WHAT IS WINLINK ?
AND
WHY IS IT USEFUL ?

https://www.winlink.org/

A PRESENTATION FOR THE CVARC RADIO SCHOOL

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AGENDA

- What is it:
  - Brief overview of how it works and the different modes (as needed for the next section)

- Use cases for:
  - Individual hams
  - Supporting Emergency Comms as part of ACS/ARES

- Resources available to So Cal operators
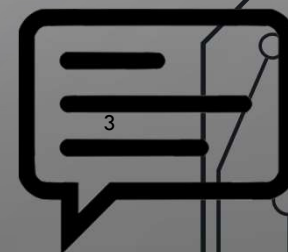
WHAT IS IT ?
IT'S EMAIL AND SMS/MMS

- Uses amateur radio frequencies for "First Mile / Last Mile" connection to the Internet and Winlink "CMS" Central Mail Servers

- "First Mile / Last Mile " Really means:
  - VHF/UHF/ARDEN Mesh ~ 10 miles depending upon topography and antenna location
    - May be extended via relaying through digipeaters, hybrid or Mesh nodes (more later)
  - HF ~100's maybe 1,000's of miles depending upon propagation

- It's connection oriented (unlike say fldigi)
  - Your station establishes a connection (with associated control messages) to a Radio Mail Server "RMS" , Telnet Post Office (Mesh) or another station (peer to peer mode) in order to send / receive emails
  - Thus, you need to know the call / address of the connection and the bands/ frequencies/ modes it is listening on

Email:
Pretty
straight
forward
set up

SMS/MMS:
Needs some
investigation prior
to use

3

WINLINK MODES
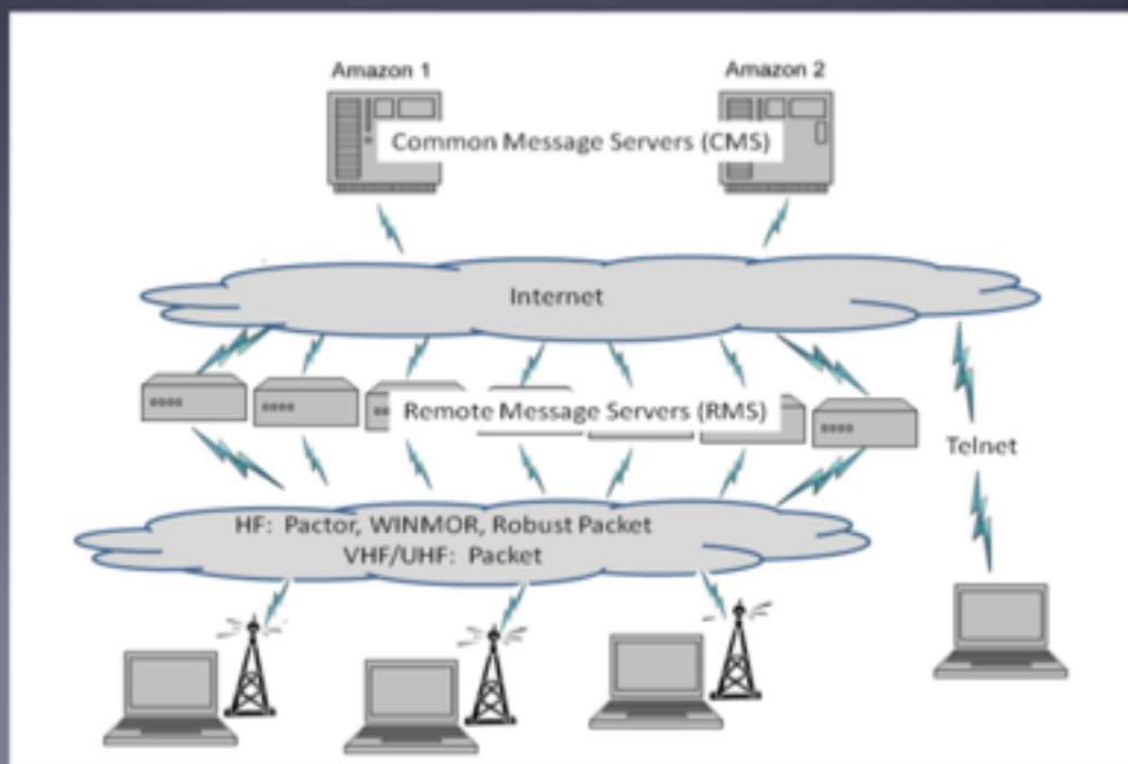
Winlink Architecture (Conventional Mode)

- **CMS**

- **RMS** (gateway)

- **Client** (you)

Amazon 1 — Amazon 2

Common Message Servers (CMS)

Internet

Remote Message Servers (RMS)

Telnet

HF: Pactor, WINMOR, Robust Packet
VHF/UHF: Packet

Typical email functions:
- Text and attachments
- Attachments limited to 120k Bytes
- Would take a looong time over HF:~100's bits per second
- can your Amp handle it ? (TX duty cycle)
- OK over VHF: ~1,000's bits per second
- No problem over mesh: ~10's megabits per second

CV**A**RC
AA6CV
www.cvarc.org

4

HYBRID AND DIGIPEATING MODES

- Hybrid:
  - Some RMSes can forward traffic to the internet via HF if:
    - Local Internet connection is temporarily down
    - Local internet is not present
  - As a client this is transparent to you

- Digipeating:
  - Some RMSes (typically VHF) may be used to relay traffic to other RMSes
    - Useful if their local Internet connection is down (as a client all you may see is an inability to connect to that RMS)
  - As a client you need to select this mode, specific callsigns need to be used

There are other modes: Radio Only and Peer to Peer, out of scope for this presentation

WHY IS WINLINK USEFUL?

We live in a world of ubiquitous, instant communications

Until ....

Something "Breaks"

calling / connecting / communicating with your loved ones can get much harder

It's a good idea for individuals and communities to prepare for these "disruptions" to our communications, power and physical infrastructure

LIVING IN CALIFORNIA: WHAT CAN "BREAK"?

Disaster
Scale

Greater LA
40 mi. 96hr. +

VC
12 mi. 48 hr. +

East VC
6 mi. 36 hr. +

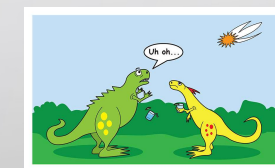Town
2 mi. 24 hr. +

Neighborhood
0.2 mi. 12 hr. +

Pub Safety
Power out

Small fire

Deliberate
Internet
Outage

Wolsey/
Thomas
Fire

Northridge
Size
Earthquake

Maybe no global
Internet left ?

Each Year

10 years

30 years

Black
Swan

Breakage Interval

www.cvarc.org

CVArc
AA6CV

7

PERSONAL USE CASE:
SETTING UP SMS/MMS

HEALTH AND WELFARE MESSAGES VIA WINLINK

- Rob W6RH forwarded this YouTube link ~ a week or so after the explosion and internet outage in Nashville
- https://www.youtube.com/watch?v=vpmNGrpZkSo
- This amateur commented that "People check their texts virtually instantly" compared to looking at emails
- Experience with my own family confirms this, Thus:
  - SMS/MSS would be the preferred method to send Health and Welfare Messages " Hi Victoria, there has been a really bad earthquake, mom and I are fine. Will get back to you once we've sorted some things out"
- Still need email, some people, including Andy's 92 year-old mom in the UK, don't text
- Can Winlink email communicate with SMS (Short Messaging Service) and MMS (Multimedia Messaging Service) ?
  - Yes, but the "email address" you use to send the SMS / MMS to depends on the recipient's carrier

As a consequence of the Nashville bombing, broadband internet went down, cell service went down even AT&T's "First Net" first responder wireless network went down

INFORMATION SOURCES

- https://www.digitaltrends.com/mobile/how-to-send-a-text-from-your-email-account/

- https://searchmobilecomputing.techtarget.com/definition/Multimedia-Messaging-Service

- There are likely other sources, my list is not exhaustive

LIST FROM OF MAJOR US CARRIERS FROM ROB, W6RH

Carrier	Email to SMS Gateway
Alltel	[10-digit phone number]@message.alltel.com Example: 1234567890@...
AT&T (formerly Cingular)	[10-digit phone number]@txt.att.net [10-digit phone number]@mms.att.net (MMS) [10-digit phone number]@cingularme.com Example: 1234567890@...
Boost Mobile	[10-digit phone number]@myboostmobile.com Example: 1234567890@...
Nextel (now Sprint Nextel)	[10-digit telephone number]@messaging.nextel.com Example: 1234567890@...
Sprint PCS (now Sprint Nextel)	[10-digit phone number]@messaging.sprintpcs.com [10-digit phone number]@pm.sprint.com (MMS) Example: 1234567890@...
T-Mobile	[10-digit phone number]@tmomail.net Example: 1234567890@...
US Cellular	[10-digit phone number]email.uscc.net (SMS) [10-digit phone number]@mms.uscc.net (MMS) Example: 1234567890@...
Verizon	[10-digit phone number]@vtext.com [10-digit phone number]@vzwpix.com (MMS) Example: 1234567890@...
Virgin Mobile USA	[10-digit phone number]@vmobl.com Example: 1234567890@...

www.cvarc.org

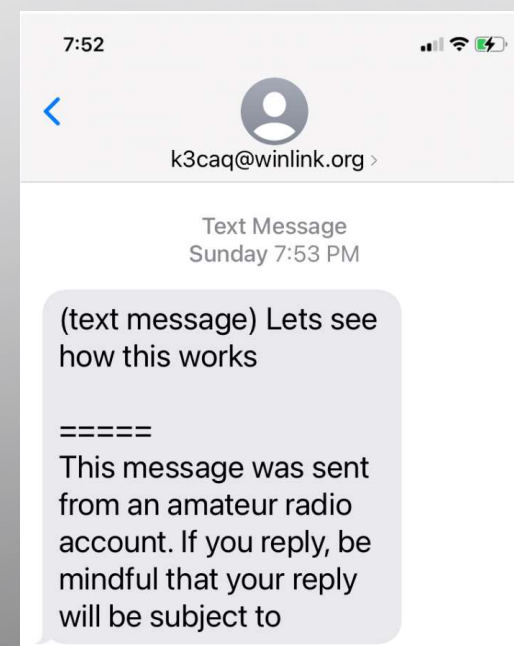| Carrier	Email to SMS Gateway						
7-11 Speakout (USA GSM)	number@...	Illinois Valley Cellular	number@...	President's Choice (Canada)	number@...
Airtel (Karnataka, India)	number@...	Iridium (satellite)	number@...	Qwest	number@...
Airtel Wireless (Montana, USA)	number@...	Iusacell	number@...	Rogers (Canada)	number@...
Alaska Communications Systems	number@...	i wireless	number.iws@...	SL Interactive (Australia)	number@...
Aql	number@...	Koodo Mobile (Canada)	number@...	Sasktel (Canada)	number@...
AT&T Enterprise Paging	number@...	LMT (Latvia)	number@...	Setar Mobile email (Aruba)	297+number@...
BigRedGiant Mobile Solutions	number@...	Meteor (Ireland)	number@...	Suncom	number@...
Bell Mobility & Solo Mobile (Canada)	number@...	Mero Mobile (Nepal)	977number@...	T-Mobile (Austria)	number@...
BPL Mobile (Mumbai, India)	number@...	MetroPCS	number@...	T-Mobile (UK)	number@...
Cellular One (Dobson)	number@...	Movicom (Argentina)	number@...	Telus Mobility (Canada)	number@...
Cingular (Postpaid)	number@...	Mobitel (Sri Lanka)	number@...	Thumb Cellular	number@...
Centennial Wireless		Movistar (Colombia)	number@...	Tigo (Formerly Ola)	number@...
Cingular (GoPhone prepaid)	number@... (SMS)	MTN (South Africa)	number@...	Tracfone (prepaid)	number@...
Claro (Brasil)	number@...	MTS (Canada)	number@...	Unicel	number@...
Claro (Nicaragua)	number@...	Nextel (United States)	number@...	Virgin Mobile (Canada)	number@...
Comcel	number@...	Nextel (Argentina)	TwoWay.11number@...	Vodacom (South Africa)	number@...
Cricket	number@... (SMS)	Orange Polska (Poland)	9digit@...	Vodafone (Italy)	number@...
CTI	number@...	Personal (Argentina)	number@...	YCC	number@...
Emtel (Mauritius)	number@...	Plus GSM (Poland)	+48number@...	MobiPCS (Hawaii only)	number@...
Fido (Canada)	number@...				
General Communications Inc.	number@...				
Globalstar (satellite)	number@...				
Helio	number@...				

If not sure e.g. ".com" or ".net" ask the recipient to send a text (simple text and one with a picture) to your internet email address

SMS AND MMS WHICH ONE SHOULD I USE ?

- SMS is "short" 160 characters (similar to the original Tweet length)
  - "This should be enough for a health and welfare message"
  - Probably, if the message is short then the Winlink trailer will appear
- MMS, developed for picture sharing ~450KBytes (too big for Winlink, 120 kBytes)
  - May incur additional cost for recipient

WINLINK -> SMS (VERIZON)

Programmer's Notepad - [test_message.txt]

File   Edit   Search   View   Tools   Window   Help

Plain Text

test_message.txt

```
010203040506070809101112131415161718192021222324252627282930
020203040506070809101112131415161718192021222324252627282930
030203040506070809101112131415161718192021222324252627282930
040203040506070809101112131415161718192021222324252627282930
050203040506070809101112131415161718192021222324252627282930
060203040506070809101112131415161718192021222324252627282930
070203040506070809101112131415161718192021222324252627282930
080203040506070809101112131415161718192021222324252627282930
090203040506070809101112131415161718192021222324252627282930
100203040506070809101112131415161718192021222324252627282930
110203040506070809101112131415161718192021222324252627282930
120203040506070809101112131415161718192021222324252627282930
130203040506070809101112131415161718192021222324252627282930
140203040506070809101112131415161718192021222324252627282930
150203040506070809101112131415161718192021222324252627282930
160203040506070809101112131415161718192021222324252627282930
170203040506070809101112131415161718192021222324252627282930
180203040506070809101112131415161718192021222324252627282930
190203040506070809101112131415161718192021222324252627282930
200203040506070809101112131415161718192021222324252627282930
```

Source text
Sent in email
(not attached)

Received SMS, Subject + 2 1/3 lines of text

(winlink to SMS)
01020304050607080
91011121314151617181
92021222324252627 2
82930
02020304050607080
91011121314151617181
92021222324252627 2
82930
03020304050607080
9101

Probably enough characters for a
"we are fine" message

14

WINLINK -> MMS (VERIZON)

Source text
Sent in email
(not attached)

More characters than you would
likely want to send in a text. Could
likely send more characters than this,
did not try to find the limit

Winlink to MMS
01020304050607080
91011121314151617181
920212223242526272
82930
02020304050607080
91011121314151617181
920212223242526272
82930
03020304050607080
91011121314151617181
920212223242526272
82930
04020304050607080
91011121314151617181
920212223242526272
82930
05020304050607080
91011121314151617181
920212223242526272

Received MMS: Subject, all 20
lines of text + Winlink caution

82930

=====
This message was sent
from an amateur radio
account. If you reply, be
mindful that your reply
will be subject to
inspection by the public.
If your reply contains
prohibited content
(profanity, personal or
commercial business
information, etc.) it may
not reach its destination,
and will endanger your
correspondent's license.
Ask your correspondent
if you have any
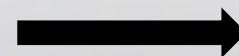questions.
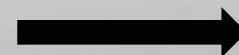
SENDING JPG ATTACHMENTS

Cropped and
reduced to ~ 20KB

K3CAQ@winlink.org ➡ myemail.com
(email) ✅

mynumber
@vzwpix.com ➡ K3CAQ@winlink.org ✅
(MMS)

K3CAQ@winlink.org ➡ mynumber
@vzwpix.com ❌
(MMS)

Original image
Mom's garden in
the UK 2.63 MB
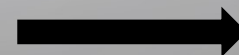
Not clear why this last transfer fails
More work to do …

ONE MORE ISSUE …WINLINK' S SPAM FILTER

There is a potential gotcha in this process. Winlink has a strong anti spam filter. Outgoing emails automatically generate a "whitelist" exception in Winlink. In other words, the email address that you send a text to is given a "safe" marking in your Winlink account. The problem is that the return email address on a response to your text may be different than the address that you sent to. The solution to this is to do test messages prior to a disaster.

You can also manually add email addresses and entire URLs to your Winlink Whitelist. In doing so, any email coming from vtext.com, for example, would pass through the spam filter. To manually update your Winlink whitelist, go to Winlink.org and login. Once logged-in, you'll find "My Whitelist" in the left-hand column. Make and save your changes.

Dan, NR6V

PERSONAL /EMCOMM USES:
DYFI
USING FORMS DURING DISASTERS:
FROM THE PERSPECTIVE OF THE AMERICAN RED CROSS

BUT FIRST, LET'S LOOK AT WHY WINLINK IS OF INTEREST TO SERVED AGENCIES

CONNECTIVITY BEYOND THE LOCAL
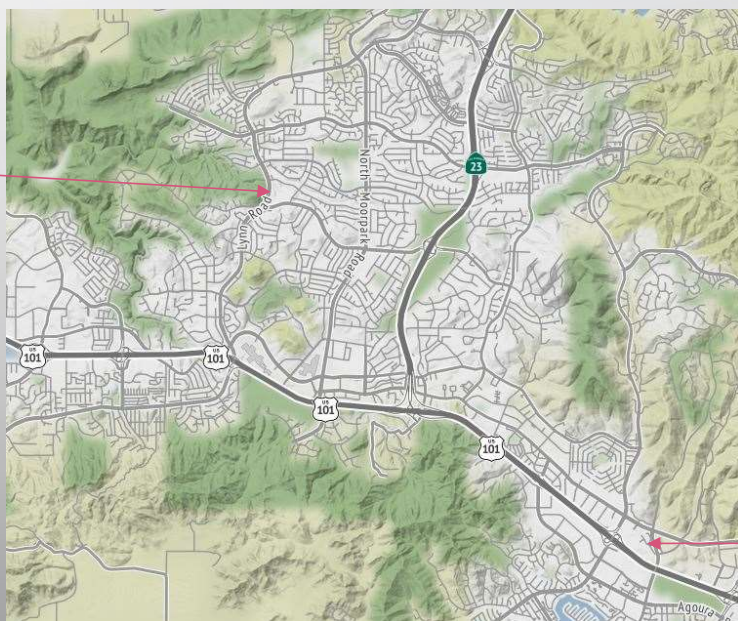
Los Robles
Main Hosp.

Los Robles
East Hosp.

- Packet, via simplex, provides excellent connectivity independent of infrastructure.

- If neither LR main or LR East have Internet connectivity, need some means to get resource requests etc. out of the affected area.

Moving critical infrastructure to the cloud has many benefits, but what happens when you can't connect to it ?
Hopefully, agencies consider this as part of their disaster planning

DID YOU FEEL IT "DYFI"

DYFI Winlink: ARES Alliance Collaboration

- ARES Groups from Southern California, Central California, Northern California, Oregon, Washington, Arizona, Nevada, Hawaii and Puerto Rico
- Winlink Development Team
  - Greg KG6SJT
  - Mike N6KZB
- USGS
  - David Wald (Geophysicist)
  - Vince Quitoriano (Programmer)

2018 DYFI Data Map

Magnitude vs. Intensity

Magnitude = energy released by an earthquake
Intensity = effects of an earthquake

Magnitude	Intensity
Fixed Value	Varies with magnitude, distance, geology
Measures energy released	Measures impact on humans and structures
Objective	Subjective

- Slides courtesy of Oliver Dully, K6OLI, ARES LAX NE from his presentation to VC ACS/ARES group July 2020
- Radio amateurs have a unique ability to send DYFI reports from the communications dead zone AKA "Donut Hole" near the epicenter of an earthquake
- Timely (within an hour) availability of this data can direct first responders to the areas where they are most needed

CALIFORNIA SHAKE OUT OCTOBER 2020

- Responses collected by USGS and dyfi@vccomm.org
- USGS had sufficient responses to build a "shake map" of the event
- DYFI responses now part of VC ACS/ARES weekly check in activities
- Responses sent for the recent tremor felt in Oak Park and some other areas
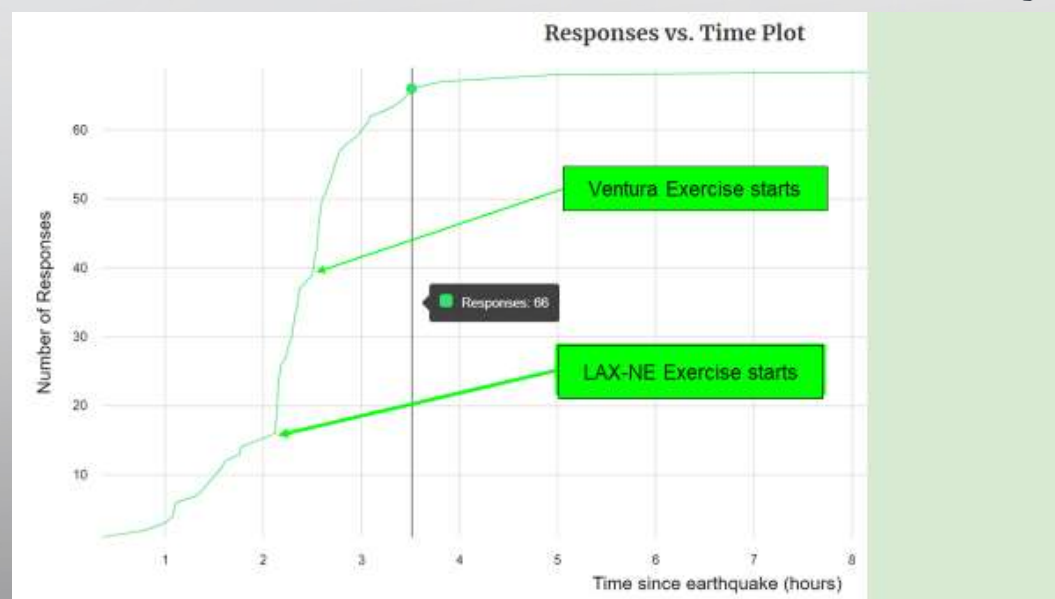
Slide courtesy of Oliver Dully, K6OLI, ARES LAX NE

ARC / ARES WINLINK EXERCISES

Nov 14th 2020 Nationwide event

- Intended to demonstrate capability of ARES, using Winlink, to provide EMCOMMs for ARC nationwide

- ARC shelters and staging areas may, by necessity, be located in areas with compromised infrastructure.

- Winlink's ability to access RMSes, and thus Internet connectivity, out of area can mitigate infrastructure limitations

- Next event is May 8th

1,750 messages from 1,550 operators in 47 states, plus Puerto Rico, Venezuela and Canada

RESOURCES AVAILABLE TO SO CAL OPERATORS

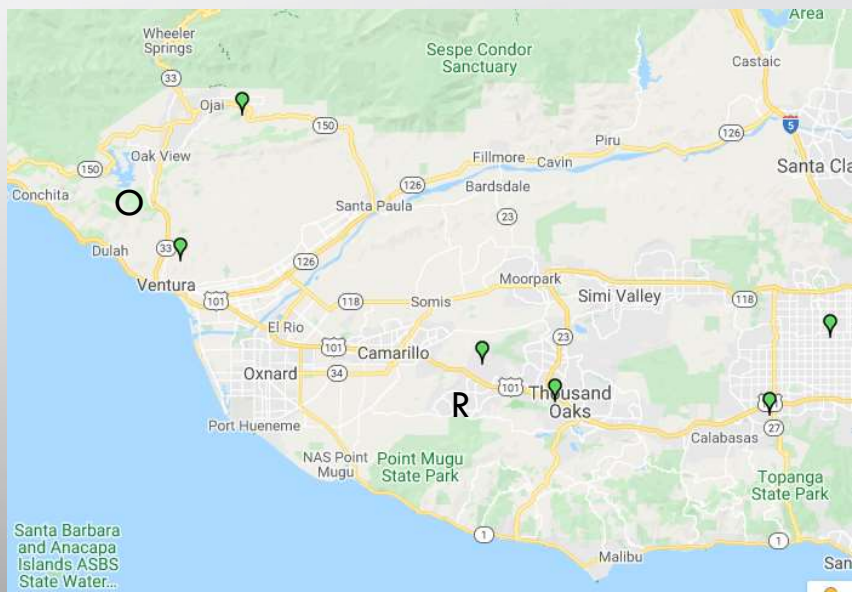WE ARE FORTUNATE IN HAVING A RICH SET OF RADIO MAIL SERVERS, DIGIPEATERS AND MESH POST OFFICE BOXES AVAILABLE TO US
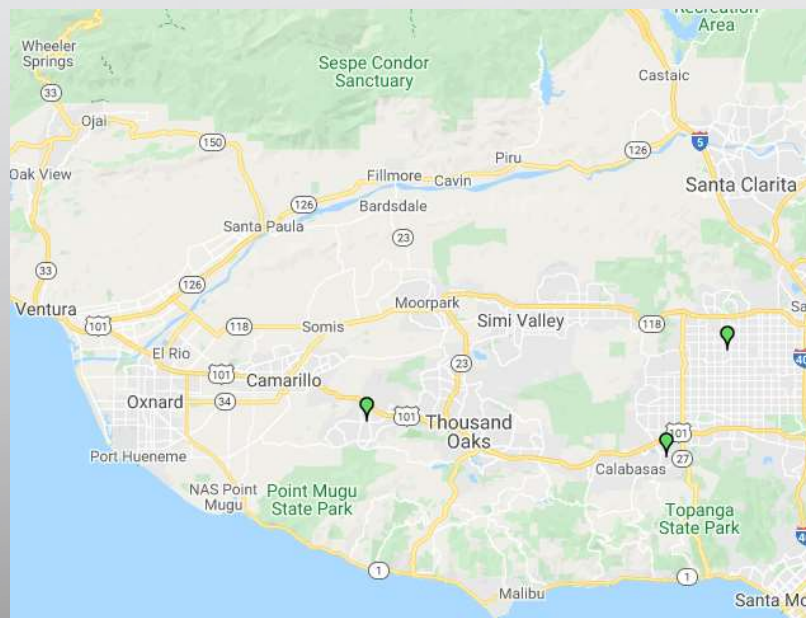
VHF

https://www.winlink.org/RMSChannels
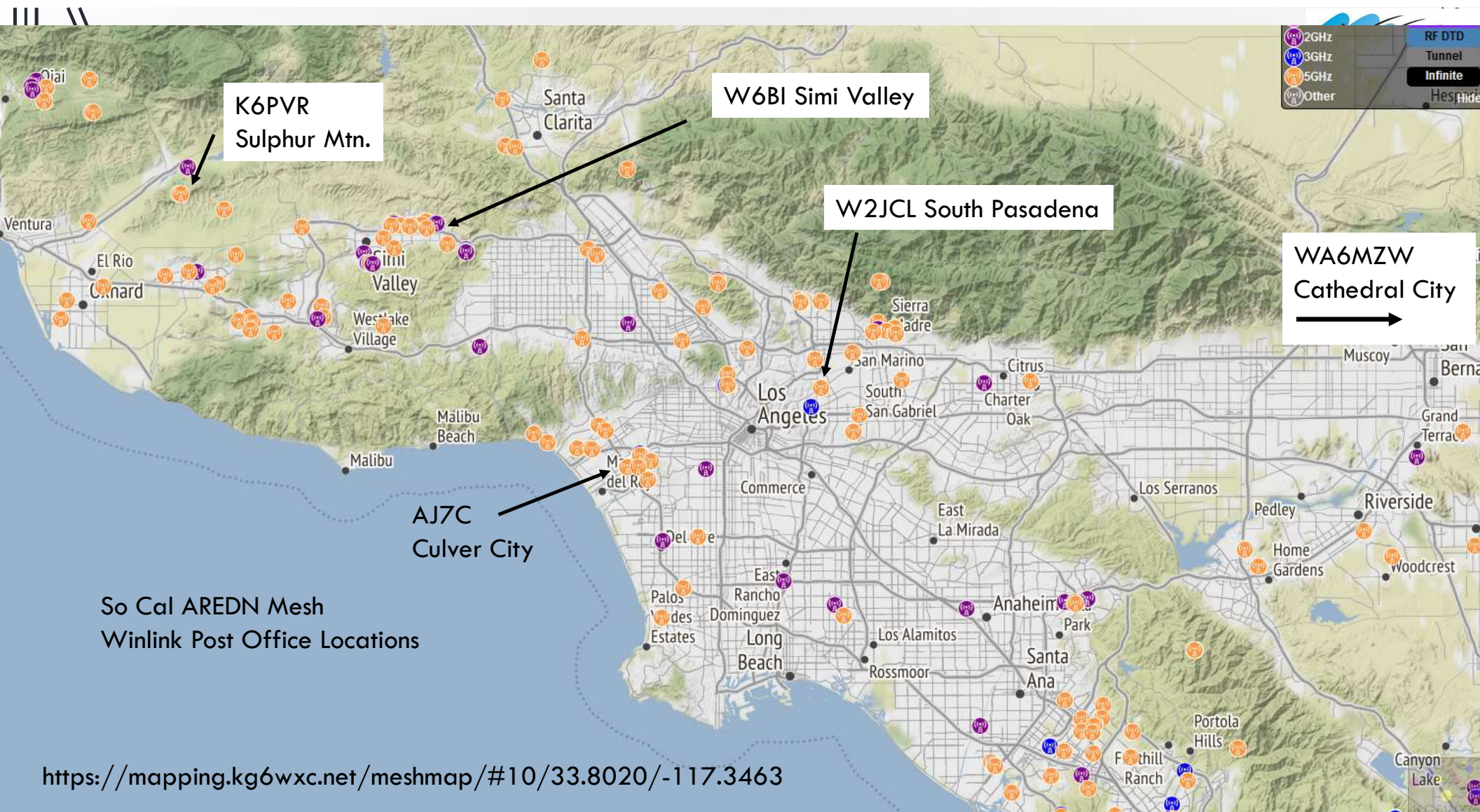
Packet Mode RMSes

Vara FM Mode RMSes

Mountain top digipeaters at Rasnow "R" and Ojai "O" Additionally, some EOCs, such as OJVEOC, and served agencies, such as HSPOJ, provide digipeating capabilities. For full details consult the VC ACS/ARES website http://www.vccomm.org/
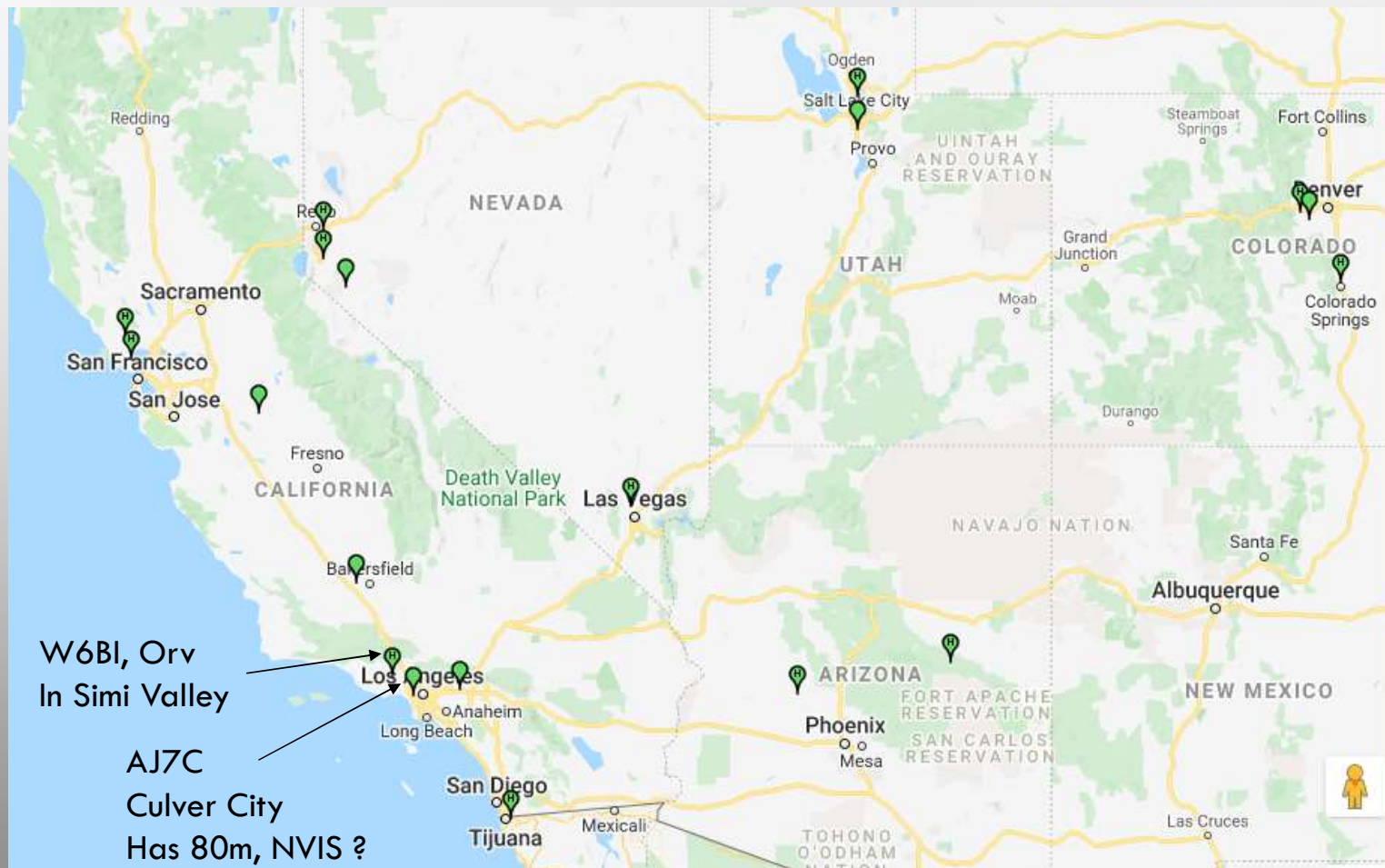
RMSes are set up to digipeat as part of the So Cal Autobahn Project
To use digipeating mode in VARA FM you need a licensed (paid for) copy of the program

24

K6PVR
Sulphur Mtn.

W6BI Simi Valley

W2JCL South Pasadena

WA6MZW
Cathedral City

AJ7C
Culver City

So Cal AREDN Mesh
Winlink Post Office Locations

https://mapping.kg6wxc.net/meshmap/#10/33.8020/-117.3463

25

VARA HF

W6BI, Orv
In Simi Valley

AJ7C
Culver City
Has 80m, NVIS ?

THANK YOU!