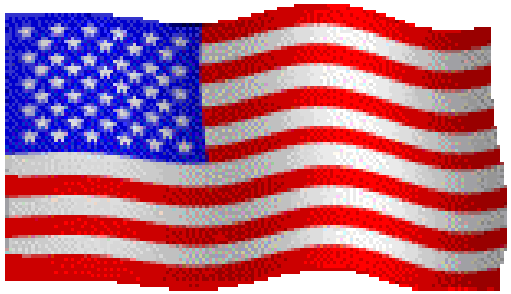


# Ham Repeater Operation and Maintenance

## Lesson One

Bill Ragsdale K6KN

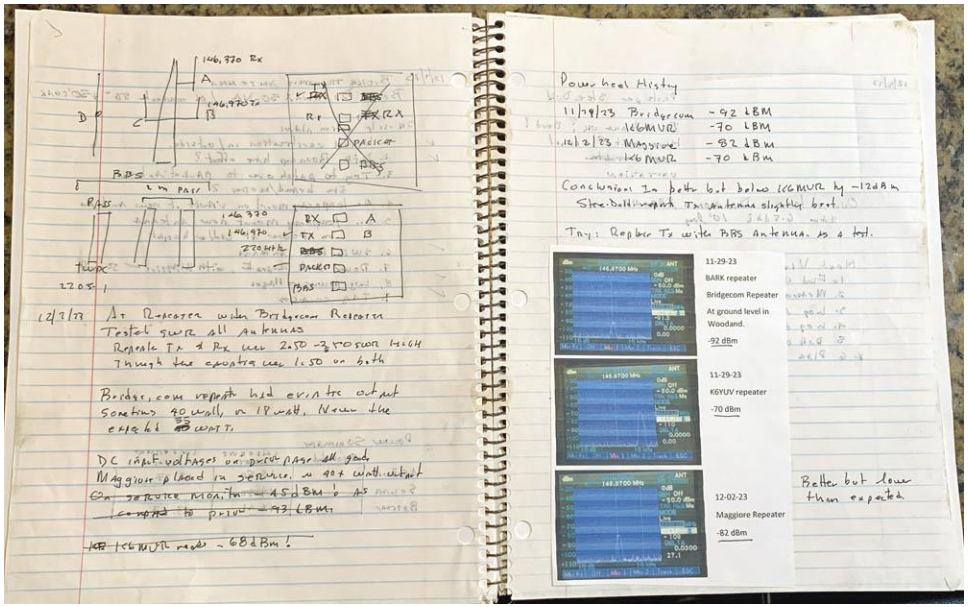
Berryessa Amateur Radio Klub

# Sessions Organization

- Five sessions over the next 5 weeks.
- A ‘hands-on’ opportunity after that.
- Sessions: 45 min. Q&A by Slack
- Zoom video will be posted on the YouTube “K6KN Bill” channel.
- Those registered at barkradio.org/training will be invited to the BARK Slack site for questions, postings, schedule.
- **Be sure to change your settings to receive notices.**
- PDF of slides posted on Slack.  Videos on YouTube.

# Your Responsibilities

- To get the most of the class get a spiral bound college ruled notebook. I've filled over 50 pages so far.




- We'll have an assignment each session to lead into the next session.

# Check-up

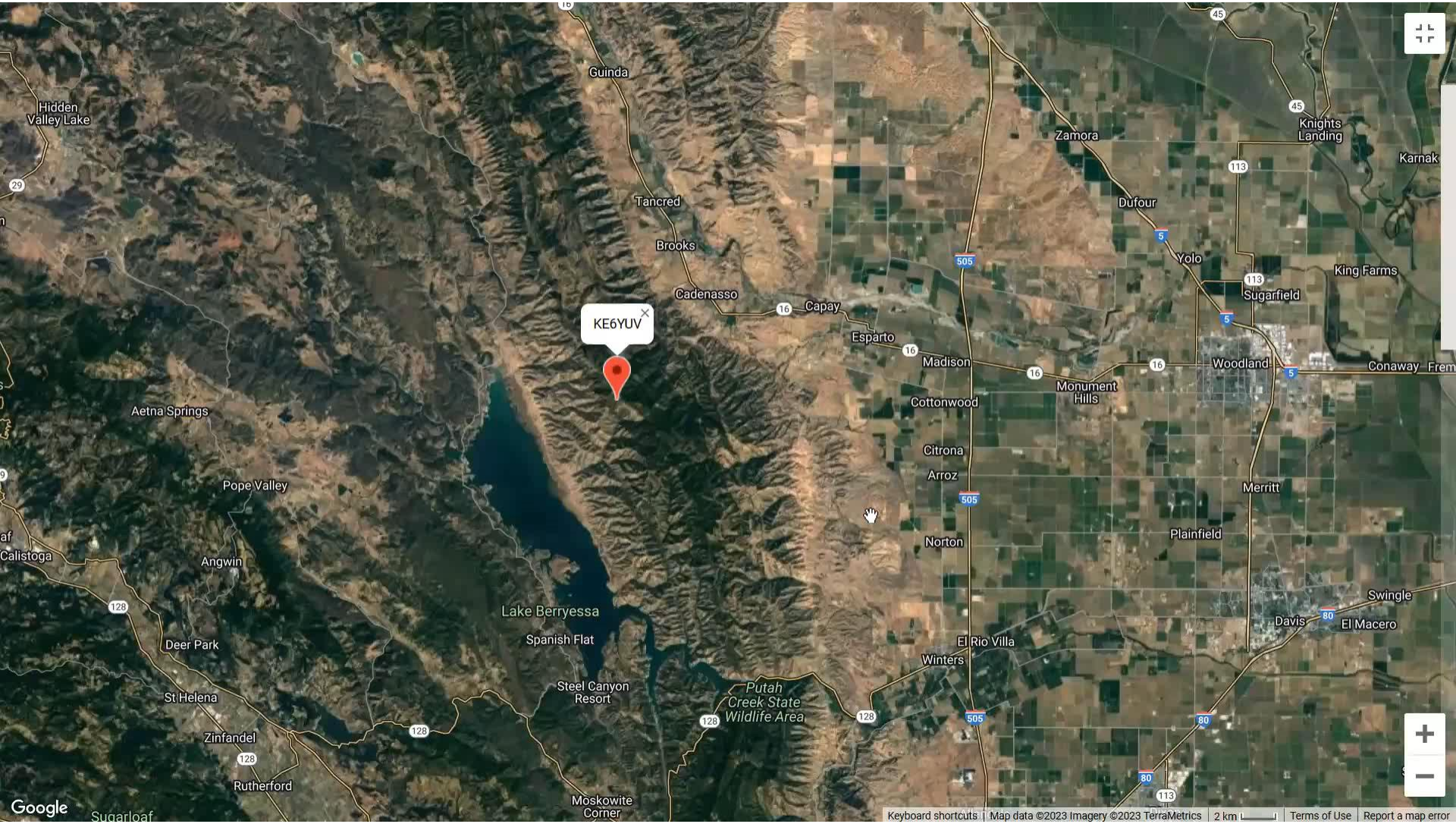
- Have you gotten your log book yet?
- Did you download the PDF of the BCR-50V repeater?

# Sessions Summary

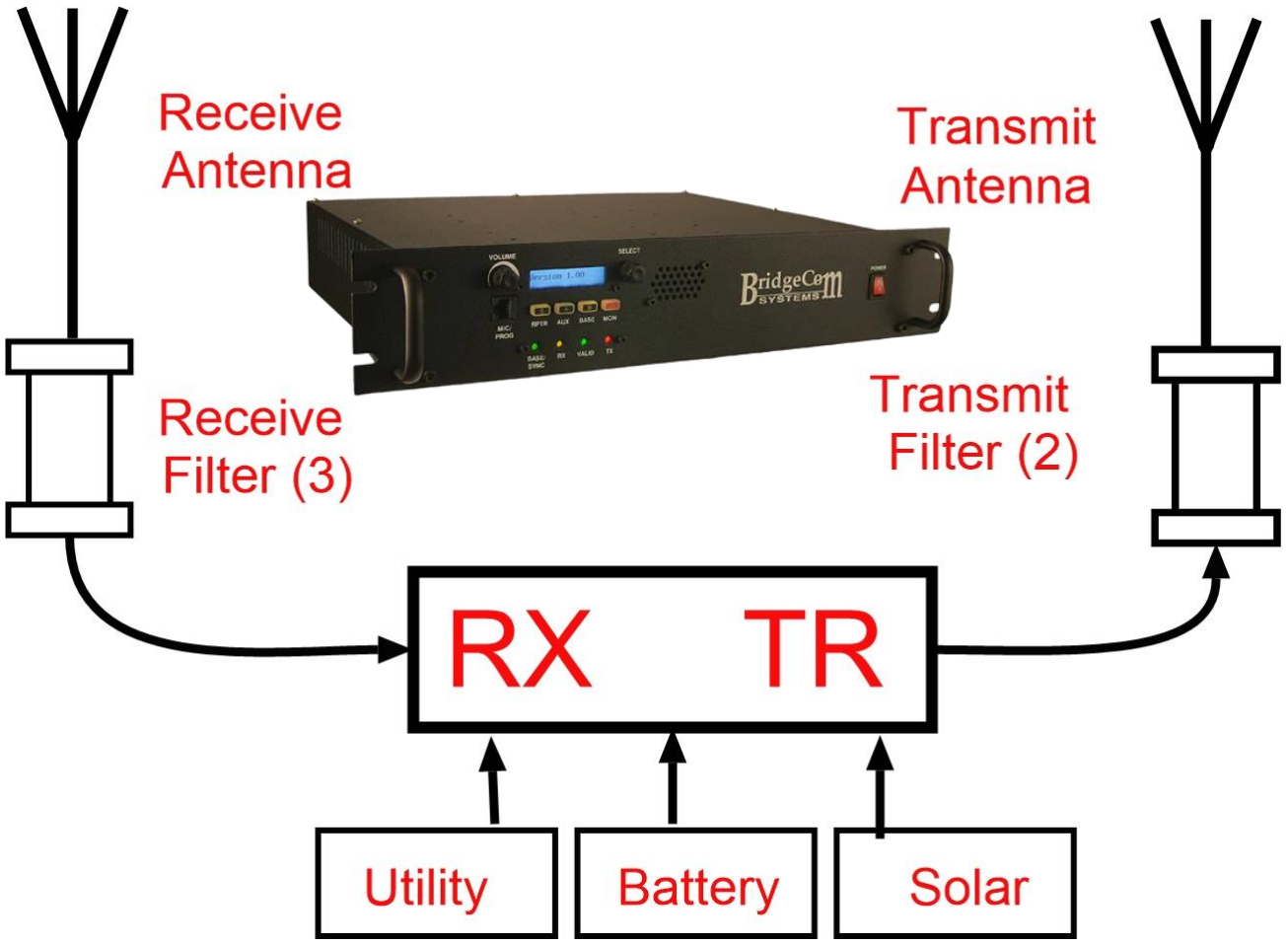
- Lesson One:  Repeater Management
- Lesson Two:  Components and Functions
- Lesson Three:  Technical aspects, measurements.
- Lesson Four: Test Equipment and Their Use.
- Lesson Five:  Trouble shooting
- Optional: Hands on training.

# Introductions

- My background
- I only know what I know. More?
- Questions at the end.
- Today: Repeater Management
- Next week we'll pick apart each component.
- To start, let's see a repeater in action.


KE6YUV
Guinda
Hidden Valley Lake
Tancred
Brooks
Cadenasso
Capay
Esparto
Madison
Zamora
Knights Landing
Karnak
Dufour
Yolo
King Farms
Sugarfield
Woodland
Conaway
Monument Hills
Cottonwood
Citrona
Arroz
Merritt
Plainfield
Norton
Aetna Springs
Pope Valley
Angwin
Calistoga
Lake Berryessa
Spanish Flat
Deer Park
St Helena
Zinfandel
Rutherford
Steel Canyon Resort
Putah Creek State Wildlife Area
El Rio Villa
Winters
Davis
Swingle
El Macero
Moskowite Corner
Sugarloaf
Google
Keyboard shortcuts
Map data ©2023 Imagery ©2023 TerraMetrics
2 km
Terms of Use
Report a map error

# Station Layout



# The Components From Input To Output

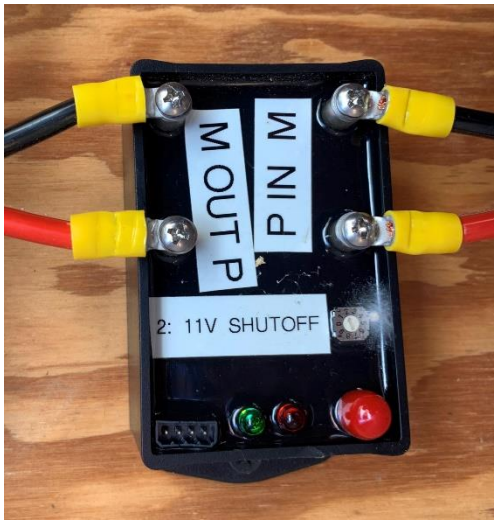

0107
0108
0109


Hi Pro Repeater
Maggiore Electronic Lab.
PTT FORCE
SILENT
RUN
SPEAKER
PTT
FAN
PWR
0101
Model R1


VOLUME
SELECT
MIC/
PROG
S
A
B
RPTR
AUX
BASE
MON
BASE/
SYNC
RX
VALID
TX
BridgeCom
SYSTEMS
POWER


ON
OFF
AMPS
ASTRON
VOLTS
ASTRON
CORPORATION
ASTRON
CORPORATION


WEST MOUNTAIN
RADIO
Epic PWRgate
BATTERY
OUT
POWER


M OUT P
P IN M
2: 11V SHUTOFF


0112
phelps dodge
Communications Company
0111
0110

# Key Terms

- Frequency pair: Frequencies on which a repeater simultaneously transmits and receives.
- Offset or split: separation between frequency pair.
- CTCSS: Continuous Tone-Coded Squelch System also called PL.
- NARCC: a frequency coordinator.
- SLACK: our web-based class support site.

# Why A Repeater?

- Allow portable and mobile stations access to a wide area.  And base stations too.
- Serve as a backup to telephone service and emergency communications.
- Build a sense of community among hams. Think Facebook by radio.
- Obsolete: phone patches gave hams mobile phone service.

# A Repeater Needs

- Elevation and shelter.
- Solid equipment
  - Repeater & filters.
  - Antennas
  - Power: Utility, Solar, Battery.
- A supporting organization
- A clear frequency pair.
- A web-site so they can find you.

# Why You Shouldn't Create A New Repater

- There a hundreds of repeaters with essentially no traffic. About twenty repeaters get all the traffic in this area.
- High elevation sites: K6MVR, N6ICW, N6QDY, KE6YUV, WD6AXM have maximum coverage.
- Several other repeaters support clubs.
- If your antenna is roof-top level you'll cover about a ten-mile circle and no one will come.

# More Reasons

- It will be hard (impossible) to get a 2 meter coordinated frequency pair in the Northern California area.
- Consider the 1.25 meter band, 220 MHz. But then, no one uses that band.
- Moderately expensive, about $4,000+.
- Running cost is $0 to $1,000 a year.

# What You Can Do

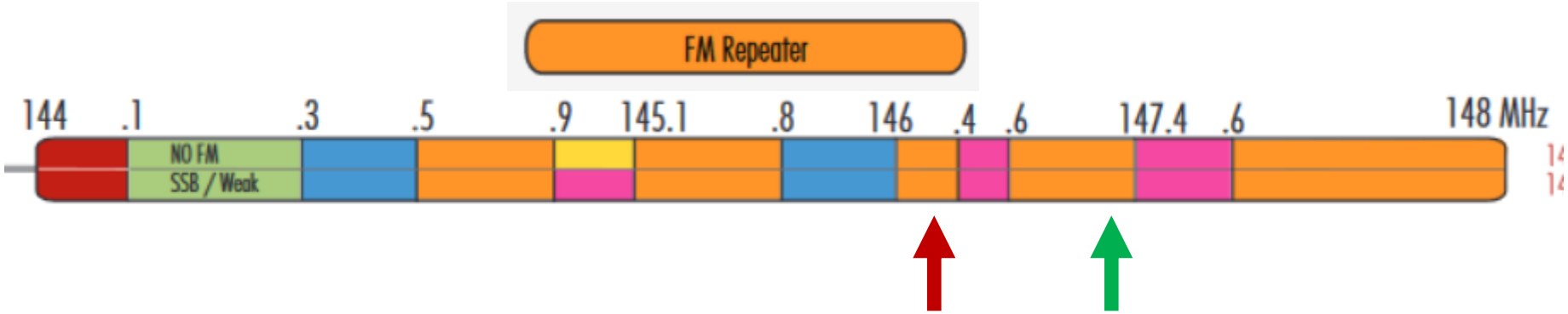
## Find an existing repeater . . .

## And join the team.

# A Brief Discussion of Key Elements

- Simplex, half-duplex, duplex,
- Bands with repeaters: 10 m, 6 m, 2 m 1.25 m (220 MHz), 70 cm (440 MHz), 900 MHz and higher.
- Modulation. FM, Yaesu Fusion, Icom D-Star, DMR.
- Strong regional preferences.
- Internet linkage: EchoLink, IRLP, EchoIRLP, AllStar. I-Link, Wires, D-Star. DMR.
- Do more research on Google
- Ask questions on our Slack (BARK) site.

# Band Plans




- From a repeater's transmit frequency a transceiver will set the repeater's input frequency (offset) and CTCSS.
- Except K6MVR is reverse and must be set manually.
- Frequency pairs are coordinated (assigned) by NARCC.org. More later.

# Legal Summary

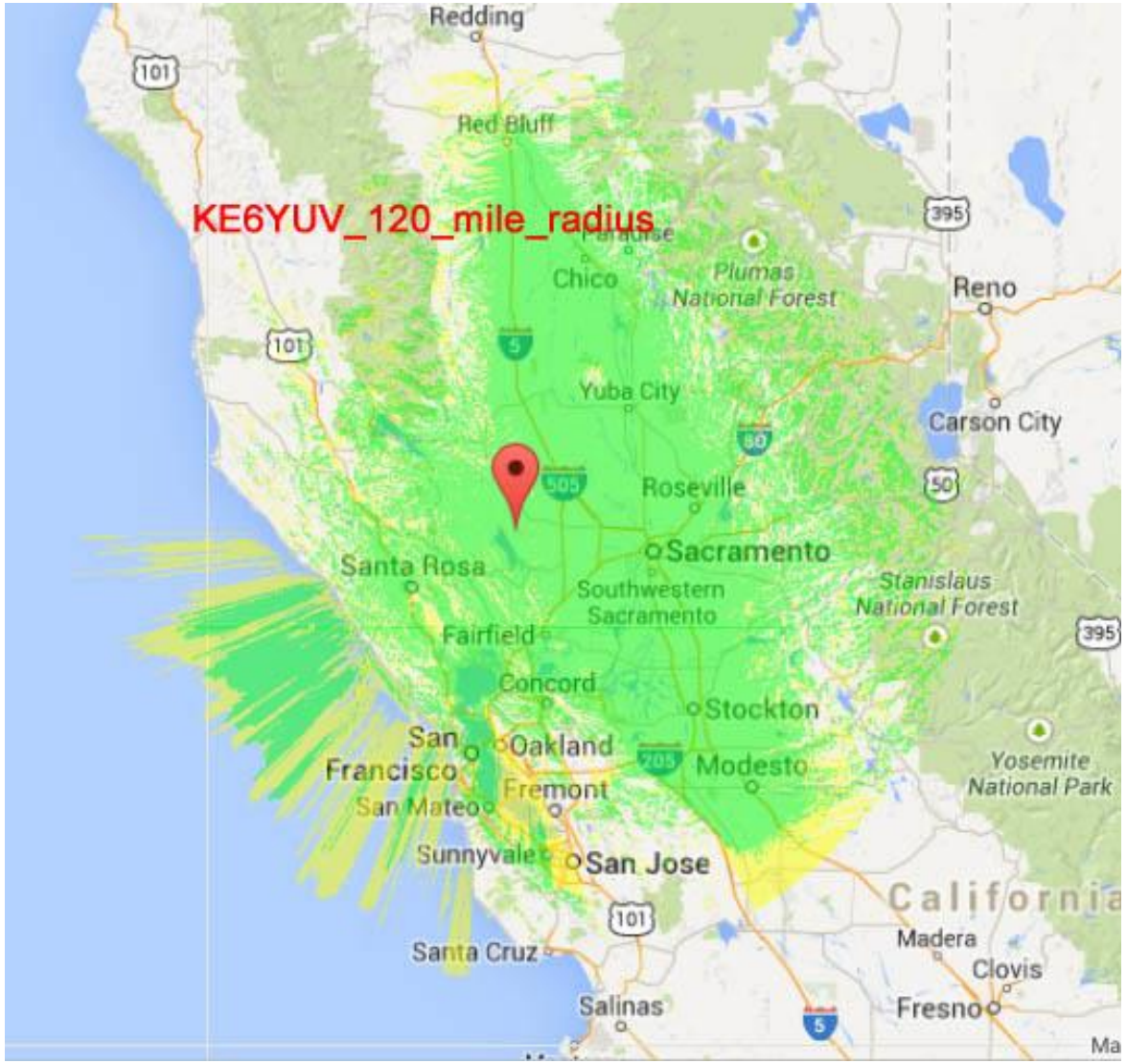
- Operate on 10 meters and higher with specific exceptions.
- Needs a control operator; FCC says 24 hours a day.
- Able able to mute remotely in case of malicious inference.
- Time-out in case of a stuck mic.
- ID within 10 minutes of use.

# NARCC

- Northern Amateur Relay Council of California
- Assigns frequency pairs and CTCSS based on exiting repeaters.
- Coordinated and uncoordinated.
- FCC accepts NARCC judgement upon a complaint.
- Equivalent organizations around the US.

# Coverage Map, Outdoor Handheld

# Coverage Map, Base Station



# Next on Lesson Two

Technical aspects of key components.

Antennas, types, gain, SWR.

Filters.

Repeater settings, key measurements.

Operating power, battery, solar.

And more.

# Assignment

- Locate one or two models of two-meter filter cavities by manufacturer
- Download a spec sheet pdf.
- Locate and review one or two two-meter antennas suitable for repeater use.

# References

- Barkradio.org/training to register for Slack
- ke6yuv.slack.com. For PDFs, questions, discussion & YouTube links.
- YouTube.com channel: “K6KN Bill”
- www.repeater-builder.com
- The ARRL Handbook For Radio Communications.
- The ARRL Antenna Book.