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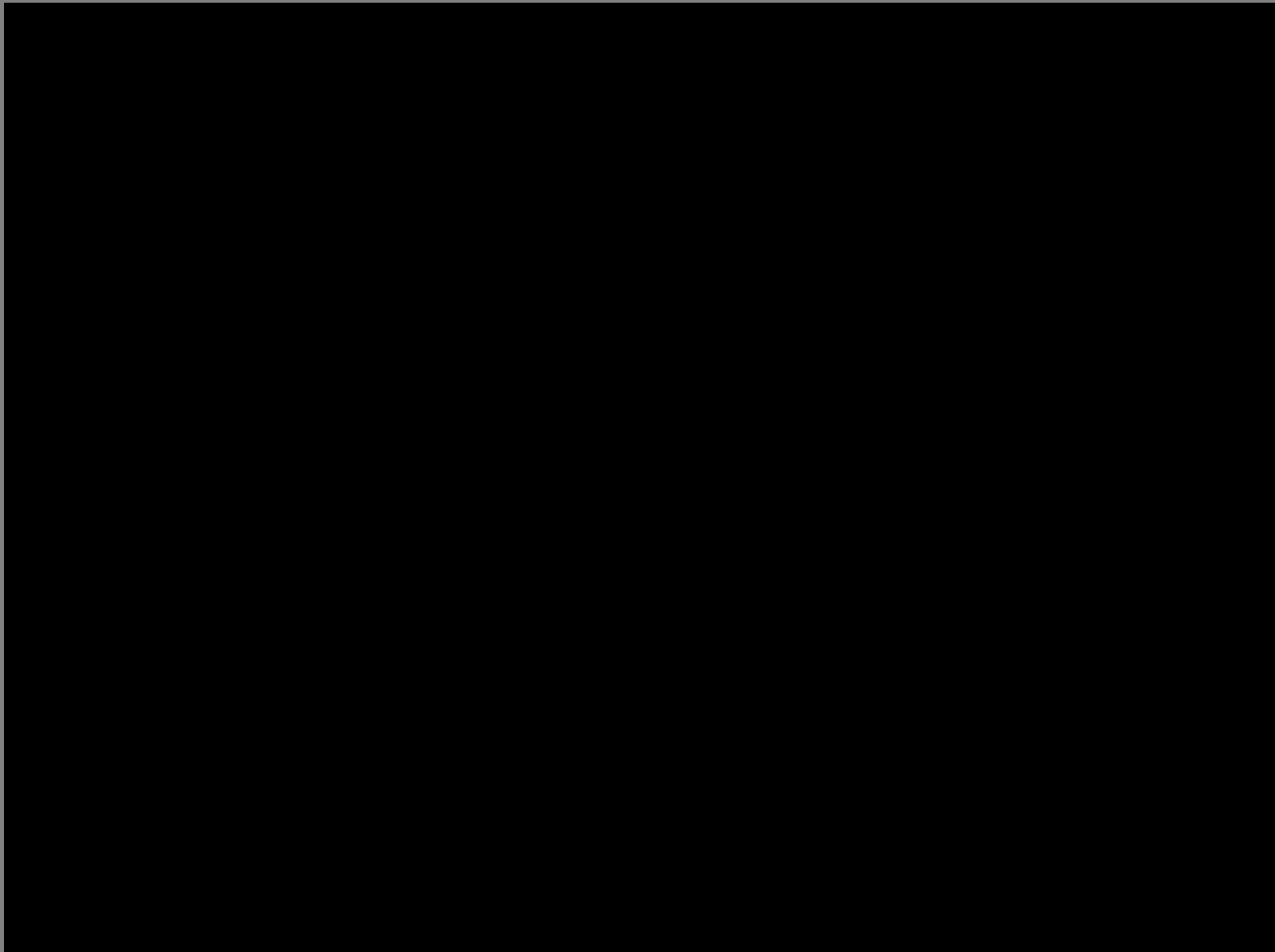


An Introduction to Emergency Communications

Santa Clara County ARES®/RACES/ACS

Revised: October 1, 2025

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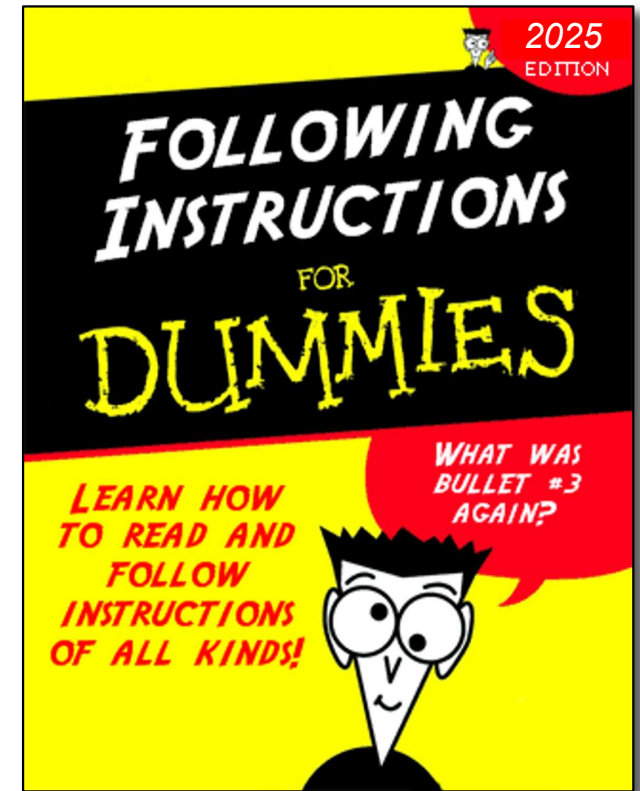


An Introduction to Emergency Communications

Santa Clara County ARES®/RACES/ACS

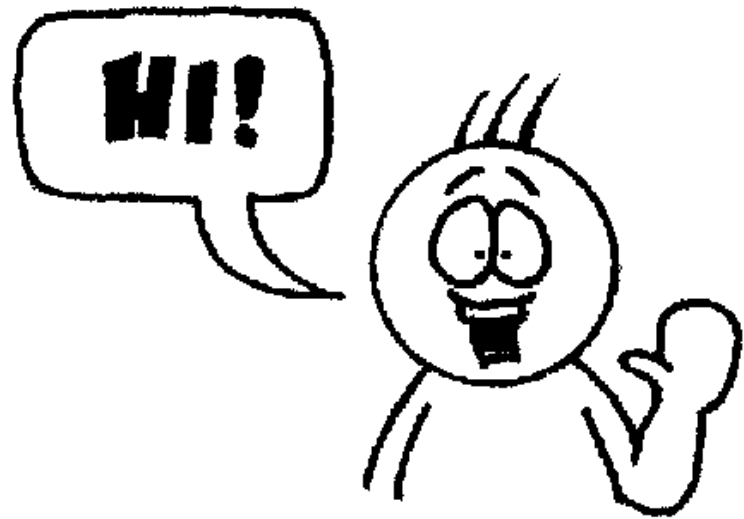
Housekeeping

- Introductions
- Pen/pencil & paper
- Cell phones on silent or vibrate
- Side conversations
- Questions
- Breaks
- Restrooms
- In case of emergency
- No wandering or exploring other areas of the building.



Introductions

- Name
- Call Sign
- City
- Year First Licensed
- Do you have a radio yet?
- Have you been on the air yet?



Today's Agenda

- Voice Technology (VHF/UHF FM)
- Voice Operating Techniques
- Additional EmComm Modes
- Radios and Accessories
- EmComm Organizations
- Additional Training & Next Steps
- After Class Exercise: Get On The Air

Learning Objectives



- At the end of this class, you will be able to
 - Explain VHF/UHF FM technology used in EmComm
 - Use band plans, frequency lists, repeater directories
 - Configure your radio for simplex & duplex operations
 - Participate in a directed net
 - Make direct contacts
 - List three other modes used in EmComm
 - Select an EmComm radio and accessories
 - Understand local EmComm organizations
 - Understand what to do next, after this class
 - Make real on-the-air contact with Net Control op

VHF/UHF FM Voice Technology

Bands and Frequencies

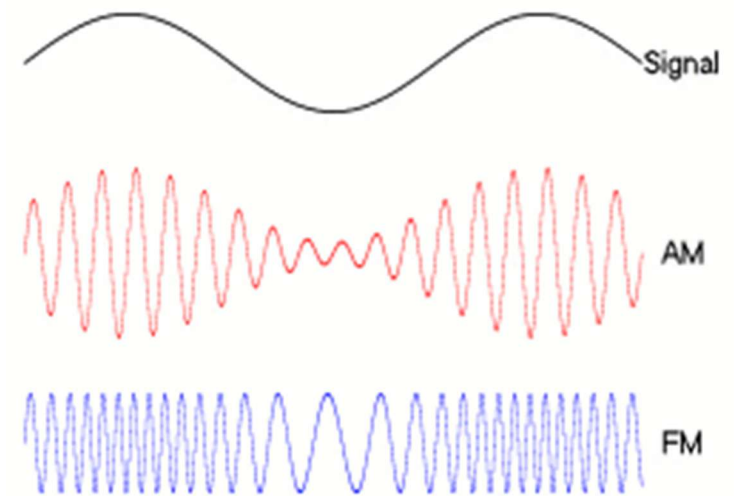
Simplex, Duplex and Repeaters

Making Sense of Repeater Listings

Setting up your Radio

Some Important Terms

- VHF – Very High Frequency
 - 30 to 300 MHz
- UHF – Ultra High Frequency
 - 300 to 3000 MHz (3 GHz)
- FM – Frequency Modulation
 - The information in the signal is represented by variations in the frequency around a central carrier
 - The amount of variation is called the “deviation”



Characteristics of VHF/UHF FM

- Short range
 - Point-to-point range typically < 5-7 miles (portable/mobile)
 - Influenced by line-of-sight; dependent on antenna height
- Frequency re-use
 - Short range allows for multiple conversations on the same frequency throughout the region
- Well suited for local emergency communications
 - Portable (handi-talkie or “HT” and mobile stations)
 - Clear voice quality (think of FM vs. AM broadcast)
 - Coverage can be extended by repeaters

VHF/UHF Amateur Bands

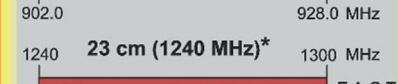
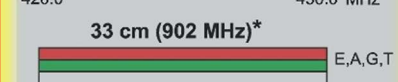
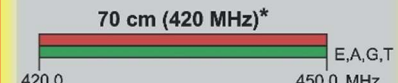
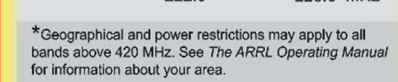
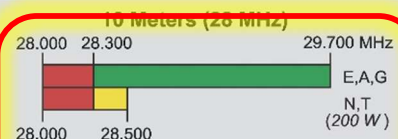
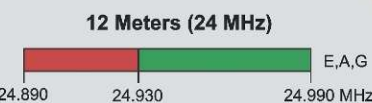
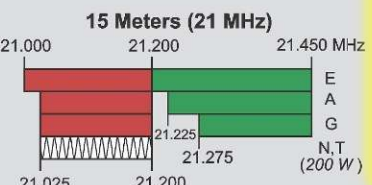
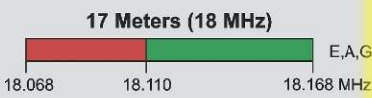
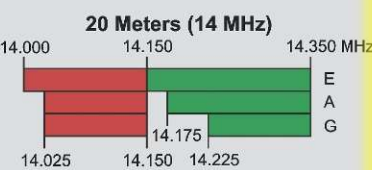
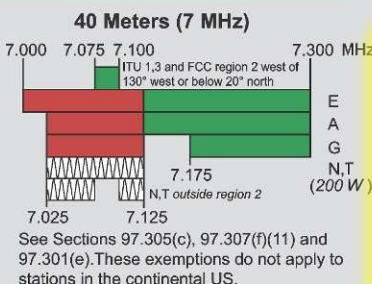
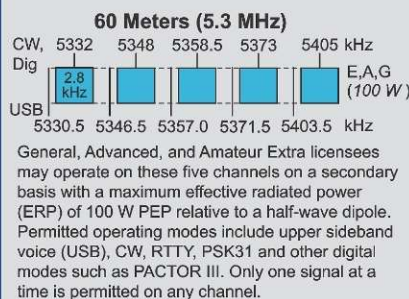
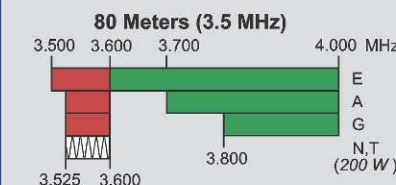
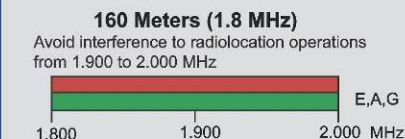
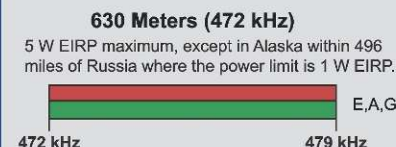
US Amateur Radio Bands

US AMATEUR POWER LIMITS — FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications. (b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.



ARRL The national association for AMATEUR RADIO®

Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.



All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5925 MHz	76.0-81.0 GHz	All above 275 GHz

± No pulse emissions

KEY

Note:
CW operation is permitted throughout all amateur bands.
MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz.
Test transmissions are authorized above 51 MHz, except for 219-220 MHz.

- RTTY and data
- phone and image
- CW only
- SSB phone
- USB phone, CW, RTTY, and data
- Fixed digital message forwarding systems only

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice

See **ARRLWeb** at www.arrl.org for detailed band plans.

ARRL We're At Your Service

ARRL Headquarters:
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Toll-Free 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

Getting Started in Amateur Radio:
Toll-Free 1-800-326-3942 (860-594-0355)
email: newham@arrl.org

Exams: 860-594-0300 email: vec@arrl.org

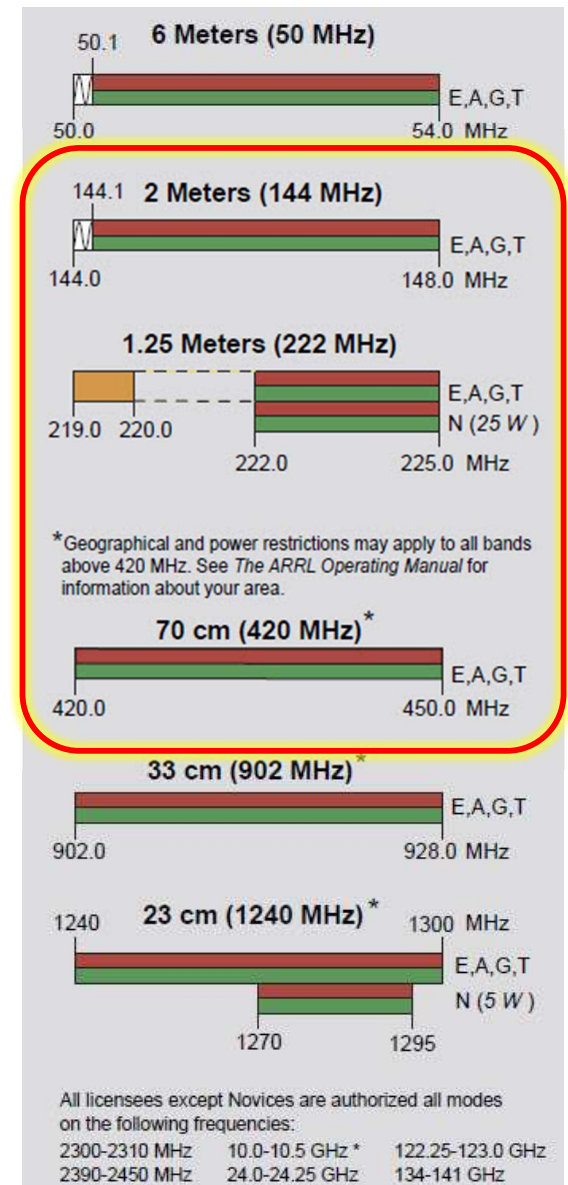
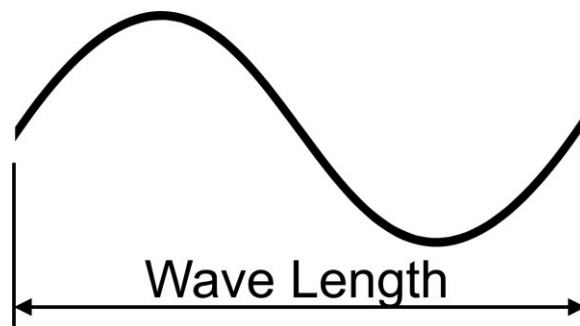
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<https://www.arrl.org/graphical-frequency-allocations>

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Primary VHF/UHF Bands for EmComm

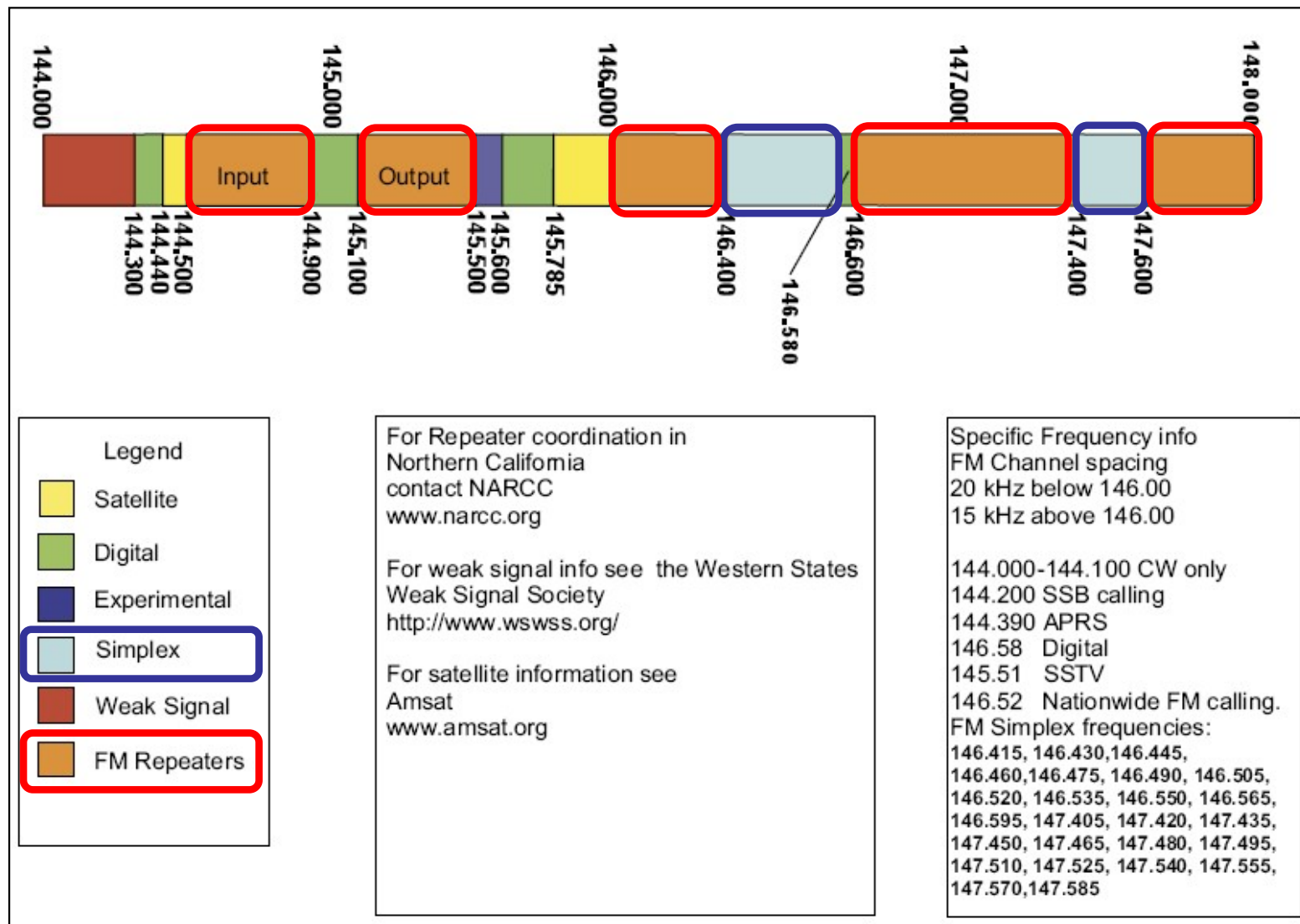
- 2 meter band (commonly called “2 meters”)
 - 144-148 MHz (VHF)
- 70 cm band (commonly called “440”)
 - 420-450 MHz (UHF)
- Also, 1.25 meter band (“220” or “222”)
 - 222-225 MHz (VHF)
 - In SCCo ARES/RACES, used for packet comms
- Where do the names come from?
 - $300/\text{Frequency (MHz)} = \text{Wavelength (m)}$
 - Example: $300 / 148 \text{ MHz} \approx 2 \rightarrow 2\text{m band}$



Selecting a Frequency

- Questions:
 - How do we pick a frequency to use?
 - How will people know where to find us?
 - How do we avoid interfering with other users?
 - How do we avoid interfering with other modes?
 - Including ones that we can't even hear on our FM radio!
- Answers:
 - Band plans
 - Allocate blocks of frequencies to particular modes
 - Frequency Lists
 - Identify specific frequencies for specific purposes

2m Band Plan (Northern California)



<http://www.narcc.org> – Northern Amateur Relay Council of California

Frequency Lists

Santa Clara County Frequencies (Reviewed 2024-01-07)					
Channel	Call Sign	Frequency	PL	Note	Updated
Message Net	W6TI	147.360 +	110.9		2011-02-11
Message Net Alt (Linked)	K6FB	145.450 –	100.0	H	2012-06-28
Message Net Alt (Linked)	K6FB	442.575 +	100.0	H	2012-06-28
Command	W6GGF	442.500 +	100.0		2016-05-16
Resource, Primary	AA6BT	146.115 +	100.0	D	2011-02-11
Resource, North	W6ASH	145.270 –	100.0	E	2011-02-11
Resource Alt, North	W6ASH	440.800 +	100.0	E	2017-07-11
Resource, South	K6SNY	443.275 +	107.2	G,I	2024-08-25
Hospital Net	N6NFI	145.230 –	100.0		2011-02-11
NTS	WR6ABD	146.640 –	162.2		2011-02-11
220 Simplex	223.400, 223.420, 223.440, 223.460, 223.480, 223.500				
440 Simplex	441.000, 446.000, 446.500				
American Red Cross Frequencies					
Channel	Call Sign	Frequency	PL	Note	Updated
Command	W7AFG	444.300 +	173.8		2011-02-11
Command Alt	WB6OQS	444.600 +	141.3		2011-02-11
Tactical 1	KB6FEC	147.165 +	162.2		2011-02-11
Tactical 2	WG6LEE	147.675 –	162.2		2022-11-23
Tactical Alt	WB6OQS	146.760 –	151.4		2011-02-11
Link	WB6OQS	224.260 –	100.0		2011-02-11
Talk Around	WB6RNH	444.300 +	162.2		2011-02-11
All Areas	Simplex	147.420 (s)			2011-02-11
Campbell Frequencies					
Channel	Call Sign	Frequency	PL	Note	Updated

Los Altos and County Frequencies						11/03/08
Program these	Frequency	offset/pl	Call Sign	Location/Sponsor	Function	
	52.525	simplex	national	calling	frequency	
	144.610	simplex	WBXSC-1		County Packet - WBXSC-1	
	145.650	simplex			County Hospital Packet Net	
	145.070	simplex	K6LOS	Mountain View - Los Altos	Packet - K6MTV in Mtn View	
	145.170	104.2	R6GL	sunnyvale	SVL Tactical	
	145.210	-123.0	K6BYJ		Cnty Resource Net So (future)	
	145.230	-100.0	N6NFI	Palo Alto-SPARK/SAH	Hospital Net	
	145.250	-123.0	N6BMF	NASA-Ames		
145.270	145.270	-100.0	W6ASH	EC Hosp - SPECS	Cnty Resource Net North-LA Cmnd	
	145.280	-100.0	K6FB	Los Altos-LAARC	County Message Net Alt	
145.570	145.570	simplex	K6LOS	Los Altos-LAARES	Los Altos Tactical Alt	
146.115	146.115	+100.0	AA6BT	San Jose-SVECS	County Resource Net Primary	
	146.400	simplex			Stanford Tactical 1	
	146.520	simplex	national	calling	frequency	
	146.535	simplex	K6MTV	Mountain View-ARES	Mountain View Tactical	
	146.550	simplex	K6LOS	Los Altos-LAARES	Los Altos Tactical Alt All	
146.595	146.595	-162.2	WR6ABD	LPRC	National Traffic System	
	146.745	-110.0	W6LAH	Los Altos Hills-ARES	ARES/RACES	
	146.760	-151.4	WB6OQS	San Jose-SCVRS	Cnty Message Net Alt 1/ARC	
	147.360	+110.0	W6TI	PA-NDXC	County Message Ne	
	147.400	simplex		sunnyvale	SVL Resource Coord	
	147.435	simplex	W6LAH	Los Altos Hills-ARES	LAH Tactical & Command	
useless	147.450	simplex	K6MTV	Mountain View-ARES	Mountain View Tactical	
	147.540	simplex		Palo Alto-ARES	PA Tactical	
	147.570	sim, 151.4		Cupertino-ARES	Cupertino Tactical 1	
	223.500	simplex	national	calling	frequency	
	223.600	simplex	WBXSC-1		County Packet - WBXSC-1	
224.140	224.140	-100.0	W6ASH	EC Hosp - SPECS		
	433.530	simplex	WBXSC-1		County Packet - WBXSC-1	
	440.200	+123.0	N6BDE	Stanford-SUARES	Stanford-primary emergency	
440.800	440.800	+100.0	W6ASH	EC Hosp - SPECS	Los Altos Command Alt	
440.875	440.875	+100.0	K6BN	Los Altos-LAARES	Los Altos Tactical Alt	
	442.500	+100.0	WB6ZVW		County Command Net	
	443.275	+107.2	K6SNY			
	444.300	+152.2	WB6RNH	SJ ARC TalkAround	County Command Net Alt	
	444.600	+141.3	WB6OQS	San Jose - SCVRS	SJ ARC	
	444.625	+110.0	N6UAC		County Resource Net South	
	446.000	simplex	national	calling	frequency	
	1282.500	-88.5	W6YX	Stanford - SUARES		
	1294.500	simplex	national	calling	frequency	
Police / Fire / Sheriff / CHP - these phone numbers are for the business office - NOT 911 Service						
	483.0625	136.2	K6K702	Los Altos Dispatch & Primary	Police - 650.947.2770	
	482.7875	483.2125		Los Altos Secondary & Tair	LA Police on MTV channe	
	154.2500	162.2		Los Altos/County	Fire - dispatch - 408.378.4010	
	154.4000	110.0		Los Altos/County	Fire - command 5	
	154.1750	162.2		Los Altos/County	Fire - tactical/mob/oor	
	48.54000	162.2		Los Altos	Public Works - 650.947.2785	
	57.0800			County EOC	EOC to EOC - 408.305.7880	
	154.28, 154.265, 154.292			SC County Fire Mut Aid	White Fire 1, 2, 3	
	155.476, 482.3375			SC County Law Mut Aid	BA1/MALCS	
	153.7850			CSERS	CA Emer Svcs Radio Sys	
	154.92, 154.935, 455.476, 480.021			CLEMARS	on-scene Law Enforcement	
	156.0750			CALCORD	mobile on-scene command channe	
	156.7000	digital	P-25	Sheriff	Cup&LAH - 408.299.2311	
	156.2100	170.0		Sheriff - Control 1	Cup&LAH - Grave [HQ]	
	154.8000			Sheriff - 1ac 5	West Side Tactical	
	155.7225	170.0			PHDA Police	
	151.2350	123.0/203.5			MROSO	
	151.1500	162.2	WPNZ857	SC County	SCC Search & Rescue Repeat	
	42.5000			CHP	Ruby - SJ - 408.487.5400	
	42.0800			CHP	White - RWC - 650.369.5261	
	482.9875	162.2		Los Altos Hills	Public Works	
	482.6125	110.0		Stanford	Police	
	482.5125	110.0		Mountain View	Police - 650.903.6395	
	154.0250	110.0		Mountain View	Fire - 650.903.6385	
	483.0500	110.0		Mountain View	Public Works	
	482.6125	110.0		Palo Alto	Police - 650.780.7100	
	153.7700	110.0		Palo Alto	Fire - 650.780.7400	
	453.7000	110.0		Palo Alto	Public Works	
	482.9825	141.3		Sunnyvale	Police - 408.730.7100	
	482.7125	141.3		Sunnyvale	Fire - 408.730.7100	
	453.8000	100		Sunnyvale	Public Works	
	482.5625	127.5		Cupertino	Public Works	

<https://www.scc-ares-races.org/operations/voice/freqs>

Check with your city EC

Maintain a copy and be familiar with the ones appropriate for you

FM Voice Operating Modes

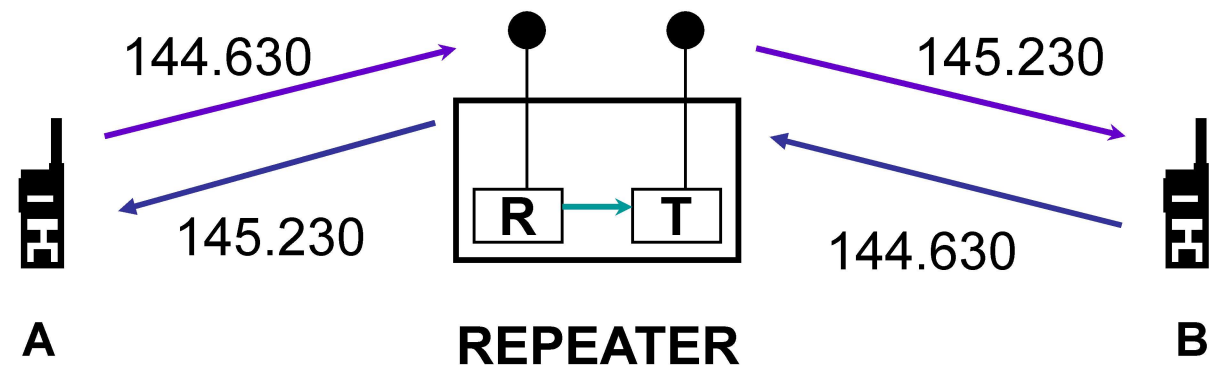
SIMPLEX

Single frequency - one station at a time

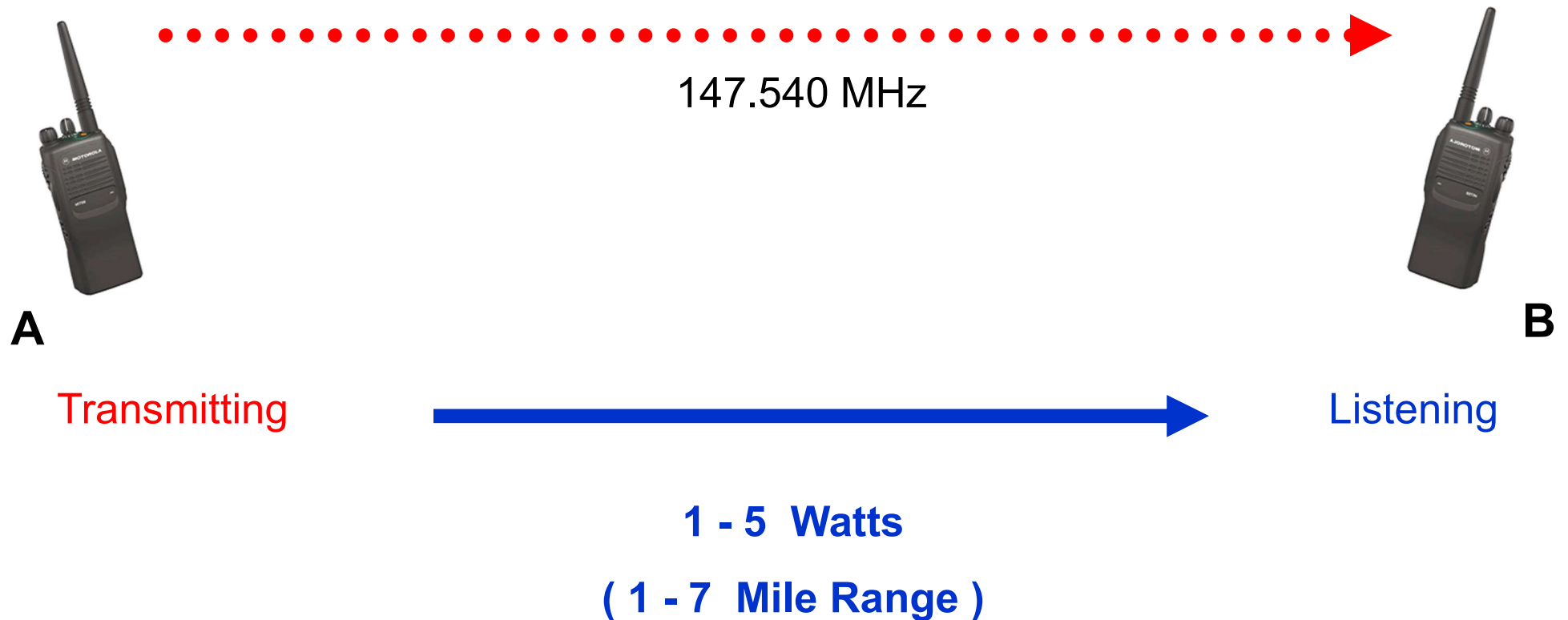


DUPLEX

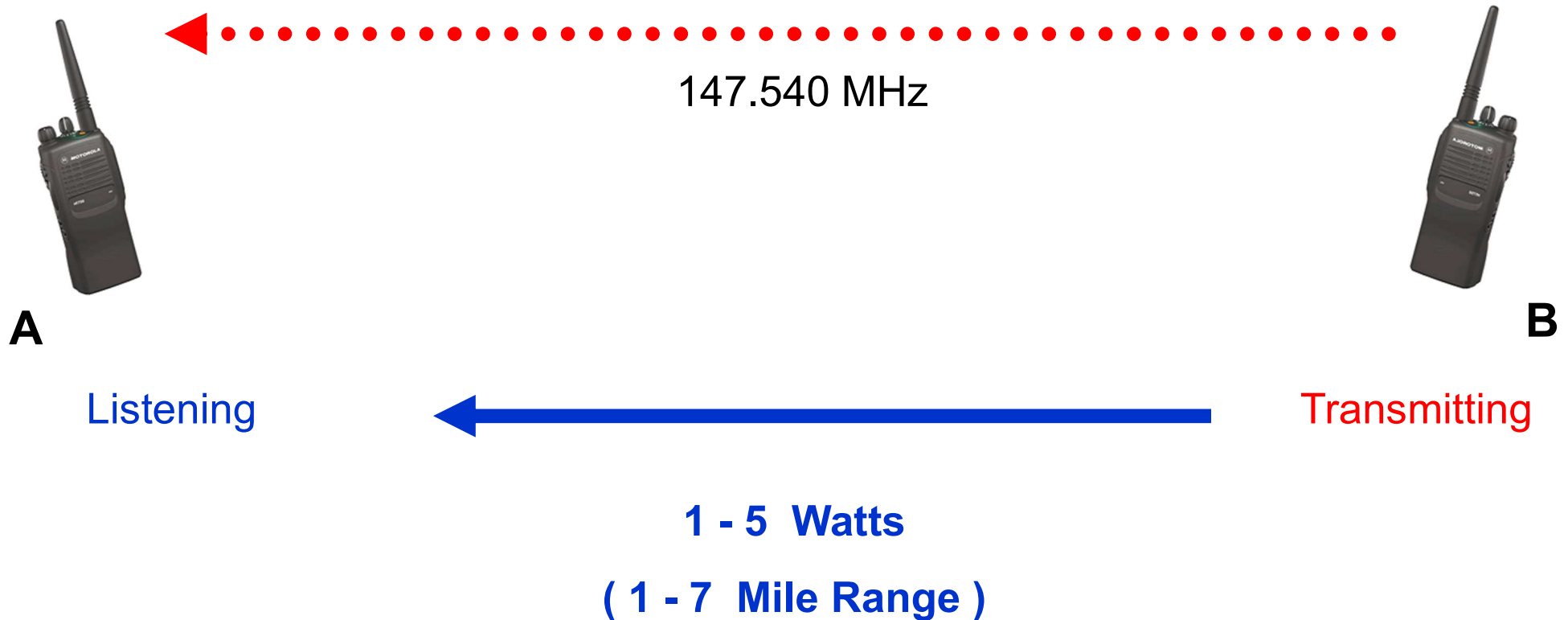
Two frequencies - one station at a time



How Simplex Communication Works...

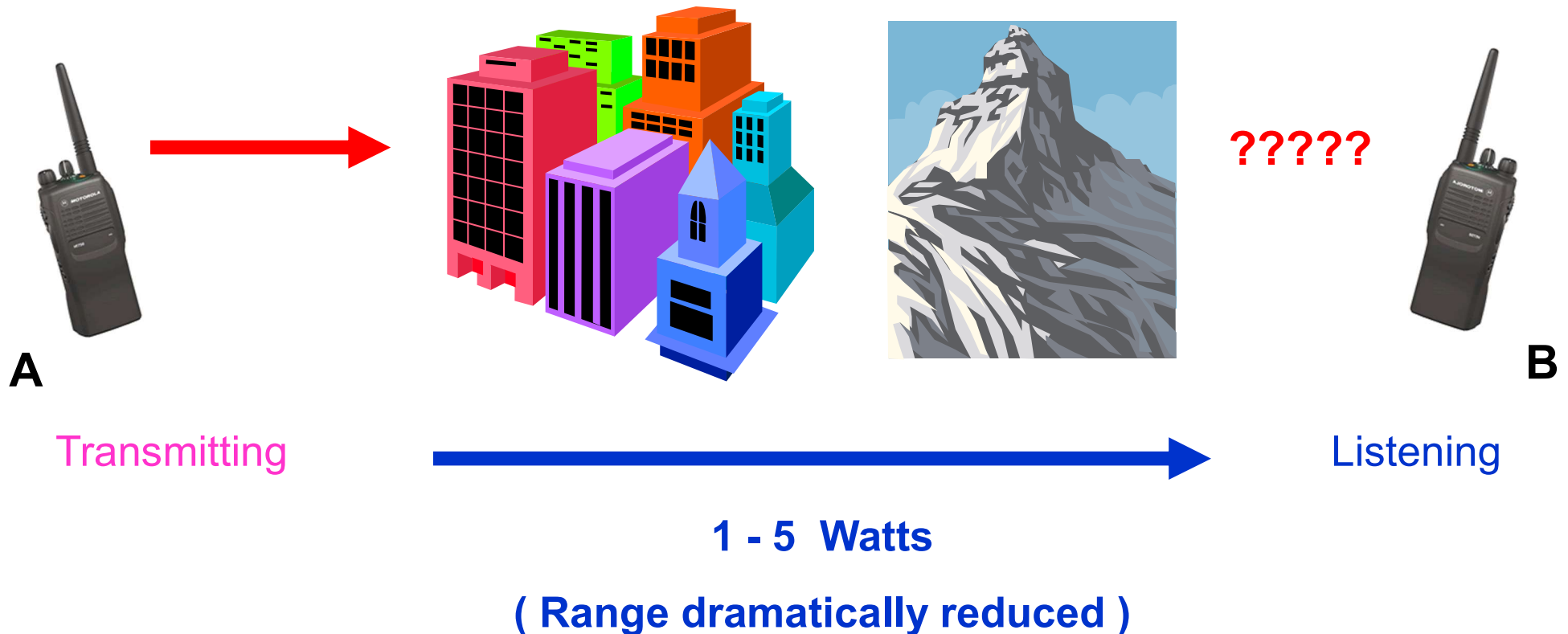


How Simplex Communication Works...



VHF & UHF are Influenced by Line of Sight

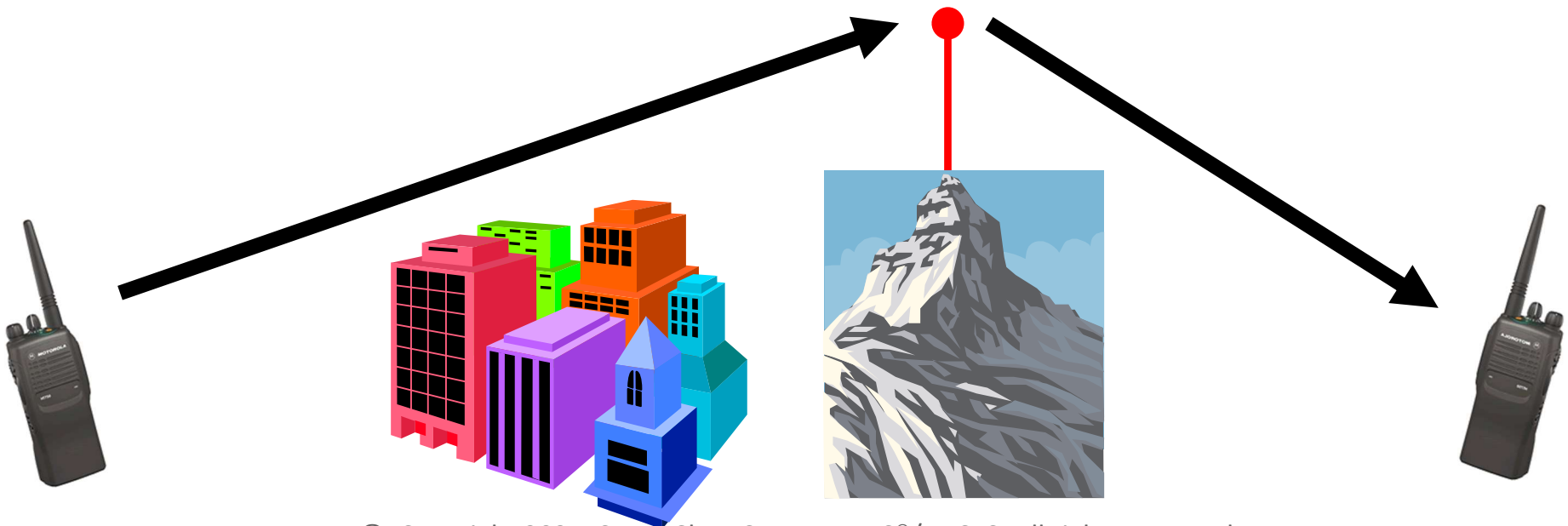
Buildings, hills, mountains can block or degrade transmission



So, how can we overcome these limitations?

Repeaters

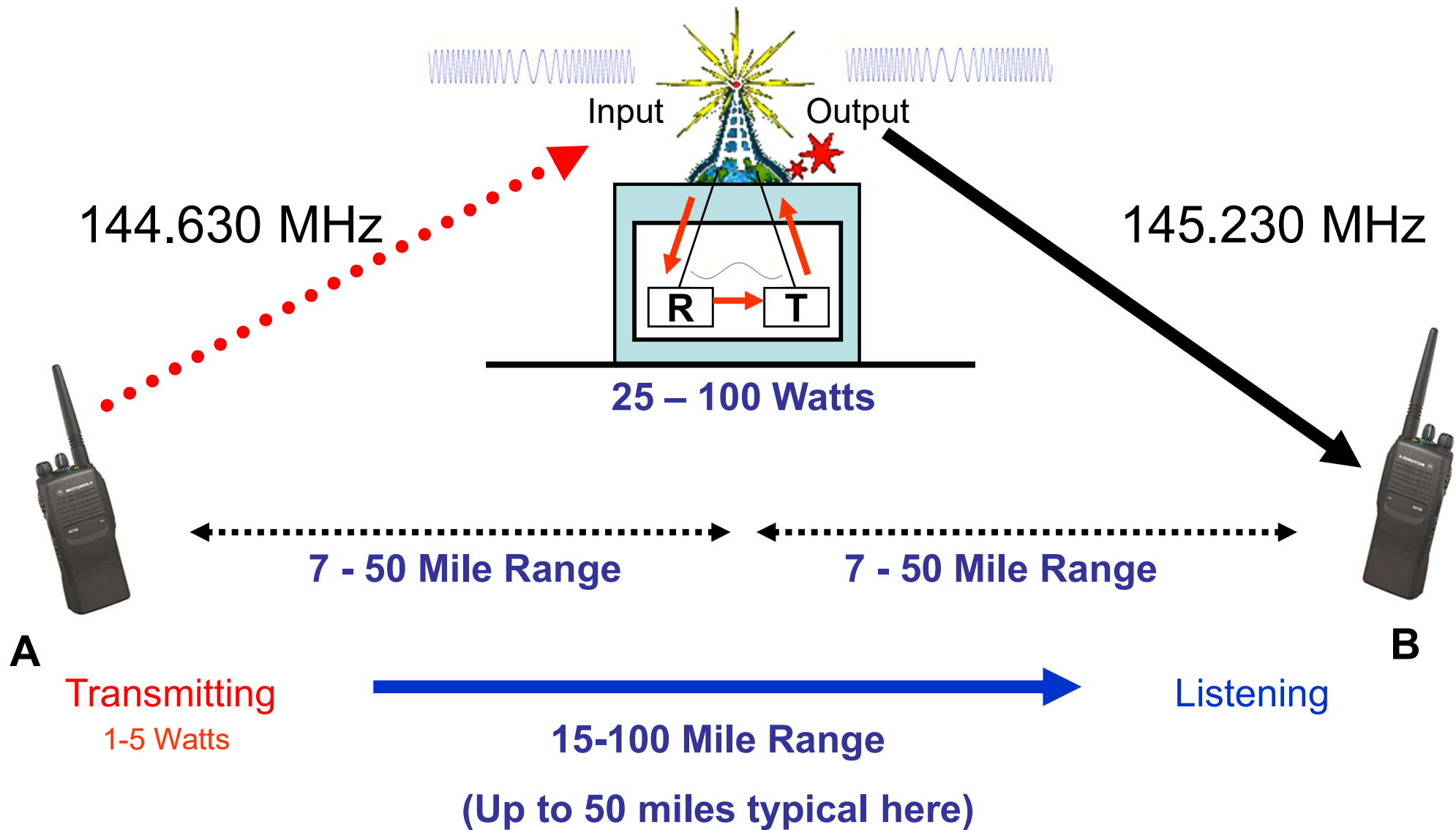
- Usually placed on towers, on top of buildings, hills, or mountains
 - Extends line of site over top of many types of obstacles
 - Extends range between end points
 - Much better antenna located up (very) high; more power



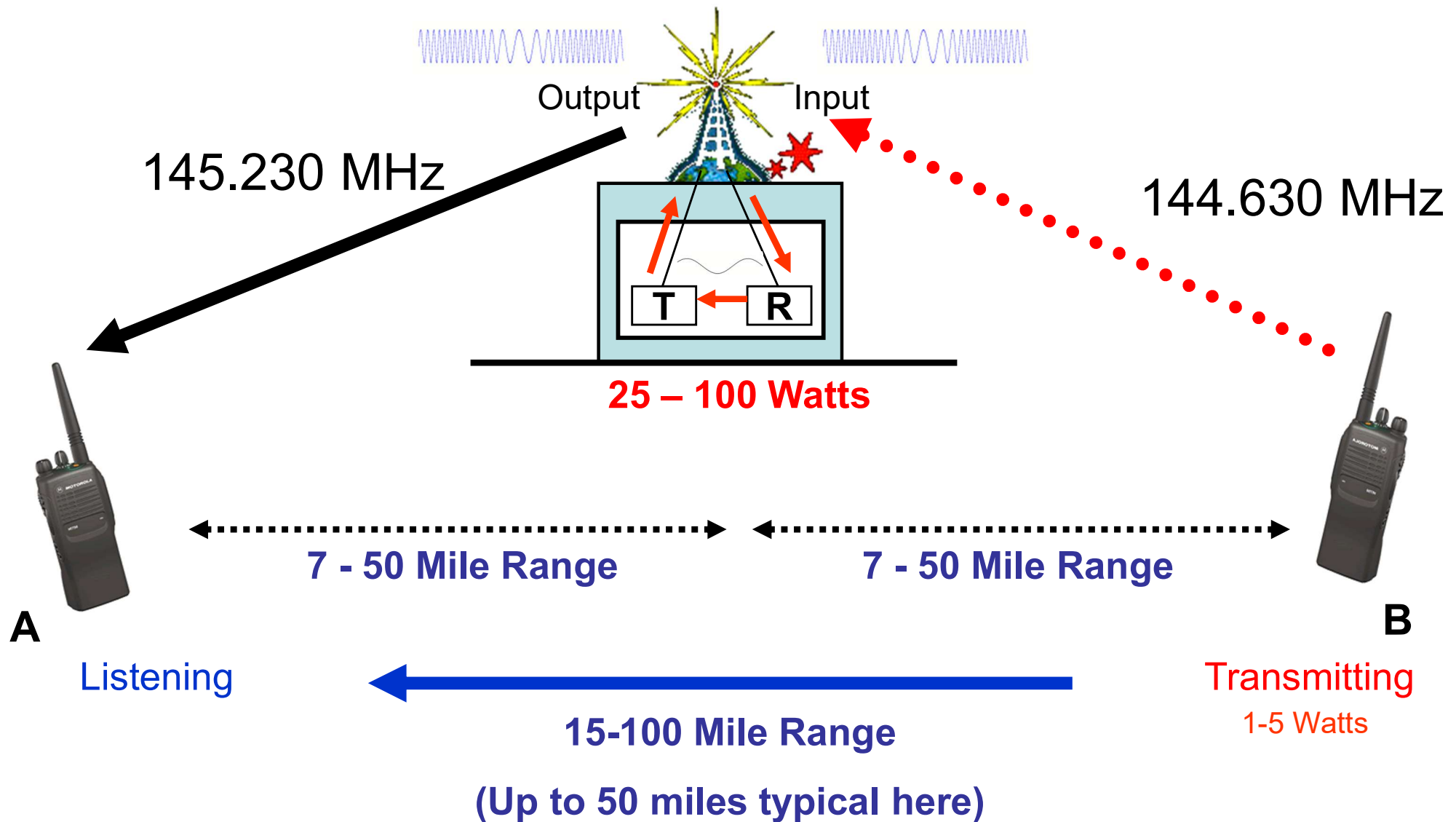
What is a Repeater?

- A repeater:
 1. Receives and demodulates an RF signal
 2. Regenerates the audio information
 3. Modulates the audio on a new RF carrier and retransmits
- Repeaters use duplex communications
 - Receives on one frequency (called the “input”)
 - Transmits on a different frequency (called the “output”)
 - Difference between output & input is the “offset” **important point**

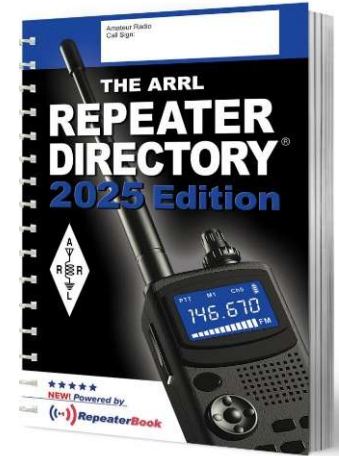
How a Repeater System Works



How a Repeater System Works



Understanding Repeater Listings



- Typical repeater directory entry looks like:

■ N6NFI 145.230 MHz – 100.0

CALL SIGN
of repeater

Repeater OUTPUT
frequency (you receive
on this frequency)

OFFSET

- "-" standard negative offset,
input lower than output
- "+" standard positive offset,
input higher than output
- Amount of offset shown if
non-standard

TONE
(frequency of tone
required to access)

Repeater Output Example

- Repeater listing:

- N6NFI 145.230 MHz – 100.0

CALL SIGN
of repeater

Repeater OUTPUT
frequency (you receive
on this frequency)

OFFSET

- "-" standard negative offset, input lower than output
- "+" standard positive offset, input higher than output
- Amount of offset shown if non-standard

TONE
(frequency of tone
required to access)

Tune radio to the repeater OUTPUT to hear the repeater

Repeater Offset

- Difference between repeater output and input is the “offset”
- 2m repeaters
 - may have positive or negative offsets – check band plans
 - standard offset amount is 0.6 MHz (600 KHz)
- 70cm/440 repeaters
 - Generally have positive offsets of 5 MHz
- 1.25m/220 repeaters
 - Generally have a minus offset of 1.6 MHz
- Most repeaters use standard offset amounts
 - Typically, just configure the offset direction (+/-);
 - Radio applies standard offset amount
 - Some radios even pick the correct offset direction automatically
 - Take care – band plans differ across the country

Repeater Offset Example

- Repeater listing:

- N6NFI 145.230 MHz - 100.0

CALL SIGN
of repeater

Repeater OUTPUT
frequency (you receive
on this frequency)

OFFSET

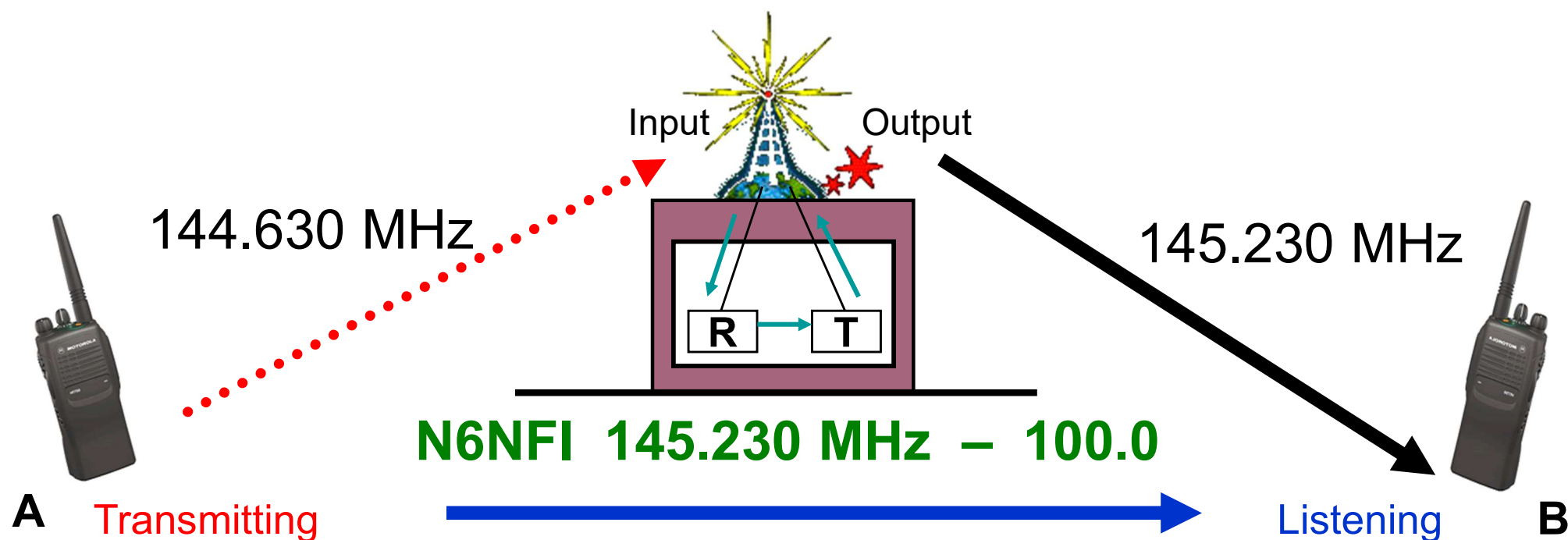
- "-" standard negative offset, input lower than output
- "+" standard positive offset, input higher than output
- Amount of offset shown if non-standard

TONE
(frequency of tone
required to access)

Example:

- This repeater uses a negative (or "minus") offset
- Input frequency is a lower frequency than output frequency
- Offset amount is standard (otherwise, it would be shown)

Repeater Offset Example



How it Works:

- You tune radio to repeater output frequency of 145.230 MHz & set minus offset
- Your radio calculates input frequency = 144.630 MHz
 - $145.230 \text{ MHz (output)} - 0.600 \text{ MHz (2m standard offset)} = 144.630 \text{ MHz (input)}$
- When you press PTT, your radio automatically switches to 144.630 MHz
- When you release PTT, your radio automatically switches back to 145.230 MHz

Repeater Tone Example

- Repeater Listing:

- N6NFI 145.230 MHz – 100.0

CALL SIGN
of repeater

Repeater OUTPUT
frequency (you receive
on this frequency)

OFFSET

- "-" standard negative offset,
input lower than output
- "+" standard positive offset,
input higher than output
- Amount of offset shown if
non-standard

TONE
(frequency of tone
required to access)

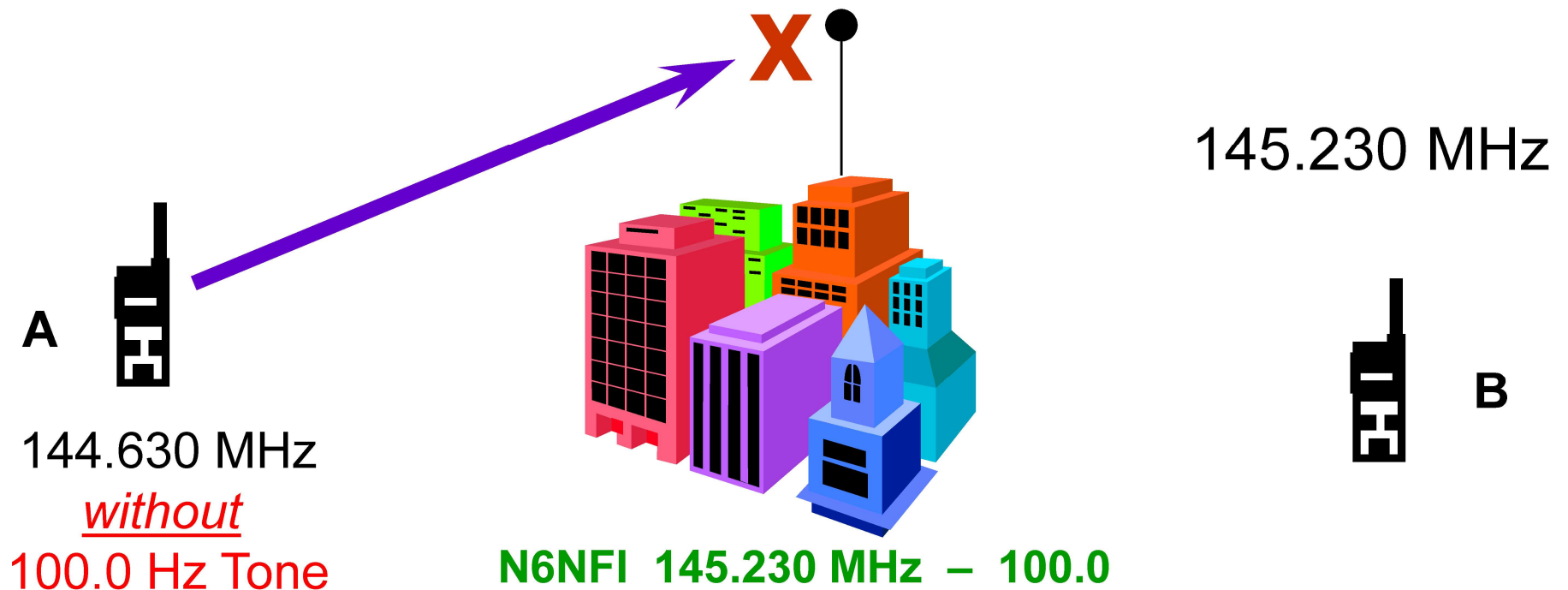
Example:

- This repeater requires a 100 Hz tone to accompany the transmission

Transmitting CTCSS Tones

- “PL” or “PL Tone” or “CTCSS” or “Tone Encode”
 - “PL” = “Private Line” (old Motorola term, still commonly used)
 - “CTCSS” = Continuous Tone-Coded Squelch System
- A sub-audible tone sent by your radio along with your voice transmission
 - About 40 discrete values ranging from 67.0 to 250.3Hz
 - Functions like a “key” to unlock the repeater receiver to accept the signal
- Repeaters
 - Most repeaters require that you send the proper tone
 - If you don’t send the tone, the repeater will not repeat your transmission
- Setting up to transmit CTCSS tone involves two steps:
 - Enable tone
 - Kenwood = “Tone” or “T”; Yaesu & Icom = “Tone”
 - Set tone frequency
 - Common error is forgetting to set tone, or setting tone to wrong frequency

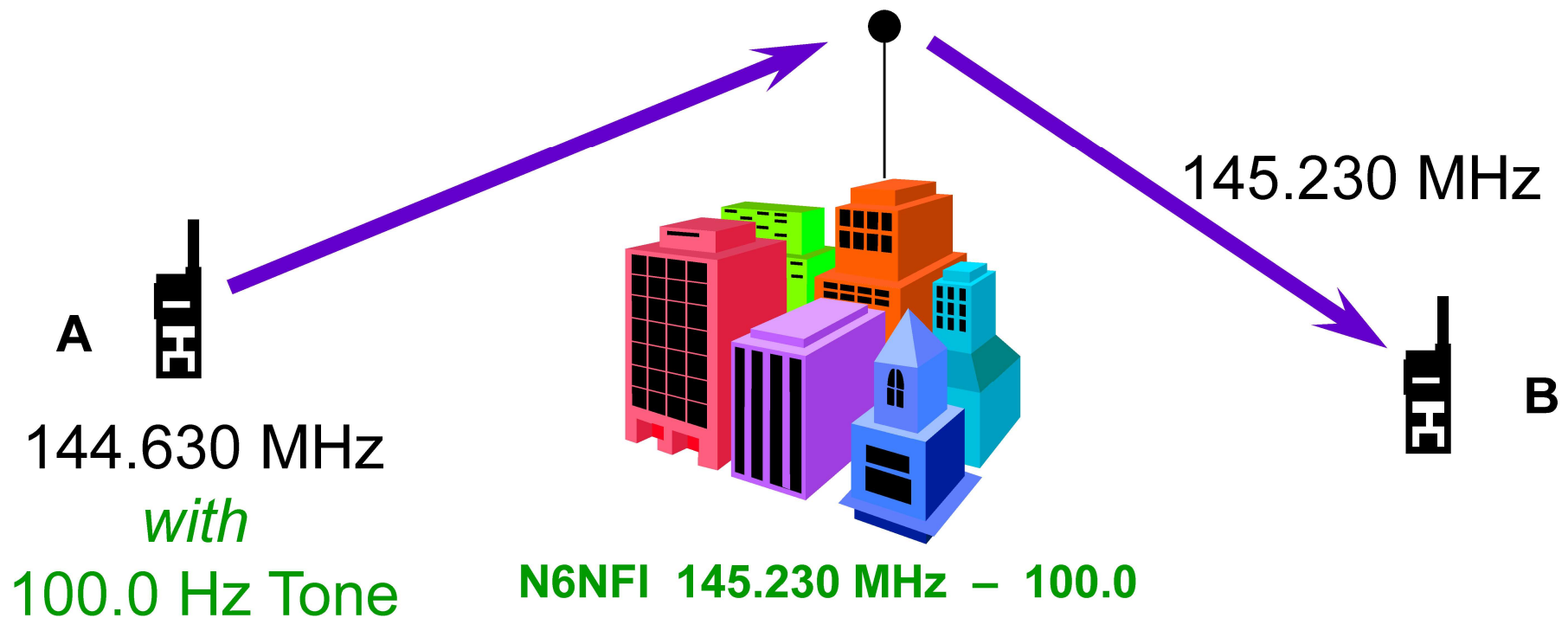
Repeater Tone Example



Example:

- Repeater requires 100 Hz tone
- No tone (or wrong tone) is sent
- Repeater does NOT repeat the transmission

Repeater Tone Example



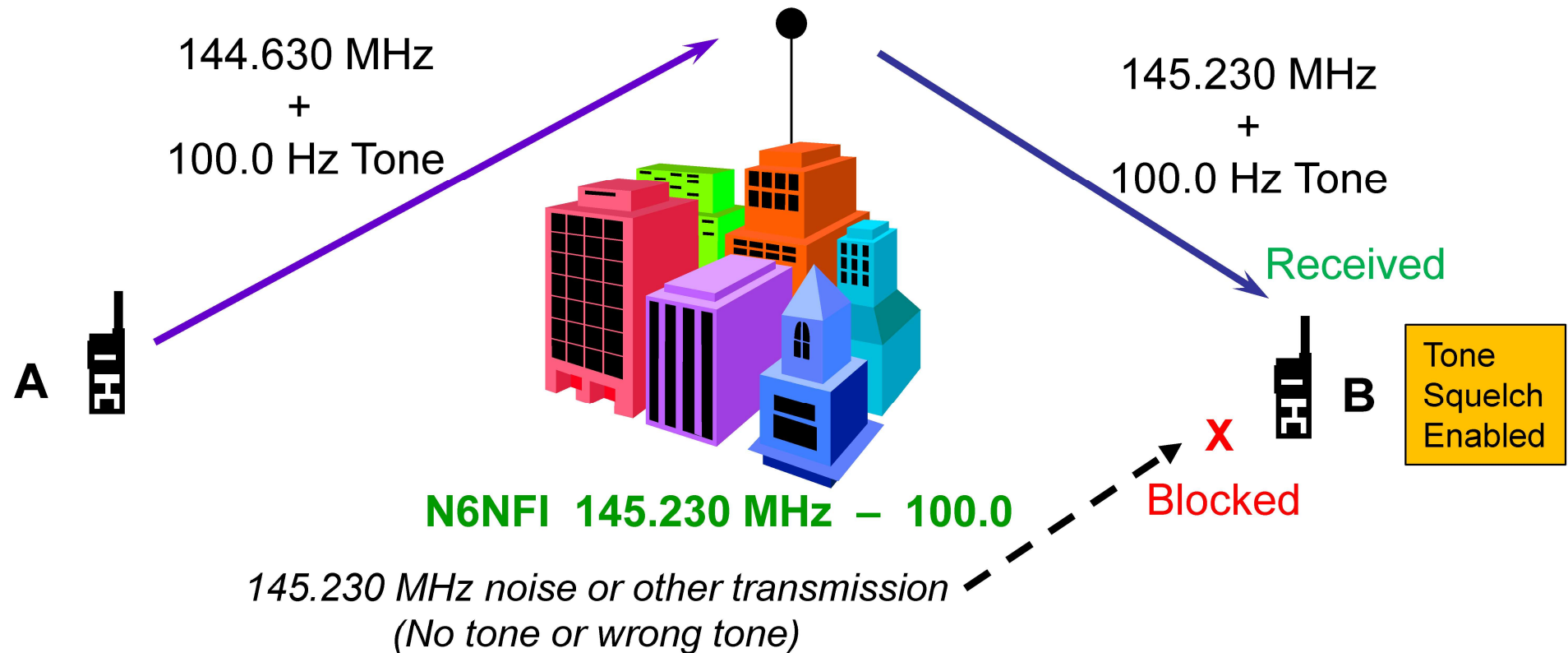
Example:

- Repeater requires 100 Hz tone; 100 Hz tone is sent
- Repeater receives and retransmits signal

Tone Squelch / CTCSS Decode

- Just like a repeater requires a tone when receiving ...
- You can configure your radio to require a tone when receiving
 - This is called “tone squelch” or “CTCSS decode”
 - Allows you to ignore transmissions not accompanied by the tone
 - Keeps local noise from exceeding squelch level
 - Display: Kenwood = “CTCSS” or “CT”; Yaesu & Icom = “TSQL”
- **BUT** ... using tone squelch will prevent reception if the other end is not sending tone!
 - Simplex
 - Most simplex users do NOT send tone – **this is changing**
 - Repeaters
 - Some repeaters also send a tone when they transmit
 - But many repeaters do NOT send a tone – check your settings

Tone Squelch Example



Example:

- A sends tone with its transmission
- Repeater hears tone and repeats transmission; also sends tone
- B has tone squelch configured; receives repeater transmission with tone
- B does not receive noise or other signals without tone

Tone Squelch / CTCSS Decode (cont.)

- Tone squelch is mentioned here for completeness and so you don't confuse it with regular repeater input tone
- Recognizing a problem
 - If: S-meter deflects but no sound is heard; volume is up; squelch is down
 - Then: tone squelch is ON but other end is not sending tone
 - Check Display for: Kenwood = "CTCSS" or "CT"; Yaesu & Icom = "TSQL"
 - Therefore: turn off tone squelch
- Recommendation:
 - Don't use this feature until you are familiar with your radio and the local repeater capabilities

Putting it All Together

Simplex (No Repeater):

**Example Simplex Frequency:
147.540 MHz**

- Set the frequency
- Disable offset (set to blank or none)
- Disable tone (usually)
- (Optional) Store setup in memory
 - Highly recommended

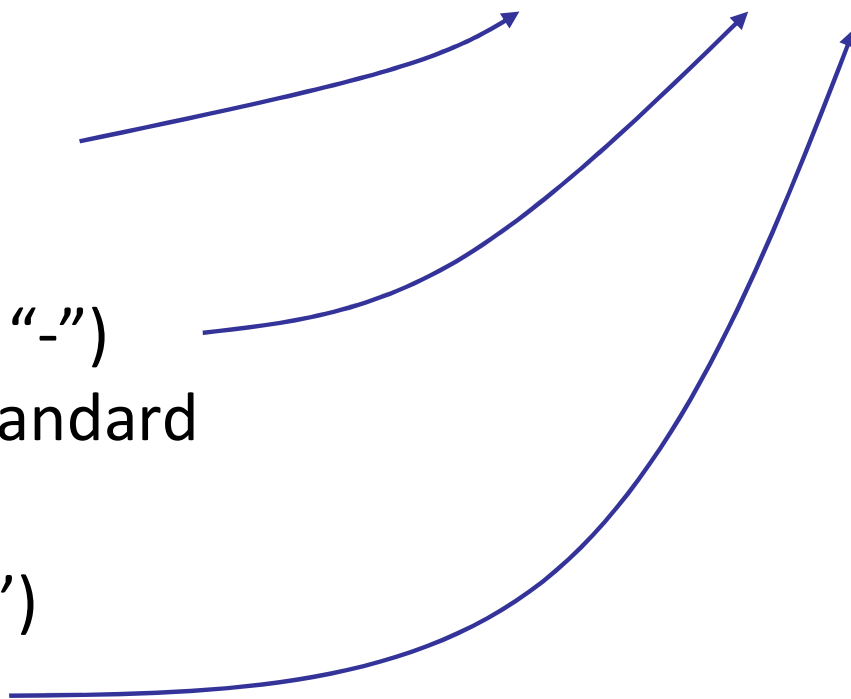
Seek additional help from fellow hams, local club members, or your ARES/RACES Emergency Coordinator or Assistant ECs

Putting it All Together

Duplex (Repeater):

- Set the output frequency
- Offset
 - Set offset direction (“+” or “-”)
 - Offset amount is usually standard
- Tone
 - Enable Tone (“T” or “Tone”)
 - Set the tone frequency
- (Optional) Store setup in memory
 - Highly Recommended

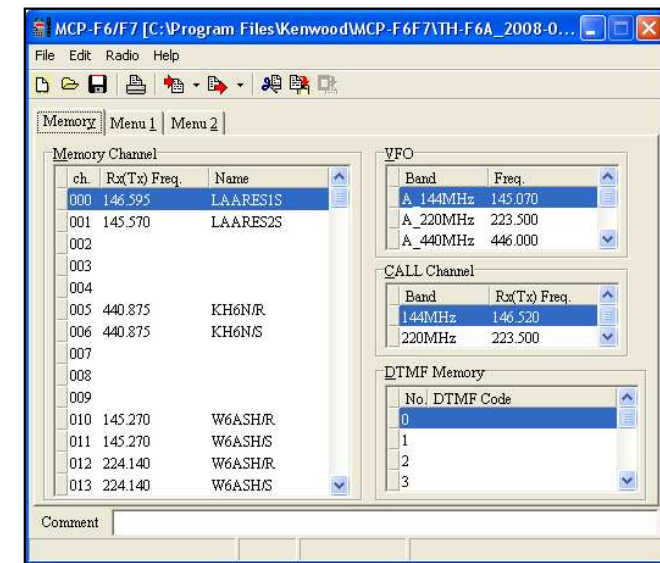
Example Repeater Listing:
N6NFI 145.230 MHz – 100.0



Seek additional help from fellow hams, local club members, or your ARES/RACES Emergency Coordinator or Assistant ECs

Programming Your Radio Memory

- Know how to program your radio with the keypad
 - Simplex and duplex (offsets)
 - Tones / PL / CTCSS
 - Keep radio manual or “cheat sheet” in your Go-Kit
 - “Nifty Accessories” (<http://www.niftyaccessories.com>)
 - SPECS website: <https://www.specsnet.org/radio-cheat-sheets>
- Programming software is nice
 - Easier to program many frequencies
 - Helps when maintaining multiple radios
 - **But ... you won't have it with you in the field!**
 - Not available for all radios – check before you buy
- Store all commonly used frequencies
 - Program into the radio's memory
 - Keep a copy of the frequency list in your Go-Kit
 - County List: <https://www.scc-ares-races.org/operations/voice/freqs>
 - City List: consult your city EC or ARES/RACES website



Break

Voice Operating Techniques

Communication Fundamentals

Directed Net Basics

Directed Net Exercises

Net Control Examples

A Radio is Not a Telephone!



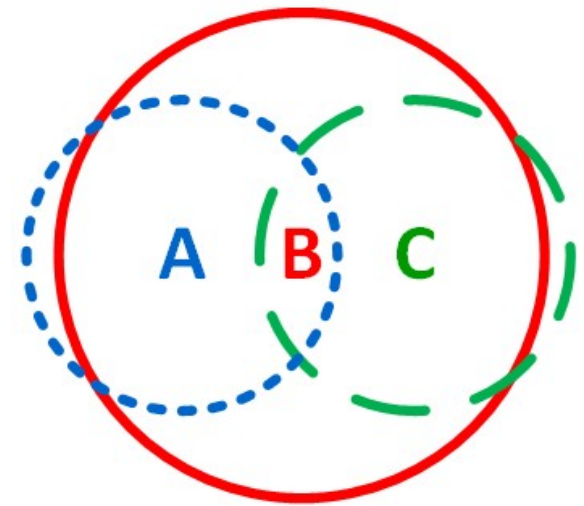
BECAUSE:

- When YOU talk, you can't hear
 - The receiver is cut-off while the transmitter is operating
- When YOU talk, no one else can talk
 - If you talk too long, you may prevent emergency traffic
 - Many repeaters have timers that help to enforce this
- If EVERYONE talks, NOBODY understands
 - A “double” occurs and all you hear is garbled noise
- SO...

Listen First!



- Simplex or repeater:
 - Leave a pause before keying up to allow others to break in
 - Check your volume (up) and squelch (down)
- Simplex
 - You may not be able to hear someone who can hear you (they've got a better antenna or location)
 - Always ask, "Is this frequency in use?"
 - Usually, someone who can hear you both will tell you
- Repeaters
 - What you're really listening to is the repeater itself
 - So, if you can hear anyone (or repeater itself), then you can hear everyone
 - Listen for a brief period to make sure others are not pausing during a conversation
 - Wait for the courtesy tone



Courtesy Tone

- Audible tone from repeater after each transmission
- Indicates when it is OK to transmit
 - After other person has dropped carrier
 - Plus slight pause for others to break in
- Eliminates need for saying “over” or “go ahead”
- Sent by many (not all) repeaters
 - N6NFI/R courtesy tone 
 - W6ASH/R courtesy tone 
 - AA6BT/R courtesy tone 
- Wait until you hear the courtesy tone and pause slightly before you transmit

When Do You Speak?



- For EmComm, speak ONLY if you have to
- Wait for the courtesy tone and/or leave a gap
 - If truly urgent, use “break” or “priority” or “emergency” as appropriate
- Key the PTT and pause slightly
 - Avoids clipping your first syllable; wait longer with linked repeaters
- Speak Accurately, Briefly, Clearly
 - Keep it short and accurate
 - Use plain English; no 10-codes or Q-signals or abbreviations
 - Stick to the facts; don’t speculate; don’t assume
 - Remember that others are listening
 - General public, news media, ...
 - Avoid personal info, sensationalism
 - Be professional at all times
- Release PTT as soon as you finish speaking; don’t create “dead air”
- In a Directed Net, be sure to follow Net Control’s instructions

Standard ITU Phonetics

A - alfa (AL-fa)	N - november (no-VEM-ber)
B - bravo (BRAH-voh)	O - oscar (OSS-cah) *
C - charlie (CHAR-lee)	P - papa (pah-PAH) *
D - delta (DELL-tah)	Q - quebec (keh-BECK) *
E - echo (ECK-oh)	R - romeo (ROW-me-oh)
F - foxtrot (FOKS-trot)	S - sierra (see-AIR-rah)
G - golf (GOLF)	T - tango (TANG-go)
H - hotel (hoh-TELL)	U - uniform (YOU-ni-form)
I - india (IN-dee-ah)	V - victor (VIK-tah) *
J - juliet (JU-lee-ETT)	W - whiskey (WISS-key)
K - kilo (KEY-loh)	X - x-ray (ECKS-RAY)
L - lima (LEE-mah)	Y - yankee (YANG-key)
M - mike (MIKE)	Z - zulu (ZOO-loo) [not zed]

* non-standard voicing

- If there is a chance of misunderstanding, spell it out with “I spell”:
 - “go to Kay Street” → “go to Kay, I spell kilo alfa yankee, Street”

Pronouncing Numerals

0 - zero (ZEE-row)

1 - one (Wun)

2 - two (Too)

3 - three (Tree) *

4 - four (FOH-wer) *

5 - five (Fife) *

6 - six (Sicks)

7 - seven (SEV-vin)

8 - eight (Ate)

9 - nine (NINE-er) *

* non-standard voicing

- Multi-digit numbers are spoken as a string of single digits:
 - 600 = “six zero zero”
- Preceded by the word “figures”
 - “Please copy 109” → “Please copy, figures, one zero niner”
 - “Requesting 16 blankets” → “Requesting, figures, one six blankets”

Directed Net Basics

Participating in a Directed Net

Calling Net Control

Acknowledging a Call

Ending a Call

Calling Another Station

What is a “Directed Net”



- One station (“net control”) controls/manages the communication flow
 - Others respond to Net Control when called
 - Others must call “Net Control” to get permission before calling anyone else
- Generally used with more than four people
- A net control operator can:
 - Coordinate communications for best efficiency
 - Prioritize use of the net for the most urgent traffic
 - Record a log of net activity

Participating in a Directed Net

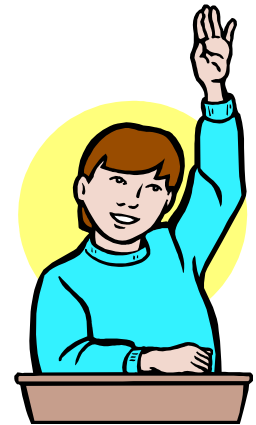
- Route all communications through “Net Control”
 - Get permission before contacting anyone else
- When called, answer PROMPTLY
 - Monitor the radio continuously
 - Answer immediately if called
 - The entire net is waiting on you to answer!
 - End your message with your call sign
 - Tells Net Control that you have nothing more to add
 - Assures that you comply with FCC ID requirements
- Check-in and Check-out
 - Don’t leave the net without checking out!
 - Otherwise, “Net Control” wastes time looking for you
 - They may send someone to find you; see if you’re o.k.
 - You’ve now become part of the problem!

Calling Net Control



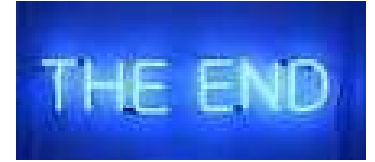
- If the Net has been quiet for a while, you might say:
 - “Net Control, this is <your ID> checking in”
 - “Net Control, this is <your ID> with one priority message”
- To convey a message or info, indicate what it is so Net Control can prioritize:
 - “<your ID> with one announcement”
 - “<your ID> with one Immediate message”
- On an very active net, usually just say your ID:
 - “<your call sign>”
- Wait for Net Control to answer
 - Don’t call repeatedly; NC probably heard you and is busy
 - Net Control will decide when you can speak
 - NC: “<your ID>, go ahead”
- Then you can speak... keep it brief

Acknowledging a Call



- When Net Control calls you ...
- Pause briefly before pressing PTT
 - Wait for the courtesy tone or slightly longer
 - Gives others a chance to break in
- Then respond right away
 - Don't keep the net waiting
 - Depress PTT, wait a second and then talk
- Say, "This is <your ID>, go ahead"

Ending a Call



- The person who initiated the call ends it
- End a call:
 - Say “... this is <your call sign>.”
 - We don’t use “73” - keep it short
 - Maintains compliance with FCC Part 97 to ID at end of last transmission
- But if you forgot to give your call sign:
 - Say “This is < your call sign> for ID” when the net is free

Calling Another Station Directly



- We don't (usually) use "CQ" in FM EmComms
- Say "<their ID>, this is <your ID>":
- Wait until they acknowledge you
 - "this is <their ID>, go ahead", or
 - "<your ID>, this is <their ID>, go ahead"
- Then you can speak... keep it brief
- Remember to ID at the end of the call
- In a directed net:
 - You must ask Net Control to "go direct" with another station
 - If possible, Net Control will give you permission to "go direct"
 - When finished, turn it back to Net Control
 - "this is <your ID>, back to Net Control"

Directed Net Exercises

Check-In

Relays

Tactical Call Signs

Announcements

Check-In



- Check-in is how you make yourself known to Net Control
- Net Control directs the process; follow their instructions
 - NC: “Will all stations in Sunnyvale, please check in now?”
 - NC: “Will all stations with call sign suffixes beginning with Alpha thru Lima please check in now”
 - The suffix is the letters after the number in your call sign
KE6AGJ W6XSC N6NFI AA6BT
- Speak slowly, enunciate clearly, make use of phonetics
 - The entire net slows down if NC needs to ask for a “fill” or repeat
 - Gives Net Control time to write it down

Exercise: Net Check-In

NC	This is <NC call sign>. My name is <name>, Net Control for the Training Net. Stations with Emergency or Priority traffic may break in at any time.
NC	We will now take check-ins by call sign suffix. Will all stations with call sign suffixes beginning with Alpha through Lima, please check-in now. I'll take the first five call signs
Various	<callsign#1> (phonetically) <callsign#2> (phonetically)
NC	Net control acknowledges <callsign#1>, <callsign#2> -- or -- "None heard." Are there any other stations with call sign suffixes Alpha through Lima, or stations that I missed?
NC	None heard. Will all stations with call sign suffixes beginning with Mike through Zulu, please check in now. I'll take the first five call signs
Various	<callsign#3> (phonetically) <callsign#4> (phonetically)
NC	Net control acknowledges <callsign#3>, <callsign#4> -- or -- "None heard" Are there any other stations with call sign suffixes Mike through Zulu, or stations that I missed?
NC	None heard. Thank you all for checking in. This is <NC call sign>

Relays



- Sometimes, a station cannot be heard by net control
 - Very weak station (poor antenna, bad location, low power)
 - Net Control may not be in an ideal location or have an ideal antenna (emergency situation, temporary NC)
- All participants need to actively monitor check-ins and acknowledgements to see if Net Control misses anyone
- If you hear a station that Net Control misses, you should relay the info to Net Control

Exercise: Net Check-In w/ Relay

NC	This is <NC call sign>, My name is <name>, Net Control for the Training Net.
NC	We will now take check-ins by call sign suffix. If you hear a station that I miss, please relay it to me. Will all stations with call sign suffixes beginning with Alpha through Zulu, please check in now.
Check-in #1 Check-in #2	<callsign#1> <callsign#2> ...
NC	Net control acknowledges <callsign#1>, <callsign#2>, ... Are there any other stations with call sign suffixes Alpha through Zulu, or stations that I missed?
Relay Station	"Relay", <your-call-sign>
NC	Go ahead <relay's call sign>
Relay Station	Net Control, I heard <weak-station-call-sign>. This is <your-call-sign>.
NC	Thank you. Acknowledging <weak-station-call sign>. Are there any other stations with call sign suffixes Alpha through Zulu or stations that I missed?
NC	None heard. Thank you for checking in. This is <NC call sign>

Tactical Call Signs (or Tactical IDs)

- Identifies a location or function instead of an individual
 - Examples: “Checkpoint 3”, “Rover 1”, “John’s Shadow”, “Net Control”
- Allows Net Control to manage resources without regard to who is staffing any particular location or function
 - Simple, plain English
 - Tactical call stays the same throughout the incident or event
 - Use your tactical call consistently
 - Contact Net Control or others by their tactical call
 - Listen for your tactical call and respond promptly when called

IMPORTANT: Does not eliminate FCC requirement to ID with your FCC call sign at least every 10 minutes and at the end of your last transmission.

- It may be longer than 10 minutes before Net Control gets back to you again
- So, finish your transmission with your FCC call sign

Exercise: Tactical Call Signs

NC	This is <NC call sign>, My name is <name>, Net Control for the Sitting Left Net.
NC	I will now poll all observers for a count of people sitting to their left. When you hear your call sign, report the number of people who are sitting to your left.
NC	Observer 1
Observer 1	Observer 1 reports <#> people sitting to my left. This is <your call sign>.
NC	Acknowledge # people. Observer 2
Observer 2	Observer 2 reports <#> people sitting to my left. This is <your call sign>
NC	Acknowledge # people. Observer 3
Observer 3	Observer 3 reports <#> people sitting to my left. This is <your call sign>
	... Etc.
NC	Poll of observer stations complete. This is net control, <your call sign>

Exercise: Announcements

NC	This is <NC Call Sign>, Net Control for the donut net. We will now proceed with announcements. If you have an announcement, please state your call sign only at this time.
#1	<your call sign #1>
#2	<your call sign #2>
NC	Net control acknowledges <callsign#1> and <callsign#2>. <callsign#1>, go ahead with your announcement.
#1	Thank you Net Control. We'd like to announce free donuts for all Los Altos hams available at Jim's house from 8pm to 9pm today. The donuts are free for Los Altos hams only. This is <callsign#1> back to Net Control.
NC	Thank you <callsign#1>. If there are any questions, please state your call sign now.
NC	None heard. <callsign#2>, go ahead with your announcement.
#2	Thank you Net Control. We would also like to announce free donuts for all Sunnyvale hams. Just go to Jim's house and tell him that you're from Los Altos. This is <callsign#2> back to Net Control.
NC	Thank you <callsign#2>. If there are any questions, please state your call sign now.
NC	None heard. This is <NC call sign>

Net Control Examples

Net Control Example

- Milpitas Quake – Oct 2007 (3m45s) 
 - AA6BT repeater; weekly SVECS net at time of quake
 - Listen for the following:
 - Check-ins; Net control calls on KE6AGJ, Larry Carr, DEC
 - Larry makes announcement [clipped]; back to NC
 - Net control solicits questions
 - Questioner talks to NC, not directly to Larry
 - NC asks Larry to answer question
 - Larry answers question [clipped]; earthquake occurs [static]
 - Larry assumes net control function, announces intentions
 - Some initial vague reports; WA6UBE w/ “double”
 - Larry begins directing traffic; net settles down
 - What aspects of your training did you hear?
 - Comments? Observations?

Net Control Example

- Loma Prieta Quake – 1989 (2m40s) 
 - W6ASH repeater 10 minutes after quake
 - Listen for the following:
 - Net Control request someone turn off timer
 - Repeater control operator answers; will do it shortly
 - Net Control directs multiple callers, in order
 - Net Control hand-off to new net control operator, N6FW
 - Repeater control operator turns off timer
 - Net Control resumes collecting damage reports
 - What aspects of your training did you hear?
 - Comments? Observations?

Additional EmComm Modes

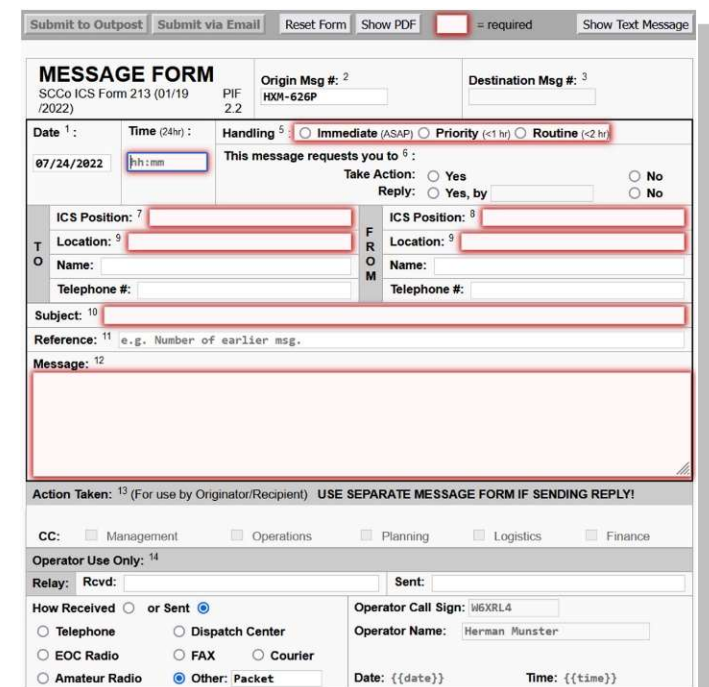
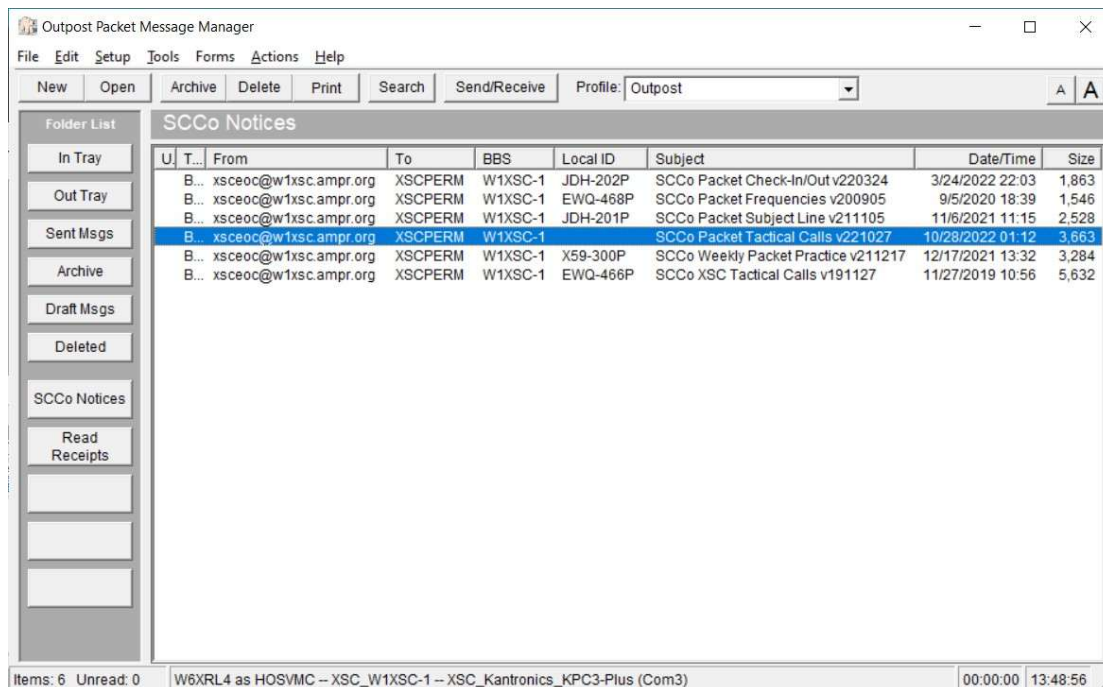
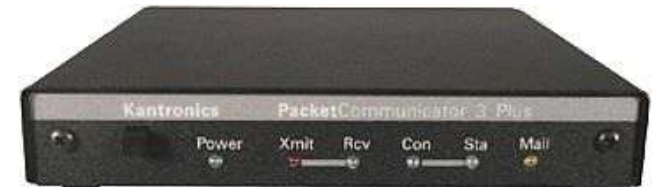
Packet

APRS

HF (various modes)

Packet

- Send and receive data via radio
 - Similar to TCP/IP packets over Ethernet
- Like using an e-mail program
- Text messages, official forms, complex spelling (drug names, addresses), cut-and-paste from other apps



Submit to Outpost Submit via Email Reset Form Show PDF [] = required Show Text Message

MESSAGE FORM
SCCo ICS Form 213 (01/19 /2022) PIF 2.2

Origin Msg #: 2
HXN-626P

Destination Msg #: 3

Date 1: 07/24/2022 Time (24hr): hh:mm

Handling 5: ☐ Immediate (ASAP) ☐ Priority (<1 hr) ☐ Routine (<2 hr)

This message requests you to 6:

Take Action: ☐ Yes ☐ No
Reply: ☐ Yes, by ☐ No

ICS Position: 7: ICS Position: 8:

Location: 9: Location: 9:

Name: Name:

Telephone #: Telephone #:

Subject: 10:

Reference: 11: e.g. Number of earlier msg.

Message: 12:

Action Taken: 13: (For use by Originator/Recipient) USE SEPARATE MESSAGE FORM IF SENDING REPLY!

CC: ☐ Management ☐ Operations ☐ Planning ☐ Logistics ☐ Finance

Operator Use Only: 14:

Relay: Rcvd: Sent:

How Received ☐ or Sent ☒

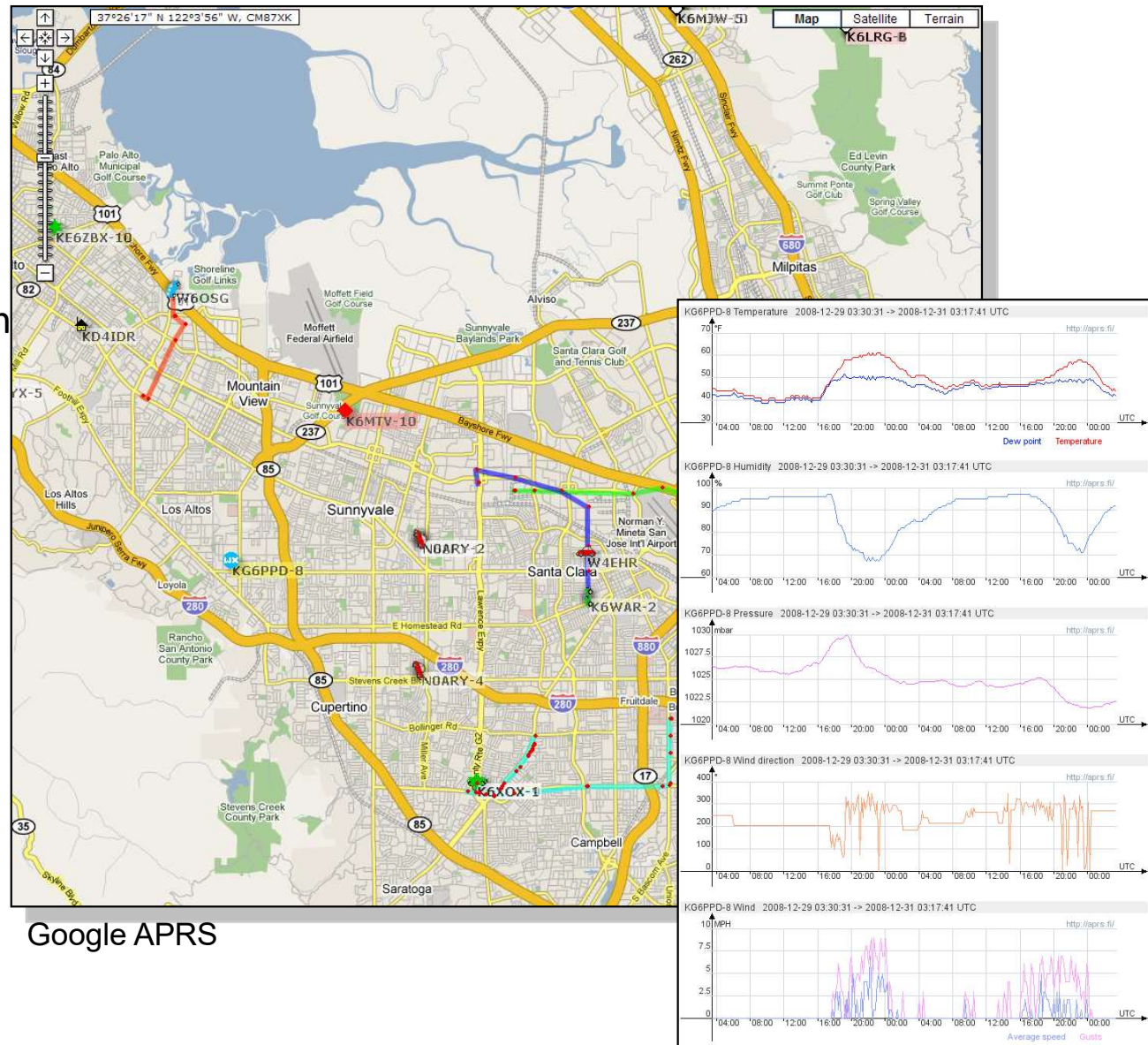
☐ Telephone ☐ Dispatch Center
☐ EOC Radio ☐ FAX ☐ Courier
☐ Amateur Radio ☒ Other: Packet

Operator Call Sign: W6XRL4
Operator Name: Herman Munster

Date: {{date}} Time: {{time}}

Automatic Packet Reporting System

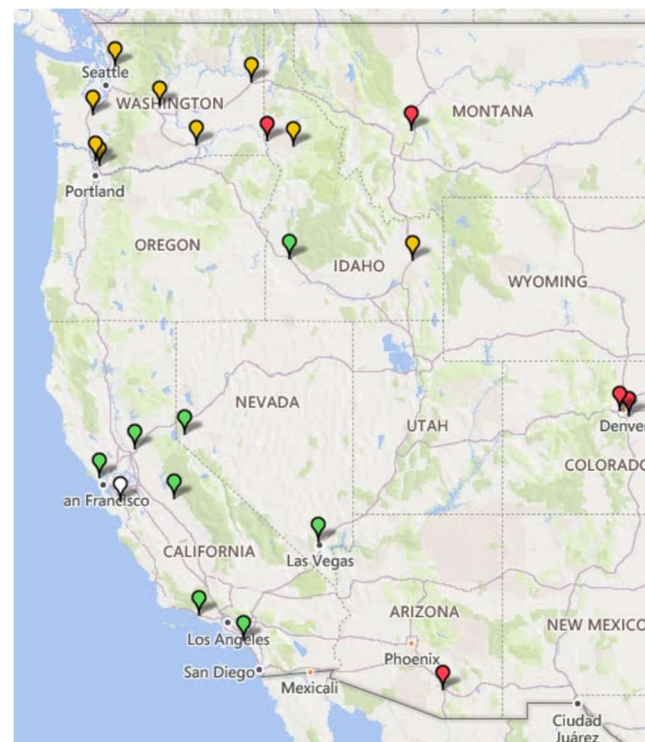
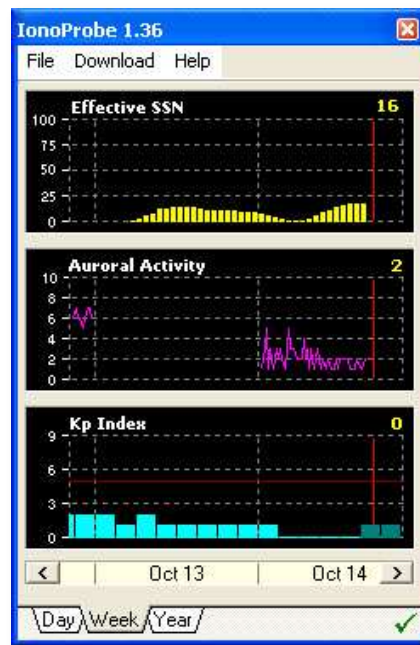
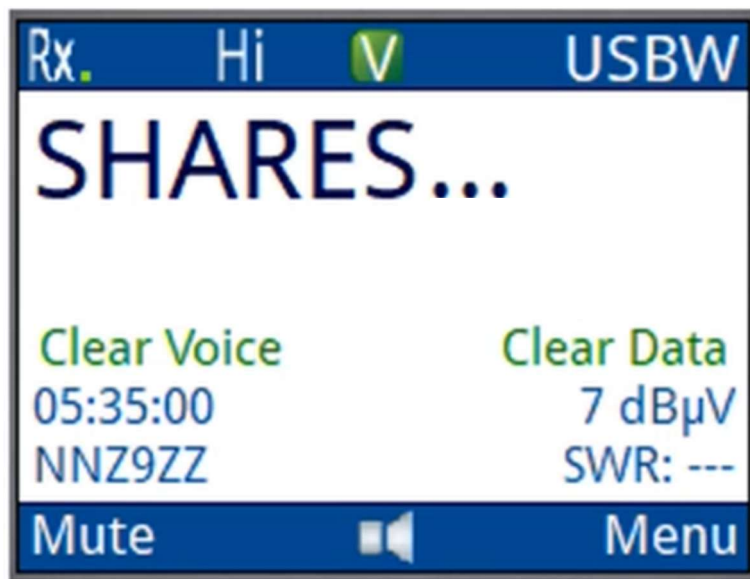
- <http://www.aprs.org>
- Special packet network
- Position
 - Connect to GPS
 - Beacon location information as you travel
- Weather
 - share your weather station info
- Short messages



Google APRS

HF (High Frequency = 3 – 30 MHz)

- 10m and lower bands
- Communications between the county and state
- Regional and national if needed
- SSB Voice (SHARES and Amateur), Winlink Data/Forms, ...
- Local voice net: Tuesdays, 2030 hrs
 - Currently on 3.878 MHz (75m LSB)



Break



Radios & Equipment for EmComm

First Radio for EmComm

Accessories

Antennas

Second Radio

Other Gear

First Radio for EmComm

- Handheld (a.k.a. handi-talkie or HT)
 - Basic entry point, least expensive radio option
- 2m/70cm dual-band HT needed for EmComm
 - Dual-receive is recommended
 - Look for 5 watts power output on (rechargeable) batteries
- What are others using (advantage: easy to get help)
 - Yaesu, Kenwood, ICOM, Alinco, ...
 - You must be able to program it in the field w/o a computer
 - Be cautious of the cheap imports, many are not legal to use.
- ARRL Article “Choosing a Ham Radio”
 - <https://www.arrl.org/buying-your-first-radio/>
 - Also included in *The Ham Radio License Manual* from ARRL



Important HT Accessories

- Batteries
 - Spare rechargeable battery packs
 - Usually provides higher power
 - Need 3000 mAH for 12 hours in the field
 - Alkaline battery pack (fill with AA)
- Cigarette lighter cable
 - Allows charging batteries in car
- Higher gain HT Antenna
 - Extendable whip for stationary use
 - Flexible, higher-gain for daily use
- Antenna connectors & adapters
 - SMA, BNC, PL-259 (UHF), N
 - Be able to connect your HT to all other cable types



Mobile/Field Antennas

- Stay in contact with net control while mobile
- VHF/UHF FM is usually vertically polarized
 - Omni-directional; Best for mobile use
- Check suitability for the mounting type
 - Mag mount won't work on fiberglass vehicles
 - In a pinch, use a cookie sheet and duct tape
 - Some antennas require a ground connection
 - Not suitable for magnetic or motorized mounts
- Roll-up J-pole antenna
 - Use string or tape to suspend from tree or pole
- Check connector type
 - Be able to adapt to your HT's connector



Speaker/Mic or Headset



- Speaker-Mic
 - Combination speaker and microphone
 - Clip to your collar and keep your radio out of the cold/rain.
 - Not ideal for noisy or quiet environments
 - Some have an earphone jack for noisy environs
 - Radio chatter heard by surrounding people



- Headset
 - Headphone/boom-mic combination
 - Works well in noisy or quiet environments
 - Single ear allows listening to radio and others
 - Don't cover both ears while driving!
 - Very noisy environments may require dual ear
 - Radio chatter not heard by surrounding people
 - Also useful with mobile or base station

Carrying Your Radio

- Your hands must be free so you can work
 - Writing, carrying equipment, holding clipboard, ...
- You'll need something to hold:
 - Radio
 - Accessories (batteries, charger, etc.)
 - Clipboard, flashlight, water bottle(s), sunscreen, etc
- Some example options:
 - Belt pouch
 - Backpack
 - Fanny pack
 - Messenger bag
 - Radio harness



Second Radio for EmComm

- 2m/440 dual-band Mobile radio
 - Power
 - Typically 50 watts; more power to drive better antennas
 - Flexibility
 - Mobile in car directly wired to battery
 - Use as base station with power supply
 - Use as field emergency Net Control with sealed lead acid (gel-cell) or Lithium Iron Phosphate (LiFePo) batteries
 - Cross-band repeater option recommended
 - Data interface option recommended (for packet use)



Standard Equipment for ARES/RACES

Santa Clara County ARES®/RACES Go Kit Checklists		Rev: 2009-Oct-17
Legend: X = Required (must have in kit at all times) R = Recommended (likely needed on most assignments) O = Optional (useful on some assignments)		
2-Hour Carry Kit Purpose: To be kept nearby at all times for immediate (within minutes) communication of damage reports during Resource Net Level 1 ops. Also used to remain in contact with Resource Net Level 2 while returning home to retrieve 12-hour Go-Kit.		
Items:		
X 2m/70cm dual-band radio - HT recommended (min. 5W on 12V/2.5W on batt) - Mobile 25W optional (if vehicle will not be far away) - Programmed with Resource Net frequencies		
X Charged batteries for 2-3 hours operation		
X Mobile antenna (mag mount or existing mobile antenna)		
X Modified Mercalli (Mike-Mike) scale		
X Notepad / pens		
R Cigarette lighter adapter		
R Emergency county and city telephone contact list		
R Cell phone		
R Water (16 oz.)		
12-Hour Go Kit Purpose: For fully independent operation; unknown environment (heat, cold, wind, rain); unknown time (day, night, up to 12 hours). Return home to retrieve.		
Equipment		
Portable Radio:		
X 2m/70cm dual-band handie-talkie (HT) - minimum 5W on 12V/2.5W on batteries [Note 1] - dual-receive recommended		
X Radio user manual or cheat sheet		
X Earbud or headphones minimum; headset, earbud/mic, or speaker/mic/earbud, or similar recommended		
R Small backpack, vest, chest harness or other similar method for carrying HT while operating portable		
Power Source:		
X Charged batteries for 12 hours (min. 3000 mAh) [Note 2]		
X Power cord adapters – connect to various power sources: - Powerpoles - Cigarette lighter socket - Vehicle battery terminals		
X Spare fuses		
R Powerpole splitter or fused distribution panel		
R Extension cord, 3-wire, 3-6 ft., multi-outlet		
O Extension cord, 3-wire, 50-100 ft.		
O Power Inverter		
Antennas:		
R 2m/70cm high gain HT antenna		
X 2m/70cm dual-band magnetic mount antenna		
R 2m/70cm dual-band portable base antenna (e.g. roll-up J-pole or other)		
R Portable mast (elevates antenna min. 10 ft.)		
R Tripod or self-supporting base for mast		
R Window clip antenna mount		
X Coax adapters to connect HT to existing antennas: - BNC plug (male) & BNC socket (female) - UHF plug (PL-259) & UHF socket (SO-239) - N-type plug (male) and N-type socket (female)		
Other Communications Gear:		
R Cell phone & charger and/or cigarette lighter adapt.		
O FRS/GMRS Radio		
O Satellite phone		
Tools:		
R Duct tape		
R Electrical tape		
R Nylon Tie-Wraps/wire ties		
R Utility knife		
R Small multi-tool or tool kit		
O Volt-Ohm meter		
O SWR/Power meter		
Operating Position:		
X Sign(s) for operating position		
R Lighting for operating position		
R Rope or Dacron cord (50')		
R Folding chair		
O Magnetic sign for car		
O Folding table		
O Pop-up Canopy		
O Tarp (8' by 8' or larger)		
O Folding cart		
O Safety strobes or flares		
O Caution/flagging tape (for marking cables, antennas, ...)		
Documentation		
Identification:		
X CA Driver's license or CA-issued ID card		
X Amateur Radio license		
X County DSW card		
X SCCo-issued ID badge; other city badges		
Maps:		
X Thomas Guide for Santa Clara County		
X Compass or GPS		
R Maps of antenna locations (if available)		

- 2 hr Carry Kit (required)
 - Nearby at all times
 - In car is o.k. if nearby
 - Immediate damage reports
 - City net check-ins
 - If cities activate
- 12 hr Go Kit (required)
 - Fully independent ops for 12 hrs
 - Return home to retrieve
- Extended Kit (optional)
- Recommended for everyone
- Talk to the other hams in your city ARES/RACES group for recommendations



EmComm Organizations

National / State / Regional
County

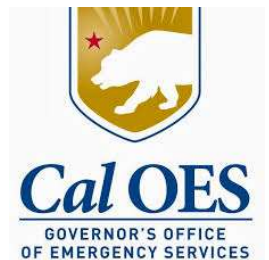
Multi-City Groups

City ARES/RACES teams

How to get connected

ARES / RACES / CRU (formerly ACS)

- ARES: Amateur Radio Emergency Service
 - A division of ARRL Field Services
 - What we are day-to-day
- RACES: Radio Amateur Civil Emergency Service
 - Official unit under FEMA; defined by FCC Part 97.407
 - What we are when activated by government agency
- CRU: Communication Reserve Unit (formerly ACS)
 - California RACES under Cal OES
 - Includes RACES, MARS, and other radio comm groups
- Increasingly, organizations are joint ARES/RACES/CRU
 - Santa Clara County merges all three



County ARES/RACES/ACS



- Santa Clara County ARES/RACES
 - Weekly Nets
 - Monthly training classes
 - Quarterly drills
 - Public service events
 - <https://www.scc-ares-races.org/>
 - Served by two groups: SPECS, SVECS

Santa Clara County ARES/RACES/ACS

- Southern Peninsula Emergency Communication System (SPECS)
 - Los Altos, Los Altos Hills, Mountain View, NASA/Ames, Palo Alto, Stanford, Sunnyvale
 - Weekly Net: Monday @ 2000 hrs on W6ASH (145.270 – 100.0)
 - <http://www.specsnet.org/>
- Silicon Valley Emergency Communications System (SVECS)
 - Campbell, Cupertino, Los Gatos, Milpitas, NASA/Ames, San Jose, Santa Clara, Saratoga, Sunnyvale and South County
 - Weekly Net: Tuesday @ 2000 hrs on W6ASH (145.270 - 100.0) and K6SNY (443.275 + 107.2 Hz)
 - <http://www.svecs.net/>

Santa Clara County ARES/RACES Leadership

County ARES/RACES Staff					
Name	Title	Phone	Email	Ctrl-10	Responsibilities
Tim Howard KE6TIM	District Emergency Coordinator Chief Radio Officer	408-891-0045 cell	ke6tim@arrl.net	OEM11	Credential Program Manager Mutual Aid Coordinator
Jim Clark N6JRC	Assistant DEC / Deputy CRO	650-823-3265 cell	n6jrc@arrl.net	OEM15	Database Administrator
Jeff Grafton AJ6XZ	Assistant DEC / Deputy CRO	571-239-1989 cell	jgrafton@gmail.com	OEM12	EOC Documentation & PC Updates Frequency Coordinator
Judy Halchin KK6EWQ	Assistant DEC / Deputy CRO	408-533-2517 cell	halchin@mac.com	OEM14	Training Coordinator
Andreas Ott K6OTT	Assistant DEC / Deputy CRO	408-431-8727 cell	k6ott@arrl.net	OEM13	Network Manager
OPEN	Assistant DEC / Deputy CRO			OEM16	
Mark Laubach K6FJC	Leave of Absence	650-996-2219 cell 408-867-4806 vm	k6fjc@arrl.net		

<https://www.scc-ares-races.org/operations/contact/staff>

SCCo City Emergency Coordinators (ECs)

City Emergency Coordinators (EC) / Radio Officers (RO)			
City	EC / RO	Email	Phone
Campbell	Barton Smith N6HDN	n6hdn@arrl.net	408-379-2875 home 408-679-2529 cell
Cupertino	Jim Oberhofer KN6PE	kn6pe@arrl.net	408-839-8798
Gilroy	Pat Moore K6PMM	pqm@garlic.com	408-500-1878
Loma Prieta	Dan Pugh KM6GNG	dan_pugh@verizon.net	408-375-5833
Los Altos	Jim Clark N6JRC	n6jrc@arrl.net	650-823-3265
Los Altos Hills	Neil Katin K2LL	lah-ec@askneil.com	650-762-6345
Los Gatos / Monte Sereno	Patrick Dirks N6PWD	n6pwd@arrl.net	408-718-8983
Milpitas	Paul Ellis KM6IAO	pje5547@gmail.com	661-904-0047
Morgan Hill	Gary Goelkel K6GMG	gary.goelkel@mhares.net	408-823-0505
Mountain View	Leslie Grimm KK6EKN	kk6ekn@arrl.net	650-969-2349
NASA/Ames	Mark Allard KD6CWM	mallard@mail.arc.nasa.gov	408-267-3688
Palo Alto	Walter Underwood K6WRU	wunder@wunderwood.org	650-906-5443
San José	Nigel Gore AF6ZF	AF6ZF@arrl.net	408-682-0855
Santa Clara	Bill Rainey K6WAR	k6war@sonic.net	408-835-5060
Saratoga	Peter Melhus AA6PM	aa6pm@arrl.net	408-255-9293
Stanford	Lea Roberts WA6ITV	lea.roberts@stanford.edu	
Sunnyvale	Wolfgang Polak AI6SL	wolfgang.polak@gmail.com	408-799-9210

<https://www.scc-ares-races.org/operations/contact/local>

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DSW = Disaster Service Worker

- For RACES, you must be registered as a DSW
 - City events require city registration (contact your EC)
 - County events require county registration
 - Applies to some training events as well as real incidents
 - Entitles you to State Worker's Comp Insurance if injured
- Process is simple
 - Take an oath and fill out a form (one for city; one for county)
- Rules for DSW Coverage
 - You must be activated
 - You must be assigned
 - You must be trained and supervised
 - You must act within the scope of your training and assignment
 - Will cover this in more detail in the next class

Activations

What Should I Do When the Shaking Stops?

- Check your family and your home
 - Without question, your family and home come first
 - You're no good to anyone if you're worried about things at home
- Check-in/Monitor county resource net
 - Primary: AA6BT (146.115 + 100.0 Hz)
 - North: W6ASH (145.270 - 100.0 Hz) (linked during event)
 - South: K6SNY (443.275 + 107.2 Hz) (linked during event)
- If asked give damage survey (Mike-Mike covered in next class)
- Review your go-kit and make sure you're ready
- Listen for city EOC to activate
- When instructed, switch to city frequency
- Check-in with your City Net control
- Standby for assignment and activation
 - Make sure your family will be o.k. if you take an assignment

Next Steps

What to do when you walk out the door today ...

Local Amateur Radio Clubs

EmComm Training

Action Items

Local Amateur Radio Clubs

- Palo Alto Amateur Radio Association (PAARA)
 - Meetings: 1st Friday of the month at 7:30 p.m.
 - Net: Monday 8:30pm on N6NFI/R (145.230 – 100 Hz)
 - <http://www.paara.org/>
- Foothill Amateur Radio Society (FARS)
 - Meetings: 4th Friday of the month at 7:00 p.m.
 - Net: Thursday 8:30pm on N6NFI/R (145.230 – 100 Hz)
 - <https://www.fars.k6ya.org/>
- Northern California Contest Club (NCCC)
 - Meetings: 2nd Monday of the Month
 - <https://www.nccc.cc/>
- Northern California DX Club (NCDXC)
 - Net: Thursday 8pm W6TI/R (147.360 + 110.9 Hz)
 - <https://www.ncdxc.org/>



Foothills Amateur Radio Society



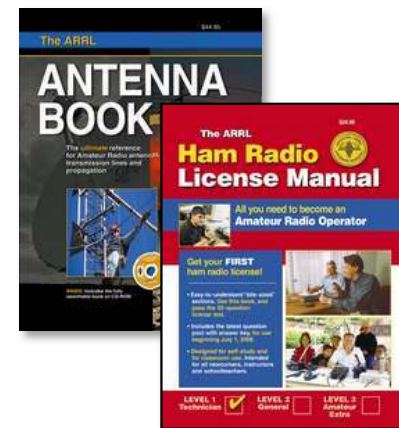
EmComm Training



- SCC ARES/RACES Training
 - Monthly training classes – generally the 1st Sat. of the month
 - Quarterly drills/practice sessions
 - City and county public service events
 - <https://www.scc-ares-races.org/training/>

Recommended next class:
**“Fundamentals of
Emergency Communications”**

- ARRL Training and Books
 - License Manual, Antenna Book, other great books
 - Amateur Radio Emergency Comms Courses, ...
 - <https://www.arrl.org/licensing-education-training/>



- FEMA NIMS/ICS/SEMS Training
 - IS-100, IS-200, IS-700, SEMS...
 - <https://www.scc-ares-races.org/training/em-mgmt>



- Red Cross Training
 - Introduction to Disaster Services, Shelter Ops, ...
 - <https://www.redcross.org>



Action Items



- Get the right radio and accessories
 - Talk to your city EC/AECs for more recommendations
- Join your city ARES/RACES group
 - Weekly nets, training, quarterly drills, operating activities
 - <https://www.scc-ares-races.org/activities>
- Learn your radio(s) inside and out
 - Simplex, duplex, offset, tone, memory, reset, etc
- Build your go-kit
 - <https://www.scc-ares-races.org/operations/go-kit>
- Join other clubs and participate
 - Getting on the air is the best way to improve your skills
 - Take part in drills, exercises and public service events
- Ask lots and lots of questions
 - Amateur Radio operators are friendly and helpful
- **Above all, GET ON THE AIR and HAVE FUN!**

Theory vs Practice vs Experience



- Learning is more than just attending a class
 - Focus of the classroom is on theory and procedures
 - Practice is hands on experimentation
 - Experience comes at drills and public service events

You need all three to master the subject

Summary



- You should now be able to
 - Explain VHF/UHF FM technology used in EmComm
 - Use band plans, frequency lists, repeater directories
 - Configure your radio for simplex & duplex operations
 - Participate in a directed net
 - Make direct contacts
 - List three other modes used in EmComm
 - Select an EmComm radio and accessories
 - Understand local EmComm organizations
 - Understand what to do next, after this class

Final Assignment

Please complete the Class Evaluation within one week.

To get course credit you need to:

- a) Attend at least 90% of the class
- b) Participate in class
- c) Complete the class evaluation

If you do these, you will get credit for the course.

Online Class Evaluation

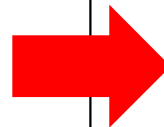
Class Evaluation must be submitted with 7 days to get class credit

Activities Database

Home
Log Out
Activities Home
SCC ARES/RACES Home
Comments/Bugs
Events
List Events By Date
List Events I Joined
Submit Class Evaluation
My Profile
My Contact Info

Website Home Page

 Training & Practice	>
Classes <i>Emergency communications training curriculum</i>	>
Submit Class Evaluation <i>How can we improve?</i>	>
Voice Nets <i>City nets, SPECS/SVECS, hospital, training, HF</i>	>



Thank You!

Join the Announce Group to be notified of training, exercises, and other things of interest related to EmComm

<https://scc-ares-races.groups.io/g/announce>

If you have questions or feedback about this or other training activities, you can join our Training discussion group.

<https://scc-ares-races.groups.io/g/training>

This is a moderated group.

Make sure you are signed up for the next class:
Fundamentals of Emergency Communications



Exercise is Next

Optional Exercise: Get On The Air



- Objective: Contact “Net Control” on each of the following frequencies and report your first name:
 - Simplex 147.570 MHz
 - Repeater 444.525 MHz + 94.8
- Recommended Sequence
- Call Net Control
 - “Net Control, this is <your call sign> with one routine message.”
- Net Control will answer
 - “<your call sign>, go ahead.”
- Report your first name and end with your call sign
 - “Net Control, my first name is <your name>. This is <your call sign>.”
- Listen for Net Control to acknowledge
 - “Net Control acknowledges <your call sign> <your name>.”
- If any corrections are needed, remember to end your conversation with your call sign

YOU
NET CONTROL