# Ham Radio Presentation for East Lake High School Nov. 16, 2022

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# Ham Radio Introduction ARRL Video and Your Presenters

https://youtu.be/wDn-6SDxyD4

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- Alan Streitman
  - Masters in Electrical Engineering
  - Retired from Raytheon Technologies

#### What is Amateur Radio?

Radio amateurs, often called "hams," enjoy radio technology as a hobby. But it's also a service —a vital service that has saved lives when regular communication systems failed.

#### Who are Hams?

Ham Radio operators are movie stars, missionaries, doctors, students, politicians, truck drivers and regular people. They are all ages, sexes and income levels linked by their interest in wireless communications technologies. There are more licensed American Amateur Radio operators now than ever before in history.

#### Why do you need a license?

The Amateur Radio Service is controlled by international law and agreements because radio waves do not stop for international borders. The Federal Communications Commission (FCC) recognizes the ability of the hobby to advance radio communication and technical skills and also to enhance international goodwill.

#### What's the appeal of Ham Radio?

Hams are at the cutting edge of many technologies. They provide thousands of hours of volunteer community and emergency services when normal communications go down or are overloaded. All of them enjoy being creators, not just consumers, of wireless technology.

#### What is the ARRL?

The American Radio Relay League is the national association for Amateur Radio in the USA, representing over 170,000 FCC-licensed Amateurs. The ARRL is the primary source of information about what is going on in ham radio.

For More Information visit: www.arrl.org

SCHOLARSHIPS AVAILABLE

139 awarded worth \$921,250



### Ham Radio Communication Modes

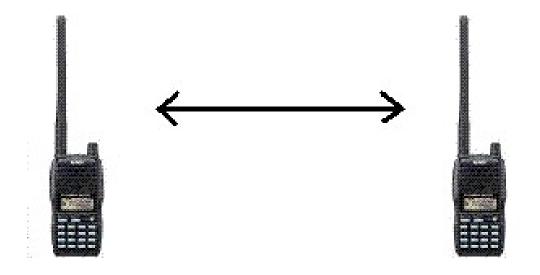
<u>Phone</u> – voice communication over SSB (Single Sideband) or AM or FM, etc. Analog and Digital versions

<u>Text and Data</u> - in data packets, fastest growing area of ham radio, very long-distance capability with very weak signals

<u>Morse Code</u> – Continuous Wave, no longer a licensing requirement but still popular among many, original mode of amateur radio

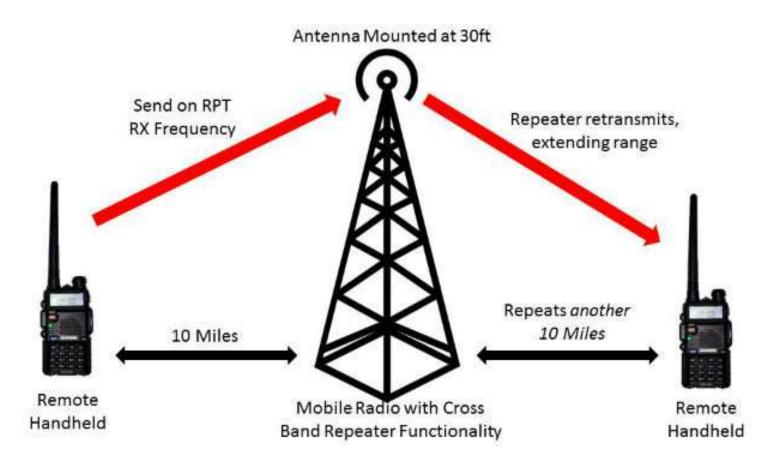
Image – Slow Scan TV (still image), Fast Scan TV (video), Facsimile

#### How a "Walkie Talkie" or HT Works

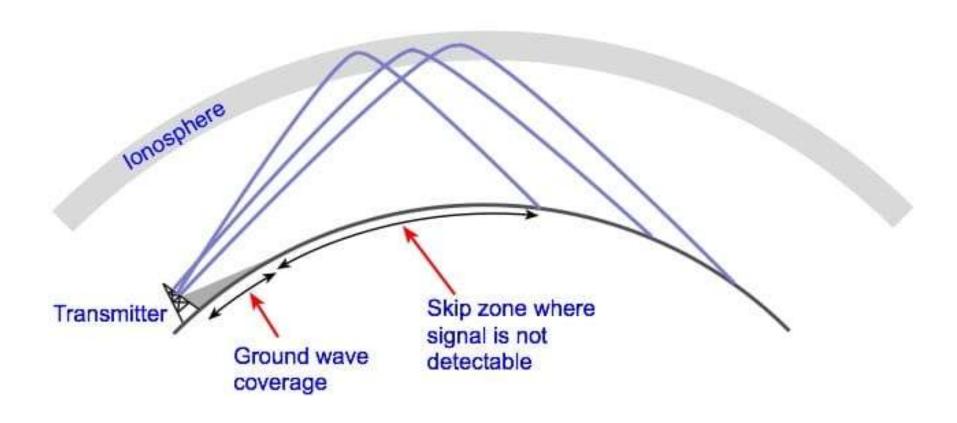


The HTs communicate directly with each other in "Simplex Mode" (same frequency alternating)

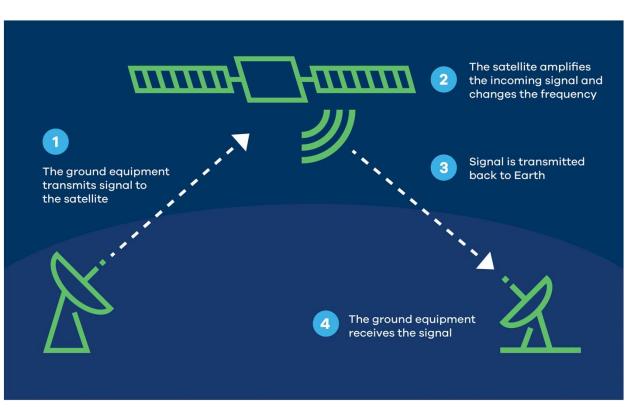
## How a Repeater Works



## How High Frequency Radio Waves Travel



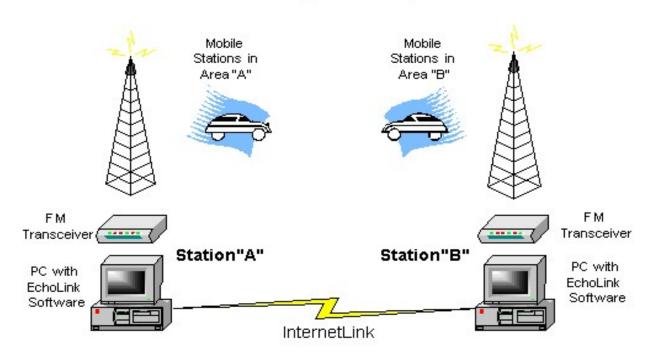
#### How Satellite Communications Mode Works





#### How Ham Radio Internet Gateway Modes Works

#### Linking Example



Stations can convert messages and relay globally via Internet

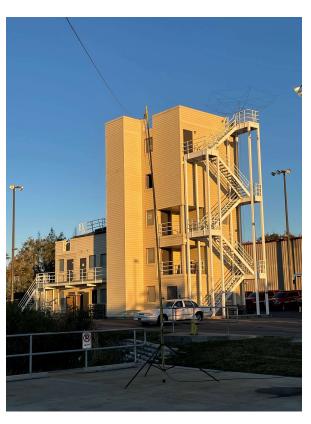
#### What is Field Day?

Field Day is ham radio's open house. Every June, more than 40,000 hams throughout North America set up temporary transmitting stations in public places to demonstrate ham radio's science, skill and service to our communities and our nation.

It combines public service, emergency preparedness, community outreach, and technical skills all in a single event.

ARRL Field Day has been an annual event since 1933 and remains the most popular event in ham radio.

# Towers used for Field Day antennas at Clearwater Fire and Training Center





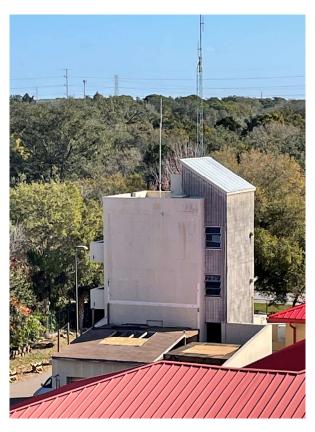
Tall (new) tower Located across parking lot

- Hex beam
- EFHW wire
- OCF Wire

Shorter (old) tower Located next to classroom

- Diamond X60A 6m
- 66' EFHW Wire antenna
- VHF/UHF





#### Club Radio Example Elecraft K4 – HF Transceiver



#### **Portable Satellite Station 2.0 Goals**





- Easy for casual operators to make contacts
- Setup for FM, SSB, CW and Packet work all of the 15+ available LEO satellites & ISS
- Full computer controlled setup to handle satellite tracking & Doppler correction
- Transportable antenna system with X-pol Yagis and pre-amps (U/V, V/U operation)
- Setup in an hour or so



#### 13 Colonies Special Event



## Route 66 Event

23<sup>rd</sup> Anniversary - Info: <a href="https://w6jbt.org/">https://w6jbt.org/</a>

Certificate and QSL cards available

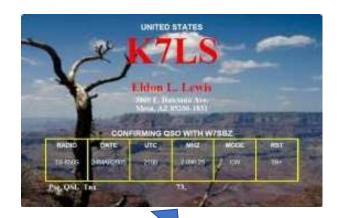
Event Stations: 19 clubs (W6A to W6R and

W6U) plus 2 rovers (W6S and W6T)



# QSL Cards



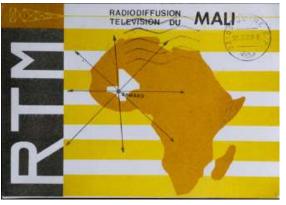


Written confirmation of a radio contact

Postcards can be fun to receive from distant locations

Nice messages often written with the card









We like to build our own antennas

Finished Antenna 66 feet

## The Kit

- Tools:
- Drill and drill bits (1/8 to ¾ in step bit, ¼ inch bit, 13/64 inch bit, 9/64 inch bit)
- Pliers
- Wire cutter
- Sharp knife or sandpaper
- Soldering iron and solder
- Screwdriver
- Marker



#### Winding the toroid (Impedance transformer)

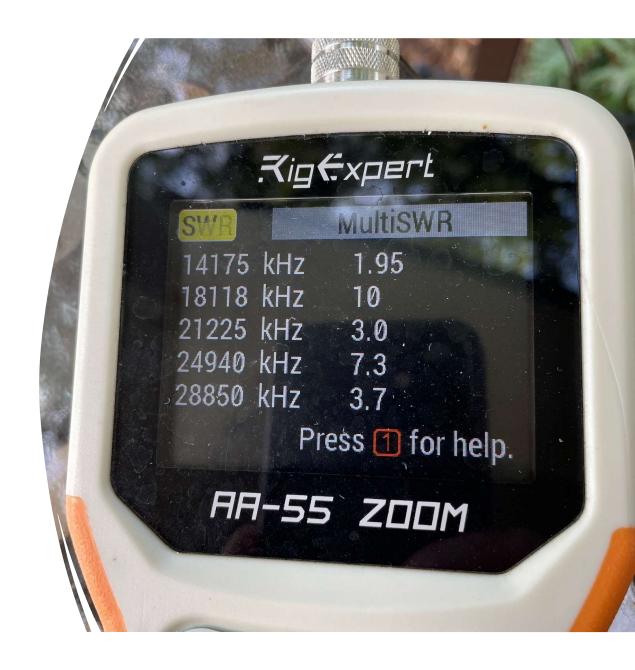


Find the point where the two pieces of wire become one, and place this on the toroid. Wrap the double part twice around the core. Then wrap the other 12 windings as shown, crossing the wire over to the other side of the toroid after the sixth wind.

Note: primary 2 turns, secondary 2+12 = 14 turns

# Hang the wire and test it!

- Test the antenna using the rig's SWR meter or antenna analyzer. Photo is before tuning.
- A standing wave ratio of approximately 1.5:1 or lower is a good match!
- Trim the antenna wire, a couple of inches at a time, to achieve a low SWR below 1.5 on 40m and 20m.



# Ham Lingo

ITU Phonetics – we use words when spelling out letters (Alpha, Bravo...)

73 = Best Regards

88 = Hugs and Kisses

CW = Continuous Wave (Morse Code)

DX = Long distance contact

Phone = voice communications

Barefoot = using a transmitter without an amplifier

Bug (also key or paddle) = Morse code keyer

Homebrew = equipment built by a Ham

Rubber Duck = the short antenna on a walkie talkie (HT)

XYL = wife (ex Young Lady)

QTH = home station address

Zulu Time = UTC (Universal Time, Greenwich England mean time)

### You are welcome to visit and join our club

- Who Upper Pinellas Amateur Radio Club "UPARC"
- Website www.uparc.org
- When First Saturday morning of each month 10:00 to 12:00
- Where Palm Harbor Fire Rescue Station #65
  - 250 W Lake Rd, Palm Harbor, FL
- We have young adults in our club
- Also we always have license testing prior to each meeting
- We will be offering a Technician license training course in the near future
- We are a very active club two Field Days each year, two Parks on the Air events, Jamboree on the air with Scouts and more!
- SCHOLARSHIPS AVAILABLE FROM ARRL licensed youth amateurs

# 73! Questions?

Please sign the Visitor Log and Thank you for this opportunity!