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# Repeaters, Remote Bases, Simplex

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South County ARES  
21 Nov 2024



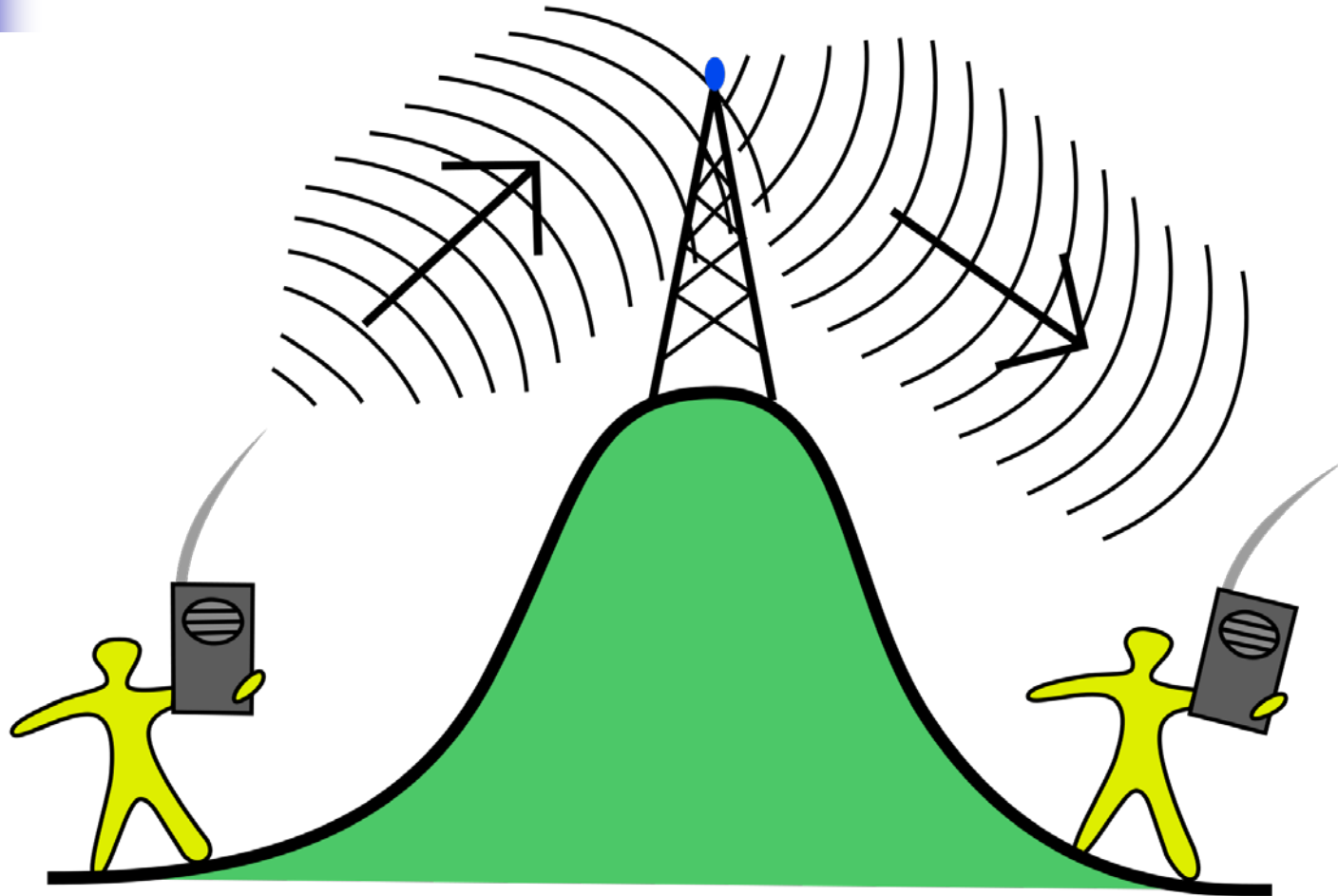
# Presentation Outline

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- Introduction
- What is a repeater?
- What is a Remote Base?
- SCARES repeaters
- Repeater diagram details
- Nuances
- Propagation
- Questions



Repeater:  
Receives on Frequency 1  
Transmits Simultaneously on Frequency 2





# SCARES repeaters

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- Number of SCARES repeaters - 3
- Frequencies
  - 444.5+ MHz PL 100 Hz
  - 53.68- MHz PL 114.8 Hz
- Locations
  - Hall of Justice RWC (primary 444.5)
  - RWC PD (aux repeater 444.5)
  - Kings Mountain Fire Station (53.68)



# What the repeater user needs to know

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- Repeater's output frequency
- Repeater's input frequency (or offset)
- CTCSS required to access the repeater?
- Does repeater transmit CTCSS?
- Is it an OPEN repeater?



# NARCC

## ■ Northern Amateur Relay Council of California

5 Records Returned

Frequency = 444.5

Red = UNCOORDINATED Repeater

Blue = Coordination Pending

Black = Coordinated Repeater

Output	Input	CTCSS	Call	Location	Sponsor	Status	Notes	Station Type
444.5000	449.5000	100.0	<a href="#">K6MPN</a>	Redwood City	<a href="#">SCARES</a>	Coordinated	oes	Repeater
444.5000	449.5000	114.8	<a href="#">K6TRK</a>	Stockton	CEVOL	Uncoordinated	ol	Repeater
444.5000	449.5000	103.5	<a href="#">KF6CCP</a>	Chester	KF6CCP	Uncoordinated	oe	Repeater
444.5000	449.5000	141.3	<a href="#">KJ6TYO</a>	Kerman	W6NCB	Coordinated	o	Repeater
444.5000	449.5000	131.8	<a href="#">WB6NIL</a>	Ahwahnee	WB6NIL	Uncoordinated	oaex	Repeater



# Repeater offset on radio

RTL



Receive Frequency 444.5



PTT



Transmit Frequency 449.5 (+5)



# SCARES auxiliary repeater

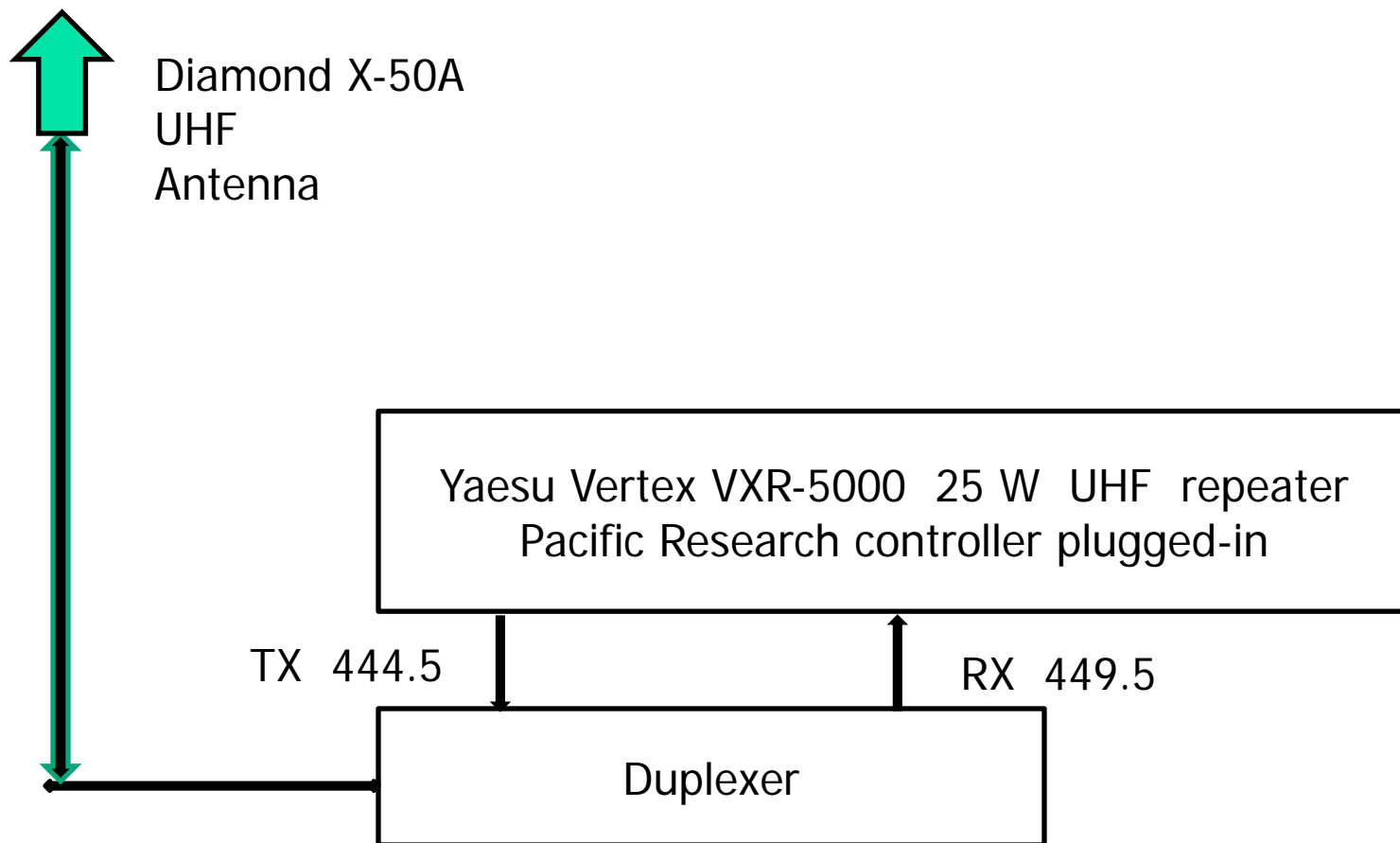
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- Located in RWCPD Ham radio room
- On "hot standby"
- Battery backup w/trickle charge
- No Remote Base
- Commanded ON if HoJ repeater is down
- Available as portable ? (not easy,heavy)





# SCARES repeater in RWCPD





# SCARES aux repeater





# SCARES aux repeater





# SCARES 6 m repeater

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- GE mobile transceiver configured as a repeater, 53.68- PL 114.8
- Pacific Research Controller
- No remote base
- Battery backed up by KMF
- Utilizes KMF 6m folded dipole antenna
- SCARES 53.68 duplexer

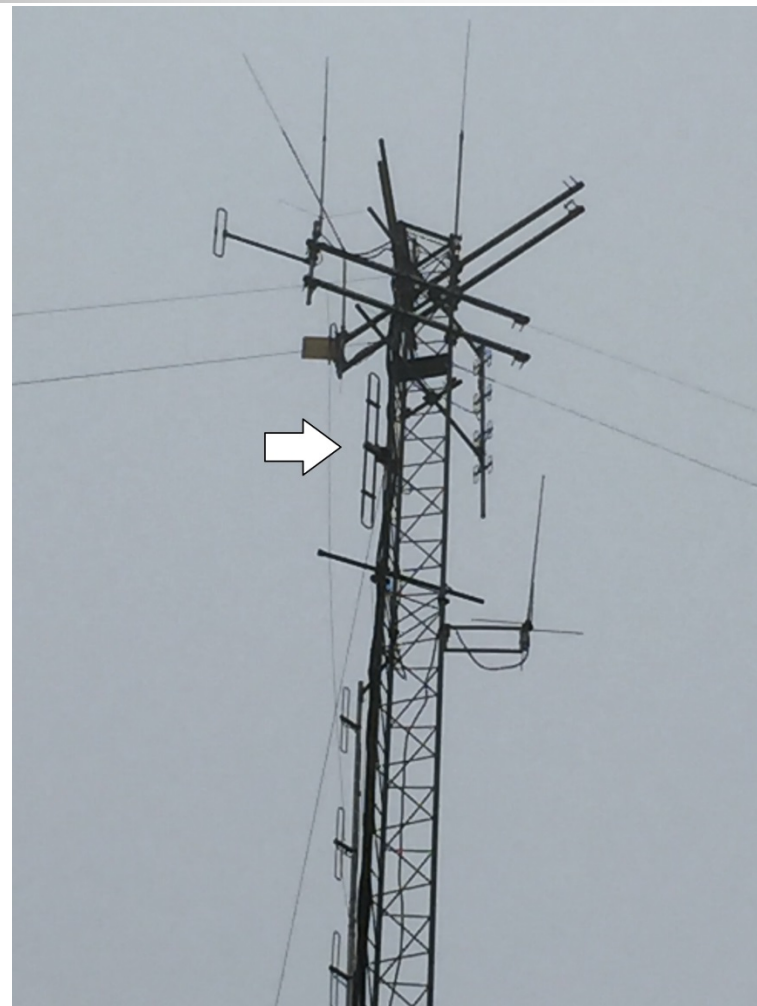
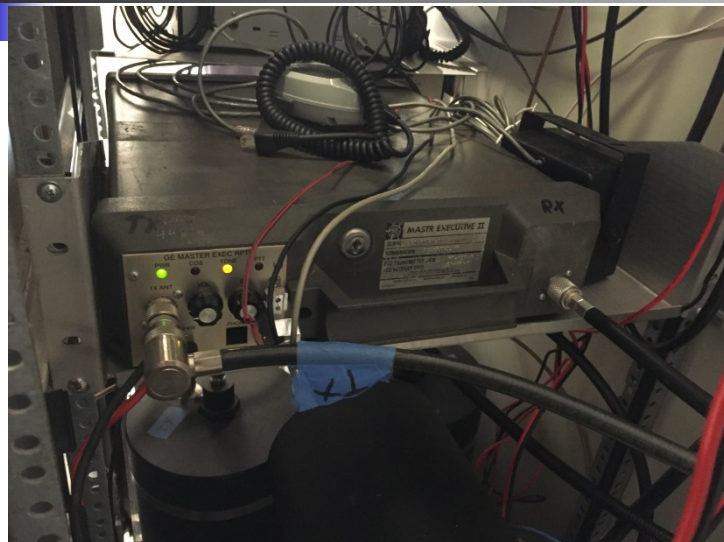


# SCARES 6 meter repeater before KM install





# 6 meter repeater at KM Fire





# SCARES primary UHF repeater

- Located atop the Hall of Justice in RWC
- 25 W Kenwood UHF repeater with DSP
- 100 Hz CTCSS both TX/RX
- DB-408 dipole antenna configured for maximum gain along peninsula
- Three channel Arcom RC210 controller
- Kenwood 2 meter remote base



# Remote Base ?

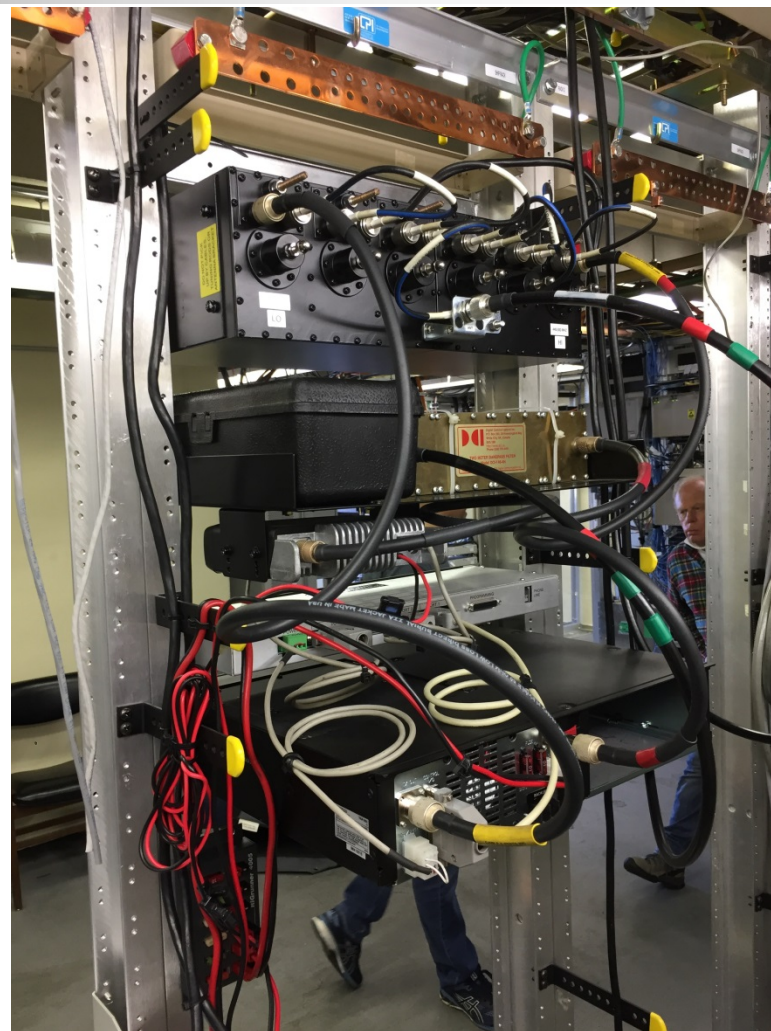
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- Remotely Controlled Base Station
- A mobile 2m Kenwood TM-281 @25 W
- Think of it as a base radio but located at another site (at the repeater)
- Controlled by the repeater's ARCOM controller





# K6MPN primary Repeater (front – back)

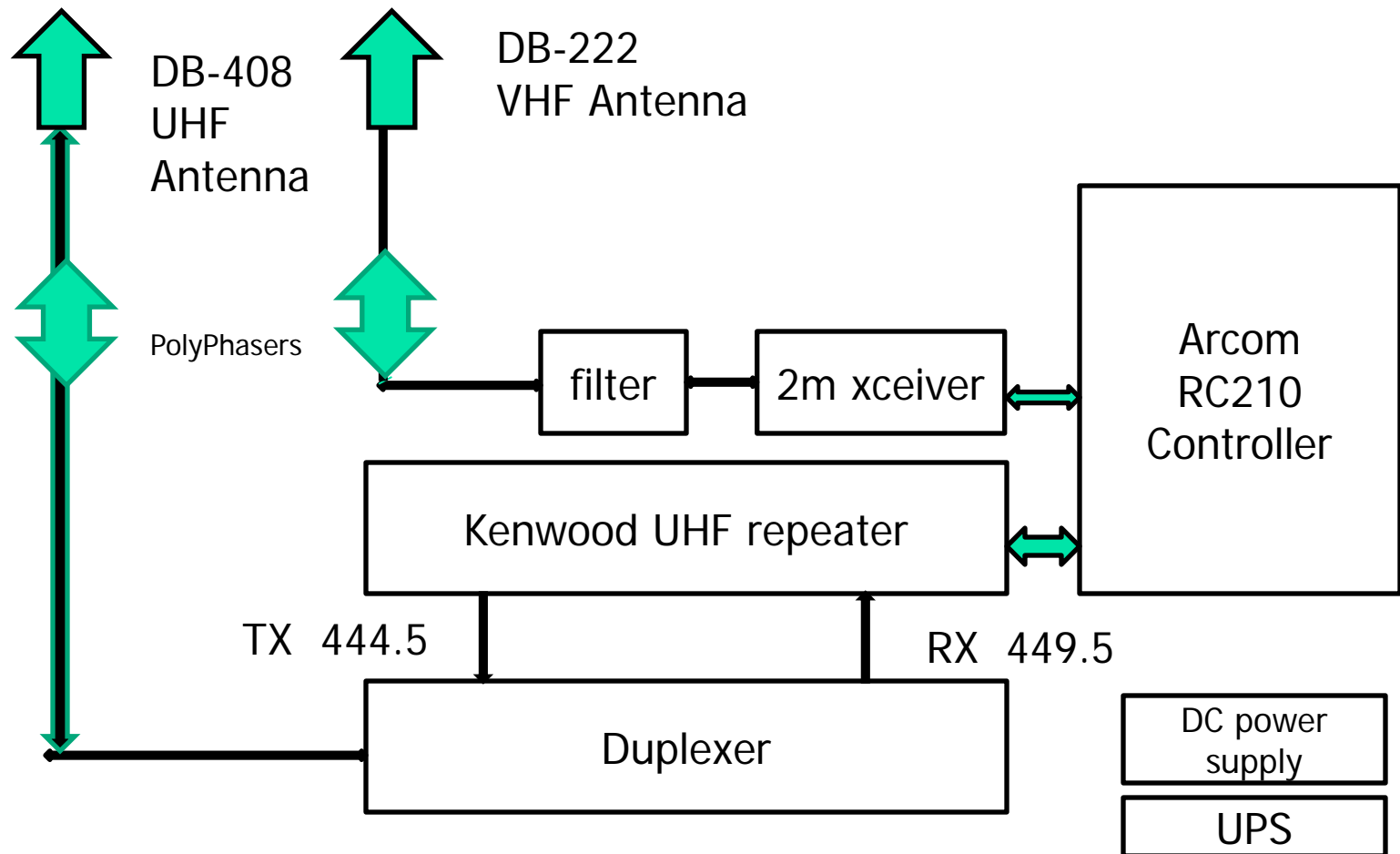




# VHF and UHF antennas



# SCARES Repeater on HoJ





# Repeater Controller (basic)

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- Processes audio from the receiver
- Sends processed audio to transmitter
- Keys the transmitter
- Inserts repeater ID (10 minute interval)
- Has watchdog timer (shuts off TX if TX stuck ON or someone has "talked off" the repeater) 90 sec tx timer limit



# SCARES repeater nuances

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- Announces net 5 minutes after the hour on Mondays from 0800 to 1900 hrs.
- Announces general meeting 5 minutes after the hour every third Thursday from 0800 to 1900 hrs.
- Turns ON remote base 1915 hrs every Monday for net and then turns remote base OFF at 2015 hrs.



# SCARES repeater nuances-2

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- 90 second time-out-timer
- Short hang-time for Remote Base
- Voice ID switches to CW if people are talking on the repeater
- Remote Base is steerable
- Automatically adjusts for DST/PST



# SCARES repeater nuances-3

- Don't transmit during RB activation
- During nets when RB is ON, 2m input will trigger a triple beep
- Don't announce you will be out of town

## FCC License Data Search Results

Search by:

Call Sign:

**Search**

Name:

**LOMBAERDE, ROBERT P, WB6WGM**

2727 BELMONT CYN RD

BELMONT, CA 940021204

ATTN: Robert P. Lombaerde

Licensee ID: L00234498

License Class: Amateur Extra



# Simplex Repeaters

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- “Simplex Repeater” is NOT a repeater
- Not simultaneous transmission of voice
- Acts like a parrot – repeating input
- Should be monitored/controlled by user
- Useful for extending range of comms for a group
- Not suitable for 24/7 operation
- Can be used outside of repeater bands





# Connecting to the world digitally via VOIP, internet

- D-Star – Icom, Kenwood
- Fusion, Yaesu
- IRLC/ECHOLink
- DMR, Digital Mobile Radio
- APCO P25
- Can SCARES repeater use VOIP/internet?

No – no internet and no phone line



# Wires (Yaesu)

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- Yaesu DTMF encode option
- Allows access to repeater connected to internet for world wide access
- Sends out DTMF code to open gateway
- Blanks out speech during first part of transmission. You only hear "---WGM"
- Unfortunately easily turned ON – causing loss of voice initially



# NARCC

- Northern Amateur Relay Council of California

NARCC Repeaters Sorted by Mode	
APCO P25 All Areas	<a href="#">APCO P25</a>
ATV Repeater All Areas	<a href="#">ATV Repeater</a>
DMR Repeater All Areas	<a href="#">DMR Repeater</a>
Dstar Data All Areas	<a href="#">Dstar Data</a>
Dstar Voice All Areas	<a href="#">Dstar Voice</a>
Fusion AMS Mode All Areas	<a href="#">Fusion AMS Mode</a>
Fusion Digital All Areas	<a href="#">Fusion Digital</a>
Mixed Mode DMR All Areas	<a href="#">Mixed Mode DMR</a>
Mixed Mode P25 All Areas	<a href="#">Mixed Mode P25</a>



# NARCC (cont.) showing open/closed and Fusion, DMR

Output	Input	CTCSS	Call	Location	Sponsor	Status	Notes	Station Type
145.0125	147.5125		AH6KD	Brisbane	<a href="#">TRBO-6</a>	Uncoordinated	olx	DMR Repeater
145.0250	147.5250		WB5NVN	Portola Valley	PVARC	Uncoordinated	oe	DMR Repeater
145.1500	144.5500		<a href="#">W6PW</a>	San Francisco	<a href="#">SFARC</a>	Coordinated	oersx	Fusion AMS Mode
145.3700	144.7700	107.2	<a href="#">N6ZX</a>	Woodside	KMARC	Coordinated	oersx	Fusion AMS Mode
145.3700	144.7700	107.2	<a href="#">N6ZX</a>	Woodside	KMARC	Coordinated	oersx	Repeater
145.3900	144.7900	100.0	<a href="#">WW6BAY</a>	Palo Alto	<a href="#">Bay-Net</a>	Coordinated	oelsx I: <a href="#">3802</a> E:314933	Repeater

443.4750	448.4750	100.0	<a href="#">K6LNK</a>	Cisco Grove	<a href="#">CARLA</a>	Coordinated	oel I: <a href="#">3994</a> E:360571	Repeater
443.7000	448.7000	123.0	WA6EWV	S. Lake Tahoe	<a href="#">TARA</a>	Coordinated	oe	Repeater
443.9750	448.9750	114.8	<a href="#">W6YDD</a>	Truckee	YDD 1.2	Coordinated	ox	Repeater
444.1750	449.1750	85.4	<a href="#">W6SUV</a>	So. Tahoe Ca	<a href="#">W6SUV</a>	Coordinated	oelrs E:324966	Repeater
444.9500	449.9500		W6PUE	Tahoe City	NORCAL	Uncoordinated	clx	Repeater
444.9875	449.9875	156.7	KA6GWY	Rubicon Spring	KA6GWY	Coordinated	oelrs E:95726	Repeater

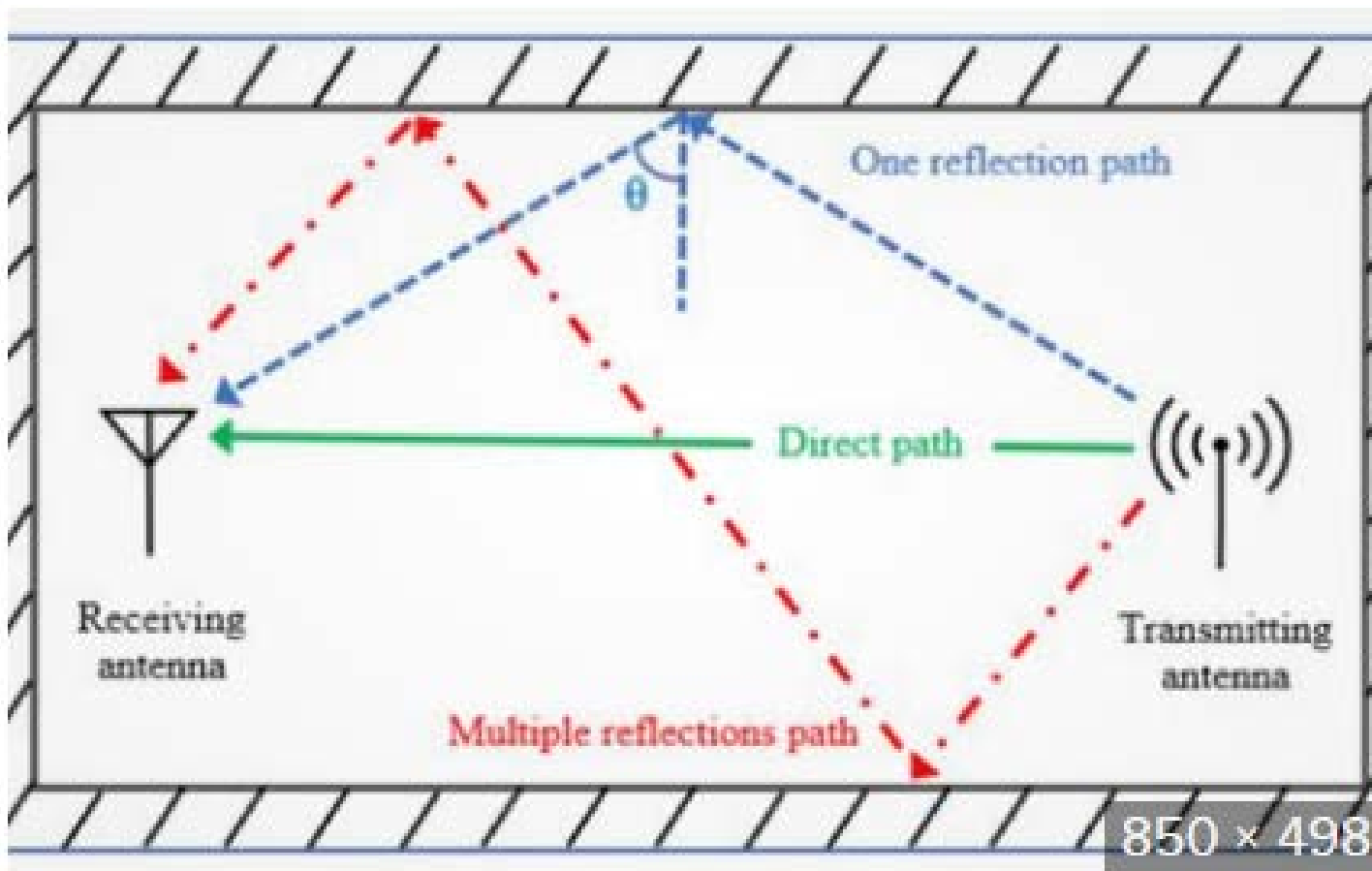


# Simplex

- SCARES "in the old days, before the repeater" Nets were 2m simplex
- With height, long line-of-sight distances are possible - SOTA
- Relays were used so all could check-in
- Locally omni antennas worked well, for distance directional antenna are better
- W6VOM, Neil in Dublin, K6VP, Dan, SJ



# Multi-path - reflections





# Multipath problems

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- Multiple delayed signals received
- Caused by reflections due to – hills, walls, buildings, atmosphere, etc
- Causes distortion in receiver
- Cured by receiving best signal with directional antenna



# Repeaters, Simplex, etc.

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- Questions ??