to be done with the DD equipment, though. We have shown that radio-to-radio and radio-to-repeater-to-Internet connections are easy to establish. In the future, we'll set up equipment and record antenna headings and data quality at many of the EOCs in Williamson and Bell counties. We'll experiment with data repeaters and coordinating multiple-radio sessions on the Internet. We'd also like to answer questions about repeater-to-repeater links which would ensure Internet access in the event that the Internet connection at a critical repeater should fail.

We have assembled equipment for testing an email server at the Walburg repeater. This would store messages during an Internet outage and allow users to download emails from an emergency site and re-transmit them from unaffected areas. We have already shown, by the way, that emails can be sent and received on the 2m and 70cm systems using D-RATS software and servers. Could emails and data sent to a Walburg email server be received on 2 meters (at a much slower data rate) and forwarded to another repeater using a PC and Dongle? The tests will tell us.

### Other Ideas

To my knowledge, DVAPs haven't been tried in Williamson county. We have a number of Dongle users, but I doubt that many of them know how to marry data and voice services through their Dongles.

Many of us have a lot to learn about programming our radios. Lloyd and I are working on a list of repeaters and special functions which would could be installed in our radios to give access to all of the D-Star repeaters in central Texas. The list will enable a user to store their voice on the repeater and hear it re-transmitted after the the PTT button is released. It will enable them to temporarily link KE5RCS to other reflectors and automatically return the repeater to the default reflector after a short delay.

Speaking of reflectors...we have moved the 4B reflector to the "C" repeater (2 meters), and we've permanently linked the "B" repeater (70cm) to the 1A reflector. The latter has meant that there is really no time of the day when you can't have a QSO on the "B" machine. A number of European repeaters use this reflector too, so international chats with other English-

speakers are easy to find.

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