

# Outpost: Packet Radio for Emergency Messaging

*Dust off your packet radio gear and put it to work for public service!*

Jim Oberhofer, KN6PE

“Great... another county drill and I still don't have anyone who knows packet radio!” The year was 2002 and again I found myself pondering how to cover our packet station operations. Packet is an excellent mode for short or medium-haul digital communications. All you need is a radio modem known as a Terminal Node Controller (TNC) and a VHF FM transceiver. There is even a sound-card-based software TNC known as *AGWPE* ([www.elcom.gr/sv2agw/agwpe.zip](http://www.elcom.gr/sv2agw/agwpe.zip)). The problem has been finding someone to operate the packet station.

As the Emergency Coordinator for the City of Cupertino, California ARES (CARES), we regularly participate in quarterly drills sponsored by Santa Clara County RACES. Each of the drills has a different scenario and objective, with the underlying theme always to practice message handling between the city and county Emergency Operations Centers using both voice nets and packet.

CARES has held packet training sessions that included an introduction to packet, what is a Terminal Node Controller and its commands, what is a Bulletin Board System (BBS) and its commands, and the procedures for creating, sending, retrieving, and printing messages. However, each drill still required the EC staff to select a “lucky volunteer” packet operator who was given an immediate packet radio refresher course, followed by plenty of hand-holding to get a

message sent. Strangely, they never wanted to come back to do packet again!

The conclusion was obvious: packet radio, in its current form, was perceived to be too complex, not interesting enough to justify buying a TNC, and too infrequently used in our drills to develop any real proficiency. This roadblock spurred the development of *Outpost*.

## What is *Outpost*?

When I started this project, I wanted to create a PC-based messaging application that simplified passing emergency AX.25 packet traffic for the ARES/RACES community. By hiding the complexity of the TNC and BBS command-set and simplifying the mechanics for managing messages, the thinking was that *Outpost* could be used in a similar manner as other contemporary e-mail clients. There are plenty of people who use e-mail that do not know how a message gets from here to there. *Outpost* is software that presents a friendly, easy-to-use “face” to the packet radio world. If you can send Internet e-mail, you can use *Outpost* to send packet traffic.

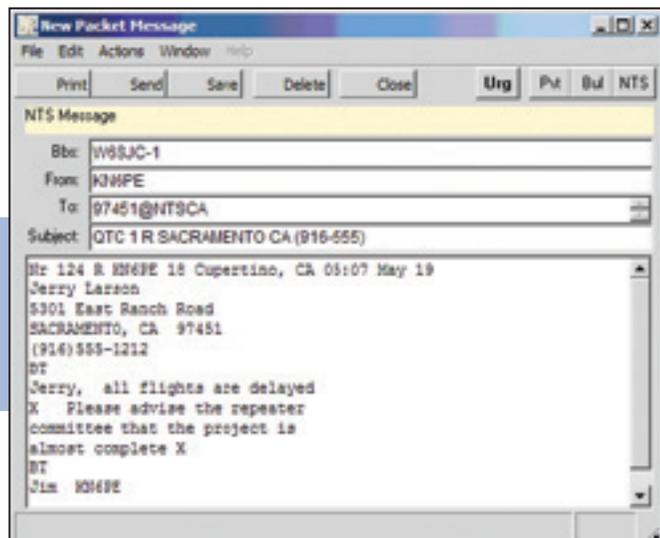
*Outpost* is not a complete packet environment. Instead, it is a messaging client that plugs into the existing AX.25 packet infrastructure. *Outpost* uses any existing BBS or PBBS (you probably have a couple in your area today) as mail drops where *Outpost* can send messages for pickup by other users or to be forwarded to another BBS. With only your existing TNC, a radio and a Windows-based PC, you tell *Outpost* about who you are (your call sign), the TNC and the BBS. *Outpost* then manages all message-handling between your PC and the BBS.

I originally started developing *Outpost* to help Cupertino ARES with their packet communication needs. However, when looking for beta testers for the first release, other ARES/RACES teams throughout the county expressed a similar interest in a simplified packet solution. Other groups outside of the county soon discovered the *Outpost* Web site, and further confirmed that there was a general need for this kind of tool.

## How *Outpost* Works

If you are a current AX.25 packet user, you will recognize the steps: you boot up

*Outpost* creates a screen that resembles an Internet e-mail application. The user doesn't need to be overly familiar with packet radio. He or she just needs to know how to type a message and click SEND. *Outpost* takes care of the rest.



your PC, run your favorite terminal emulator, power up your TNC and radio, and check the TNC (or interface) settings. You connect to your local BBS, check for and retrieve any personal messages, bulletins of interest, or NTS messages, send any outgoing messages and then exit from the BBS. If you are operating during an emergency, you may be waiting for information and have to repeat these steps several times.

*Outpost* takes care of much of the above. Whatever you would normally type at the keyboard, *Outpost* does for you in an automated terminal emulation mode. Because you have previously told *Outpost* all about the TNC and BBS prompts and commands, *Outpost* essentially reads and interprets the messages sent back by the TNC or BBS to determine when they are ready to accept another command (just as you would do), then sends and processes all TNC and BBS commands and replies during a "Send/Receive Session."

Best of all, *Outpost* does all this with a user-friendly screen that looks a bit like the popular Microsoft *Outlook* e-mail program. Once an *Outpost* station is set up and configured, any ham, even one who knows next to nothing about packet radio, can operate with ease. As far as the operator is concerned, it looks as though he or she is sending routine Internet e-mail.

Once you initiate a Send/Receive session (just a push of a button), *Outpost* sets up the TNC or selected interface, connects to the BBS, sends all messages from its out-tray destined for this BBS, requests the list of messages based on the message types you selected, reads each message, stores it in the in-tray, deletes the retrieved message off of the BBS (if allowed), then exits. *Outpost* can be configured to periodically repeat this process automatically, essentially operating in an unattended mode.

**Table 1**  
**Outpost Supported TNCs and BBSs**

TNCs	BBSs
Kantronics KPC family	AA4RE
Kantronics KAM family	F6BB
Data Engine (Kantronics)	MSYS
AEA PK-88, PK-232, DSP-232	NØARY
MFJ-1270x	DXNET
MFJ-1278	Telpac/ Winlink WØRLI F6FBB

## Features

All of *Outpost*'s features align with its mission to support emergency packet communications. While there are plenty of things it can do, here's the list of what I think are the top 10 features:

- Supports all three packet message types: Private, NTS and Bulletins.
- Messages can be created from scratch, imported from an ASCII file, cut and pasted in from other applications, or by Replying to or Forwarding a previously received message.
- You can also use the built-in NTS Message Maker, a forms-based menu that prompts the user for all required fields, then creates a correctly formatted and addressed NTS packet message. ARL Messages can also be selected and automatically formatted. Or you can use the online report interpreter that helps get a pre-defined report templates filled out, formatted and sent quickly.
- Supports serial TNCs, *AGWPE* and Telnet interfacing.
- *Outpost* can use several popular PBBS and BBSs as mail drops including Winlink via Telpac (see Table 1).
- You can reach these BBSs by configuring for either direct access, going through one or more Digipeater stations, or through a

series of KA-Node/Netrom stations.

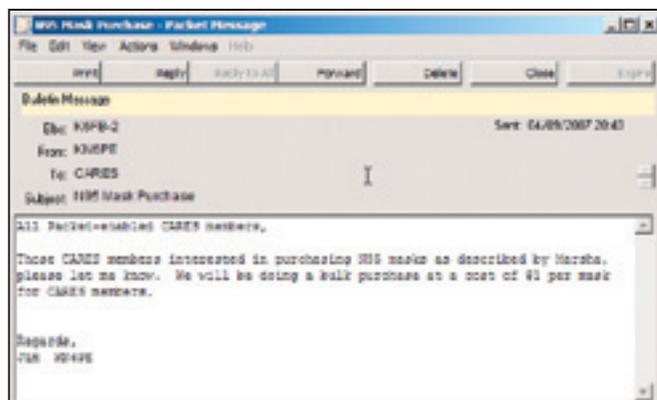
- When multiple *Outpost* stations are in use, the originator can flag a message as Urgent (shows up in red at the recipient's station), or request delivery and read receipts.
- *Outpost* can automatically initiate Packet Sessions with a BBS either at some pre-defined interval, or by defining up to 4 absolute times over the course of an hour (ie, 5 minutes after the hour, 20 after, 35 after, 50 after).
- Tactical Calls can make a field assignment "operator neutral," thereby allowing the operators to change without having the assignment name change. *Outpost* implements Tactical Calls by taking advantage of specific BBS behaviors while still operating within the FCC rules.

There are plenty of other program features, all accessible from pull-down menus off of *Outpost*'s main forms that are not covered here. However, it is worth noting that the best ideas for new *Outpost* features come from the *Outpost* user community. For instance:

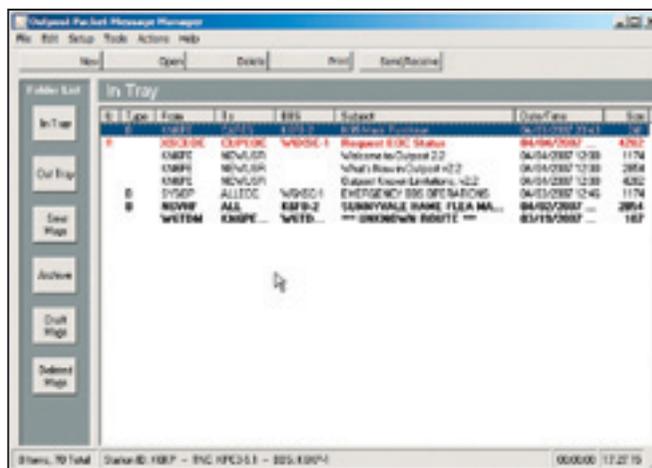
**Message filtering.** George Planic, W9GWP, the Digital Coordinator for Lake County (IL) RACES/ARES, needed a way to retrieve his emergency bulletin traffic from among the general message traffic that passes through his MSYS BBS. His request inspired selective message retrieval to be added as a new *Outpost* capability.

**Telnet access.** Bill Scholey, VE7QC, supports an F6FBB BBS in the same building as the North Shore Emergency Management Office (NSEMO) in North Vancouver and suggested adding Telnet access. Now, Bill runs *Outpost* directly to the BBS over NSEMO's LAN without tying up a radio and contributing to channel congestion.

**Message printing.** William Bressette, VE3WPJ, with Mississauga ARES, and John Sebastian, KG6EZX, a member



Creating packet e-mail is easy in *Outpost*.



Reading an incoming packet message in *Outpost*.

of San Francisco Auxiliary Communication Service (ACS), both requested features to quickly print and route incoming messages to multiple locations for their respective served agencies. Several message print features have been added for both incoming and outgoing messages.

## Putting *Outpost* to Work

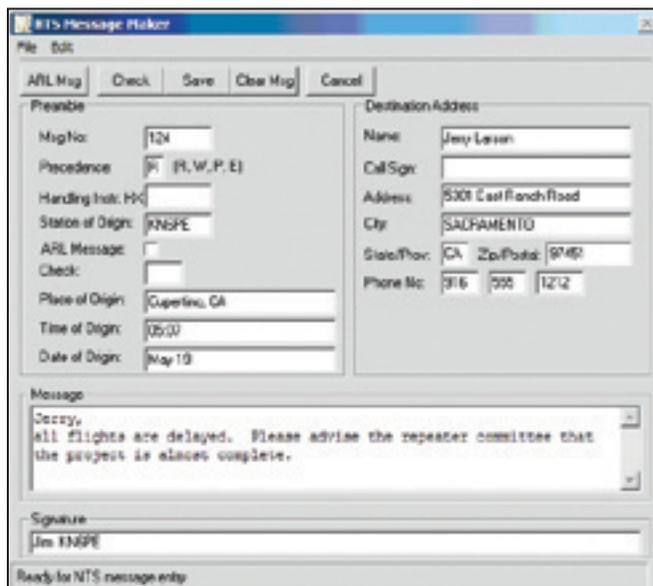
How is *Outpost* being used in the field? While I've received several reports from emergency communications teams describing how they have deployed *Outpost*, the common requirement they all sought to address was the need to pass digital message traffic. For instance, Sean Brennan, KE1AB, Rhode Island section emergency coordinator, described his experiences during a recent FEMA drill:

Operation Ardent Sentry was a national exercise designed to test the government's abilities to respond to 3 scenarios: an Alaskan oil pipe line leak, a terrorist attack on a Nuclear Power Station in Ohio, and a Hurricane running up the middle of Rhode Island.

The Rhode Island Chapter of the American Red Cross (ARC) was tasked with activating their shelter program for a Post Category 3 hurricane. ARC had all communications go through ham radio to their secondary EOC Office in Middletown, Rhode Island, and they activated the shelter on the Island of Jamestown. To support their shelter operations, ARC uses a shelter report that they wished to have sent every hour. With this requirement in hand, RI ARES used *Outpost* and its ability to send report templates. I developed the *Outpost* report template based on the data needed for the ARC report, and that was used to maintain the ARC report requirements without tying up the VHF or UHF voice bands being handled by the Newport County Radio Club (NCRC). The shelter communications team forwarded the reports to the RI ARES BBS using tactical calls that, in turn, were downloaded at the ARC EOC packet station. Because of this demonstration, ARC plans to have a dedicated packet station installed by the NCRC over the next couple of weeks.

*Outpost* has also been deployed to support different public service events. Arnold Harding, KQ6DI, of the Livermore Amateur Radio Klub (LARK) reported that

LARK used *Outpost* during the Devil Mountain Double, a 22-hour, 205-mile bike ride to transmit rider information from portable packet stations located at two rest stops, through a portable digipeater set up



An NTS message created within *Outpost*.

near the top of Mt Hamilton, California, back to Net Control. The LARK volunteers used many of *Outpost*'s features and especially appreciated the fact that they could hit the SEND button and everything happened automatically, including automatic downloads at the event headquarters. Net Control did not need to do any further editing of the information; files could be attached and sent, then saved at the receiving end. Incoming messages were printed with a click of the mouse, just like using an e-mail program.

## *Outpost* in Perspective

*Outpost* does have its limitations. I will be the first to state that it is not the Swiss-army knife of packet apps. Because *Outpost* performs an automatic terminal emulation of what the user would do, *Outpost* relies heavily on the BBS' anticipated behavior. While it knows a lot about the PBBS and BBSs, an unanticipated BBS configuration setting or errant response does periodically pop up, causing *Outpost* to stop processing. The program's error handling continues to evolve to handle these situations gracefully, and logging options have been added to help troubleshoot problems when they do arise. I've also encouraged the *Outpost* user community to let me know when a BBS shows some new behavior that the program was not anticipating so program changes can be made.

*Outpost* does not support any of the common Internet e-mail protocols such as POP3 or SMTP, and does not currently support e-mail attachments or any of the BBS forwarding protocols.

On the plus side, *Outpost* appears to have satisfied a requirement to easily pass digital message traffic within an existing or ad-hoc packet network. Some users have reported

dusting off and putting some old TNC hardware back in service as either an *Outpost*-connected TNC or a PBBS message drop. *Outpost*'s familiar look and feel with other e-mail programs and similar message workflow has reduced the learning curve, thereby allowing the uninitiated packet operator to get a message created and sent quickly. Last but not least, its functionality has been implemented specifically with the requirements of the emergency communications community in mind.

I am still enhancing *Outpost* based on requests for new functionality that directly supports our emergency communications response efforts and the requirements of our local municipalities and served agencies. I see

*Outpost* as a complementary tool that rounds out the suite of communications capabilities that an ARES/RACES team may need to deploy to support an emergency.

## Get Your Own Free Copy of *Outpost*

If you are interested in learning more about *Outpost* or want to give it a try, check out the Web site at [www.outpostpm.org](http://www.outpostpm.org). You can download the latest version there. You'll also find program documentation (user guide, app notes, training packages), the online "How-To" pages, release information and other topics (list of supported TNCs and BBS, and troubleshooting notes).

For more information about VHF/UHF packet radio, pick up a copy of the new *ARRL VHF Digital Handbook*. Call (toll-free in the US) 888-277-5289, or order online at [www.arrl.org/shop/](http://www.arrl.org/shop/).

*Jim Oberhofer, KN6PE, was first licensed as KA1FJP in 1980. He enjoys participating in Cupertino, California ARES (www.cupertinoares.org) as the EC, and supporting Santa Clara County RACES' broader emergency response mission. Jim earned a Bachelor's degree in mathematics and computer science from San Jose State University and has held various positions with Hewlett-Packard Company and Agilent Technologies in product development and information technologies. Jim can be reached at [kn6pe@arrl.net](mailto:kn6pe@arrl.net).*

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