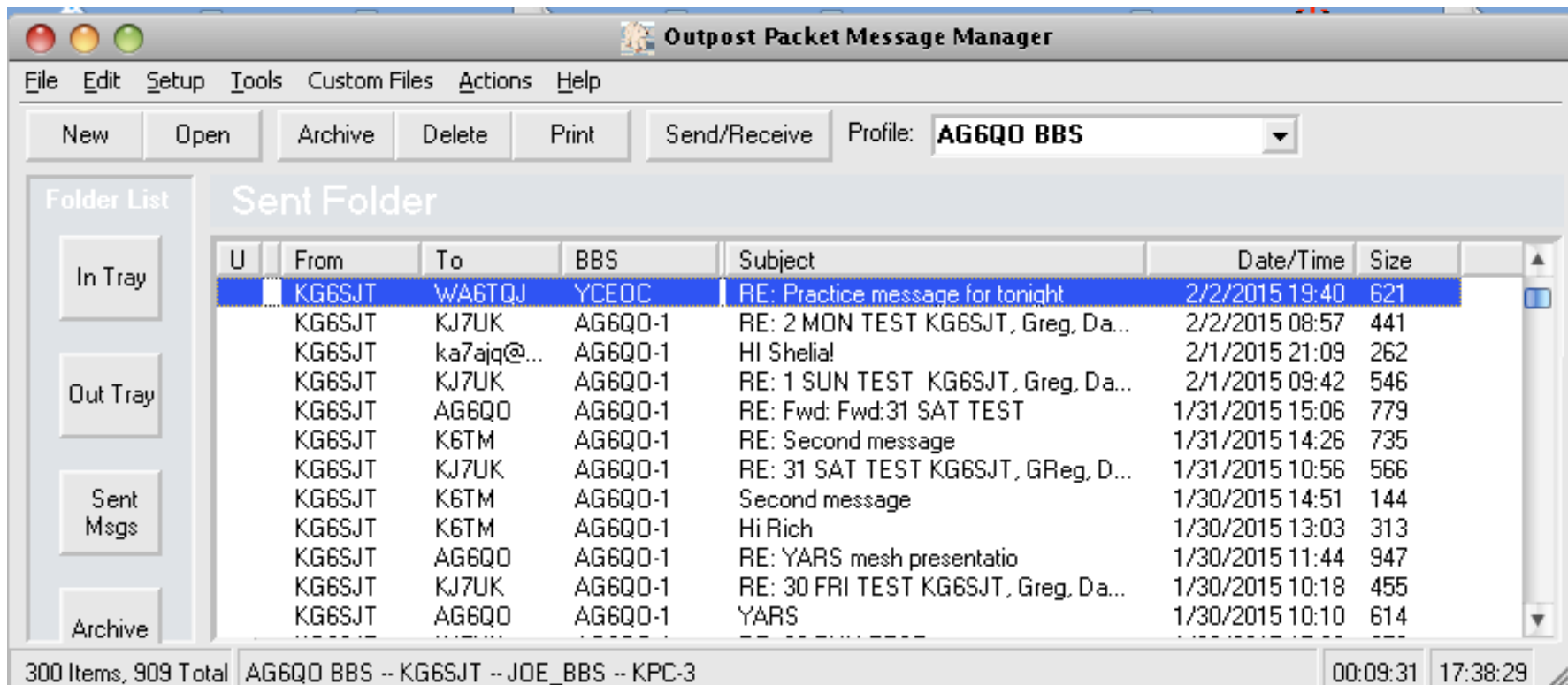# *Packet Radio*
Email via radio

Greg Kruckewitt, ARRL Sacramento Valley Section EC
Paul Grose N6DRY & Dwane Evans KG6KPW

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
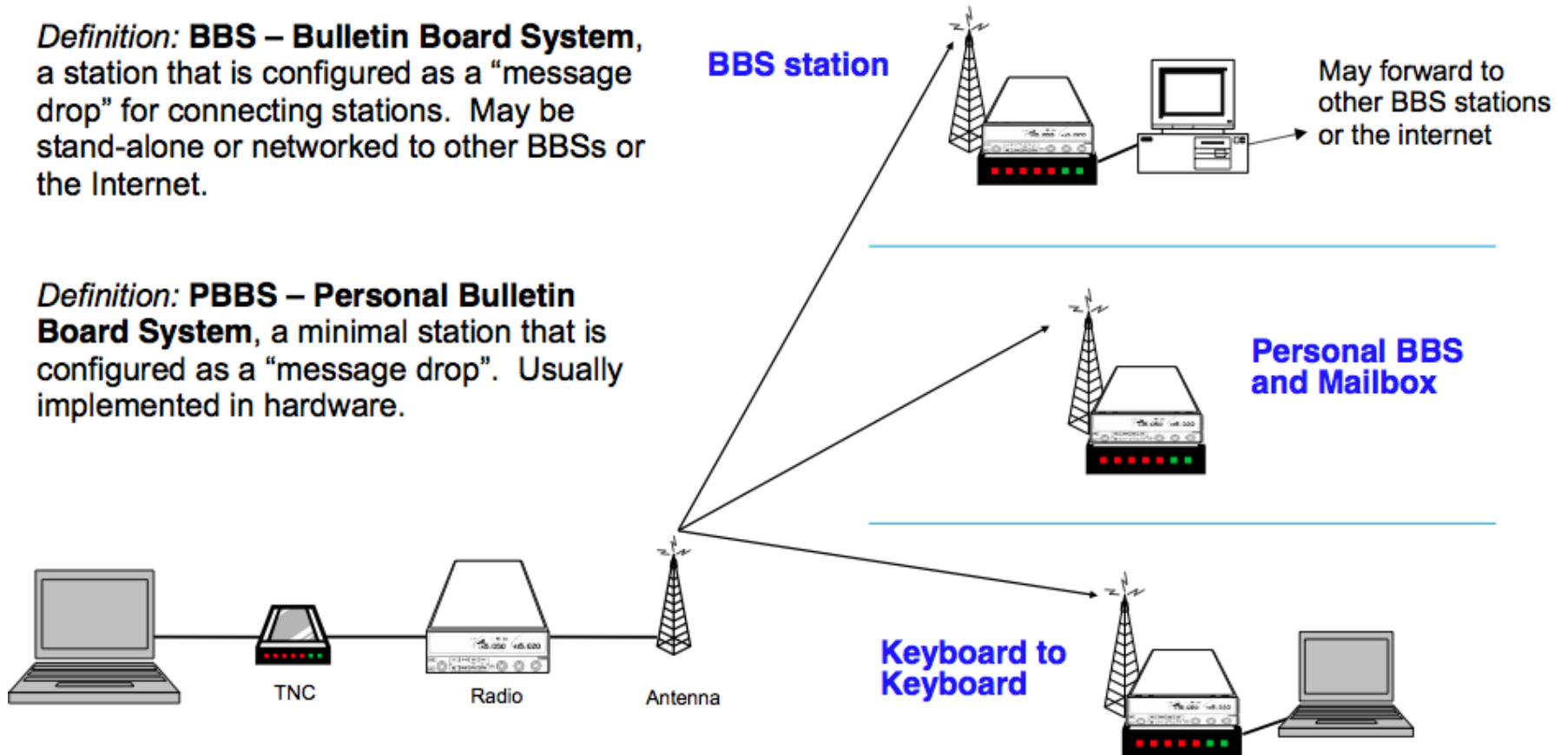- Sends packets (an envelope + payload)
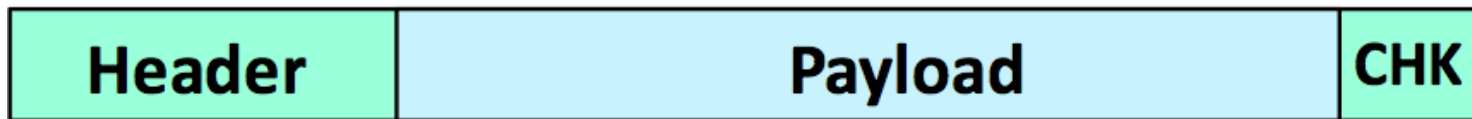
Header	Payload	CHK

– 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.

BBS station

May forward to other BBS stations or the internet

Personal BBS and Mailbox

Keyboard to Keyboard

TNC

Radio

Antenna

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:

```
                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 ASAP. Each
client evacuated from home with minimal or no RXs and no durable medical goods.
```

9

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
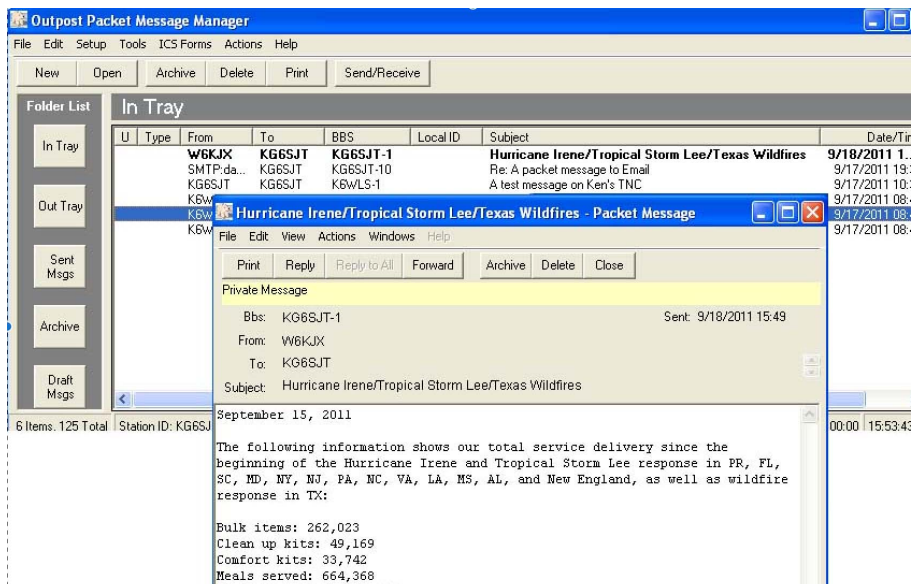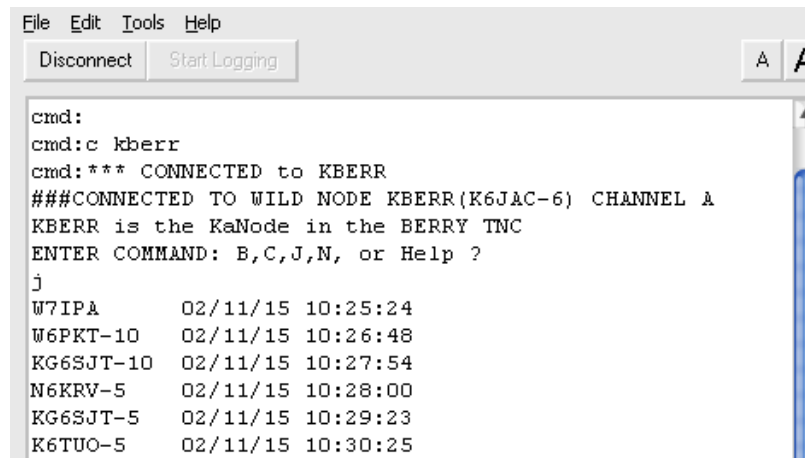
- RMS Express

- Outpost Packet Manager

Outpost PM & Winlink Express

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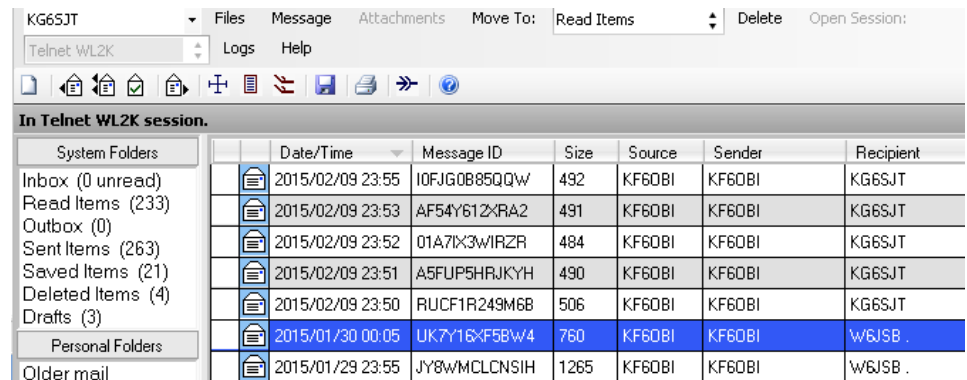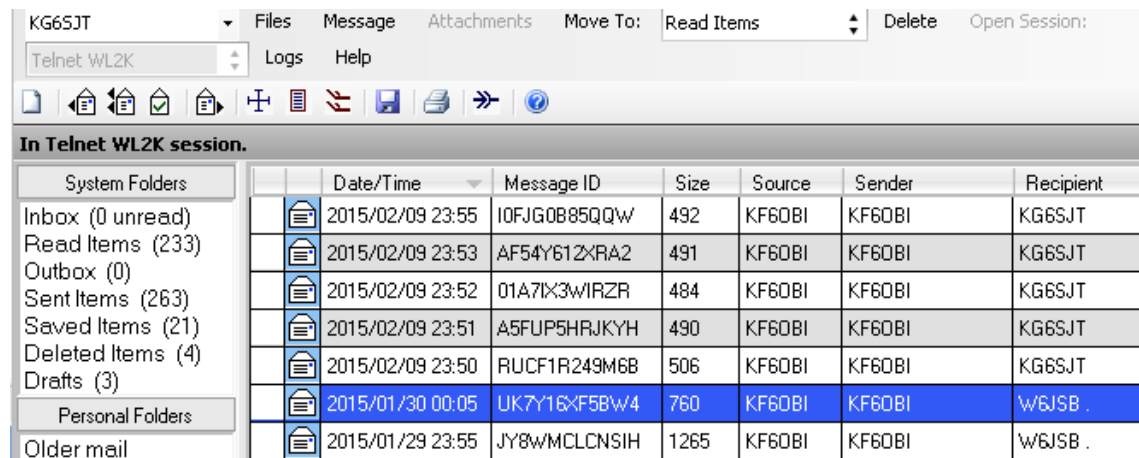
Terminal Program

- 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
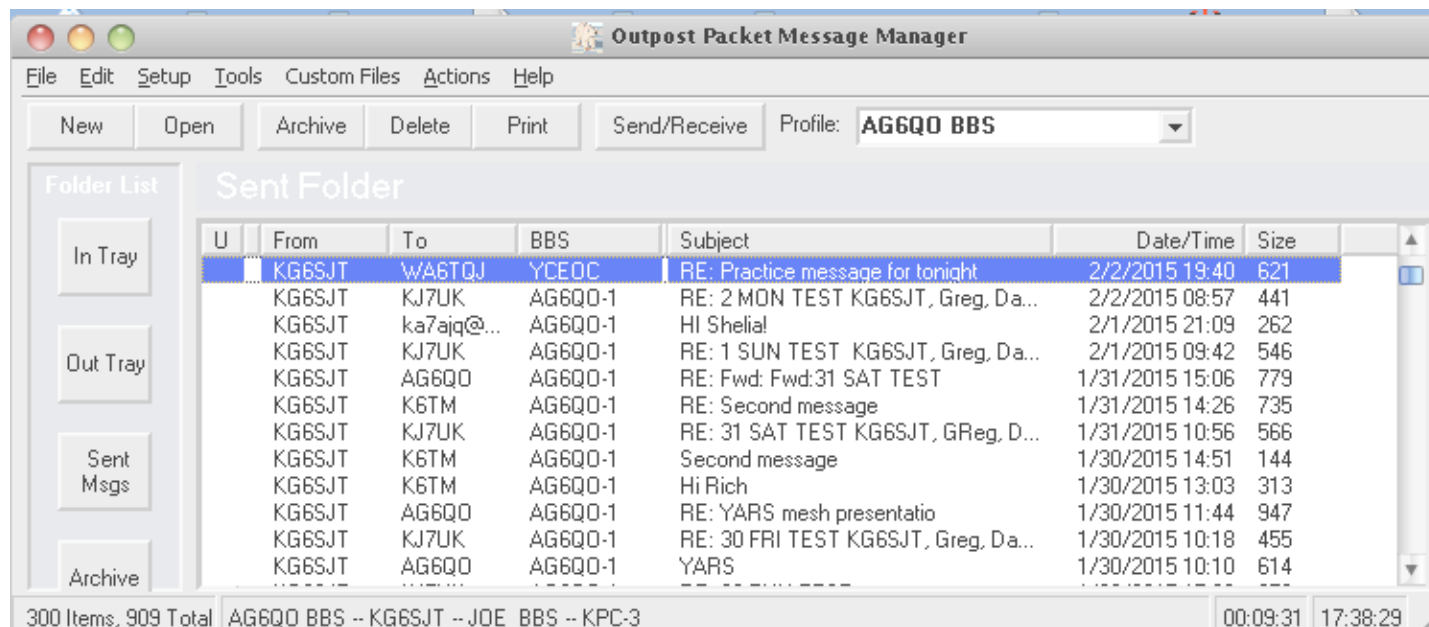
- Can send attachments such as small photos
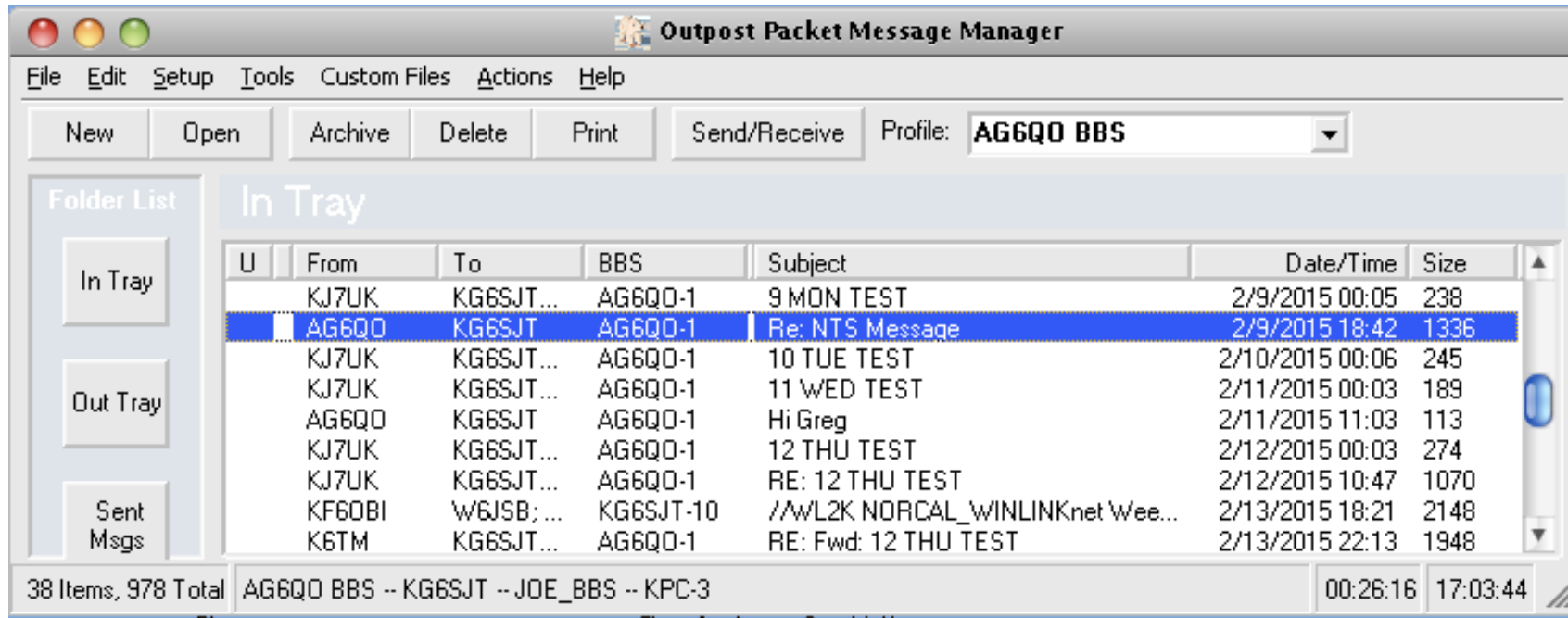
Outpost Packet Manager

- 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
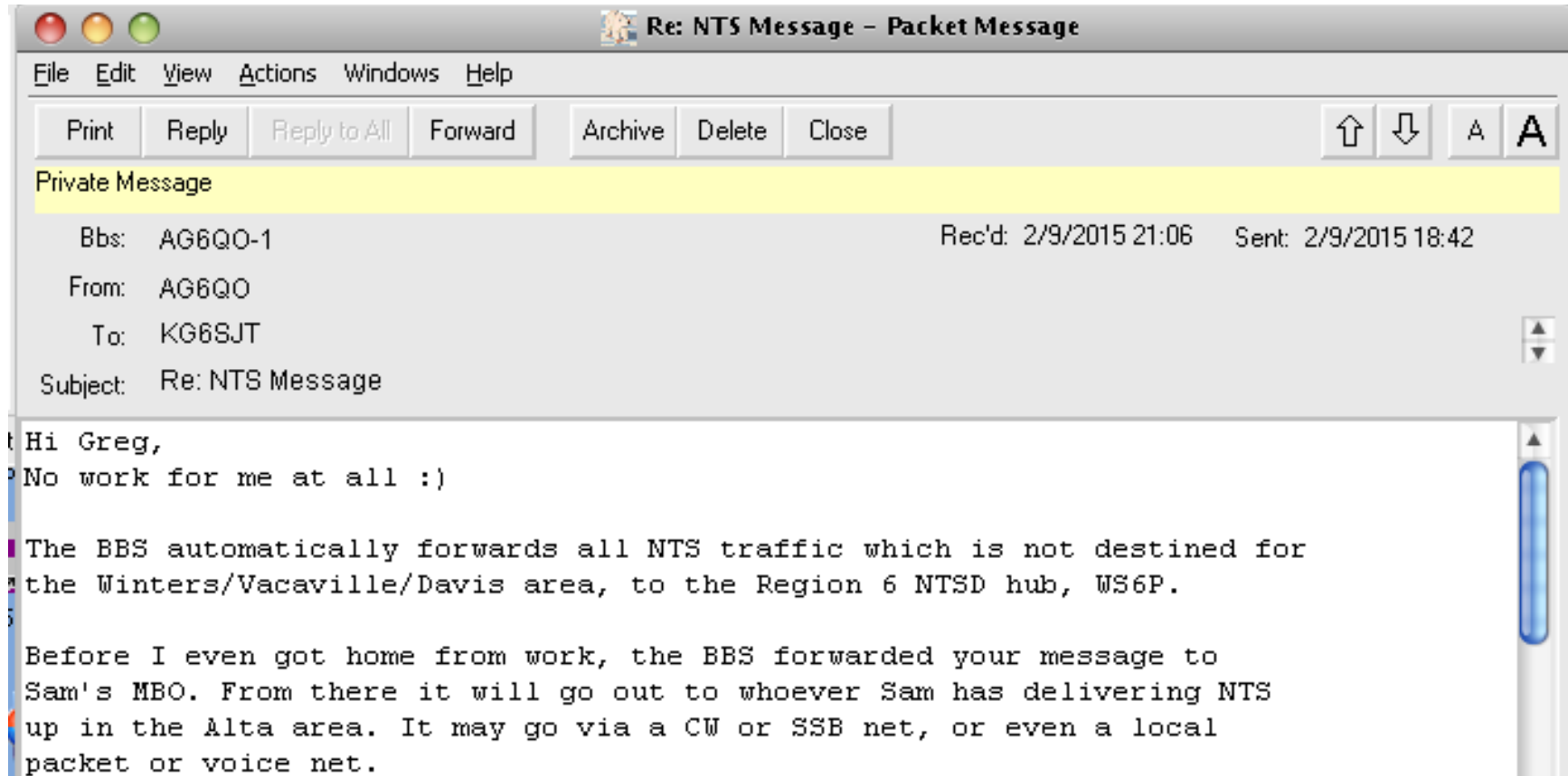- Makes printing a message as simple as a click

Outpost: Message List

Outpost: Read Messages

Re: NTS Message – Packet Message

File Edit View Actions Windows Help

Print | Reply | Reply to All | Forward | Archive | Delete | Close

Private Message

Bbs: AG6QO-1   Rec'd: 2/9/2015 21:06   Sent: 2/9/2015 18:42

From: AG6QO

To: KG6SJT

Subject: Re: NTS Message

Hi Greg,
No work for me at all :)

The BBS automatically forwards all NTS traffic which is not destined for
the Winters/Vacaville/Davis area, to the Region 6 NTSD hub, WS6P.

Before I even got home from work, the BBS forwarded your message to
Sam's MBO. From there it will go out to whoever Sam has delivering NTS
up in the Alta area. It may go via a CW or SSB net, or even a local
packet or voice net.

Outpost: Compose a Message
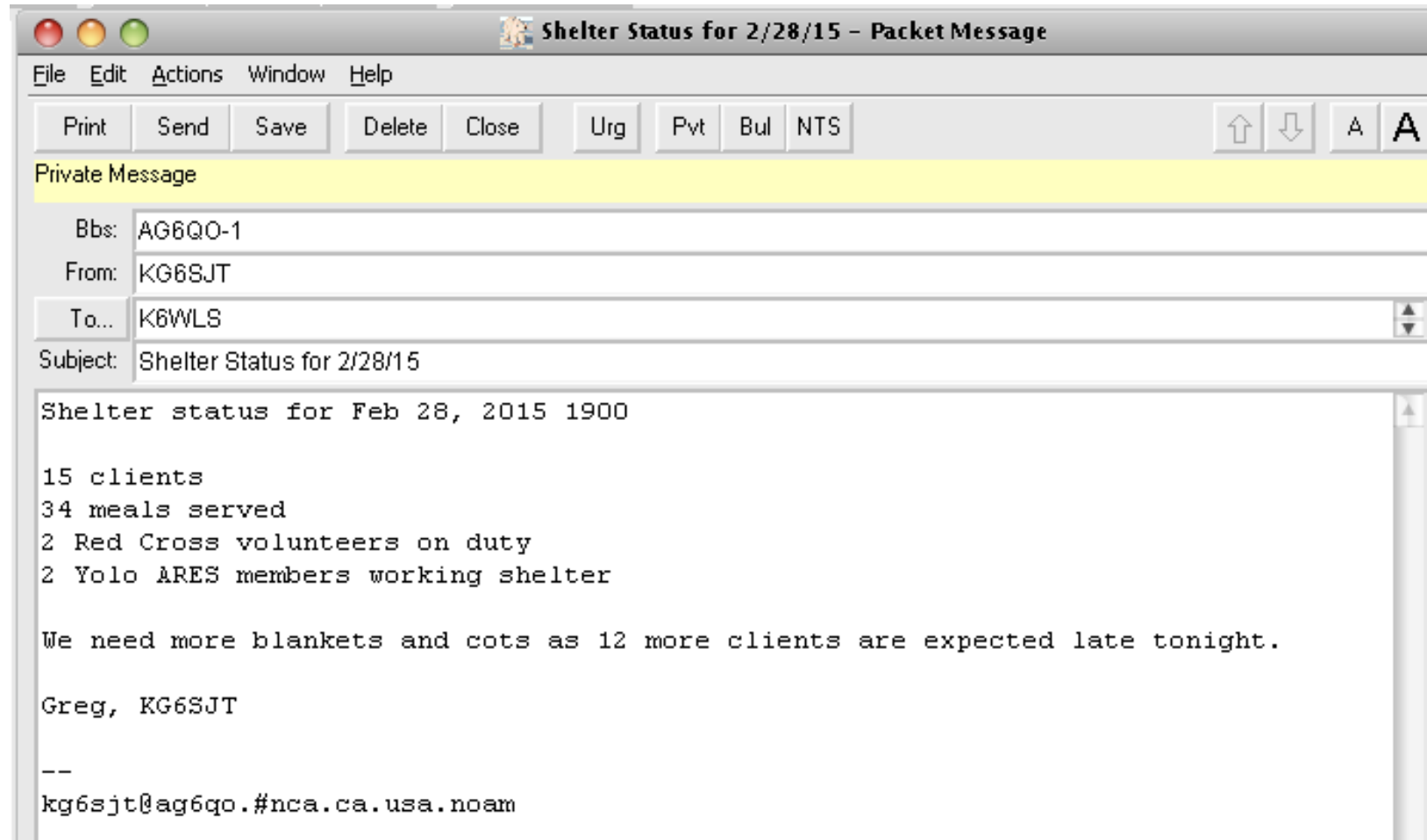
Packet Radio

- 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
  kg6sjt@gmail.com
  cell: 530-219-0611

  Dwane Evans, KG6KPW
  kg6kpw@sbcglobal.net
  cell: 916-764-0227

  Paul Grose, N6DRY
  pgrose@pacbell.net
  cell: 916-956-7387

- **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.