Amateur “Ham” Radio

Get Ready to Meet the World

What is Ham Radio?

- Individuals operating Radio Stations of their own
- Licensed by The FCC (Federal Communications Commission)
- Experimenters & Hobbyists, furthering the science and art of Radio Communication.
- Provide Valuable Communications in Emergencies
- Providing Communication Services to Charities during their fund raising events
- Is Used by SAR (search and rescue teams) for reliable communications in remote areas

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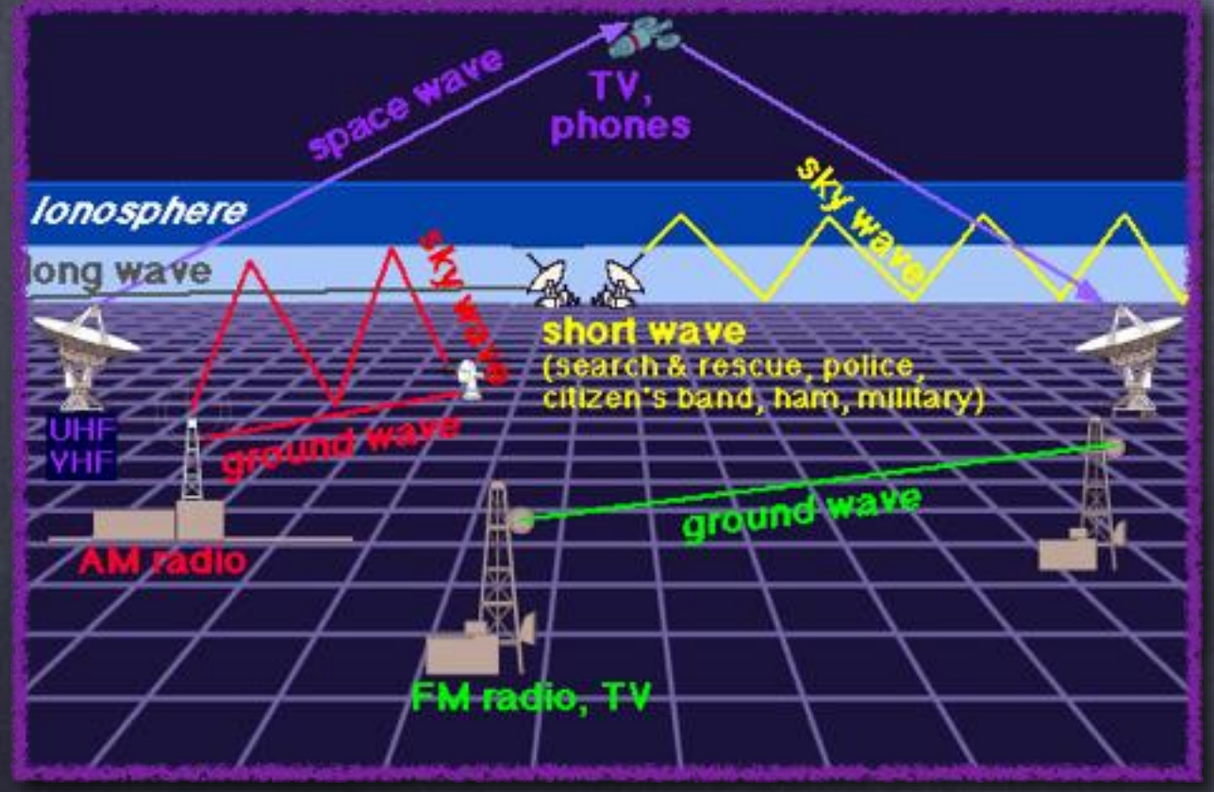
Who are Hams: Kings, Queens, Prime Ministers, Presidents, Governors, Senators, Congressman, Singers, Inventors, Astronauts, Cosmonauts, Actors, Athletes, Scientists, Your Neighbors, ... YOU?

What Are Radio Waves?

- All electromagnetic radiation can be regarded as waves that undulate through an electromagnetic field, like ripples in a pond. They are produced when an electrically charged particle, usually an electron, changes its speed or direction of motion.

- The best-known use of radio waves is to send images, audio, and text in the form of signals



Types of Waves

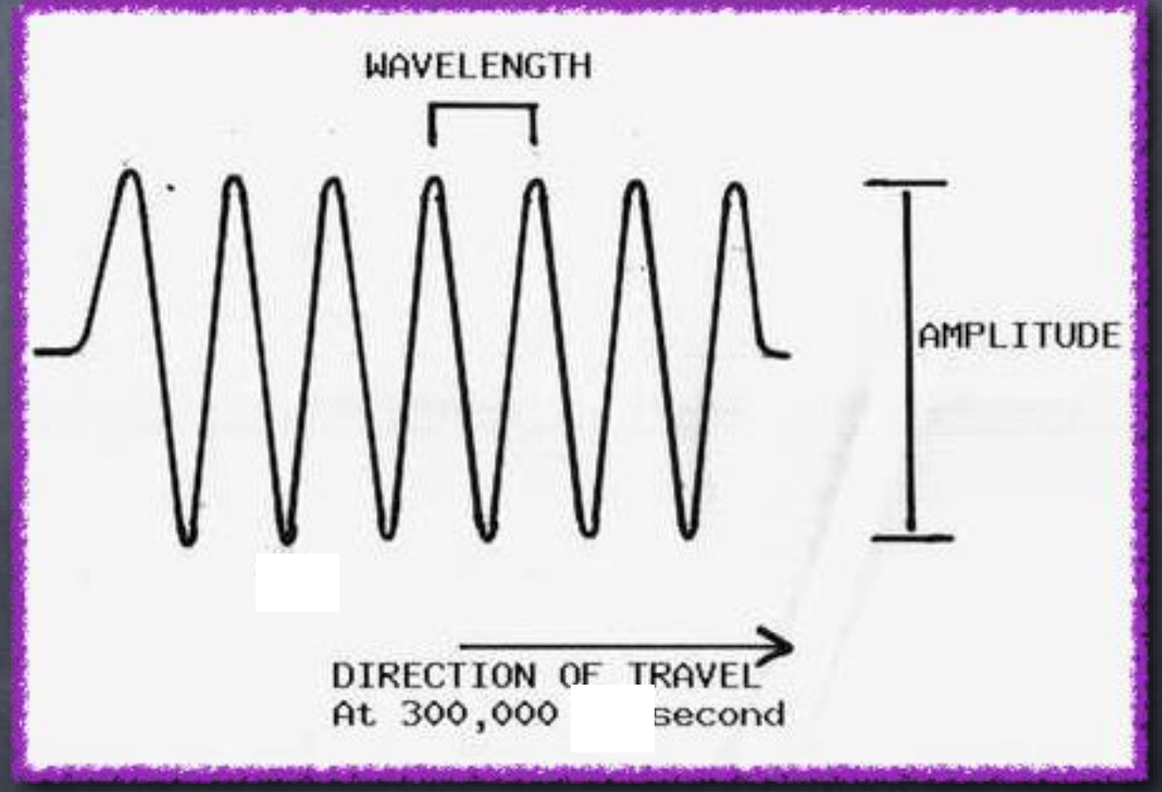
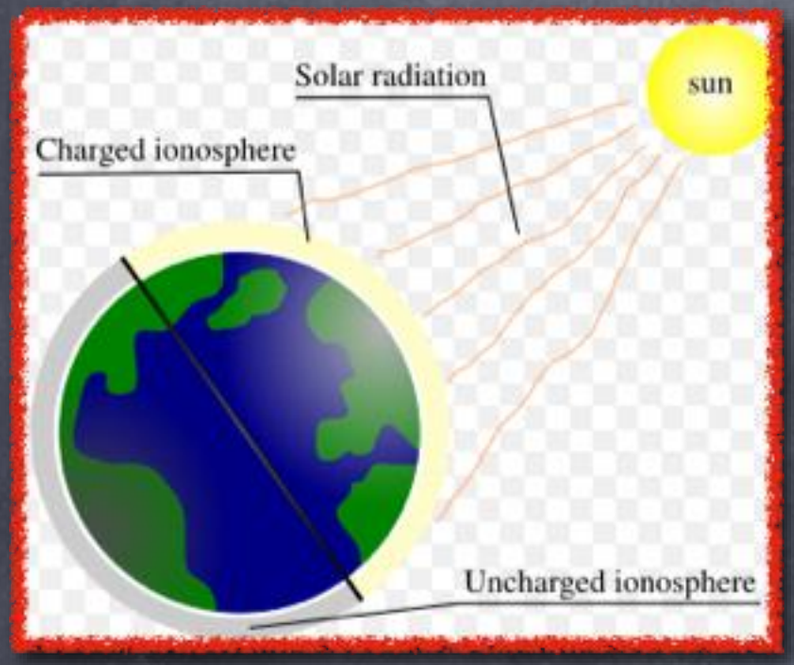
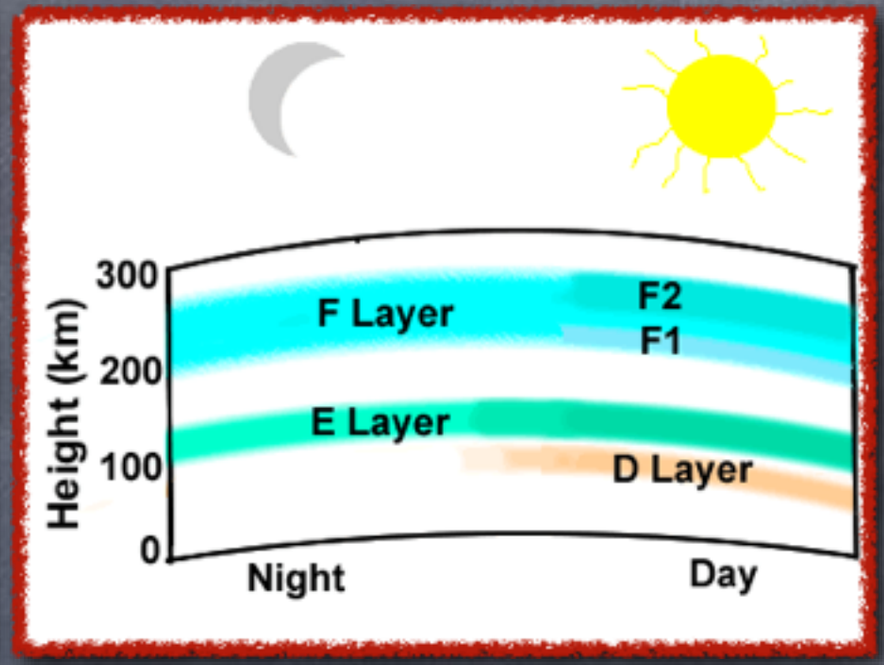


Diagram of a Wave

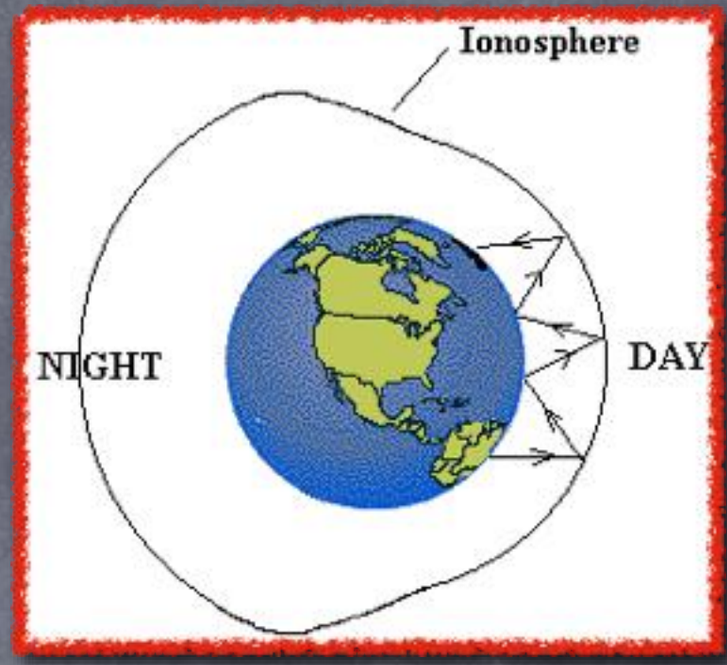
How Can Signals Travel Around the World?



The Sun's exhaust (electron gas plasma) "heats up" the ionosphere, electrically.



At night the E layer and F layer are present. During the day, a D layer forms and the E and F layers become much stronger.



These layers, now charged can refract electromagnetic waves.

Each layer reacts differently at different frequencies, bending the radio waves to enable long distant communication.

Making Contacts on the Air

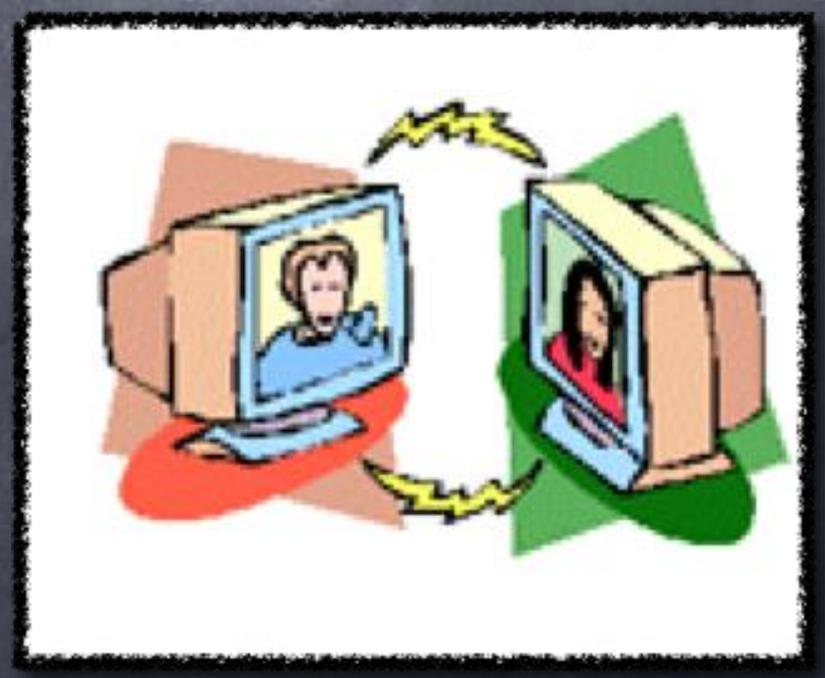
- Erect an Antenna
- Build a Station
- Connect with Other Hams
- Participate in Nets
- Enter Operating Contests
- Work Toward Awards; DXCC, WAS

QSL Cards

Hams send each other postcards to confirm their contacts.

Modes of Operating

- CW - Morse Code - the most reliable form of communication as it can generally make it through the most difficult conditions where other signals can't.
- Voice - FM, SSB, AM
- Digital - PSK, RTTY, Packet: Keyboard to Keyboard Communication
- SSTV - Slow Scan TV - Transmitting Images & Diagrams
- IRLP - Linking the radio with the Internet



Public Service

- Communication during fund raising and local sporting events is necessary for the safety of the participants.
- Ham Radio provides communication free of charge.

A Simple Go Bag

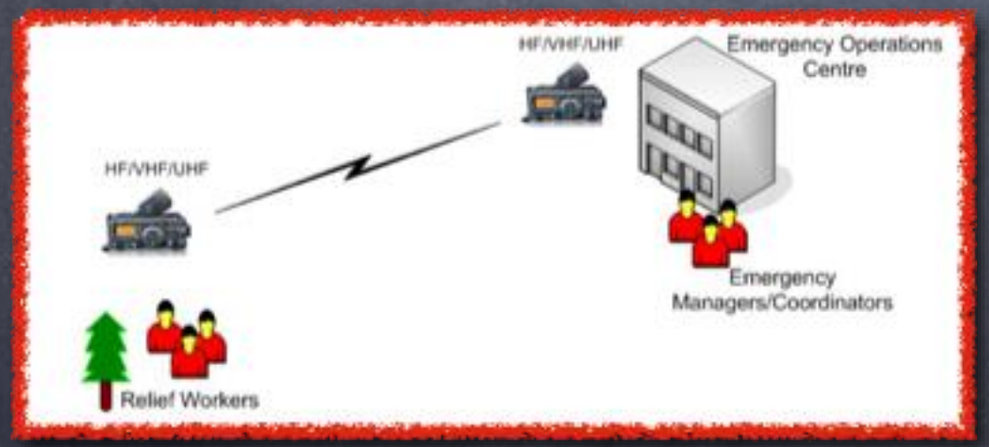
Emergency Communication

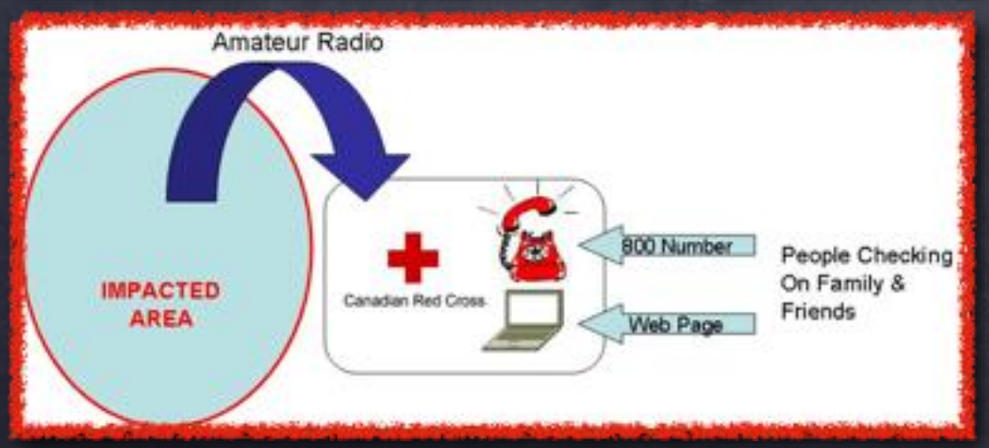
Despite the complexity of modern commercial communications - or perhaps BECAUSE they are so complex - Amateur Radio operators are regularly called upon to provide communications when other systems are down or overloaded.

- Operating Off the Grid
- Using Portable Equipment
- Emergency Power - Solar, Batteries
- Tent Shelters set-up in Open Spaces
- A National Exercise held annually demonstrates the ability of Hams to develop a Nation Wide Communication Network, when none exists.

“Traffic” Handling

- “Traffic” refers to Formal Written Messages
- Handling or Transmitting and receiving these messages, requires the use of specific procedures that allow these messages to flow smoothly through the National Traffic System.
- Hams practice sending routine messages through Local, State Wide and Regional Nets to build operating skills needed in Emergency Situations.





The American Radio Relay League
RADIOGRAM
Via Amateur Radio

Number	Precedence	HX	Station of Origin	Check	Place of Origin	Time Filed	Date

To:

This Radio Message was received at:

Amateur Station_____ Date_____
Name_____
Street Address_____
City, State, Zip_____

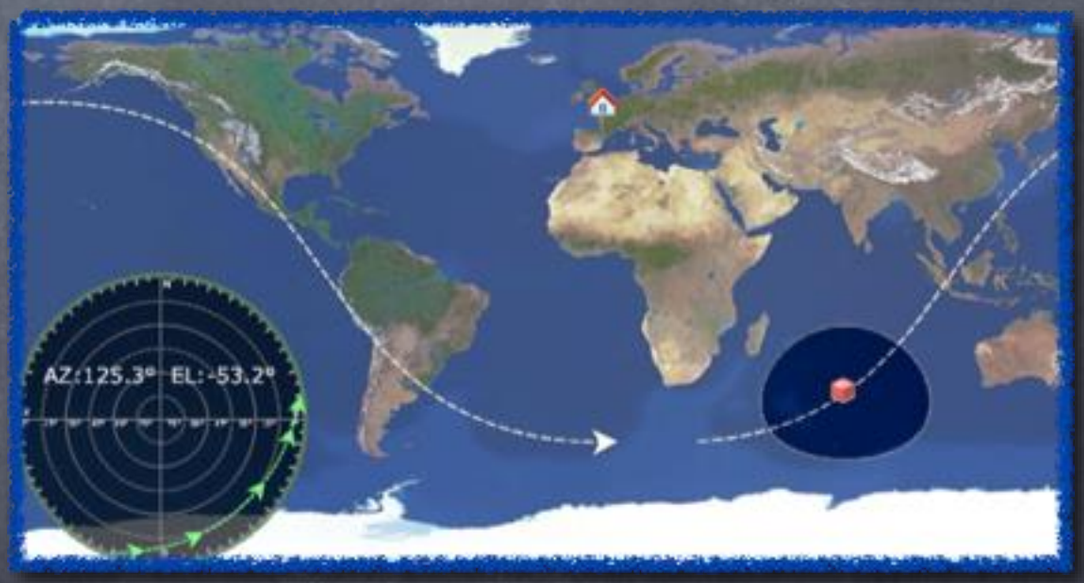
Telephone Number:

	From	Date	Time		To	Date	Time
REC'D				SENT			

Satellites

Hams Have Their Own

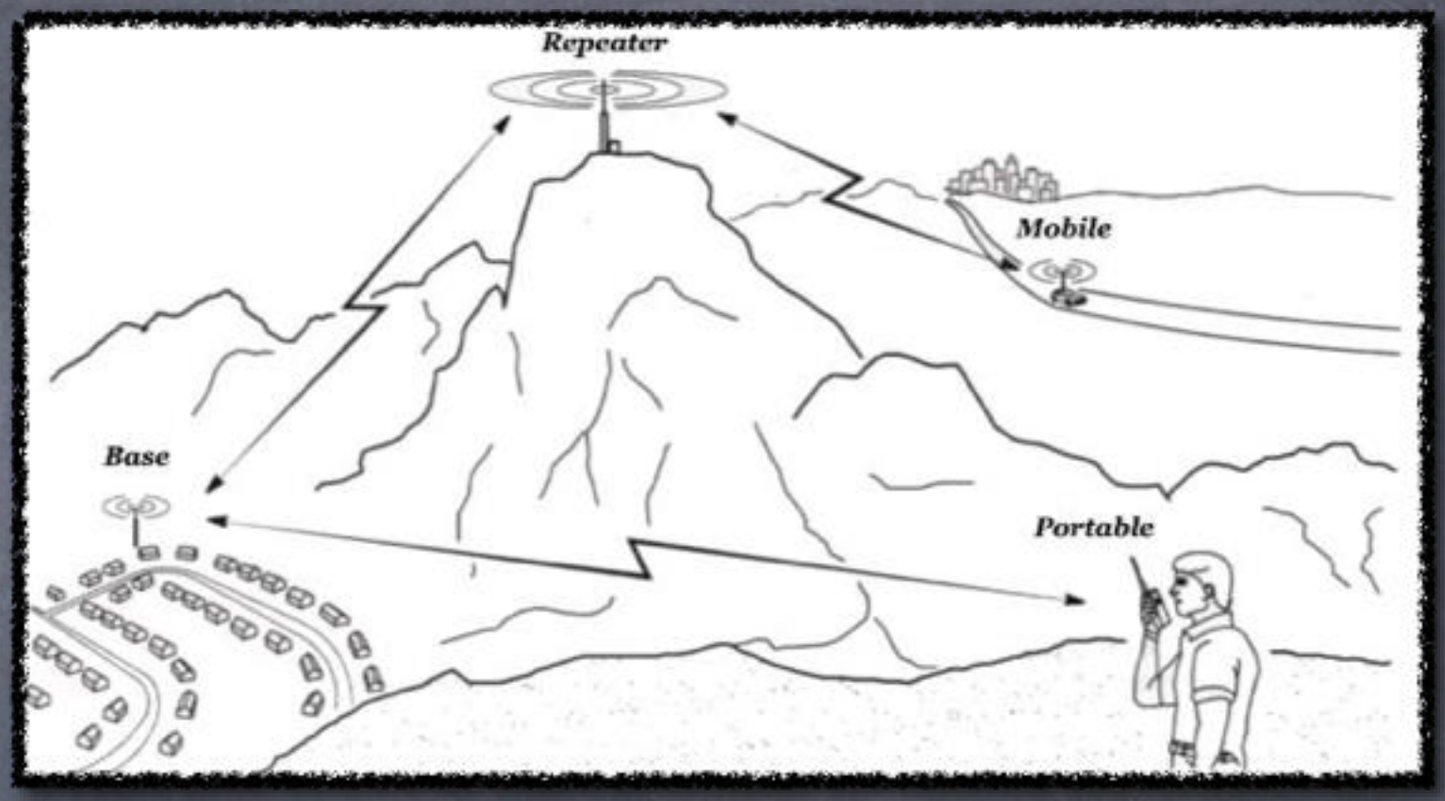
- Learn how to Track a Ham Satellite
- Communicate through them with simple equipment - Even an Handi-Talkie
- Read & Understand Satellite Telemetry
- Build an Antenna for Satellite Communication



Learn to understand a technology people use and need everyday.

Repeaters

Think of repeaters as cell phone towers for ham radio.



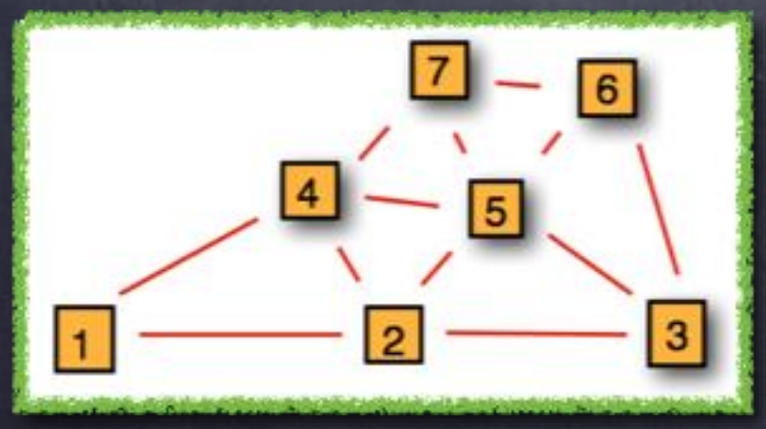
- Operate Automatically
- VHF/UHF radio signals travel in a straight line
- To communicate around obstacles like mountains and/or to extend the range, repeaters are used.
- Repeaters listen on one frequency and transmit on another.
- Repeaters can be linked together to further their range
- Repeaters can be connected to the Internet to enable Handi-Talkies to communicate with others great distances away.

MESH Networks

Hams Can Make Their Own “Internet”

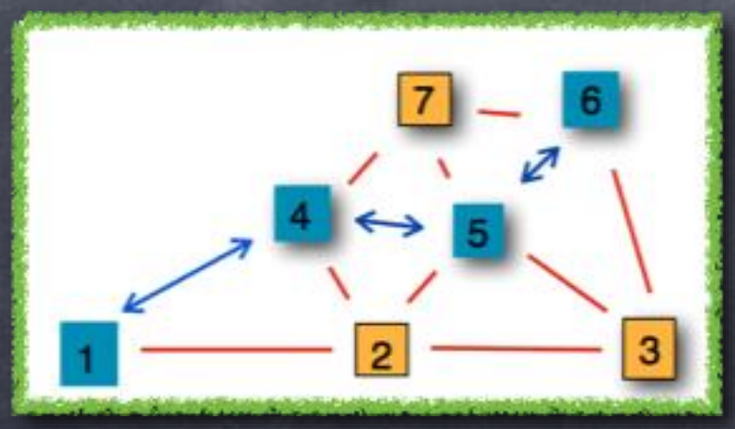
- Two or More Computers connected together via radio is a Network
- Each Station/Computer is a Node
- The Network is Self-Configuring, Adjusting for Added or Dropped Nodes, Automatically
- Connect Video, Files, Internet so all Nodes have access

A



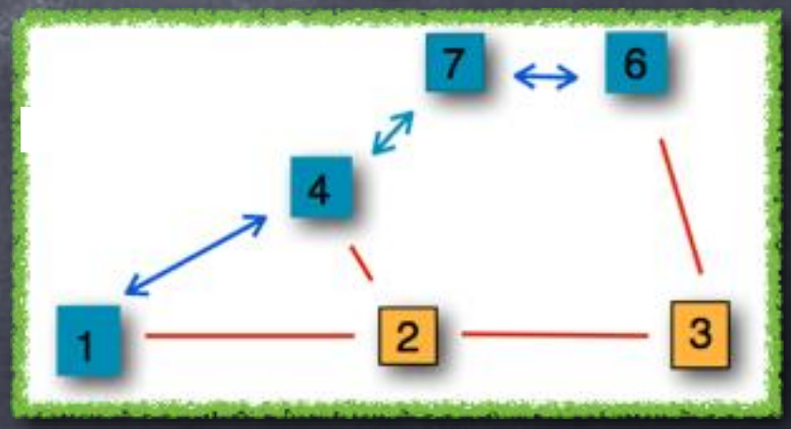
Network

B



Station (Node) 1 Connects to 6

C



Node 5 Drops Out, 1 still connects to 6

For Educators

Ham Radio is S.T.E.M.

- Solar Physics - to understand radio propagation
- Math Formulas - for Antenna Design
- Space Science - Satellite Tracking and Communication
- MESH Network Construction & Optimization
- Robotics - Radio Control & Sensory Feedback
- High Altitude Balloons - Radio Transmission of Sensory Data and Visual Images

How Can You Become a Ham?

- Any U.S Citizen, of ANY Age is eligible
- Prepare for the License Exam
  - Study license manual - Visit: ARRL.org
  - Take a Class
  - View Online Video Clips
  - Take Practice Tests Online
- Pass the Test, given monthly