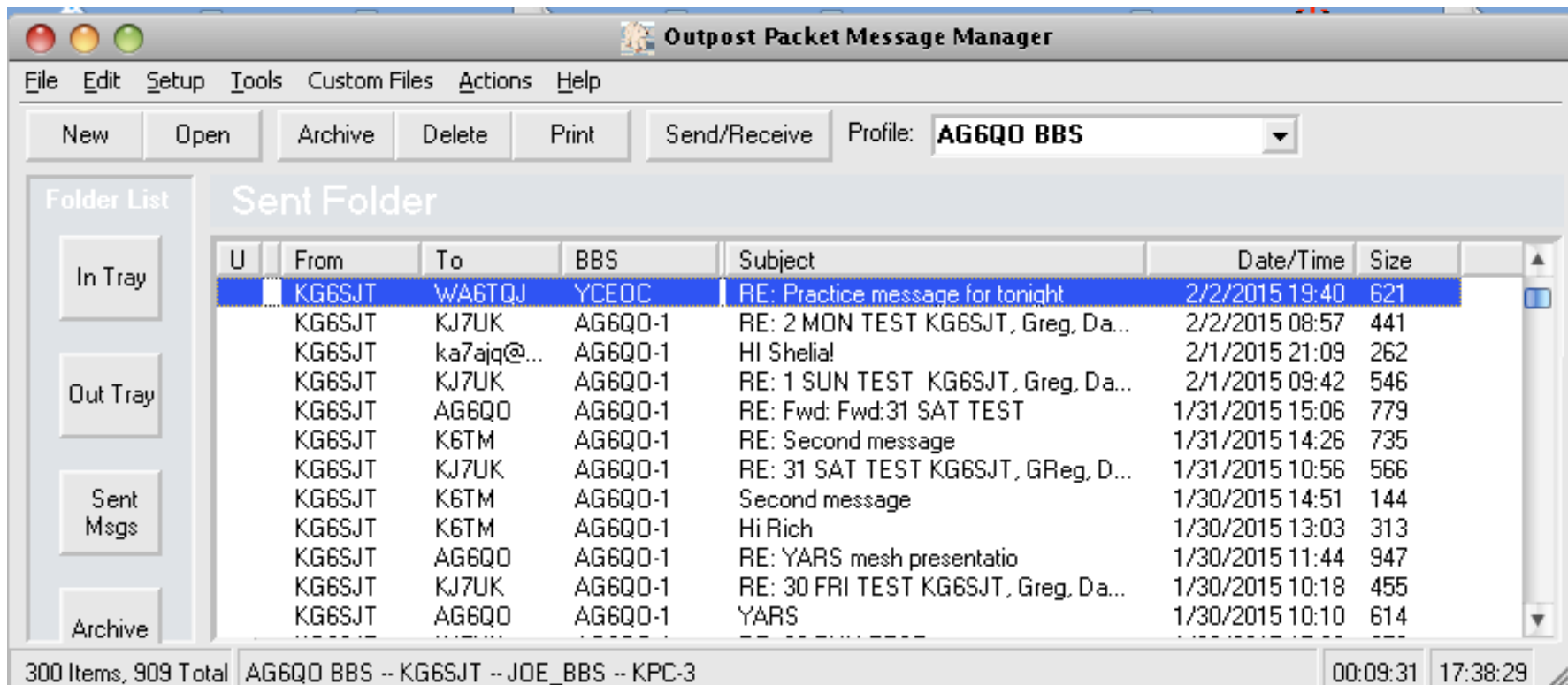


Packet Radio

Email via radio



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Topics

- Introduction
- What is Packet Radio?
- Why use Packet Radio?
- Building a Packet Station
- Software for Sending Packet Messages
- Demo

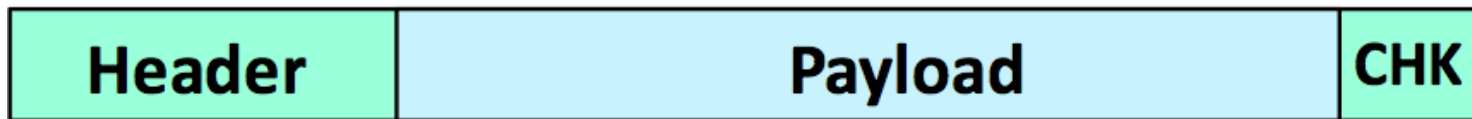


What is Packet Radio?

- Amateur Packet Radio is one of many digital modes that Hams can use to build wireless computer networks
- Packet establishes a “private connection” between two stations while sharing a frequency with other stations
- Packet can use Bulletin Board Systems (BBSs) for dropping off and retrieving messages between users
- You can take advantage of packet nodes to connect to distant stations

How Packet Radio Works

- Packet Radio uses the AX.25 protocol
- Sends packets (an envelope + payload)

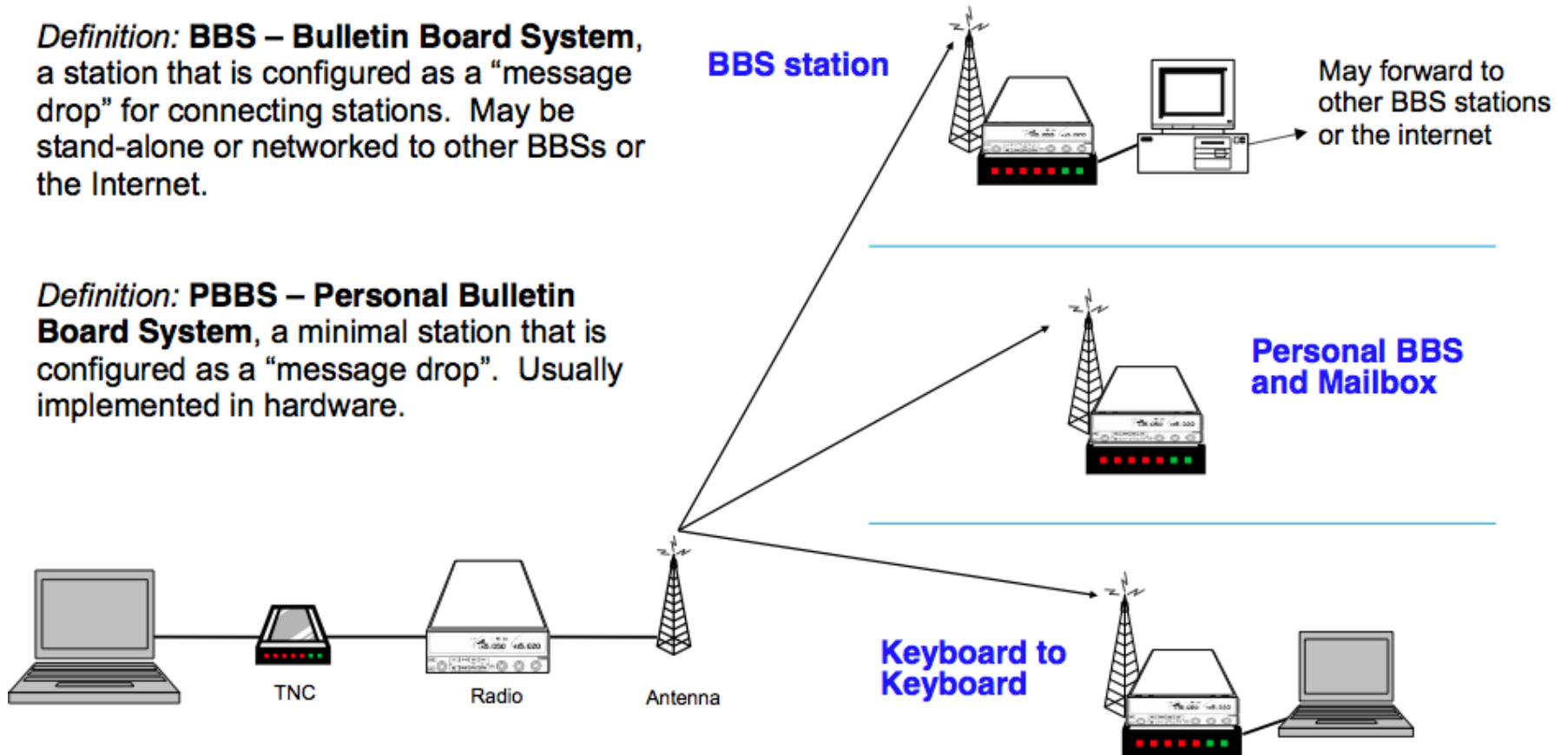


- Envelope contains the header at the beginning and a checksum at end
- Header contains addressing information (to, from)
- Checksum determines if packet is ***error-free***
- Payload contains the data to be sent

Packet – Making Connections...

Definition: BBS – Bulletin Board System, a station that is configured as a “message drop” for connecting stations. May be stand-alone or networked to other BBSs or the Internet.

Definition: PBBS – Personal Bulletin Board System, a minimal station that is configured as a “message drop”. Usually implemented in hardware.



Advantages of Packet Radio?

- Messages sent to a BBS can be stored and forwarded throughout connected BBS networks.
- The recipient does not need to be on-line to get the message, meaning that messages can be retrieved at the recipient's convenience. *This can save computer's battery power.*

Advantages of Packet Radio?


- Packet radio is ideal for sending **complex messages**
 - passing lists of material, addresses, instructions, or complex words (i.e. pharmaceuticals or chemicals)
 - You would not want to mistake;
Hydrogen Sulphide (a gas) with
Hydrogen Sulfate (an acid)
- *Error checking insures that messages are sent error-free*

Complex Data Sent from Tevis Ride

Subject: DATA JUDGE DAVIS 0912

```
25 Mile Endurance
DATA JUDGE DAVIS 0912
BEGIN JUDGE DAVIS
206      0921      IN
210      0944      IN
202      0950      IN
203      0950      IN
205      0954      IN
206      1003      OUT
208      1011      IN
207      1017      OUT
201      1028      IN
202      1029      OUT
205      1030      OUT
203      1037      OUT
208      1056      OUT
```


Complex Data from a Red Cross Shelter

| | | | |
|---|--|--------------------------------|---------------|
|  | American Red Cross | ARC 213 General Message | HTML Vers 1.1 |
| DR #: 117-17 | Incident Name: Hur. Matthew | Message #: 001 | |
| Precedence: Routine | Do NOT use this form for an Emergency message! | | |
| To (Name/Position): | Rita Smith, RN CLS/HS/MN | | |
| From (Name/Position): | Jim Piper, RN, DHS Supervisor Tarboro Shelter | | |
| Subject: Shelter status re medically fragile cli | Date: | Time: | |
| Original Message: | | | |
| <p>Telecommunications impacted: no cell, no wired phones, no internet avail. Shelter pop is 75 and anticipated to increase to 150 over next 6 hours. Have assigned Joan Smith, RN to reception to screen clients s/p registration 11 medically fragile clients with following issues: One fragile diabetic w/enough insulin (Humalog) to last 2 days (self care) Four geriatrics (2F, 1M) with mobility problems. M uses scooter and does not have battery charger. One F uses walker, other uses WC (has WC with her). One 32 yo F bariatric client (>200kgs) w/significant mobility prob (has scooter). At risk for infection d/t reason surgery. Isolated w/husband & 2 small children from main dormitory. One F w/ESKD. Requires dialysis 3x/week, M, W, F. Next scheduled Monday. Nearest dialysis facility in Rocky Mount, NC, 20 mi away. Transportation an issue as main highways flooded & impassable.. Remaining 4 have multiple co-morbidities and multiple medications requiring replacement AS&P. Each client evacuated from home with minimal or no RXs and no durable medical goods.</p> | | | |

Building a Packet Station

- To build a packet station you will need:

- Computer



- Terminal Node Controller



- Radio



- Cables from computer to TNC
and from TNC to radio



Packet Radio Software

- Terminal program
- RMS Express
- Outpost Packet Manager

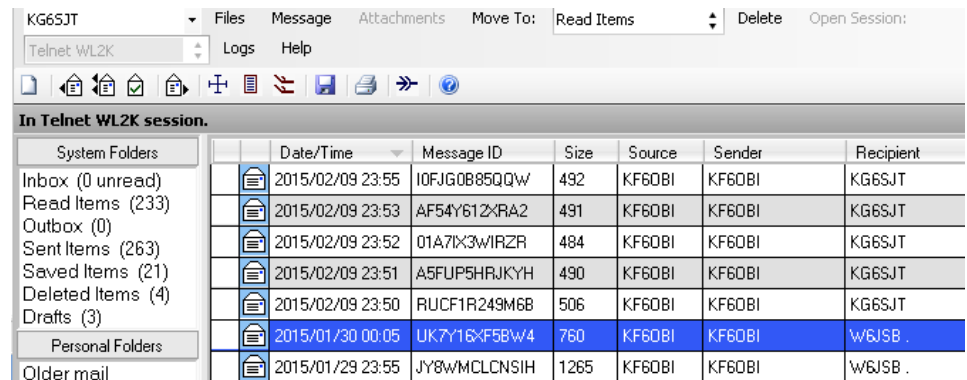
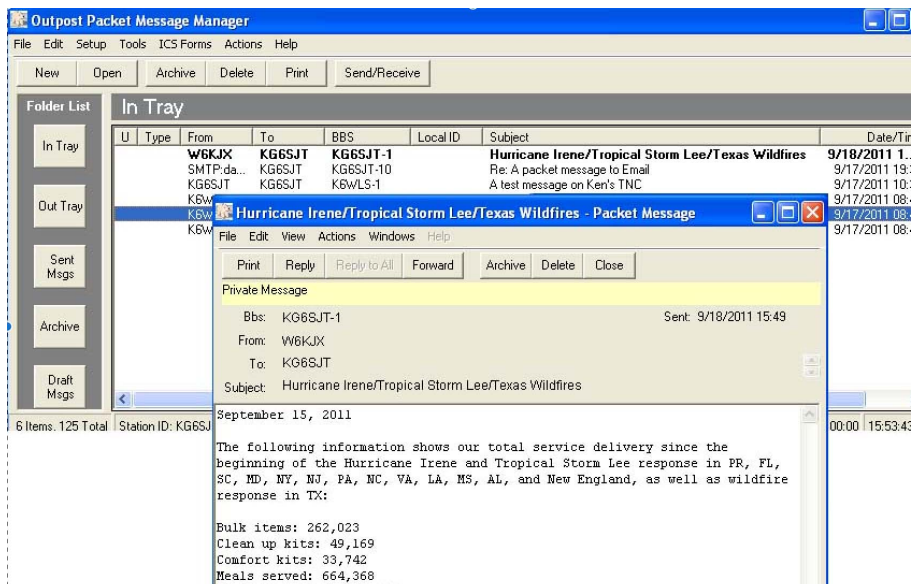
```
cmd:  
cmd:c kberr  
cmd:*** CONNECTED to KBERR  
###CONNECTED TO WILD NODE KBERR(R6JAC-6) CHANNEL A  
KBERR is the KaNode in the BERRY TNC  
ENTER COMMAND: B,C,J,N, or Help ?  
J  
W7IPA      02/11/15 10:25:24  
W6PKT-10   02/11/15 10:26:48  
KG6SJT-10  02/11/15 10:27:54  
N6KRV-5    02/11/15 10:28:00  
KG6SJT-5   02/11/15 10:29:23  
K6TUO-5    02/11/15 10:30:25
```

| System Folders | Date/Time | Message ID | Size | Source | Sender | Recipient |
|-------------------|------------------|--------------|------|--------|--------|-----------|
| Inbox (0 unread) | 2015/02/09 23:55 | 10FJG0885QQW | 492 | KF60BI | KF60BI | KG6SJT |
| Read Items (233) | 2015/02/09 23:53 | AF54Y612XRA2 | 491 | KF60BI | KF60BI | KG6SJT |
| Outbox (0) | 2015/02/09 23:52 | 01A7D3WIRZR | 484 | KF60BI | KF60BI | KG6SJT |
| Sent Items (263) | 2015/02/09 23:51 | A5FUP9HRJKYH | 490 | KF60BI | KF60BI | KG6SJT |
| Saved Items (21) | 2015/02/09 23:50 | RUCF1R249M6B | 506 | KF60BI | KF60BI | KG6SJT |
| Deleted Items (4) | 2015/01/30 00:05 | UK7Y16XFE8W4 | 780 | KF60BI | KF60BI | W6JSB |
| Drafts (3) | 2015/01/29 23:55 | JY8WMCLCNSIH | 1265 | KF60BI | KF60BI | W6JSB |
| Personal Folders | | | | | | |
| Older mail | | | | | | |

| From | To | BBS | Subject | Date/Time | Size |
|--------|-----------|---------|-------------------------------------|-----------------|------|
| KG6SJT | W6JSB | AG6Q0-1 | RE: Please see messages for tonight | 2/2/2015 08:57 | 441 |
| KG6SJT | KJ7UK | AG6Q0-1 | RE: 2 MON TEST KG6SJT, Greg, Da... | 2/2/2015 08:57 | 441 |
| KG6SJT | ka7aq@... | AG6Q0-1 | Hi Sheila! | 2/1/2015 21:09 | 262 |
| KG6SJT | KJ7UK | AG6Q0-1 | RE: 1 SUN TEST KG6SJT, Greg, Da... | 2/1/2015 09:42 | 546 |
| KG6SJT | AG6Q0 | AG6Q0-1 | RE: Fwd: Fwd 31 SAT TEST | 1/31/2015 15:06 | 779 |
| KG6SJT | KSTM | AG6Q0-1 | RE: Second message | 1/31/2015 14:26 | 735 |
| KG6SJT | KJ7UK | AG6Q0-1 | RE: 31 SAT TEST KG6SJT, GReg, D... | 1/31/2015 10:56 | 566 |
| KG6SJT | KSTM | AG6Q0-1 | Second message | 1/30/2015 14:51 | 144 |
| KG6SJT | KSTM | AG6Q0-1 | Hi Rich | 1/30/2015 13:03 | 313 |
| KG6SJT | AG6Q0 | AG6Q0-1 | RE: YARS mesh presentatio | 1/30/2015 11:44 | 947 |
| KG6SJT | KJ7UK | AG6Q0-1 | RE: 30 FRI TEST KG6SJT, Greg, Da... | 1/30/2015 10:18 | 455 |
| KG6SJT | AG6Q0 | AG6Q0-1 | YARS | 1/30/2015 10:10 | 614 |

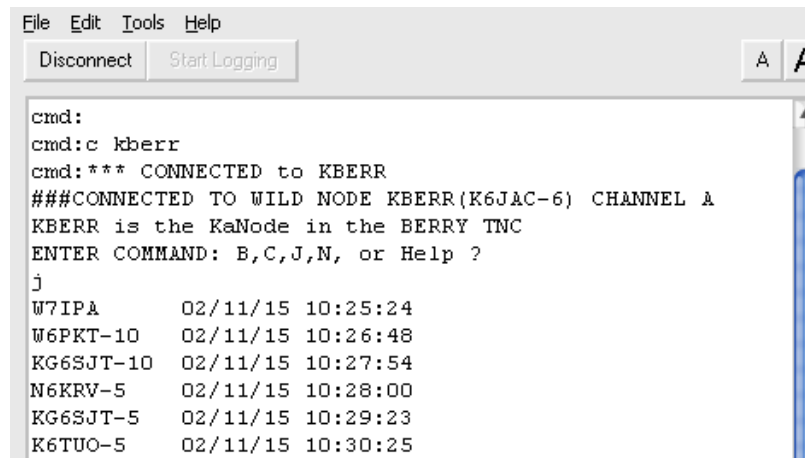
Outpost PM & Winlink Express

- Both Outpost PM and Winlink Express
 - Have a familiar **Email Program** look...



Terminal Program

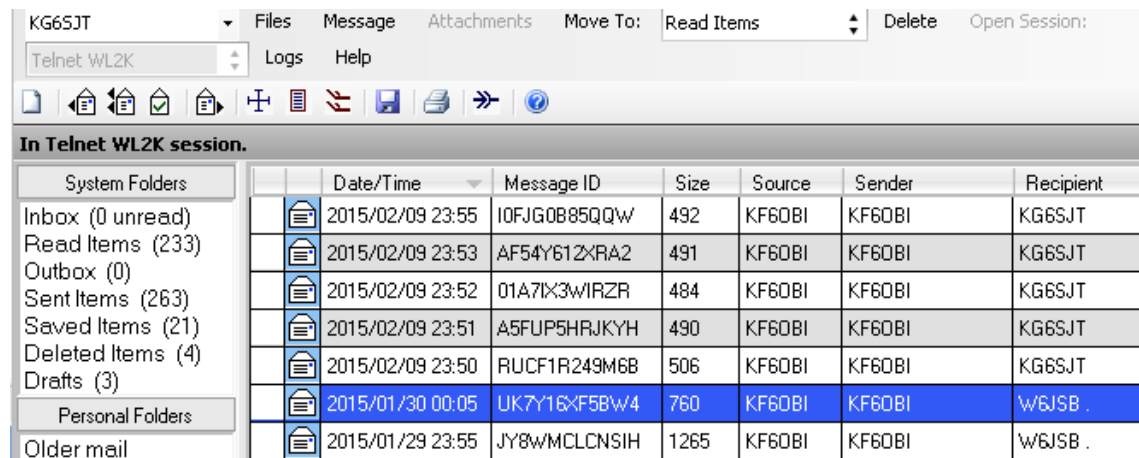
- Terminal programs can be used to connect and send short packet messages
- Many commands to learn
- Can be used for keyboard to keyboard messaging



```
File Edit Tools Help
Disconnect Start Logging A A
cmd:
cmd:c kberr
cmd:*** CONNECTED to KBERR
###CONNECTED TO WILD NODE KBERR(K6JAC-6) CHANNEL A
KBERR is the KaNode in the BERRY TNC
ENTER COMMAND: B,C,J,N, or Help ?
j
W7IPA      02/11/15 10:25:24
W6PKT-10   02/11/15 10:26:48
KG6SJT-10  02/11/15 10:27:54
N6KRV-5    02/11/15 10:28:00
KG6SJT-5   02/11/15 10:29:23
K6TUO-5    02/11/15 10:30:25
```

RMS Express

- Designed to be used with exclusively Winlink Email System
- *Cannot* be used to connect to a PBBS
- Ideal to send email anywhere in the world
- Can send attachments such as small photos

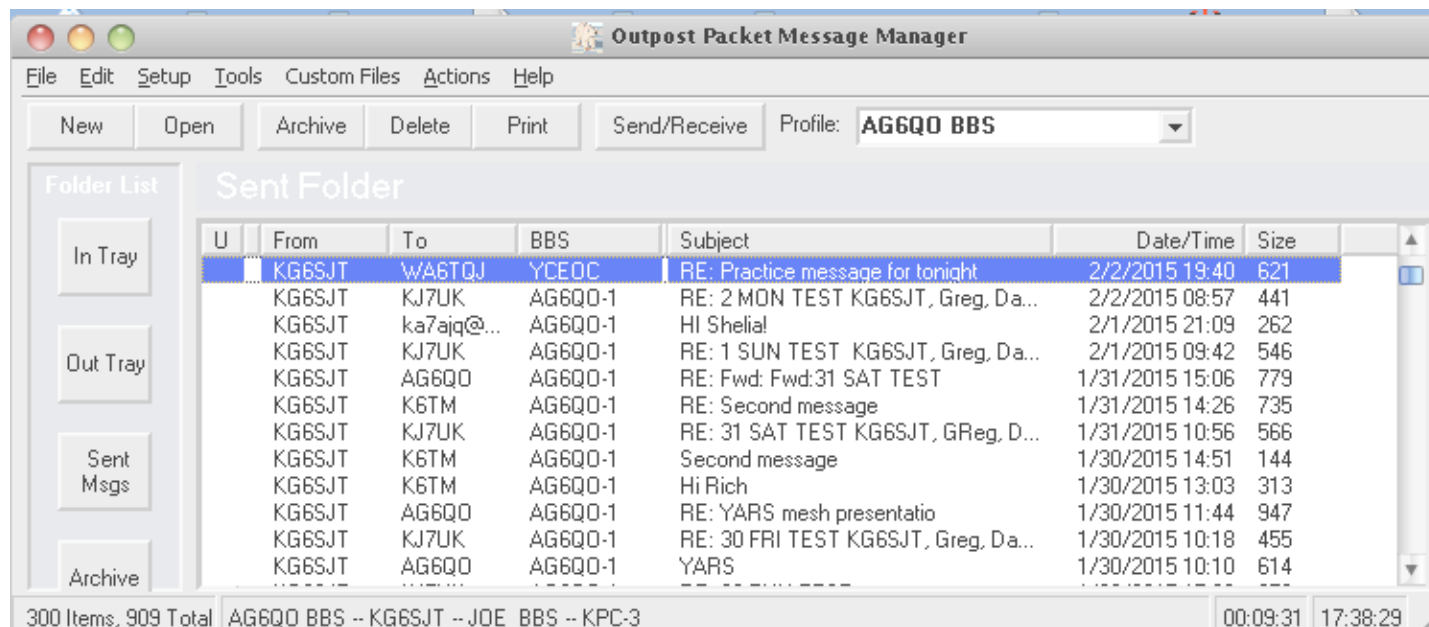


The screenshot shows the RMS Express interface. At the top, there is a menu bar with 'Files', 'Message', 'Attachments', 'Move To: Read Items', 'Delete', and 'Open Session:'. Below the menu bar is a toolbar with various icons. The main window displays 'In Telnet WL2K session.' and a table of email messages. The table has columns for Date/Time, Message ID, Size, Source, Sender, and Recipient. The messages are listed in chronological order, with the most recent at the top. The message with the subject 'UK7Y16XF5BW4' is highlighted in blue.

| | Date/Time | Message ID | Size | Source | Sender | Recipient |
|--|------------------|--------------|------|--------|--------|-----------|
| | 2015/02/09 23:55 | I0FJG0B85QQW | 492 | KF60BI | KF60BI | KG6SJT |
| | 2015/02/09 23:53 | AF54Y612XRA2 | 491 | KF60BI | KF60BI | KG6SJT |
| | 2015/02/09 23:52 | 01A7IX3WIRZR | 484 | KF60BI | KF60BI | KG6SJT |
| | 2015/02/09 23:51 | A5FUP5HRJKYH | 490 | KF60BI | KF60BI | KG6SJT |
| | 2015/02/09 23:50 | RUCF1R249M6B | 506 | KF60BI | KF60BI | KG6SJT |
| | 2015/01/30 00:05 | UK7Y16XF5BW4 | 760 | KF60BI | KF60BI | W6JSB . |
| | 2015/01/29 23:55 | JY8WMCLCNSIH | 1265 | KF60BI | KF60BI | W6JSB . |

Outpost Packet Manager

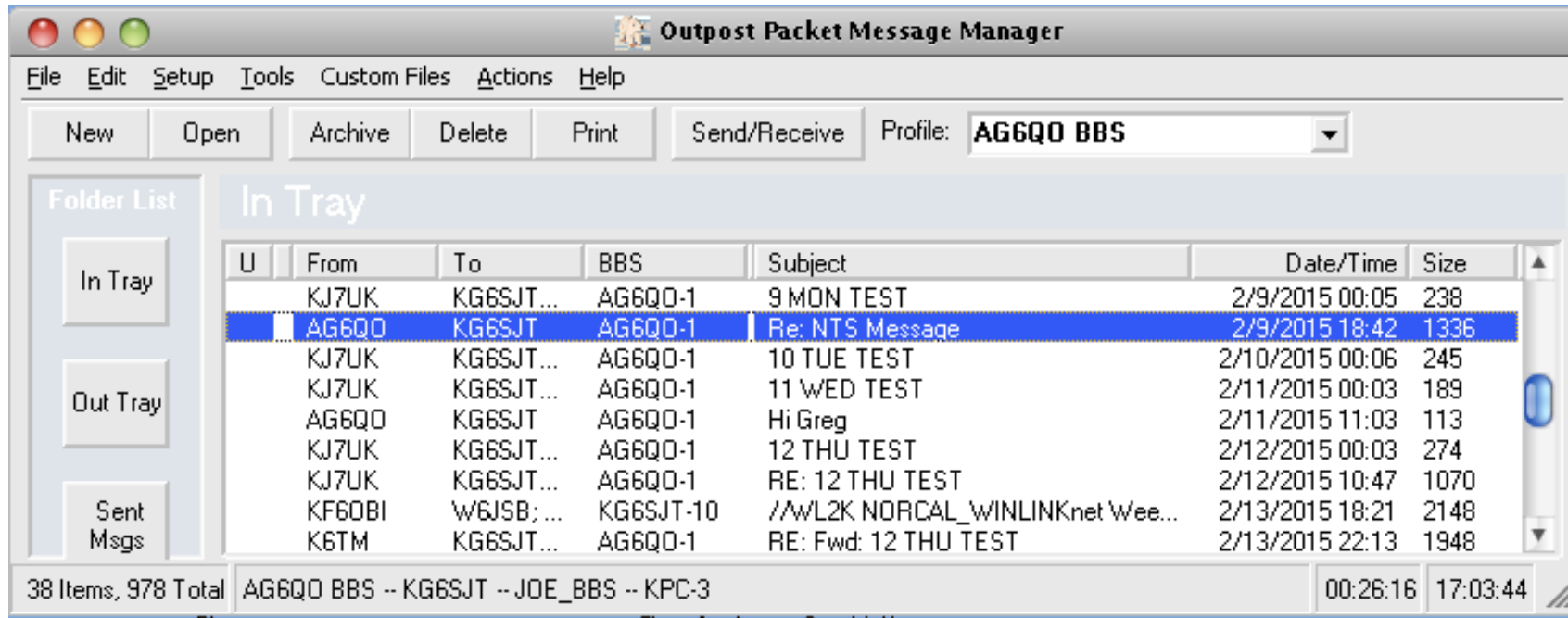
- Designed for ARES/RACES Emcomms by Jim Oberhofer, KN6PE specifically for ARES/RACES in Santa Clara County. Used by many ARES groups for digital communications in the US.



Why Outpost is ideal for ARES

- Easy to use, e-mail like interface
- Folders: Inbox, Outbox, Sent, Archive, Draft, Deleted
- Address book
- Automates comms with TNC/BBS – just press *Send/Receive*
- Auto logging of all messages sent and received
- Makes printing a message as simple as a click

Outpost: Message List



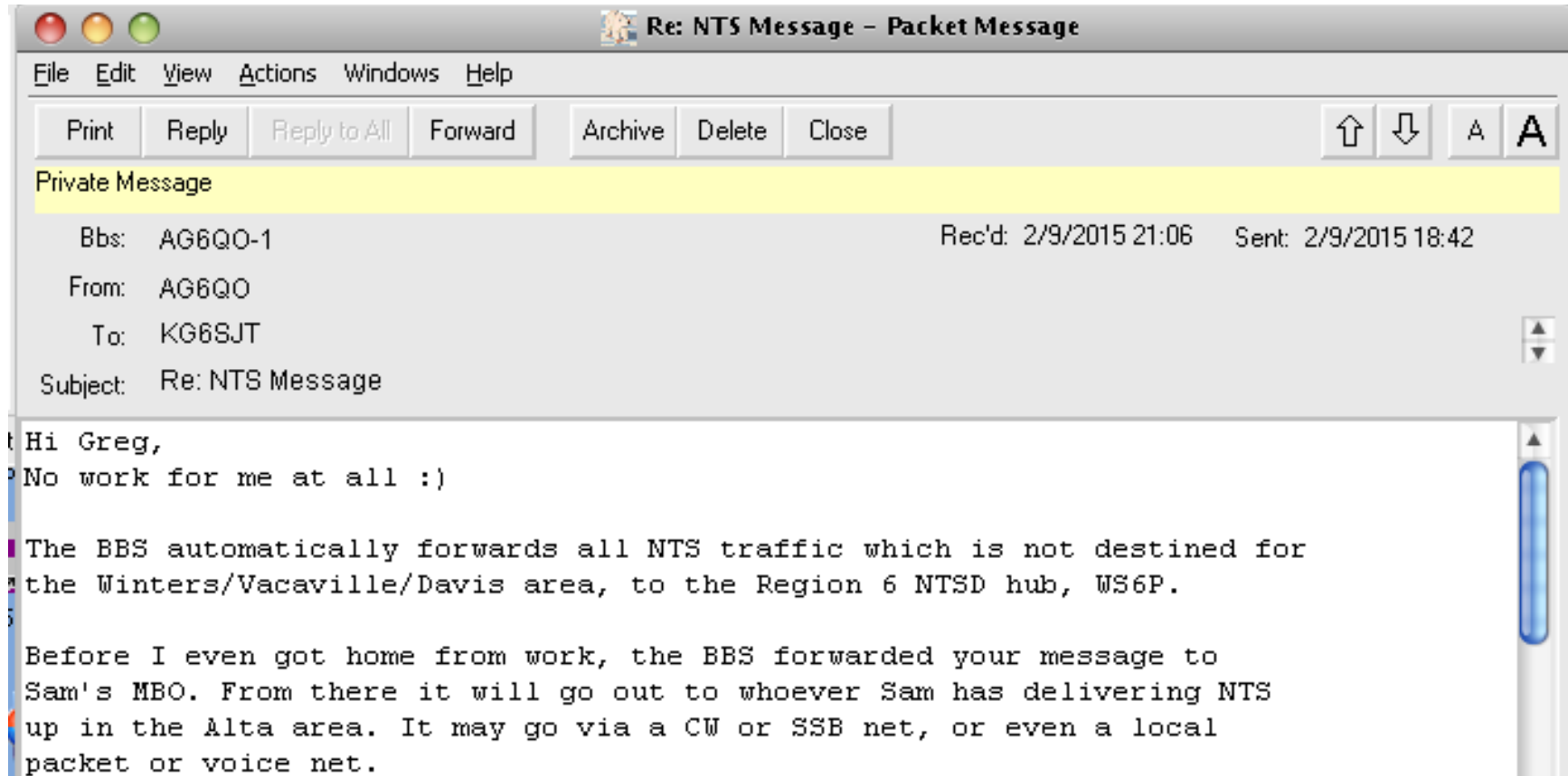
The screenshot shows the Outpost Packet Message Manager interface. The title bar reads "Outpost Packet Message Manager". The menu bar includes "File", "Edit", "Setup", "Tools", "Custom Files", "Actions", and "Help". Below the menu bar are buttons for "New", "Open", "Archive", "Delete", "Print", and "Send/Receive", along with a "Profile:" dropdown menu set to "AG6QO BBS".

The main window is divided into a "Folder List" on the left and a "Message List" in the center. The "Folder List" contains buttons for "In Tray", "Out Tray", and "Sent Msgs". The "Message List" is titled "In Tray" and contains a table of messages.

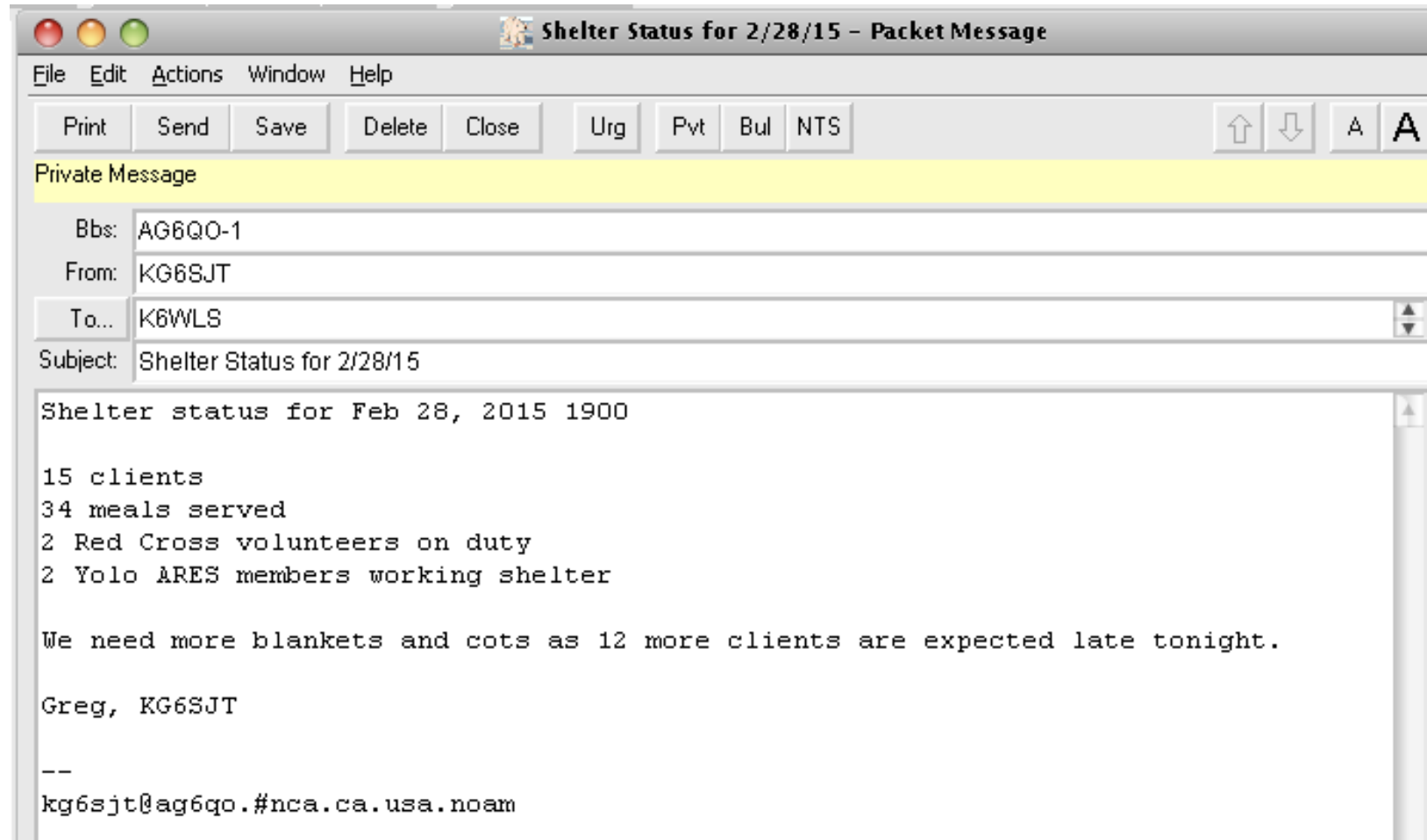
| U | From | To | BBS | Subject | Date/Time | Size |
|-------------------------------------|--------|------------|-----------|---------------------------------|-----------------|------|
| | KJ7UK | KG6SJT... | AG6QO-1 | 9 MON TEST | 2/9/2015 00:05 | 238 |
| <input checked="" type="checkbox"/> | AG6QO | KG6SJT | AG6QO-1 | Re: NTS Message | 2/9/2015 18:42 | 1336 |
| | KJ7UK | KG6SJT... | AG6QO-1 | 10 TUE TEST | 2/10/2015 00:06 | 245 |
| | KJ7UK | KG6SJT... | AG6QO-1 | 11 WED TEST | 2/11/2015 00:03 | 189 |
| | AG6QO | KG6SJT | AG6QO-1 | Hi Greg | 2/11/2015 11:03 | 113 |
| | KJ7UK | KG6SJT... | AG6QO-1 | 12 THU TEST | 2/12/2015 00:03 | 274 |
| | KJ7UK | KG6SJT... | AG6QO-1 | RE: 12 THU TEST | 2/12/2015 10:47 | 1070 |
| | KF6OBI | W6JSB; ... | KG6SJT-10 | /w/L2K NORCAL_WINLINKnet Wee... | 2/13/2015 18:21 | 2148 |
| | K6TM | KG6SJT... | AG6QO-1 | RE: Fwd: 12 THU TEST | 2/13/2015 22:13 | 1948 |

At the bottom of the window, a status bar shows "38 Items, 978 Total" and "AG6QO BBS -- KG6SJT -- JOE_BBS -- KPC-3". The time displayed is "00:26:16" and "17:03:44".

Outpost: Read Messages



Outpost: Compose a Message



Packet Radio

- Demos:
 - Using a terminal program
 - Using Outpost to connect to another packet station
 - Using Winlink to send a packet email message

Resources

- **Contact information**

Gregory Kruckewitt, KG6SJT

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Paul Grose, N6DRY

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Dwane Evans, KG6KPW

kg6kpw@sbcglobal.net

cell: 916-764-0227

- **Outpost Packet Manager**

<http://www.outpostpm.org/>

- **RMS Express & Winlink**

<http://www.winlink.org/>

- **www.sacvalleyares.org**

Links to this presentation as well as information on packet and many other topics related to ARES.