D-RATS — an Application Suite for D-STAR

Make D-STAR meet your needs with text chatting, file sharing and other applications.

Dan Smith, KK7DS

Anyone who has already taken the plunge into using the digital audio and data D-STAR system has probably heard of *d*Chat*.[1,2] This application, by Brian Roode, NJ6N, provides keyboard-to-keyboard chat over the low speed data channel of a D-STAR radio. While text chat is a critical function, additional features such as file transfers and structured data transport would make the digital radios even more useful. For these reasons, as well as the desire to have something that works on other platforms, I was motivated to create *D-RATS*.

[1]Notes appear on page 35.

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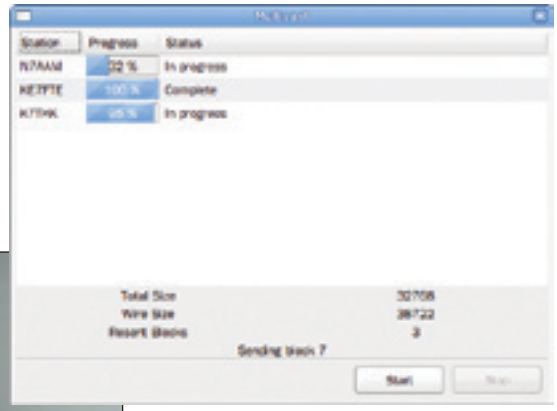

Figure 2 — Multicast file transfer status report.

D-STAR Put to the Test

In December 2007 Oregon's northwest coast and coastal mountain range experienced major flooding. Conventional communication systems were interrupted for up to seven days in many areas. The Amateur Radio Emergency Service (ARES) was immediately activated and was the primary source of communications, handling emergency traffic for both 911 centers and the American Red Cross. It was this quick and determined response that earned the Governor's praise for ham radio operators as the "unsung heroes" of the disaster.

The small coastal mountain range community of Vernonia was hit particularly hard during this event — it received over 15 inches of rain in a very short period of time. Massive flooding followed. Washington County was the closest county to the affected areas and its ARES organization provided much of the communications assistance. Multnomah and Clackamas Counties also provided service.

At this time D-STAR is still new to the Washington County ARES group. Some members have already purchased radios and the local governmental agencies are also beginning to buy equipment. There was no D-STAR repeater at the time (although one has since been ordered by the Washington County Sheriff's Office), so simplex was the only option.

Once the event had stabilized, Washington County ARES had the opportunity to test the available D-STAR equipment. They used *d*Chat* to send small bits of text from the Vernonia Emergency Operations Center (EOC) to the Red Cross Shelter, about two miles away. In one test, digital signals were successfully transmitted from Vernonia to the Washington County community of Aloha, approximately 17 miles away.

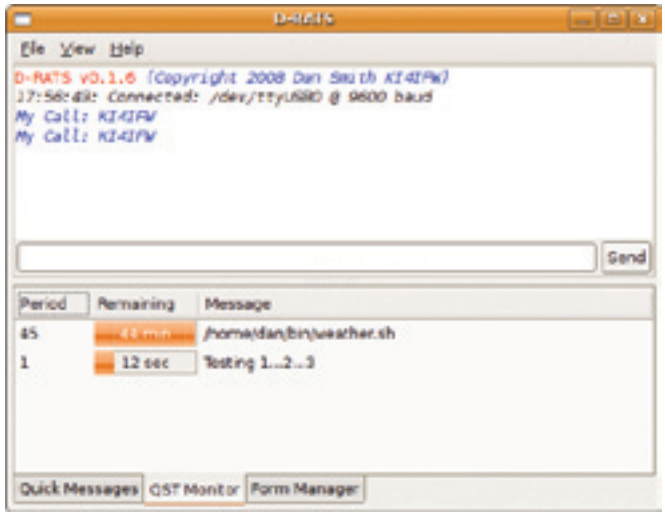

Figure 1 — Main *D-RATS* window showing multiple QSTs.

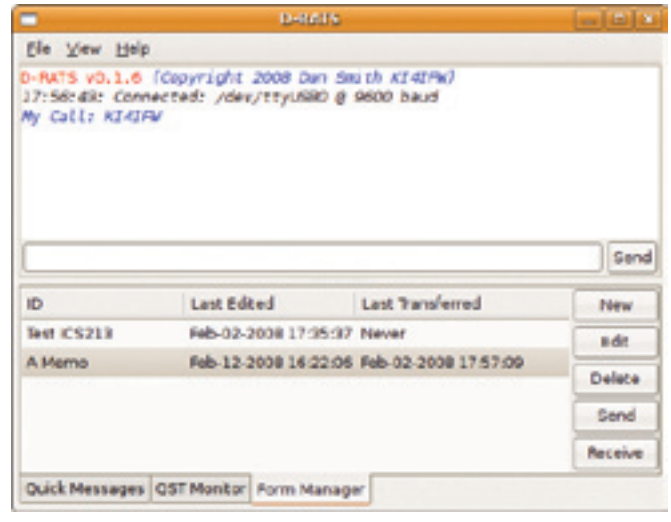

Figure 3 — *D-RATS* form manager makes filling out forms easy.

From September 2008 QST © ARRL

Figure 4 — An ISC-213 form ready to be filled out for transmission over *D-RATS*.

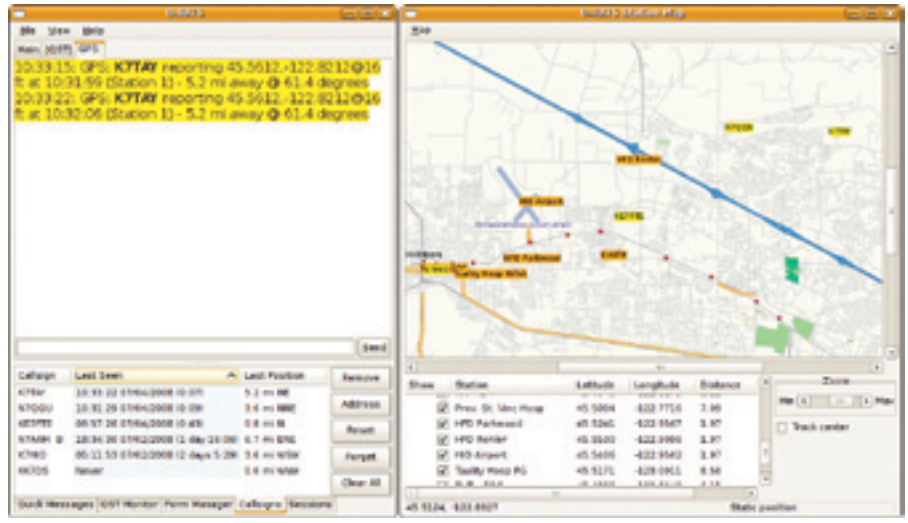

Figure 5 — The integrated GPS and mapping feature.

Text is Great, but Files are Important Too

The ability to send files during this event would have meant that the hams could have sent spreadsheets and other agency-provided data much more quickly. Larger volumes of traffic could have been collected and organized into a file in any format and transmitted with greater precision and speed between locations. While this is possible with terminal programs that support Kermit (or similar protocols), *d*Chat* is the only tool they had available and had been trained to use.

D-RATS Fills the Gap

D-RATS was created to provide a cross platform base for many of the additional features that *d*Chat* was lacking. The first major goal was to implement file transfer capabilities into the application itself, as well as improve upon some of the features that *d*Chat* already supported. Some of these improvements include allowing multiple automatic *all call* or QST messages at varying schedules, and creating an unlimited number of preset or canned messages (*d*Chat* supports only seven). As soon as the ability to have multiple QSTs defined was available (see Figure 1), it quickly became apparent that some indication of when the next QST was to be sent would be important. D-RATS has a display panel showing each of the QSTs with a countdown progress bar showing the time remaining until the next broadcast (see Figure 2).

As more local people started sending regular QSTs, it became clear that the message display was reaching a point at which it became difficult to determine which of the messages were important. *D-RATS* supports *dimming* and *highlighting* of certain messages based on a search string to help improve readability (see Figure 3). Additionally, traffic can be split off into tabs to keep it separate from the rest. This can be useful to keep automatic beacon messages out of view, or to pull important messages (such as from a net control station) into a dedicated screen.

File transfers are, of course, one of the major features of *D-RATS*, and have been improving steadily since the beginning. However, one of the very important points that attracts a lot of attention is the structured data or *form* support. Almost every organization has one or more standardized formats for sending specific types of information. There are NTS forms and Red Cross forms, as examples. *D-RATS* allows you to recreate these forms in the application by defining a list of form fields and associated types into a template. Once a template is defined, a user can easily create a new instance of (for example) an NTS form, fill it out, save it and then send it to one or more stations using the error free file transport mechanism. See Figure 4 for an example of a form template.

Multicast Saves Bandwidth

D-RATS has also recently gained *multicast* support, allowing efficient broadcasting of a file from one station to multiple receiver stations simultaneously. This function ensures that everyone receives the complete file, free of errors, without having to send a separate file to each receiver one at a time. This also results in (up to) a 100% duty cycle transmission, which minimizes transfer time. With the least expensive (and slowest) 2 meter radios, a 55 kB, 640 × 480 pixel, photograph can be sent in just under eight minutes. A multi-page MS *Word* document compressed to 11 kB would take just under two minutes to send. The same content in text format (6 kB) compressed to 3 kB would take less than 30 seconds. Assuming no block resends are needed, the time to transfer the file itself is independent of how many stations are receiving the file. *D-RATS* now includes integrated compression for file transfers.

Keep Track of the Team

D-RATS also incorporates integrated global positioning system (GPS) support for interacting with compatible ICOM radios. It can broadcast your position (with or without the use of an external GPS) and can calculate distance and direction to other stations. An integrated map view (see Figure 5) can even plot known stations using freely available geographical data.

D-RATS is written in Python/GTK, which means it runs on Linux, MacOS and Windows. It is free, open-source and can be downloaded from **d-rats.danplanet.com**. The Web page for the application uses a community editable wiki, which I encourage people to update and extend with their own suggestions, comments and experiences.[3]

Notes

[1]W. Silver, NØAX, "D-STAR Digital Voice and Data — An Overview" (sidebar to Product Review of the ICOM IC-2820H Dual Band FM Transceiver), *QST*, Jun 2005, pp 67-69, available on the ARRL Members Web site at **www.arrl.org/members-only/prodrev/pdf/pr0711.pdf**.

[2]**nj6n.com/dstar/dstar_chat.html**.

[3]**d-rats.danplanet.com/wiki/DownloadPage**.

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