Cupertino Amateur Radio Emergency Service

Topic: Packet in Cupertino

Speaker: Jim Oberhofer KN6PE, EC Cupertino ARES

Date: Thursday, 30-September-2010, 19:30

Event: Cupertino ARES Meeting, Orientation Training

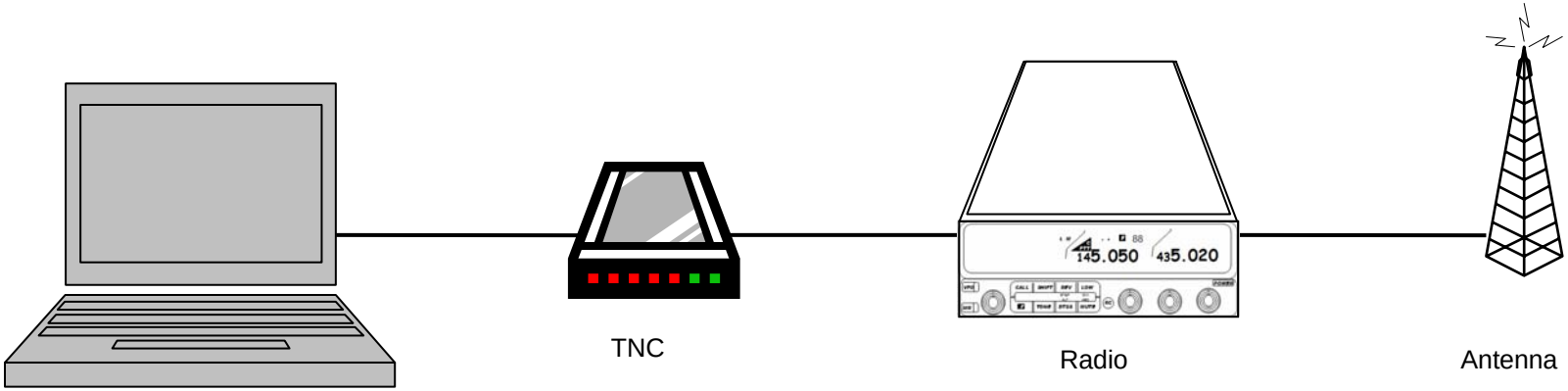
Topics

1. **Why use packet?**
2. **Santa Clara County's Packet Architecture**
3. **Packet in Cupertino**
4. **The October Drill**

Why use Packet Radio?

What is Packet Radio?

What are the components?



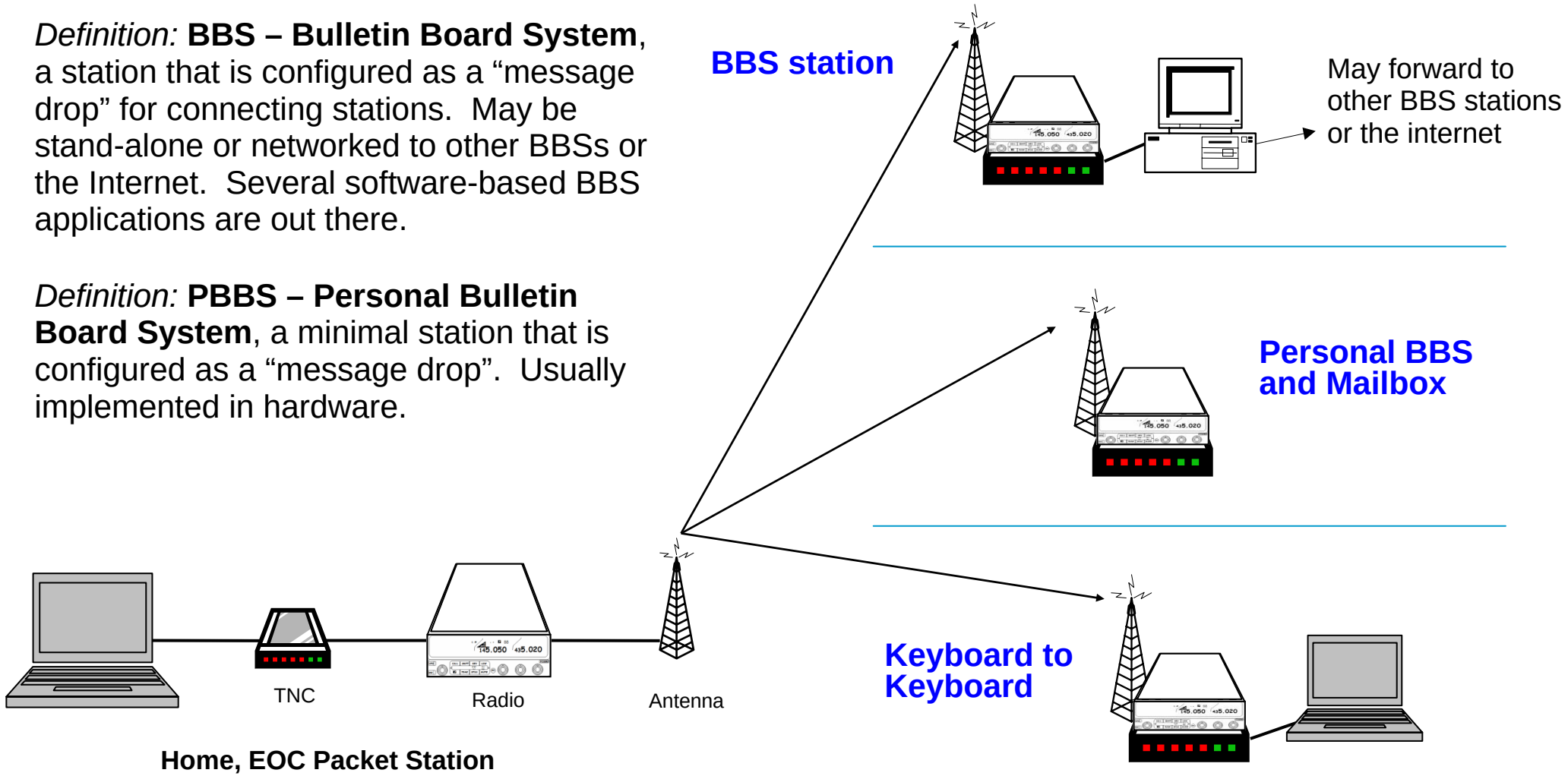
- **Computer:** runs a “terminal emulation” program
- **TNC:** Terminal Node Controller; similar to a telephone modem; the interface between your radio and your computer; may be hardware or software
- **Radio:** and antenna; transmits the digital data sent to the TNC to another packet station

What is Packet Radio?

What can we connect to?

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. Several software-based BBS applications are out there.

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



Home, EOC Packet Station

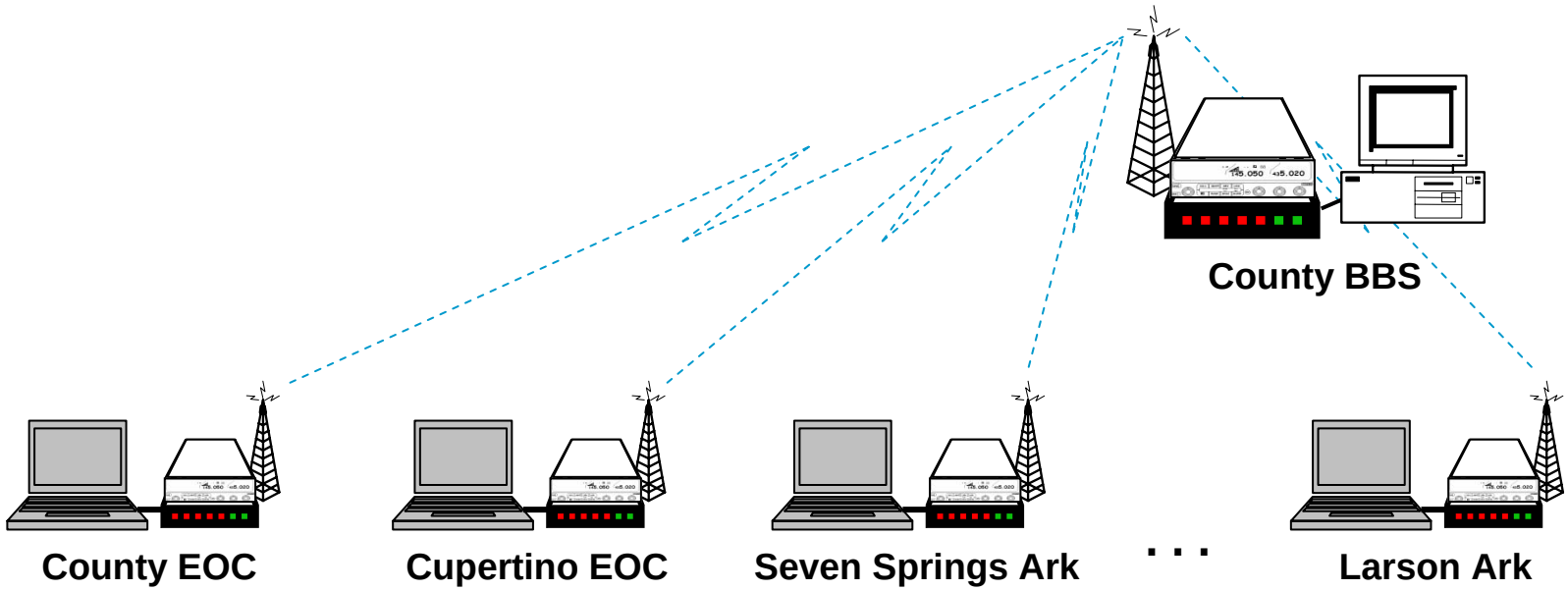
Why use Packet Radio?

The case for packet radio

1. Message Store and Forward

BBSs allow messages to be stored, retrieved, or forwarded throughout the connected BBS network.

The recipient does not need to be on line to get the message, meaning that messages can be retrieved at the recipient's convenience.



Why use Packet Radio?

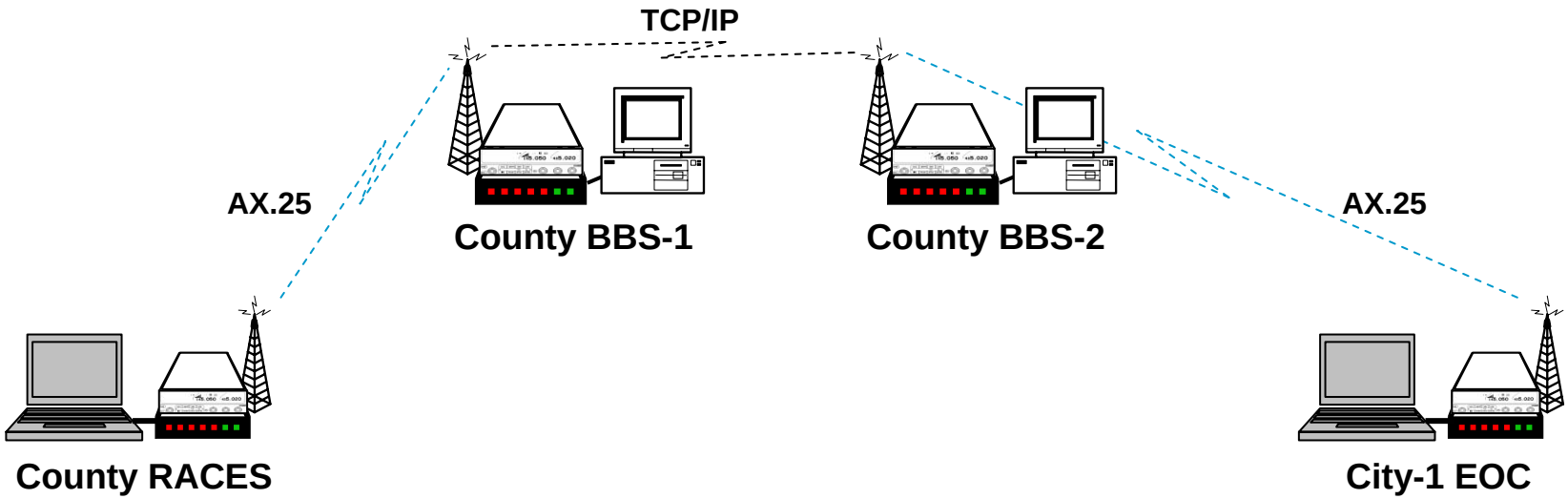
The case for packet radio

2. Communications Protocol – Error Free messaging

Packet uses a protocol called AX.25. This is based on the ITU X.25 protocol for networked packet communications.

AX.25 supports error correction and control that guarantees that all packets (and subsequently messages) are delivered correctly.

TCP/IP is also used to support interlinking BBSs together



Why use Packet Radio?

The case for packet radio

3. Interoperability

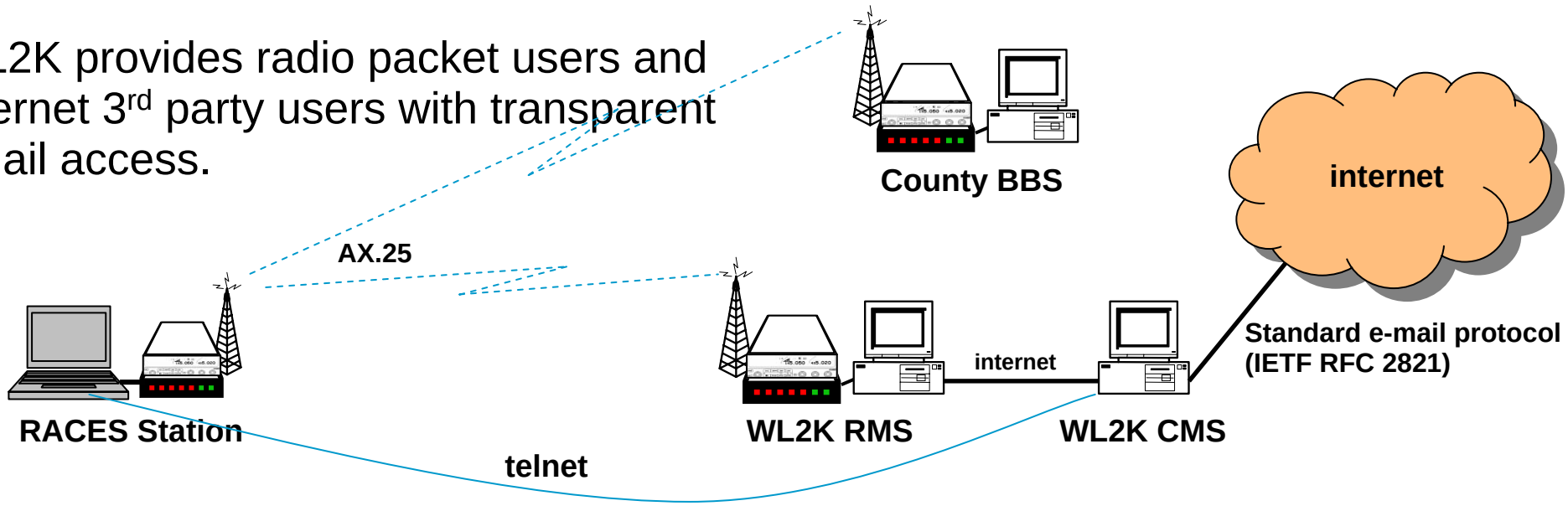
DHS suggested to the ARRL that the Amateur community should design and maintain a national digital network for emergency communication purposes**.**

Winlink 2000 (WL2K) was adopted as that solution.

WL2K provides radio packet users and internet 3rd party users with transparent email access.

Definition: **RMS – Radio Message Servers**, provides an RF gateway from packet users to the WL2K system.

Definition: **CMS – Common Message Servers**, coordinates message traffic between RMS stations and the internet.



Cupertino ARES/RACES

Why use Packet Radio?

The case for packet radio

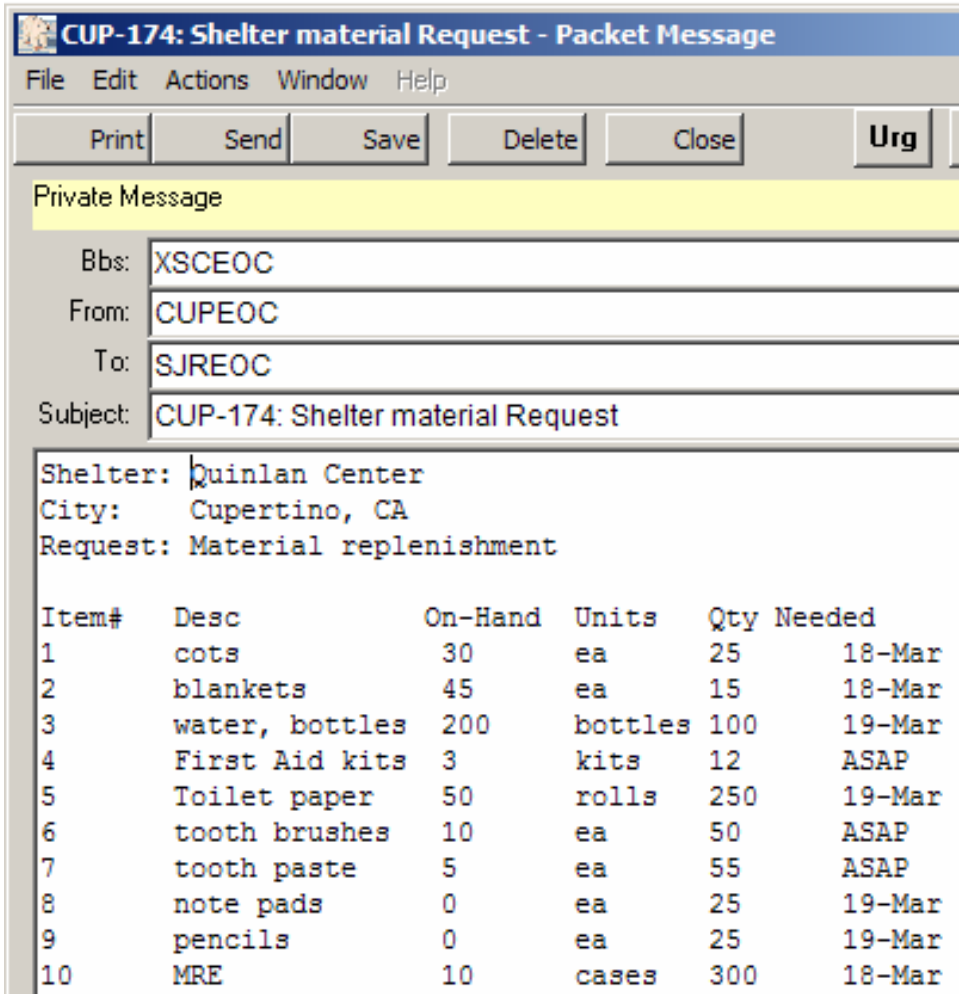
4. Complex messaging

Packet is ideal for passing lists of material, addresses, instructions, or complex words (i.e. pharmaceuticals or chemicals)

- you do not want to mistake ***Hydrogen Sulphide*** (a gas) with ***Hydrogen Sulfate*** (an acid)

Packet-based messaging ensures...

1. the originator can verify the content before it is sent (more than likely typed it him/herself),
2. reduces transcription errors between the sender and receiver, and
3. keeps the voice channel clear for more critical traffic.



Why use Packet Radio?

The case for packet radio

5. Reduces message handling

Packet messaging can originate from the source using standard office applications (or other methods) and sent directly to the packet app or by *sneaker-net* to the radio room for loading and sending.

Because packet is digital and relies on a computer, messages can also be printed directly to a printer (assuming the terminal program supports it, such as Outpost).

Why use Packet Radio?

The case for packet radio

6. Supported by the Amateur Community

Packet is supported by hams with the interest and intent of supporting a disaster response when commercial communications is overwhelmed or lost.

During last year's Chino Hills Earthquake…

- Magnitude 5.4 Earthquake
- telephone companies reported no physical damage to telecommunications facilities.
- phones in the San Bernardino County Sheriff's station worked only intermittently
- Sprint: "… reported an 800% increase over normal call volume in the half hour after the earthquake struck… the volume soared past predictions for emergencies."
- Verizon: "… about 40% more than the peak we expect during disasters."

Source: Los Angeles Times article, "Post-quake callers overload phone systems", 30-July-08

Why use Packet Radio?

The case for packet radio

7. Expectations

Our connected society has come to rely on our inherent ability to contact anyone, at anytime (thanks to cell phones and WiFi)

Wireless connectivity has evolved beyond a novelty to an EXPECTATION

The Santa Clara County Emergency Management Association (EMA) knows that our local communications infrastructure ***WILL FAIL*** during an earthquake and ***expects*** Ham Radio to enable the response and speed the recovery.

Packet is well suited to support the response mission. *Are we ready?*

Santa Clara County Packet Architecture

What do we need?

Enhanced County Packet System

The new packet system needs to address the following:

1. Common hardware platform… intel-based, current X86 architectures
2. Contemporary O/S… Linux or Windows
3. Contemporary BBS app… still supported, widely used
4. Message volume… handle the current and anticipated growth
5. TNCs and radios… support 1200 and 9600 baud speed
6. Leverage of the installed base hardware
7. Number of users… support the current users and ad-hoc (MACs)
8. Tactical Call support
9. Expandable… cover what we have today, add to it as necessary
10. Interoperability… with our PacFORMS and Outpost toolset
11. Short learning curve… looks and behaves like what we have today

Our current operating environment

Where are we today?

3. County RACES operates a 3 channel BBS system with Tactical Call and digipeater support…
4. … that hosts 25 organizations, 16 of which are active on packet

Who is ACTIVE* on Packet

- Campbell
- Cupertino
- Gilroy
- Los Altos
- Los Altos Hills
- Los Gatos
- Milpitas
- Morgan Hill
- Mountain View
- NASA – Ames
- Palo Alto
- San Jose
- Santa Clara
- Santa Clara County
- Saratoga
- Sunnyvale

Who else has a Tactical Call

- County Comm
- Loma Prieta
- Los Gatos Red Cross
- Monte Sereno
- Palo Alto Red Cross
- San Jose Red Cross
- San Jose Water Company
- Santa Clara Valley Water District
- Santa Cruz County
- Stanford

Who else wants to use Packet

- Various cities in the county
- 14 County hospitals

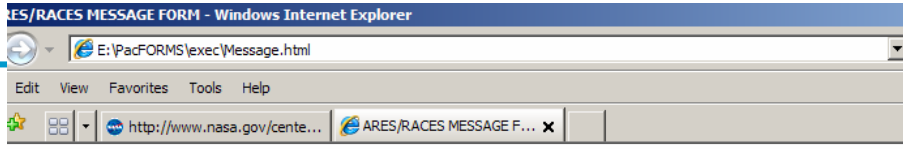
*__Active__ means: the city/agency…
(i) is confirmed as an active packet user,
(ii) has participated in County RACES Drills, and
(iii) has equipment and resources to support packet operations

Our current operating environment

Where are we today?

5. **Adopted or chartered new tools** to make packet messaging easier and more efficient

   - **PacFORMS** – web-based forms that standardize the data collection process between the city EOCs and the County EOC
   - **Outpost** – Packet program for exchanging packet messages with the BBS



EOC MESSAGE FORM

PacFORMS adaption of SCCo ICS Form 213 (Ver. 2.0)
By Phil Henderson, KF6ZSQ
(This form works with Outpost/OpDirect for Automatic ASCII text save)
For Instructions using this form Click Here.

2.) When Receiving Msg.: Senders's msg. #

1a.) Date: (MM/DD/YY) 03/10/2009

1b.) Time: (24 hour clock) 2202
0001 to 2400
2:00 PM = (2+12)=1400 Hrs.

4.) Situation Severity (Select One)
- EMERGENCY (e.g., Life Threat)
- URGENT (e.g., Property Threat)
- OTHER (All Others)

5.) Msg. Handling Order (Select One)
- IMMEDIATE (As Soon as Possible)
- PRIORITY (Less Than One Hour)
- ROUTINE (More Than One Hour)

To:		From:	
7.) ICS Position: (required)			8.) ICS Position: (required)
9a.) Location: (required)			9b.) Location: (required)
Name: (optional)			Name: (optional)
Telephone #: (optional)			Telephone #: (optional)

10.) SUBJECT:

(e.g., Number of earlier msg.):

at, when, where needed; how long; contact name and phone number)

n: (For use by Originator / Recipient) -> USE SEPARATE MESSAG

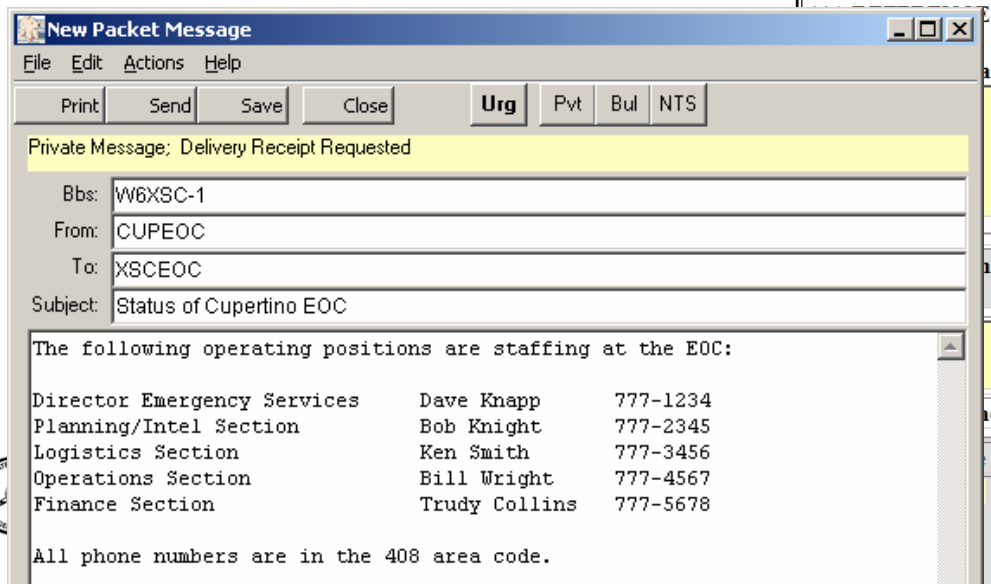
nent Operations Planning Logistics Finan

Only

or Sent (Check One this line and

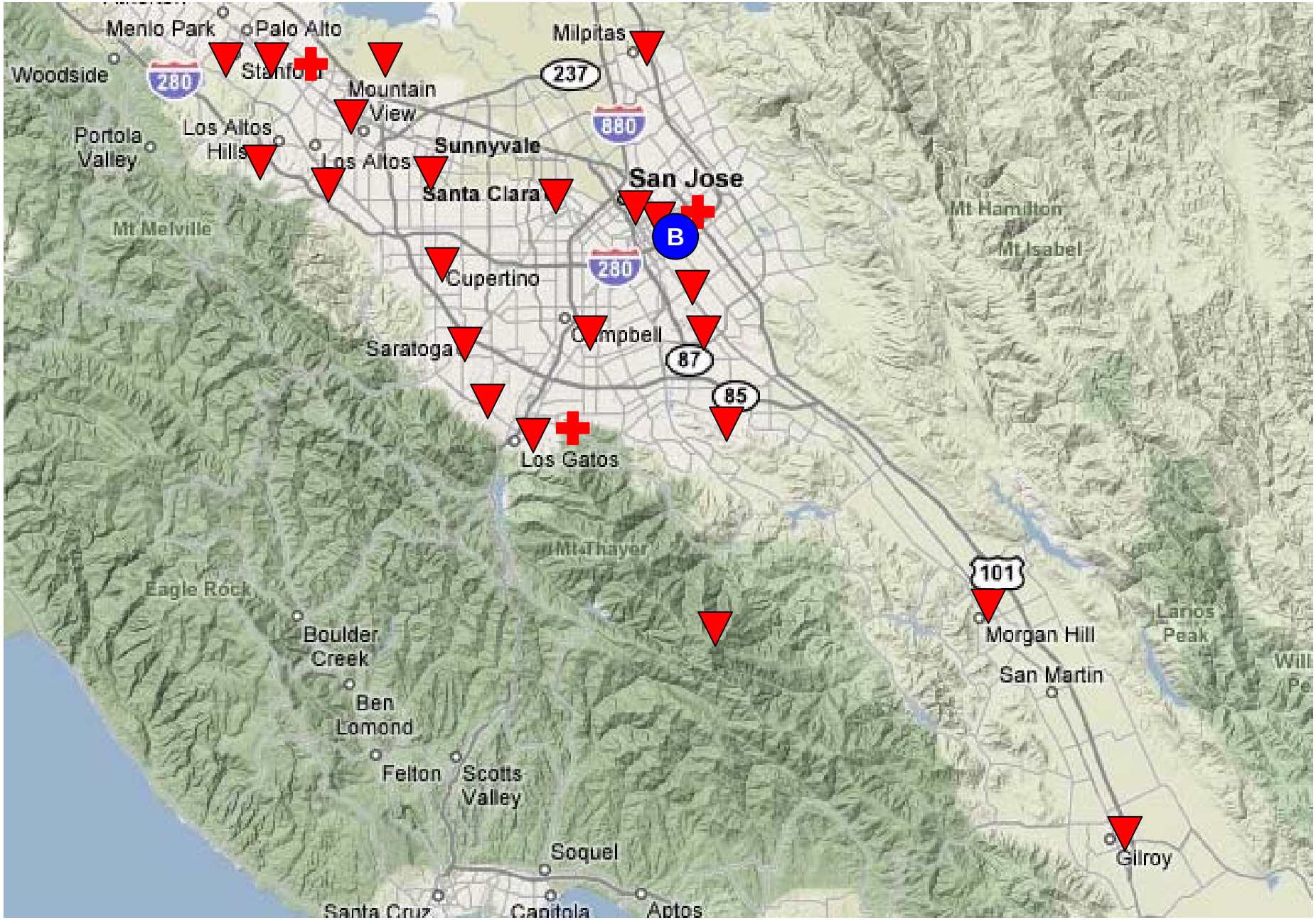
Dispatch Center
FAX Courier

Operator Call Sign:
Operator Name:



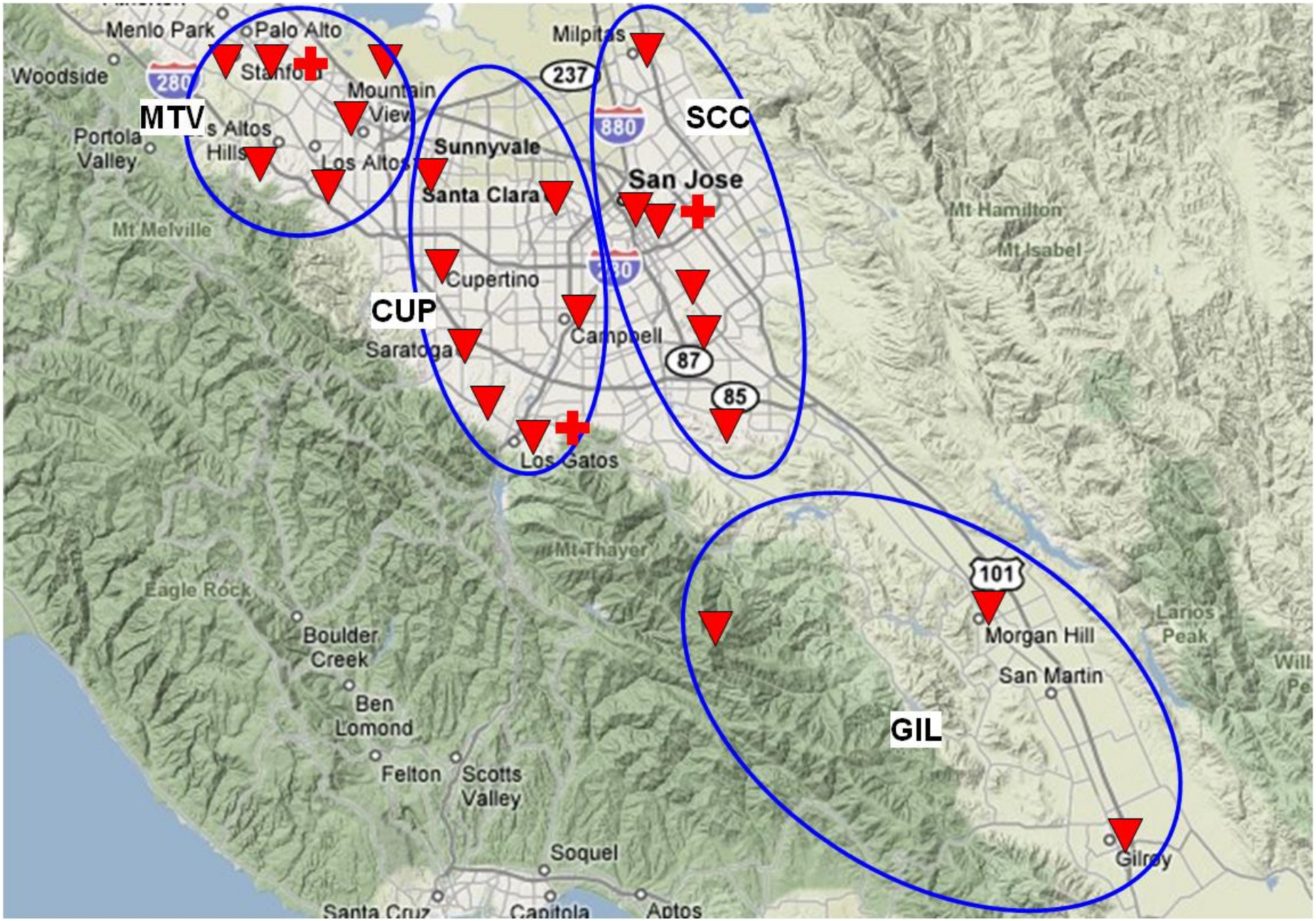
Where is everybody?

Enhanced County Packet System



The Plan: grouping into packet areas

Enhanced County Packet System – Long term plan



The Plan: City / agency alignment

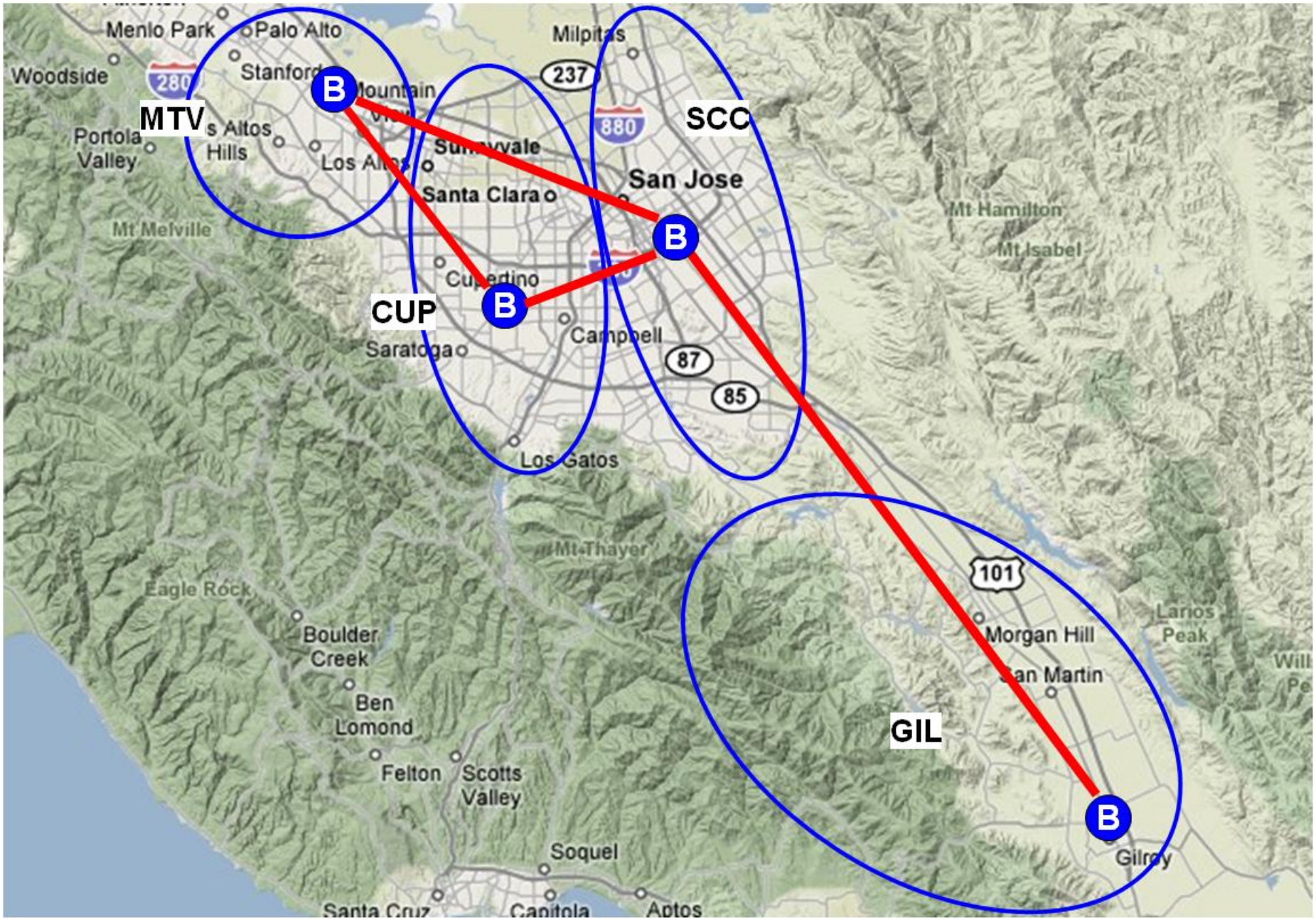
Enhanced County Packet System

1. Each JNOS BBS is hosted by a city and supported by either County RACES or the host City's local ARES/RACES organization.
2. Assign participating cities and served agencies a primary JNOS BBS for their main packet access.

Node Name	MTV	GIL	SCC	CUP
Host City	Mountain View	Gilroy	San Jose	Cupertino
Assigned Cities	1.Palo Alto 2.Los Altos 3.Los Altos Hills 4.Mountain View 5.NASA AMES.	1.Gilroy 2.Morgan Hill	1.Milpitas 2.San Jose 3.San Jose Red Cross 4.County EOC	1.Sunnyvale 2.Santa Clara 3.Cupertino 4.Campbell 5.Saratoga 6.Los Gatos
Others Pending	1.Palo Alto Red Cross 2.Stanford University	1.Loma Prieta	1.County Comm 2.San Jose Water 3.SCVWD	1.Monte Sereno 2.Los Gatos Red Cross

The Plan: Overlaying our 4 BBSs

Enhanced County Packet System



The Plan: Frequency Assignments

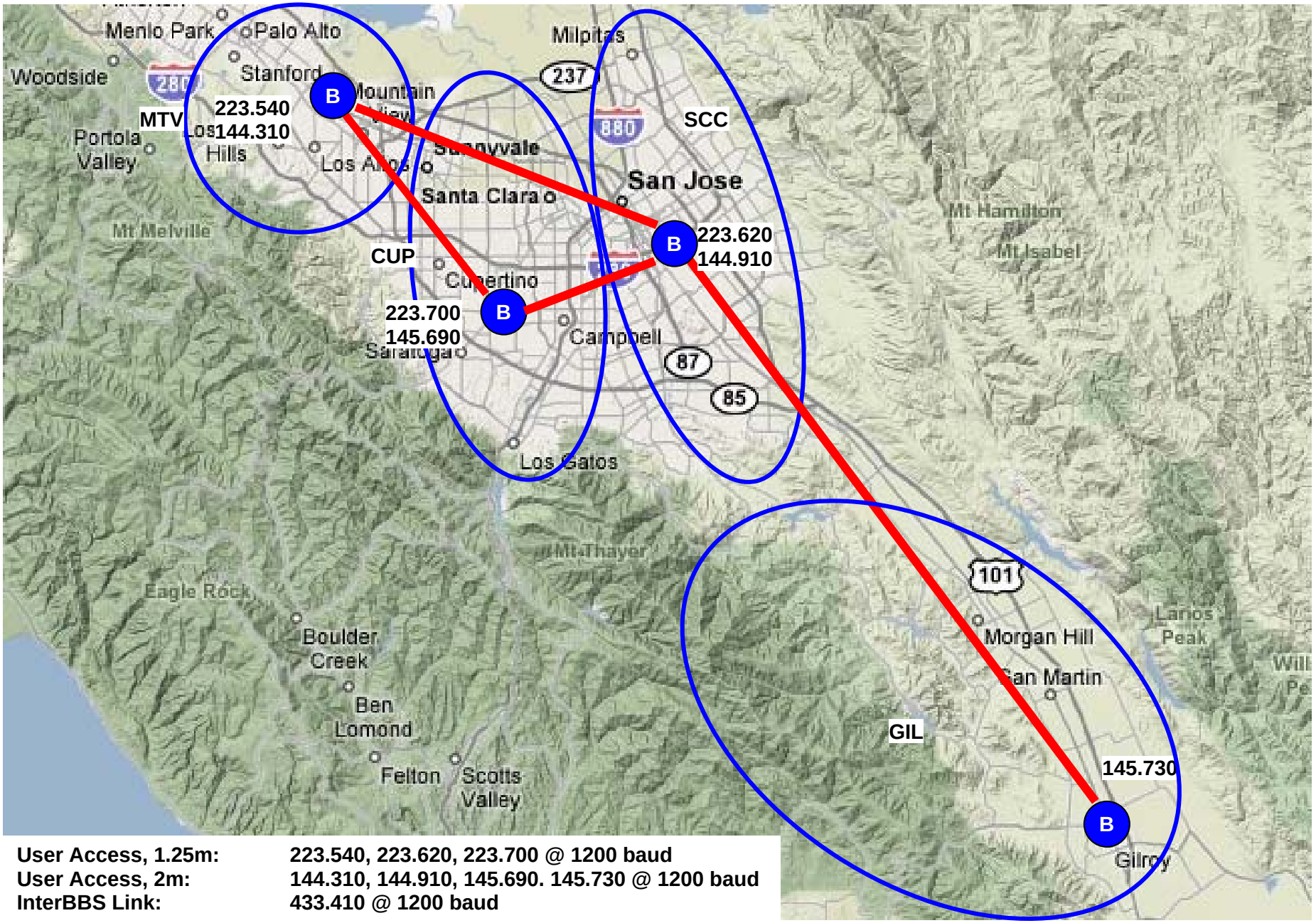
Enhanced County Packet System

6. Users access the BBS on different 2 meter and 220 MHz frequencies using standard AX.25 packet with existing equipment at 1200 baud.
7. Messages are transferred between JNOS BBSs using a common TCP/IP 1200 baud 440 link.

Node Name	MTV	GIL	SCC	CUP
Host City	**Mountain View**	**Gilroy**	**San Jose**	**Cupertino**
2 meter user frequencies	144.310 MHz	145.730 MHz	144.910 MHz	145.690 MHz
220 user frequencies	223.540 MHz		223.620 MHz	223.700 MHz
440 Link frequency	433.410 MHz	433.410 MHz	433.410 MHz	433.410 MHz

The Plan: Frequency Assignments

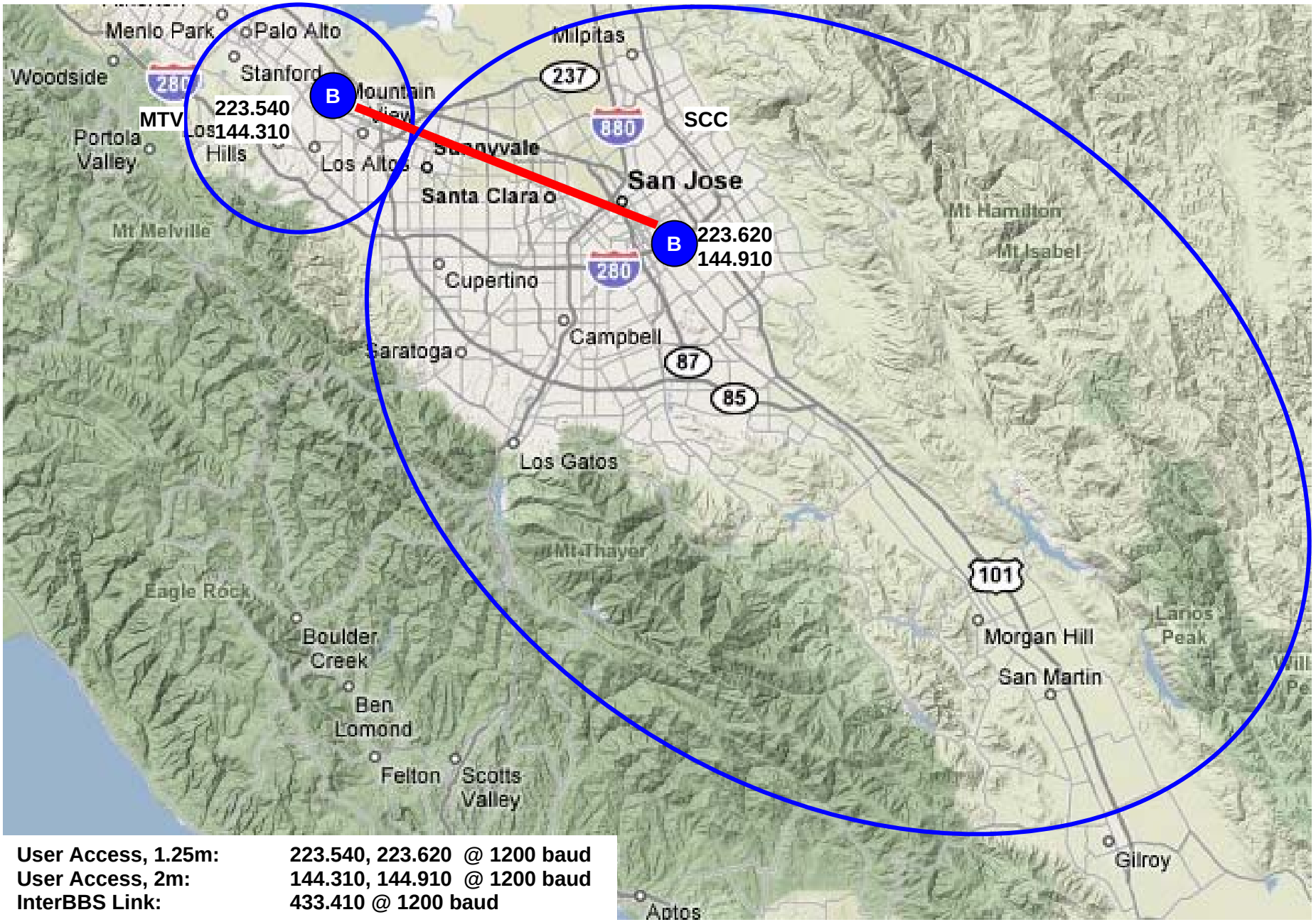
Enhanced County Packet System



User Access, 1.25m:	**223.540, 223.620, 223.700 @ 1200 baud**
User Access, 2m:	**144.310, 144.910, 145.690. 145.730 @ 1200 baud**
InterBBS Link:	**433.410 @ 1200 baud**

Implemented: 2 of the 4 BBSs so far

Enhanced County Packet System



User Access, 1.25m:	**223.540, 223.620 @ 1200 baud**
User Access, 2m:	**144.310, 144.910 @ 1200 baud**
InterBBS Link:	**433.410 @ 1200 baud**

Implemented: City, BBS specifics

Enhanced County Packet System

Node Name	MTV	SCC	
Host City	Mountain View	San Jose	
2 meter	144.310 MHz	144.910 MHz	
220	223.540 MHz	223.620 MHz	
Connect Name	K6MTV-1	W6XSC-1	
Assigned Cities	1.Palo Alto 2.Los Altos 3.Los Altos Hills 4.Mountain View 5.NASA AMES.	1. Gilroy 2. Morgan Hill 3. Milpitas 4. San Jose 5. San Jose Red Cross 6. County EOC	7. Sunnyvale 8. Santa Clara 9. Cupertino 10. Campbell 11. Saratoga 12. Los Gatos

Ref: http://www.scc-ares-races.org/freqs/packet-freqs.html

http://www.scc-ares-races.org/packet.html

Santa Clara County OES, California
ARES/RACES

Packet Network Information

Packet Frequency and BBS Information

What is Packet, An Introduction... (PDF - 554 KB) by Jim Clark, N6JRC

Packet Network Presentations:
Packet Updates in Santa Clara County (PDF - 8MB) Presentation at SPECS, 1/30/2010, by Jim Oberhofer, KN6PE
Packet Network Update (PDF - 564 KB) Presentation at EC Council, 01/14/2010, by Michael Fox, N6MEF
Packet Updates in Santa Clara Co. (PDF 808kB) Presentation at SVECS Breakfast, 10/24/2009, by Jim Oberhofer, KN6PE

Configuration and Set-up Instructions

Standard Outpost Configuration Instructions - 09/11/2010 (PDF - 608 KB)
Standard TNC Parameter Settings - 05/05/2010 (PDF - 456 KB)
JNOS Settings for Outpost - 02/24/2010 (PDF - 69 KB)
How to Request Tactical Calls - 09/13/2010 (PDF - 115 KB)
How to Configure Outpost for Inbound Message Numbering - 09/11/2010 (PDF - 93 KB)
How to Configure Outpost for Automated ICS-309 Printing - 09/11/2010 (PDF - 97 KB)

Operating and Usage Instructions

How to Send a Packet Message with Outpost - 01/20/2010 (PDF - 76 K)
Standard Format for Packet Message Subject Line - 09/08/2010 (PDF - 85 KB)
Weekly Packet Check-In Procedure - 06/20/2010 (PDF - 68 KB)

Client Software

Download the SCCo Packet installer (v19) 9/11/2010 (.EXE - 3.8 MB)

User Group and Technical Support

Santa Clara County ARES/RACES Packet Users Group - **scc-packet**
This Yahoo group is available for discussing and getting help on packet radio for Santa Clara County ARES/RACES. *Click above to join.*

Packet in Cupertino

Situation

1. Cupertino uses packet to pass digital message traffic between Cupertino and County EOC.
2. During the October 2009 City Drill, CARES and County MACs were used to cover some of the Ark communicator shifts.
3. There were ham radio operators (some CARES, some not) staffing ICS positions at the Arks.
4. During a full-scale emergency response, it is unlikely that CARES will have immediate access to MACs to cover some shifts.
5. Some alternatives for Ark comms are:
    - SUVs
    - Packet with Ark ICS staff as Control Operators
6. Cupertino OES is interested in investing in Packet kits for the arks

How will we deploy packet?

1. Operate in the EOC for EOC to County message handling
2. Start with the Arks
3. Use at the Arks for Ark-to-City EOC message handling
4. Understand the message requirements and develop message templates for Ark-to-City EOC (structured) message handling
5. Leverage the County Packet infrastructure (BBSs)
6. Continue to align to the message hierarchy protocol

Aligning Packet in California

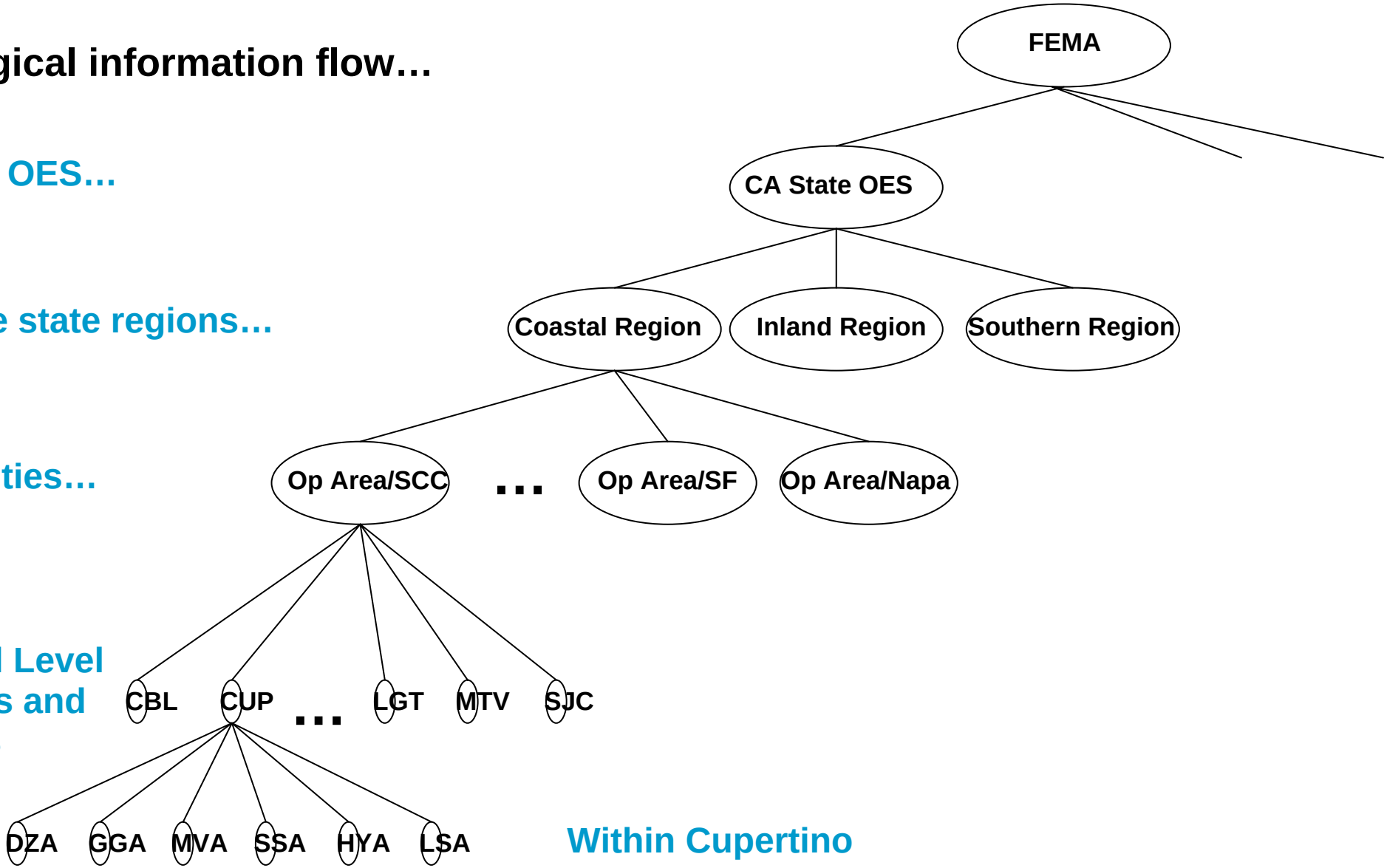
Logical information flow…

State OES…

Three state regions…

Counties…

Local Level towns and cities



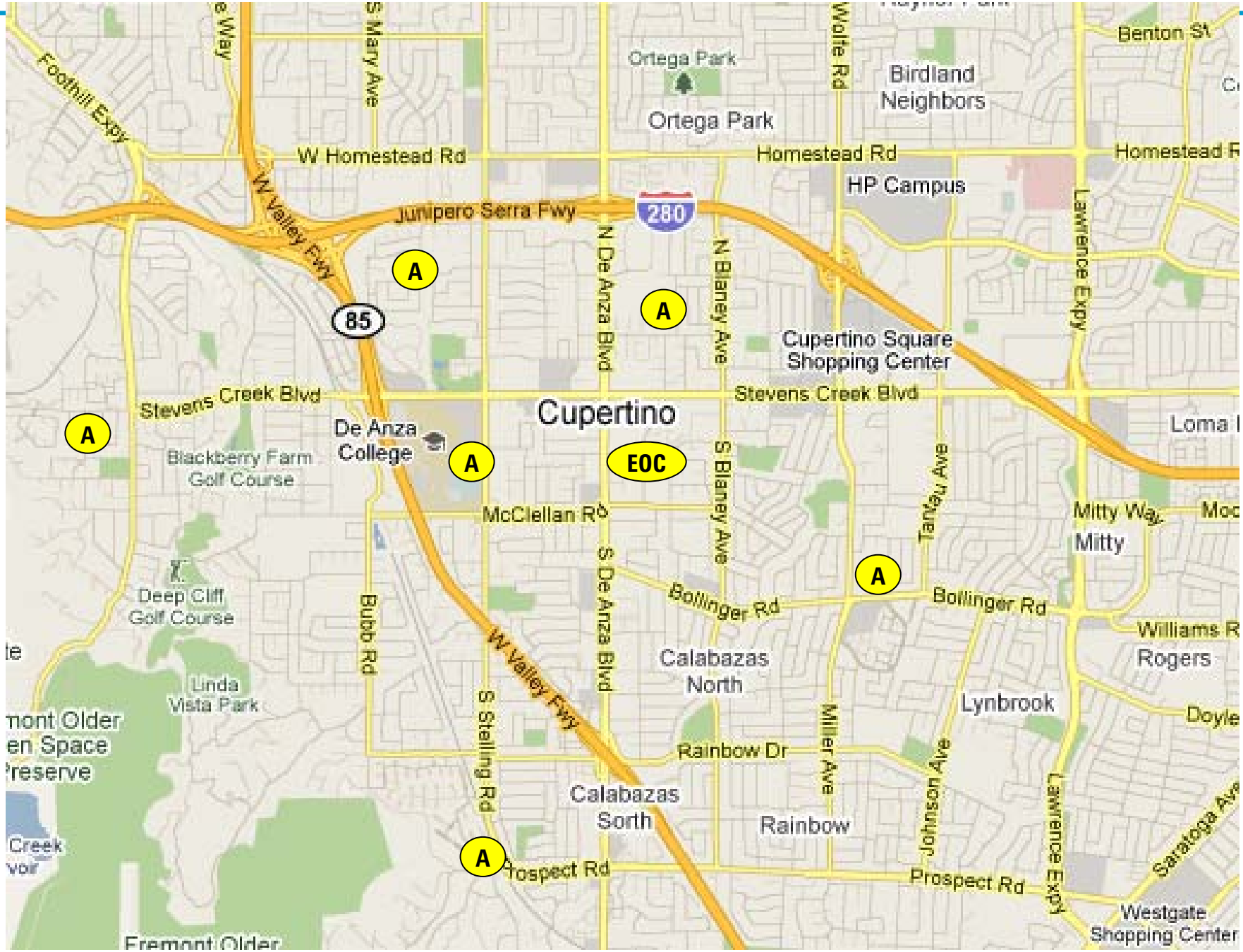
Within Cupertino

Cupertino ARES/RACES

Considerations for Cupertino packet

1. Tactical Calls
2. Use the SCCo Outpost Install
3. Our packet message mail drop
4. Using Outpost

1. Tactical Calls: EOC, Ark Locations



1. Tactical Calls for Cupertino

City Facilities

CUPBBF	Cupertino Blackberry Farm (OES)
CUPCRE	Creekside Park
CUPDPW	Cupertino Corp Yard
CUPEOC	Cupertino EOC
CUPJOL	Jollyman Park
CUPMEM	Memorial Park
CUPOPS	Field Operations
CUPPOR	Portal Park
CUPQLN	Quinlan Community Center Shelter
CUPWVS	West Valley Service Center

Arks

CUPDZA	DeAnza College Ark
CUPGGA	Garden Gate Ark
CUPHYA	Hyde Middle School Ark
CUPLSA	Larsen School Ark
CUPMVA	Monta Vista Ark
CUPSSA	Seven Springs Ark

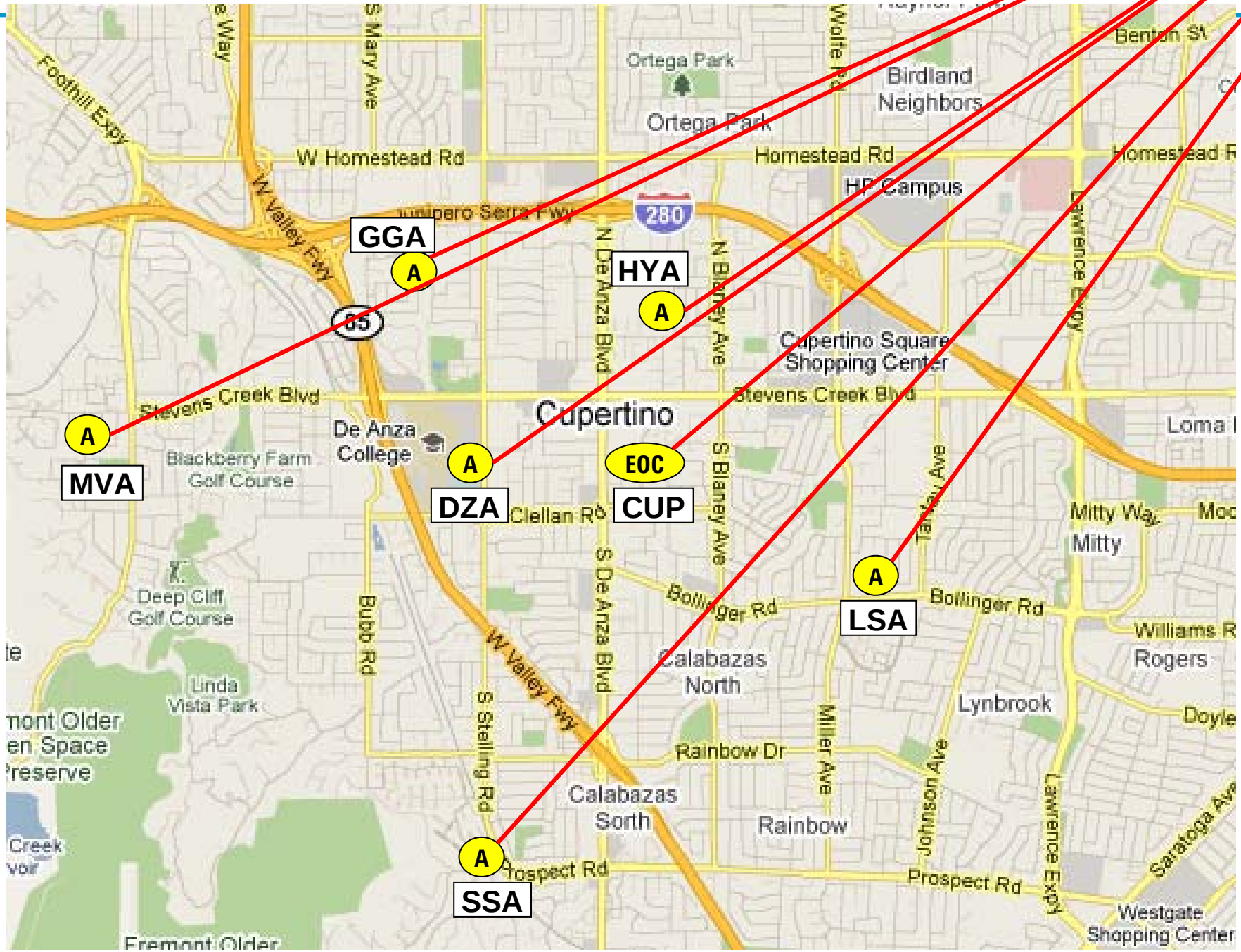
Public Safety

CUPCSO	County Sheriffs station, west side
CUPCUF	Cupertino Fire
CUPMVF	Monta Vista Fire
CUPSSF	Seven Springs Fire

Services

CUPMED	Cupertino Medical Center
CUPSJW	San Jose Water in Cupertino
CUPSAN	Cupertino Sanitary District

1. Tactical Calls: EOC, Ark Locations



2. SCC Packet Install

http://www.scc-ares-races.org/packet.html

- Outpost and PacFORMS are the standard client software used in Santa Clara County ARES/RACES. Outpost provides an easy to use, e-mail-like user interface for sending, receiving and managing packet messages. PacFORMS provides an HTML representation of many standard county forms and optimizes the sending and receiving of forms-based information over a packet network.
- This program installs both Outpost and PacFORMs and includes optimized configuration files for the county BBSs and several popular TNCs. All Santa Clara County packet network users should use this version of Outpost and PacFORMS.
- Instructions: Download the installer to your hard drive. Double click to run the installer. *(ECs: Access the password-protected part of the website to download the installer with all private PacFORMS.)*
- Windows XP and earlier: Install in the default directory…
  "C:\Program Files\SCCo Packet"
- Windows Vista and Windows 7: Change the install directory to…
  "C:\SCCo Packet". This will avoid the restrictions these operating systems place on writing to files in the installation directory.

Download the SCCo Packet installer (v19) 9/11/2010 (.EXE - 3.8 MB)

3. BBS specifics

Enhanced County Packet System

Node Name	MTV	SCC	
Host City	Mountain View	San Jose	
2 meter	144.310 MHz	**144.910 MHz**	
220	223.540 MHz	223.620 MHz	
Connect Name	K6MTV-1	**W6XSC-1**	
Assigned Cities	1.Palo Alto 2.Los Altos 3.Los Altos Hills 4.Mountain View 5.NASA AMES.	1. Gilroy 2. Morgan Hill 3. Milpitas 4. San Jose 5. San Jose Red Cross 6. County EOC	7. Sunnyvale 8. Santa Clara **9. Cupertino** 10. Campbell 11. Saratoga 12. Los Gatos

Introduction to Outpost

A brief introduction

Outpost Packet Message Manager

What is Outpost?

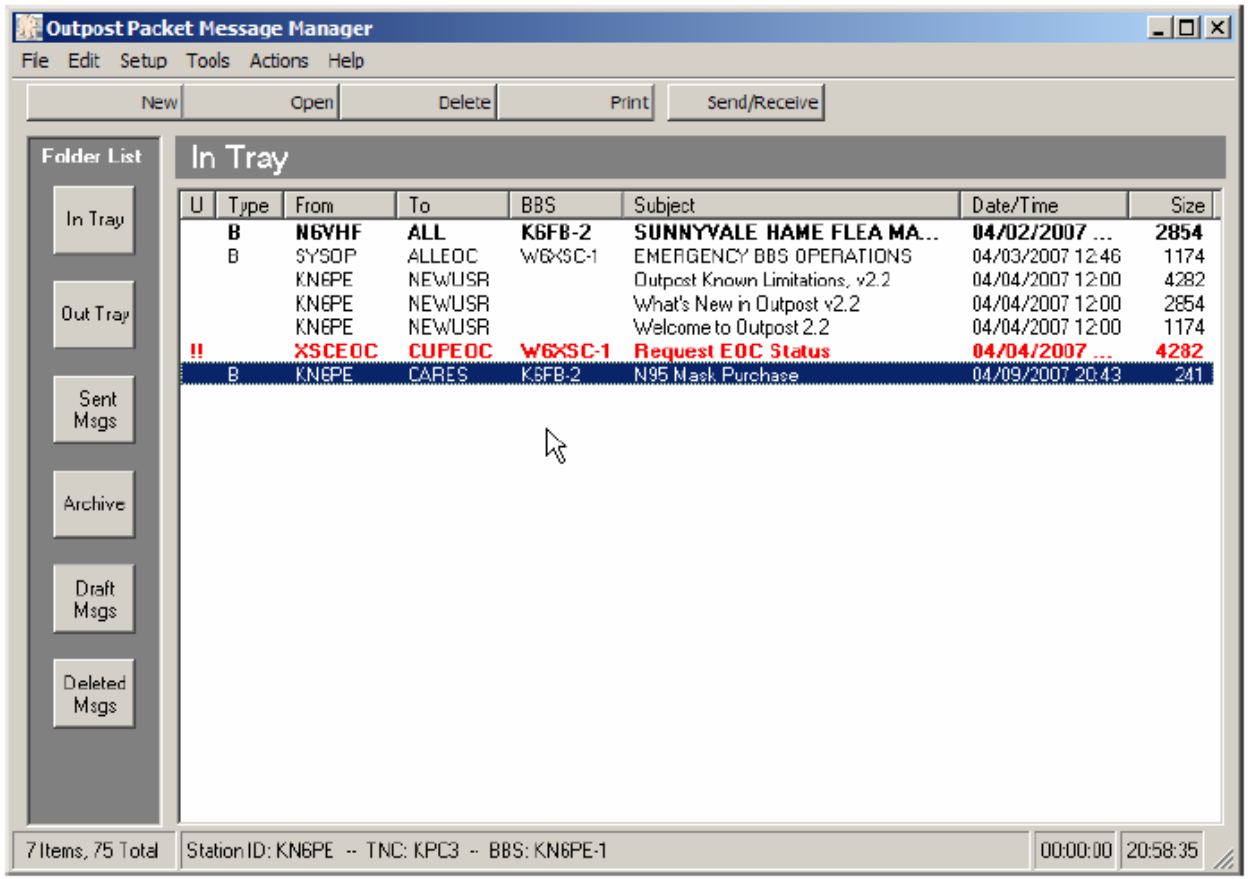
- A Windows-based packet messaging client that hides the complexity of the packet world
- Helps automate all the features available with the packet message handling environment
- Manages all message-handling between you and the BBS
- Lets you read, delete, create, reply to, or forward messages back to the BBS
- Enables ARES / RACES teams to support the response efforts and requirements of our local served agencies by pass digital traffic

A closer look

Outpost Packet Message Manager

Managing Messages

- Familiar email-app look and feel
- Separate folders for message storage
- Clear message identification (unread=**BOLD**, urgent=**Red**)
- Follows a typical message workflow
- Manages BBS and interfaces
- Various settings to control how Outpost behaves

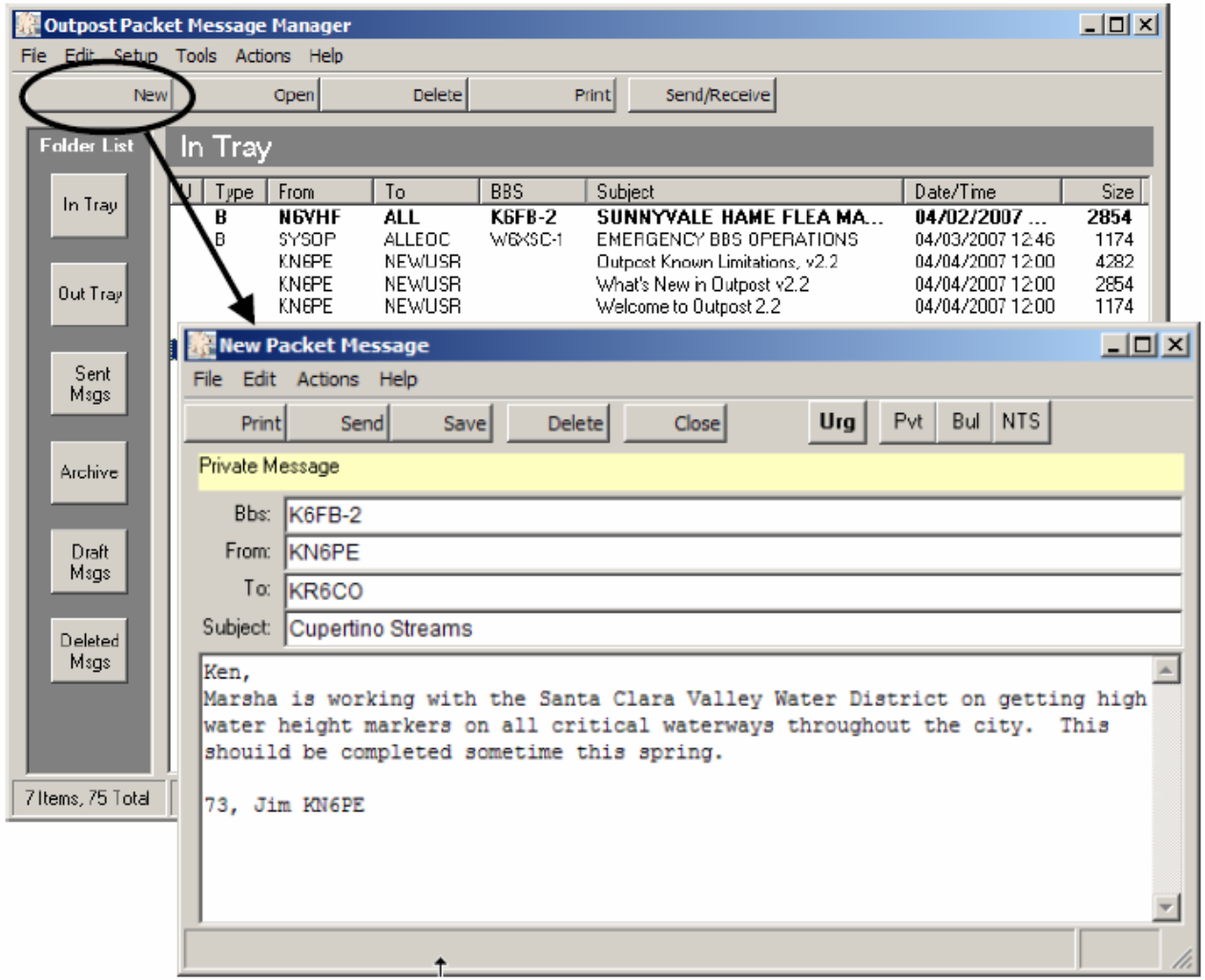


A closer look

Outpost Packet Message Manager

Creating Messages

- Familiar email-app look & feel
- Supports Private, Bulletin, and NTS message types
- Freeform message formatting before sending
- Set messages to **Urgent**
- Delivery and read receipts
- Different ways for originating messages
  - NTS Message Maker
  - Online Reports

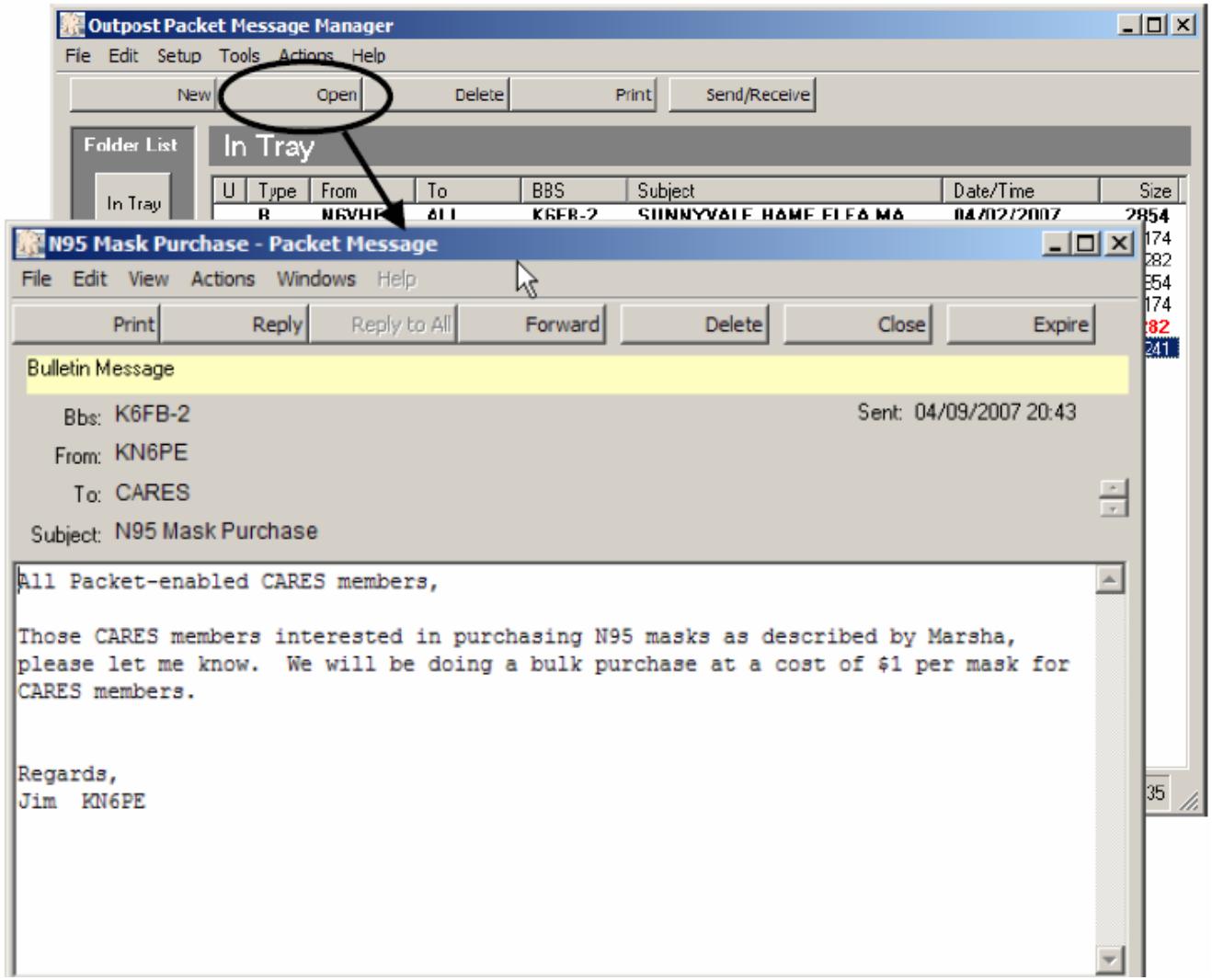


A closer look

Outpost Packet Message Manager

Viewing Messages

- Supports viewing, printing, deleting or saving a message to a local file
- Reply and Forward message formatting

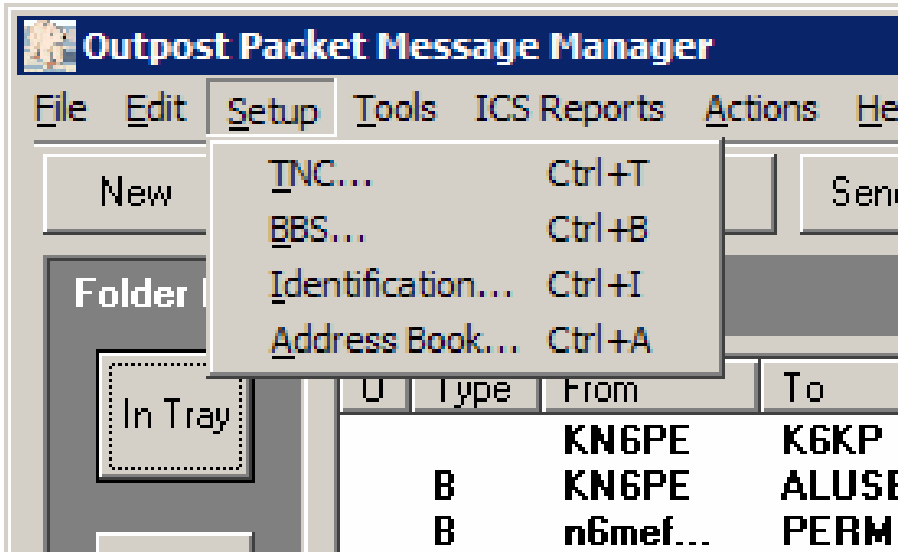


A closer look

Outpost Packet Message Manager

Application Setups

- TNCs: create, update, or delete; configure serial ports for your TNC
- BBSs: create, update, or delete
- Change Station Identifier (your call sign, tactical call)
- Set up Address book entries (optional)

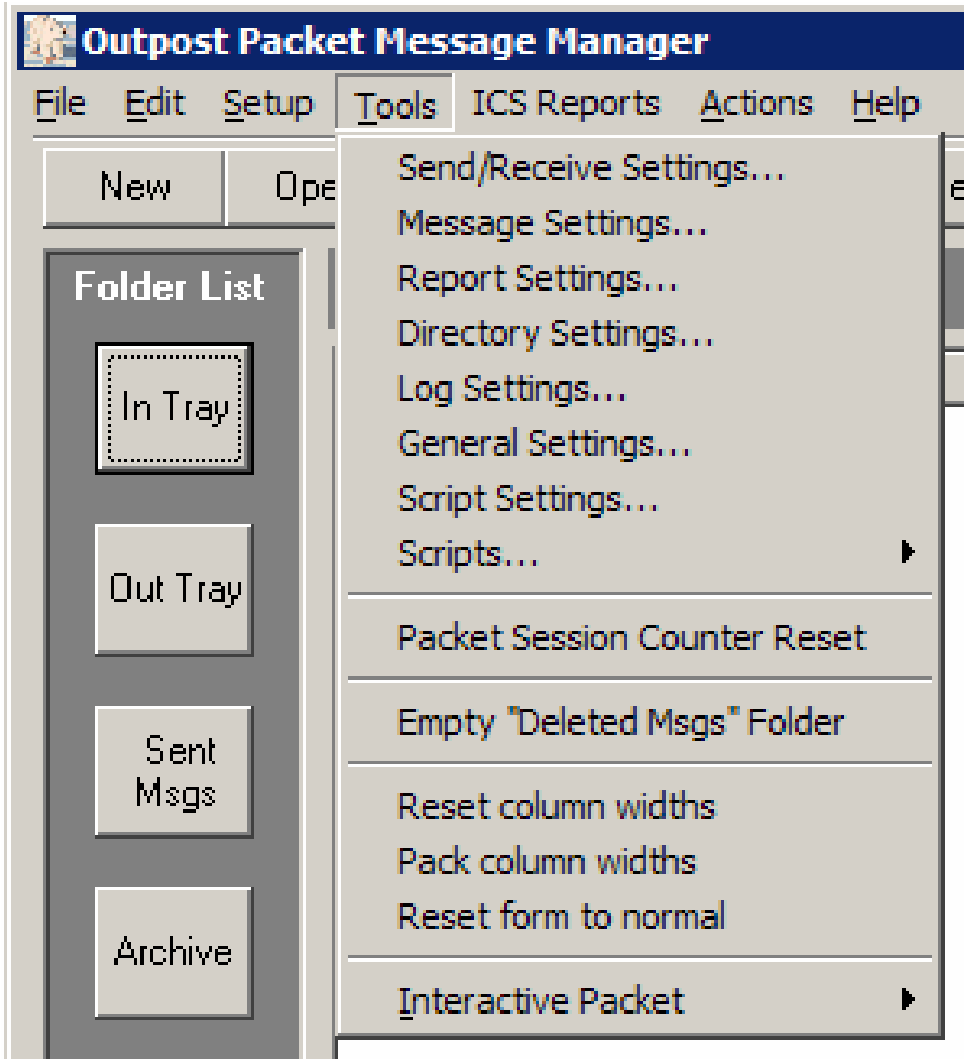


A closer look

Outpost Packet Message Manager

Application Controls

- Send/Receive settings: automation, what messages to retrieve, what to do when they are received
- Message Settings: Message numbering, tracking, PacFORMs controls
- And more…

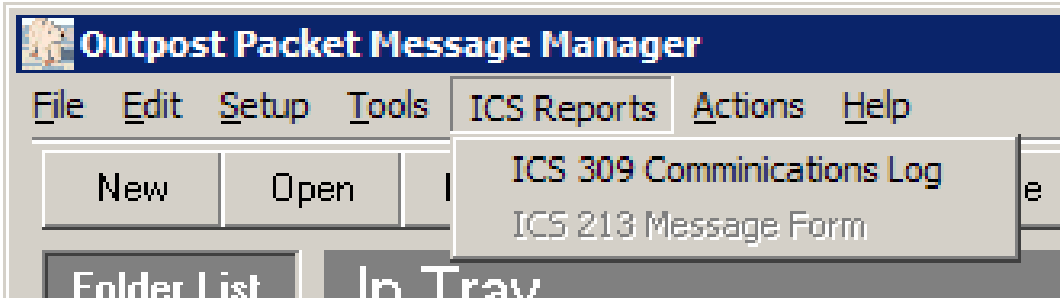


A closer look

Outpost Packet Message Manager

ICS Reports

- ICS 309 Communications Log



http://www.outpostpm.org/howto/

Outpost Packet Message Manager
HOW-TOs

Outpost How-To's

The Outpost program does not include any online help. Instead, a series of HOW-TO files are provided with the application and are available on-line here. See the Outpost Users Guide for other details.

Interface How-Tos

1. AGWPE Set up
2. Telnet Set up
3. Telnet Setup for Winlink
4. TNC Command file
5. TNC Setup

BBS/PBBS How-Tos

1. BBS Set up
2. BBS Set up for Santa Clara County RACES
3. Connecting to a local KPC3/ KPC9612 PBBS
4. Connecting to a local MFJ-127X PBBS
5. Connecting to a local PK-232/DSP-232 PBBS
6. Using KA-Node/ Netrom (BPQ) Access

Messaging How-Tos

1. Acknowledge Read, send automatically
2. Add a signature
3. Annunciation
4. Automatic Retrieval
5. Creating a message
6. Drag and Drop
7. Forwarding/Replying
8. Numbering messages
9. Online reports
10. Online Reports, one touch loading
11. Printing Automatically
12. Requesting Delivery and Read Receipts
13. Retrieving selected bulletins
14. Send as Urgent
15. Sending a text file

Miscellaneous How-Tos

1. Enhanced Channel Monitoring
2. Scripting
3. Tactical Calls

October City Drill

Preparation

1. Hands-on training sessions planned
- Saturday, 2-October, can we move to 1:00p – 3:00p?
- Sunday 10-October, 2:00p – 4:00p
- Anytime

2. Load and configure Outpost
3. Create and send messages
4. Send traffic
5. Another BBS to play with: K6FB-1, 145.050

The Drill – 16-October

1. EOC Staffing
2. Ark Packet (and voice) staffing

Any Questions?