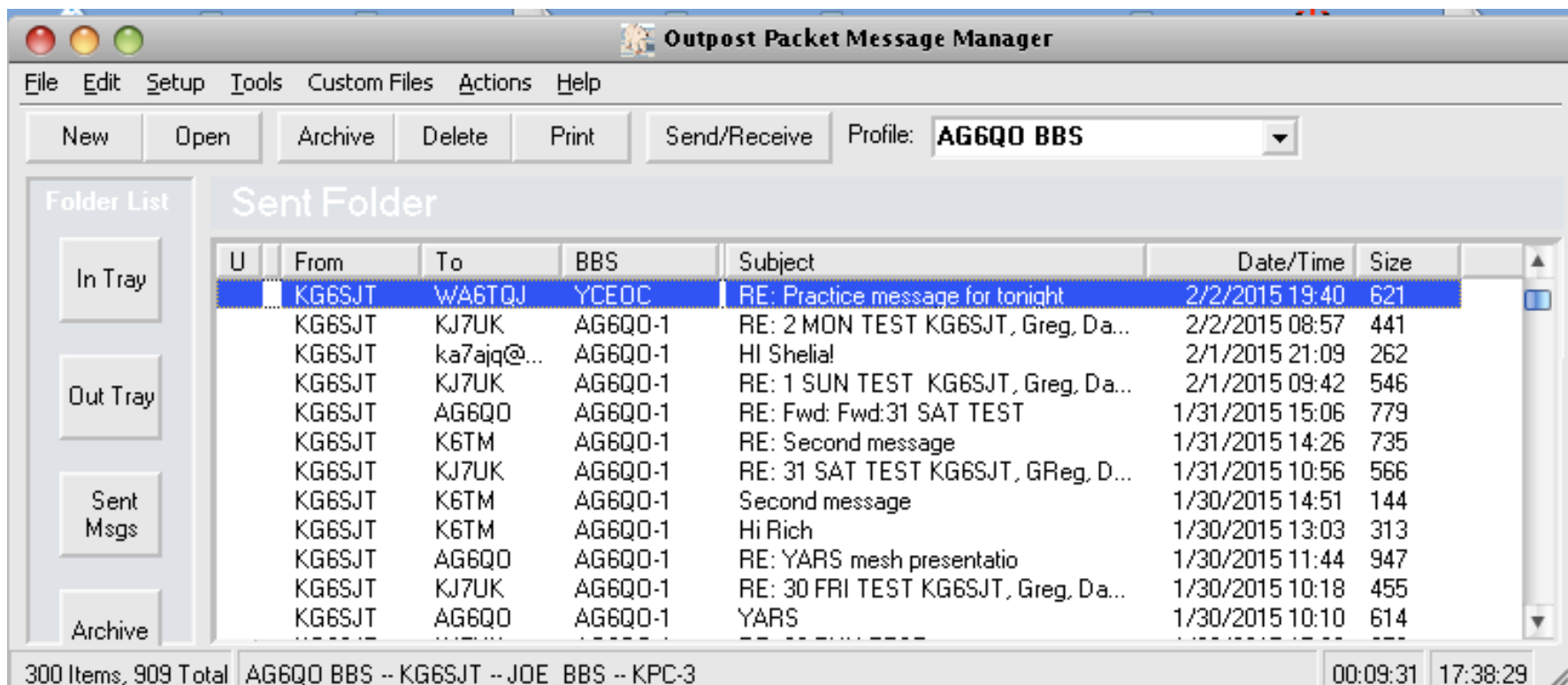


Packet Radio

Email via radio



Greg Kruckewitt, ARRL Sacramento Valley Section EC

Topics

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

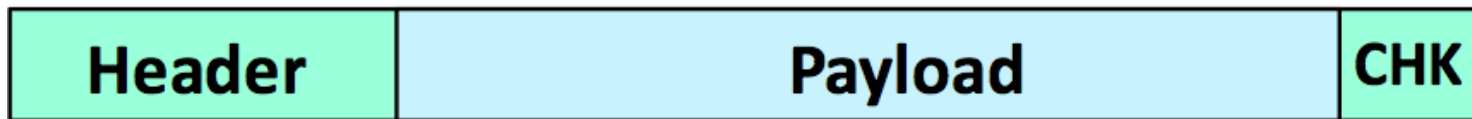


What is Packet Radio?

- 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)

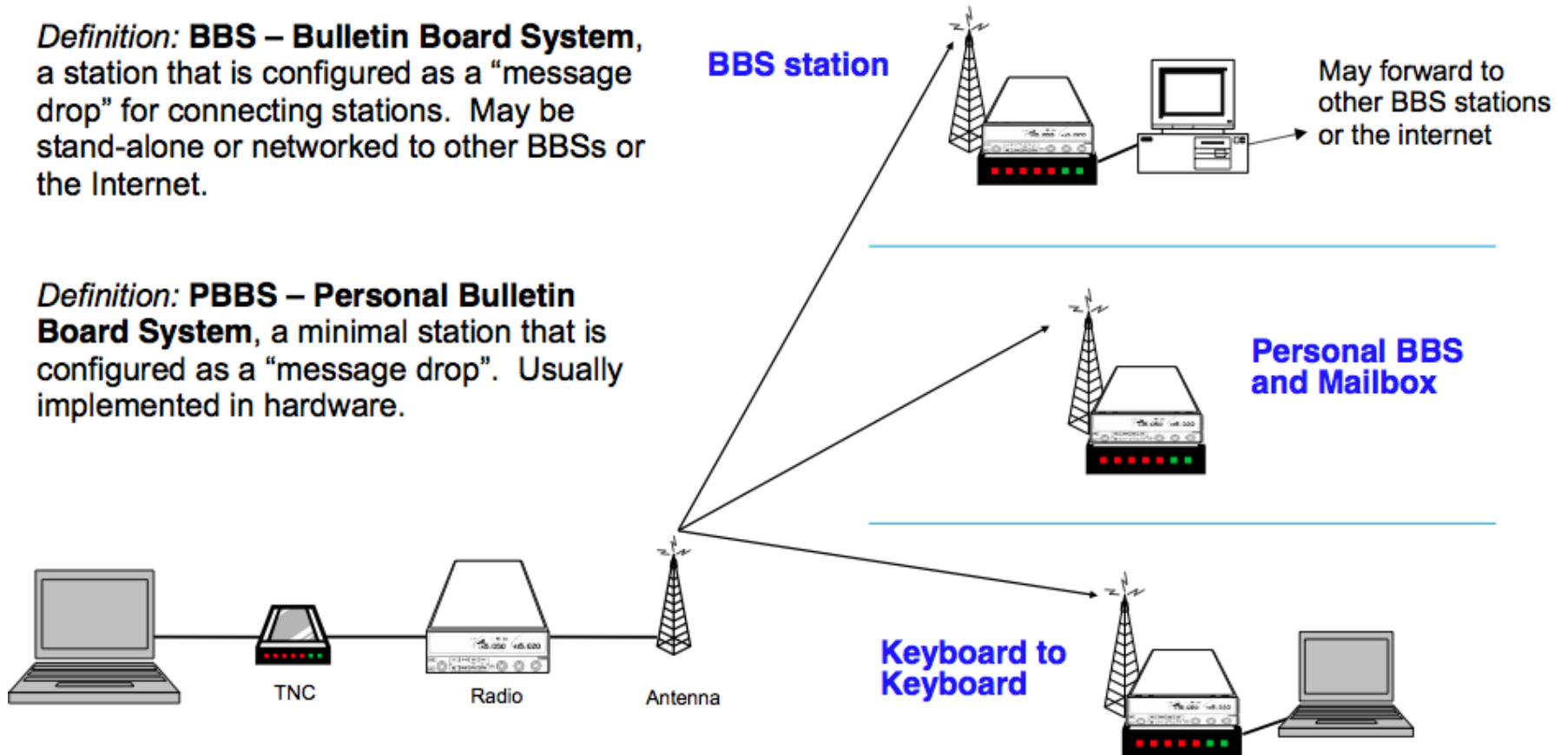


- Envelope contains the header at the beginning and a checksum at end
- Header contains addressing information (to, from)
- Checksum determines if packet is ***error-free***
- Payload contains the data to be sent

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

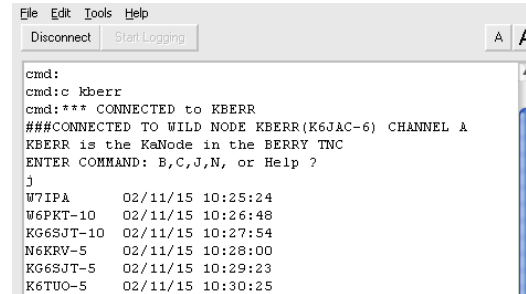


- Cables from computer to TNC
and from TNC to radio



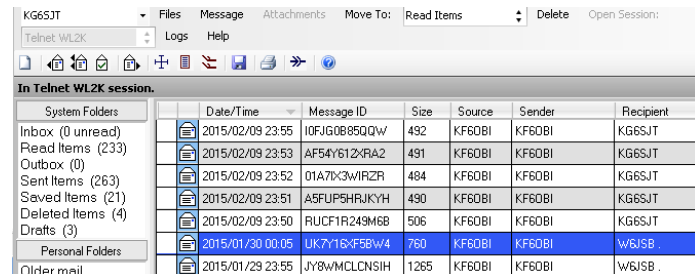
Packet Radio Software

- Terminal program
- RMS Express
- Outpost Packet Manager

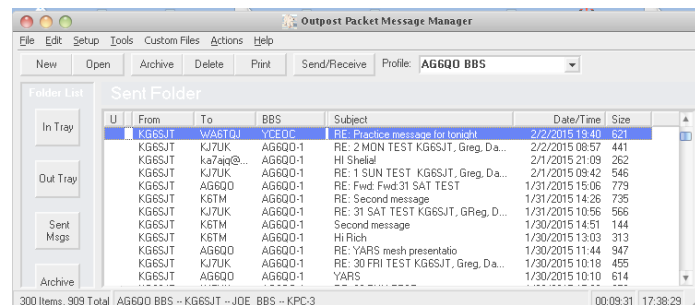


```
File Edit Tools Help
Disconnect Start Logging A A

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
```



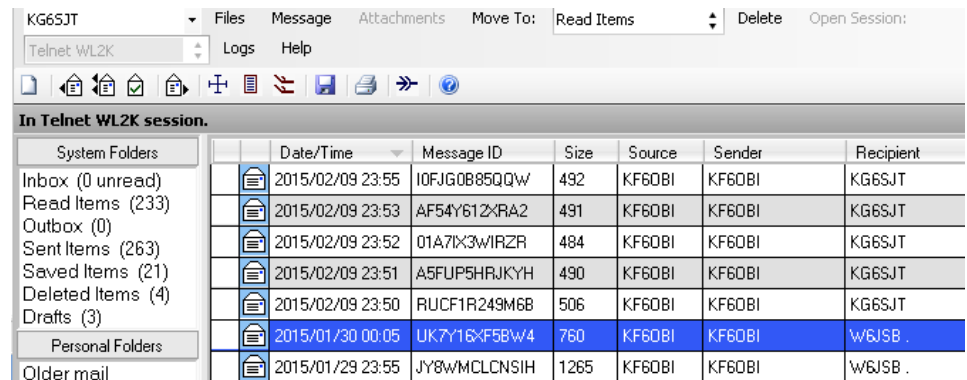
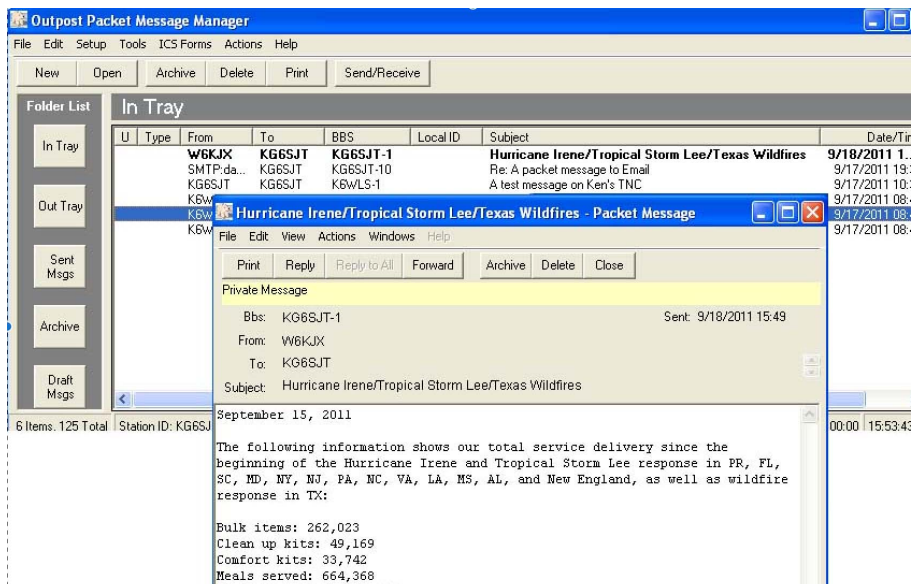
System Folders	Date/Time	Message ID	Size	Source	Sender	Recipient
Inbox (0 unread)	2015/02/09 23:55	I0JG0885QQW	492	KF60BI	KF60BI	KG6SJT
Read Items (233)	2015/02/09 23:53	AF54Y612XRA2	491	KF60BI	KF60BI	KG6SJT
Outbox (0)	2015/02/09 23:52	01A7D3WRZR	484	KF60BI	KF60BI	KG6SJT
Sent Items (263)	2015/02/09 23:51	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	JY8WMLCNSIH	1265	KF60BI	KF60BI	W6JSB
Personal Folders						
Older mail						



Folder List	From	To	BBS	Subject	Date/Time	Size
In Tray	KG6SJT	W6S1QJ	AG600-1	RE: Please see messages for tonight	2/2/2015 08:57	441
Out Tray	KG6SJT	KJ7UK	AG600-1	RE: 2 MON TEST KG6SJT, Greg, Da...	2/2/2015 08:57	441
Sent Msgs	KG6SJT	ka7aq@...	AG600-1	Hi Sheila!	2/1/2015 21:09	262
Archive	KG6SJT	KJ7UK	AG600-1	RE: 1 SUN TEST KG6SJT, Greg, Da...	2/1/2015 09:42	546
	KG6SJT	AG600	AG600-1	RE: Fwd: Fwd 31 SAT TEST	1/31/2015 15:06	779
	KG6SJT	KSTM	AG600-1	RE: Second message	1/31/2015 14:26	735
	KG6SJT	KJ7UK	AG600-1	RE: 31 SAT TEST KG6SJT, GReg, D...	1/31/2015 10:56	566
	KG6SJT	KSTM	AG600-1	Second message	1/30/2015 14:51	144
	KG6SJT	KSTM	AG600-1	Hi Rich	1/30/2015 13:03	313
	KG6SJT	AG600	AG600-1	RE: YARS mesh presentatio	1/30/2015 11:44	947
	KG6SJT	KJ7UK	AG600-1	RE: 30 FRI TEST KG6SJT, Greg, Da...	1/30/2015 10:18	455
	KG6SJT	AG600	AG600-1	YARS	1/30/2015 10:10	614

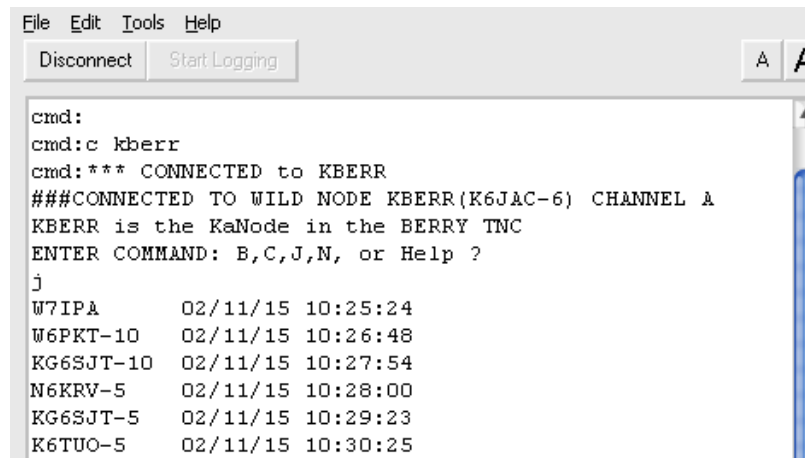
Outpost PM & Winlink Express

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



Terminal Program

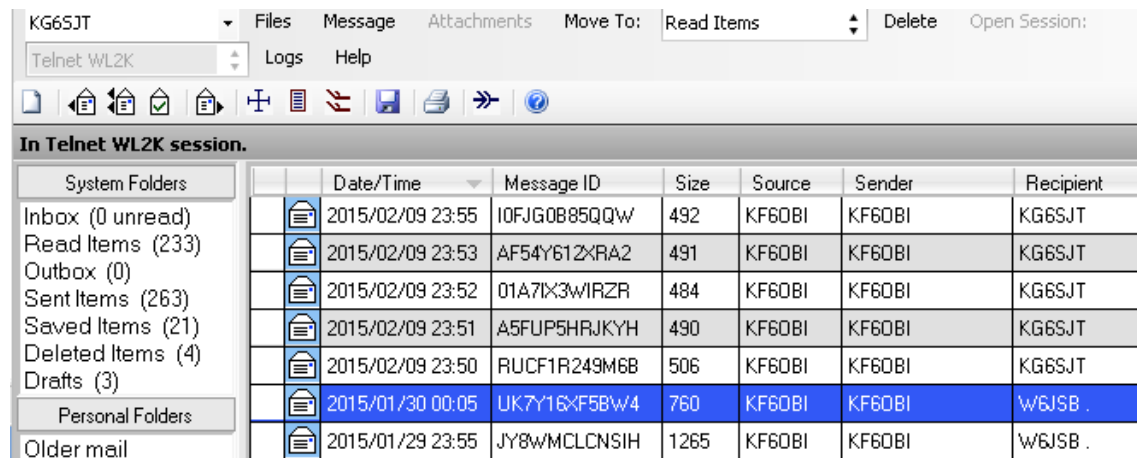
- Terminal programs can be used to connect and send short packet messages
- Many commands to learn
- Can be used for keyboard to keyboard messaging



```
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

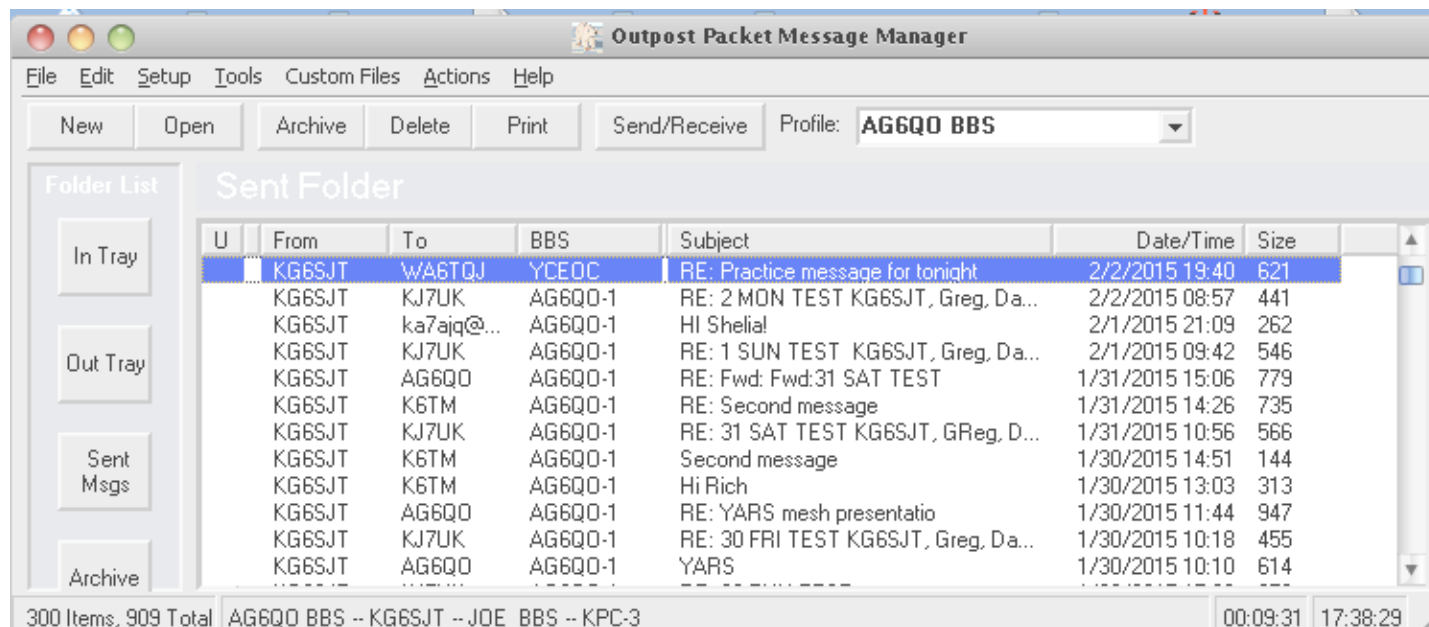


The screenshot shows the RMS Express interface. At the top, there is a menu bar with options: Files, Message, Attachments, Move To: Read Items, Delete, and Open Session:. Below the menu bar is a toolbar with various icons. The main area displays a list of messages in a table format. The table has columns 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 ID UK7Y16XF5Bw4 is highlighted in blue.

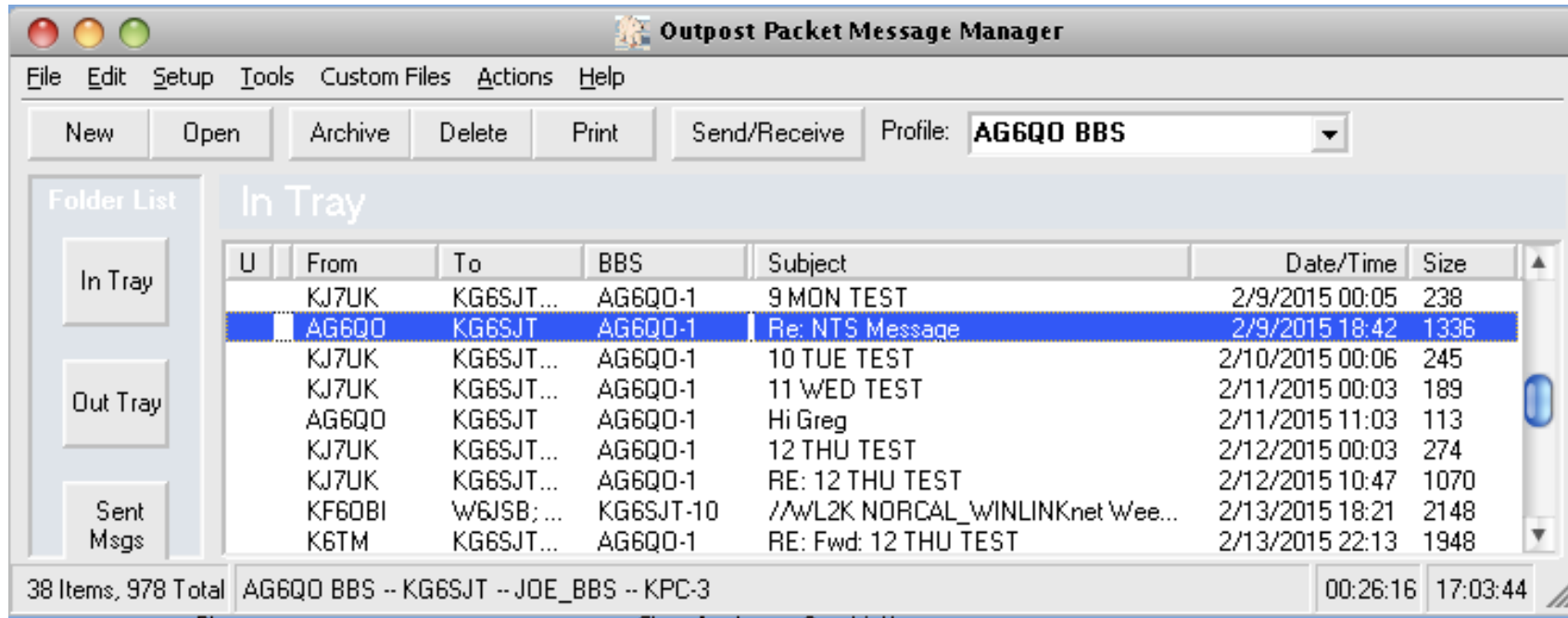
	Date/Time	Message ID	Size	Source	Sender	Recipient
	2015/02/09 23:55	I0FJG0B85QQW	492	KF60BI	KF60BI	KG6SJT
	2015/02/09 23:53	AF54Y61ZXRA2	491	KF60BI	KF60BI	KG6SJT
	2015/02/09 23:52	01A7IX3WIRZR	484	KF60BI	KF60BI	KG6SJT
	2015/02/09 23:51	A5FUP5HRJKYH	490	KF60BI	KF60BI	KG6SJT
	2015/02/09 23:50	RUCF1R249M6B	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.



Outpost: Message List



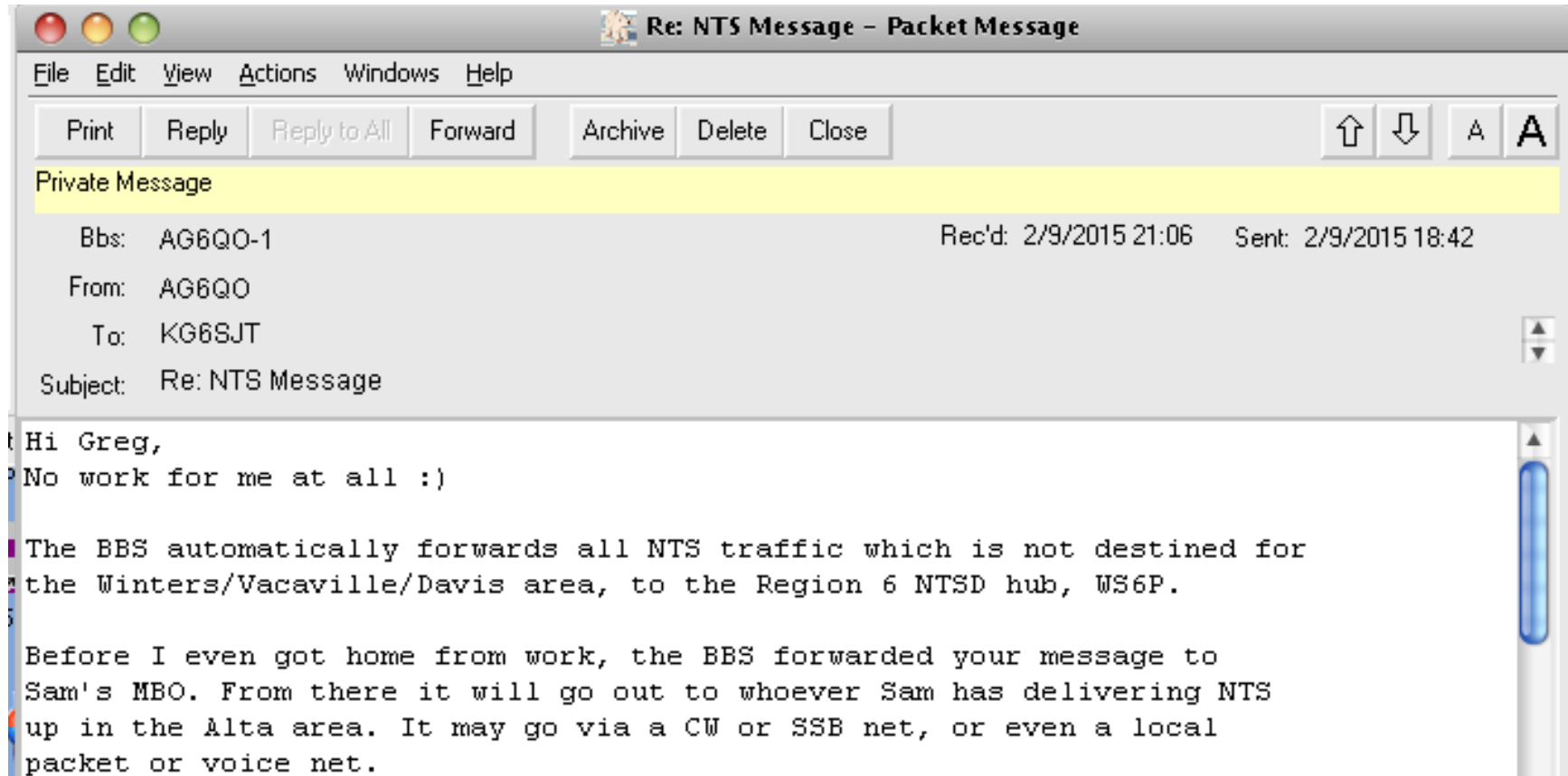
The screenshot shows the Outpost Packet Message Manager interface. The title bar reads "Outpost Packet Message Manager". The menu bar includes "File", "Edit", "Setup", "Tools", "Custom Files", "Actions", and "Help". Below the menu bar is a toolbar with buttons for "New", "Open", "Archive", "Delete", "Print", and "Send/Receive". A "Profile:" dropdown menu is 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. The table has columns for "U", "From", "To", "BBS", "Subject", "Date/Time", and "Size". The second row is selected, showing a message from "AG6QO" to "KG6SJT" with the subject "Re: NTS Message".

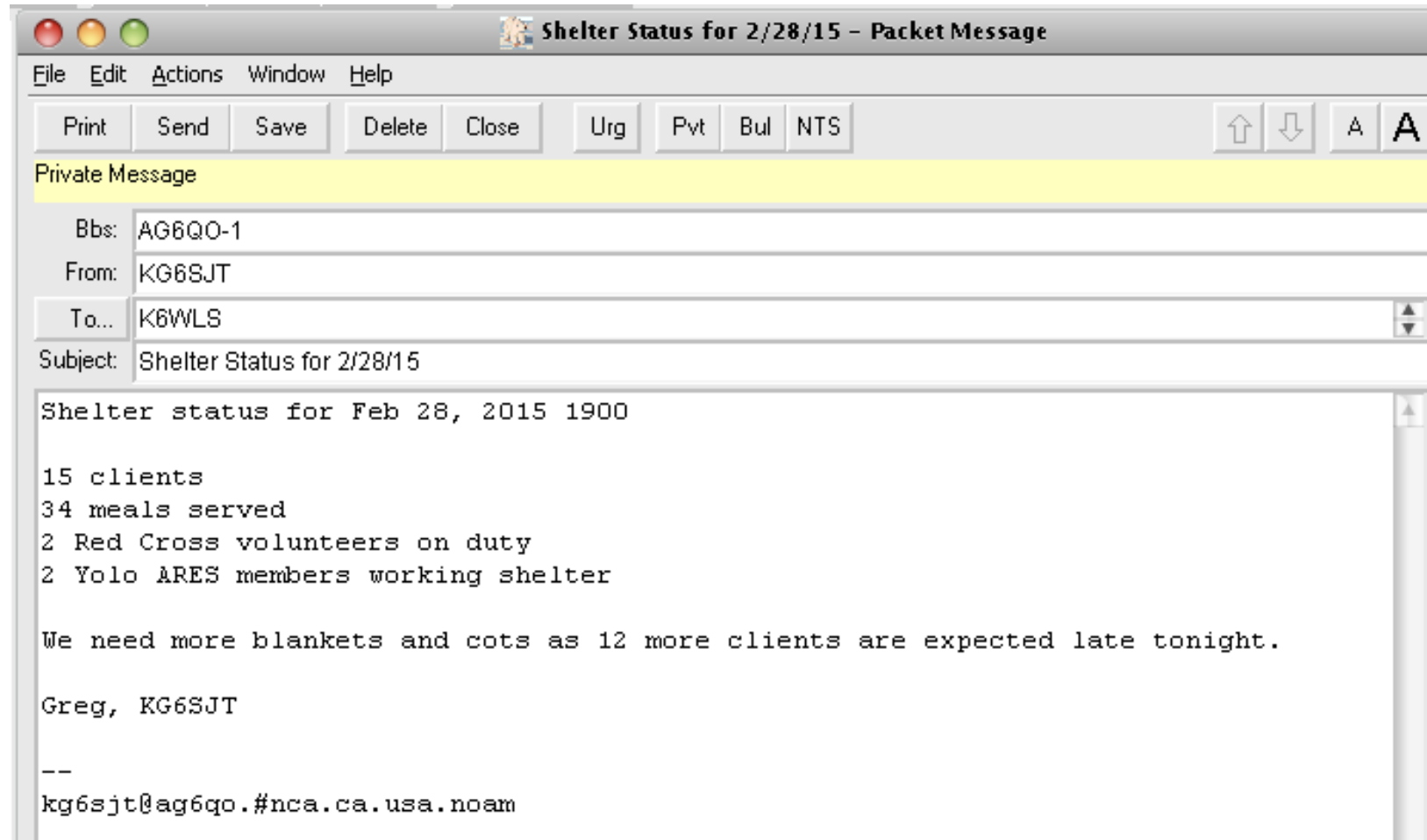
U	From	To	BBS	Subject	Date/Time	Size
	KJ7UK	KG6SJT...	AG6QO-1	9 MON TEST	2/9/2015 00:05	238
	AG6QO	KG6SJT	AG6QO-1	Re: NTS Message	2/9/2015 18:42	1336
	KJ7UK	KG6SJT...	AG6QO-1	10 TUE TEST	2/10/2015 00:06	245
	KJ7UK	KG6SJT...	AG6QO-1	11 WED TEST	2/11/2015 00:03	189
	AG6QO	KG6SJT	AG6QO-1	Hi Greg	2/11/2015 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
	KF60BI	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

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

Resources

- **Contact information**

Gregory Kruckewitt, KG6SJT

kg6sjt@gmail.com

cell: 530-219-0611

- **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.