



Amateur Radio

What is it?

Norm Cantin – WA1NLG - April 23, 2022

What is Amateur Radio?

Amateur Radio, aka “ham radio,” is a popular hobby that enables so many activities;

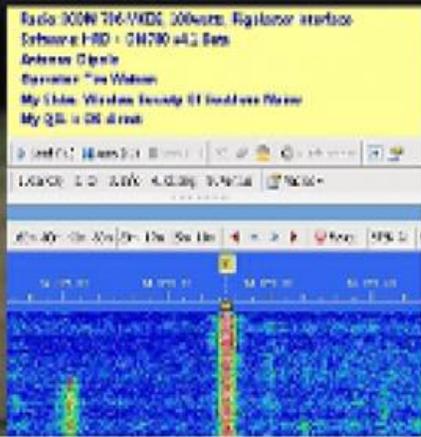
- From Casual Operation to Emergency Service to Public service
- From Technical Development, Building Equipment, Antennas to much more
- Over 800,000 US Hams, Over 3M Worldwide



Hams are from all walks of life...



https://youtu.be/8x6x_6mDVIQ



Amateur Satelites

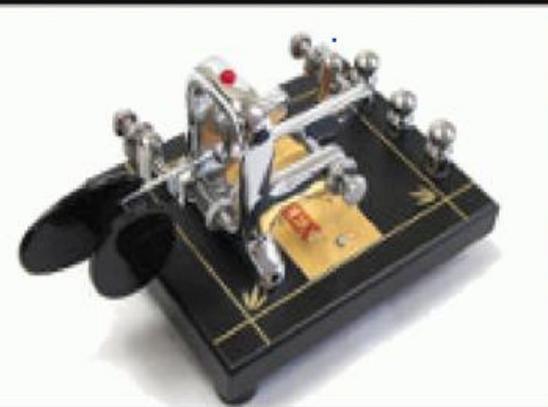
Talk to Astronauts

Radio Control

Digital Modes

Phone

These are some of the cool things hams do:



Slow Scan TV

Radio Telegraphy

Homebrewing

Public Service

Vintage

Morse Code (CW)

MORSE CODE			
A	..	N	..
B	....	O	---
C	....	P	....
D	... .	Q	----
E	.	R	... .
F	....	S	... .
G	... .	T	- .
H	....	U	... -
I	..	V	....
J	.----	W	... -
K	- . -	X	....
L	....	Y	....
M	--	Z	....

- Original method of communicating
- Transmit text with a series of dits and dahs
- No longer required for a Ham license – But still very popular



SOS – 5 wpm 

SOS – 30 wpm 



Hello – 5 wpm 

Hello – 30 wpm 

Field Day - Annual Worldwide Emergency Preparedness Event



How Do I Get on The Air?



Portable
\$25 - \$125



Mobile
\$100 - \$250



Fixed Station
\$200 - \$\$

BARC Members willing and ready to help get you on the Air

Antennas



Mag Mount

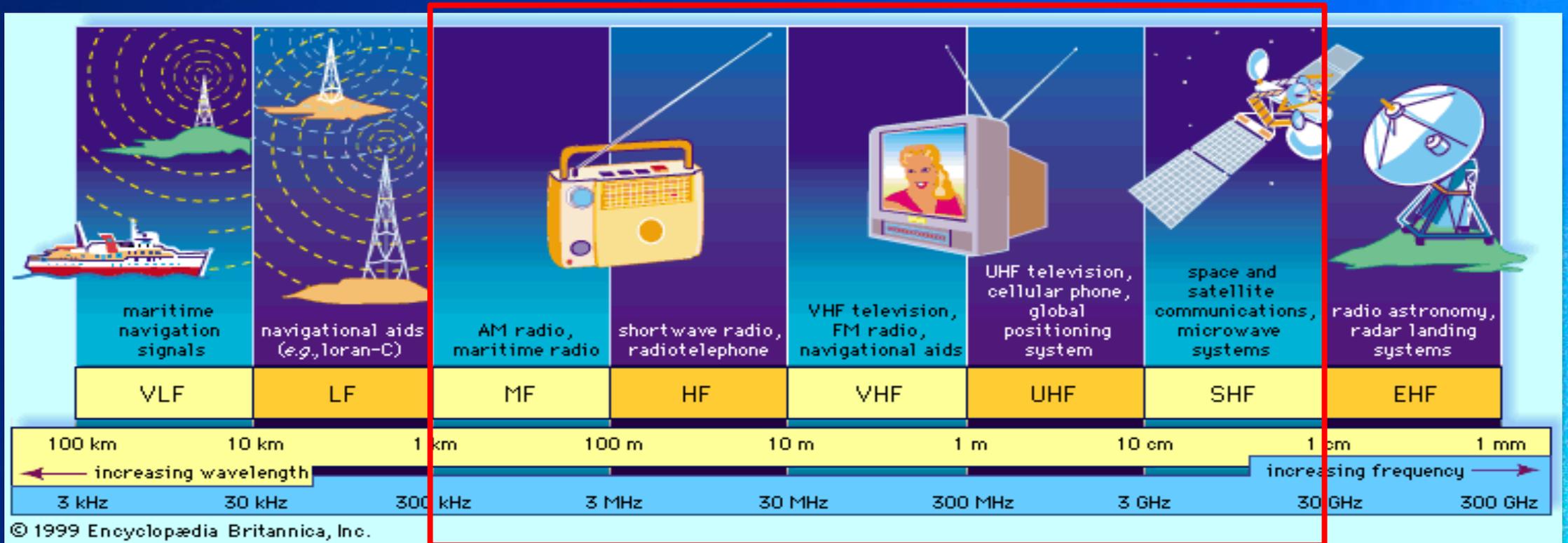


Wire Dipole



Multi Element Yagi

The Radio Spectrum



Radio Amateurs have privileges from 160 meters (MF) to the Microwave bands (SHF)

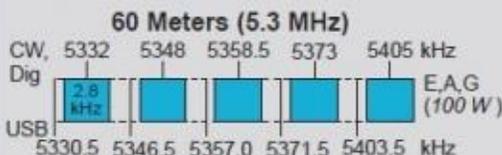
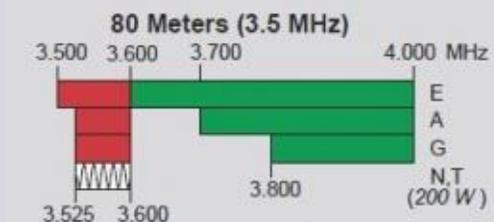
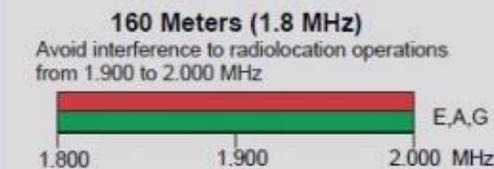
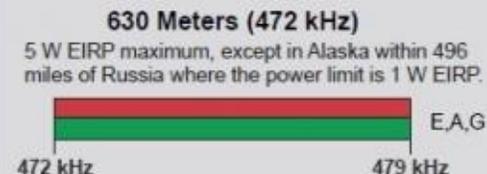
US Amateur Radio Bands

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.

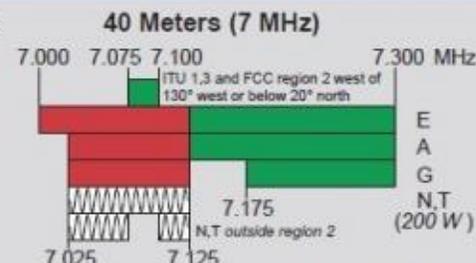


ARRL The national association for AMATEUR RADIO®

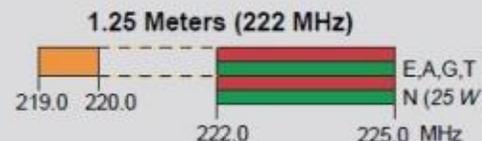
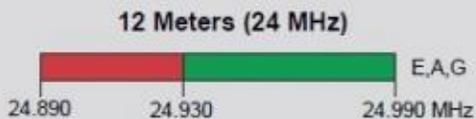
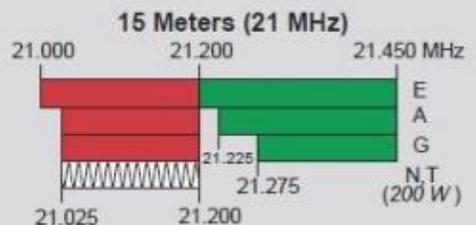
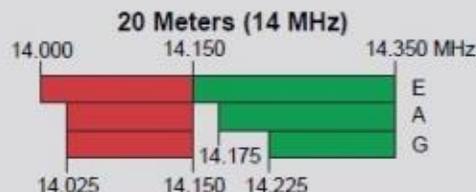
Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.



General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.



See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.



*Geographical and power restrictions may apply to all bands above 420 MHz. See *The ARRL Operating Manual* for information about your area.



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:
860-594-0200 (Fax 860-594-0259)
email: hq@arrl.org

Publication Orders:
www.arrl.org/shop
Toll-Free 1-888-277-5289 (860-594-0355)
email: orders@arrl.org

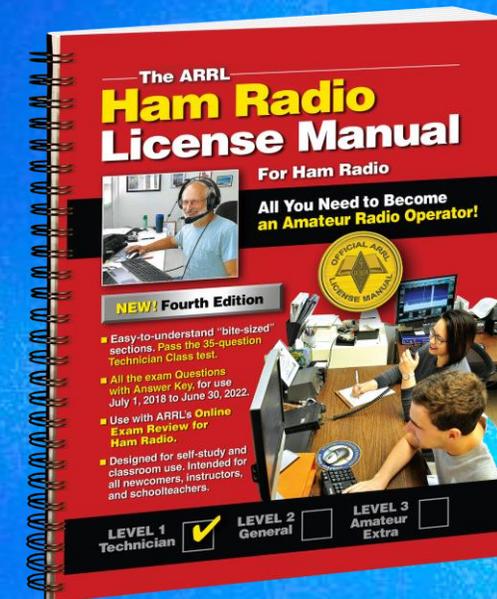
Membership/Circulation Desk:
www.arrl.org/membership
Toll-Free 1-888-277-5289 (860-594-0338)
email: membership@arrl.org

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

How to Become a Radio Amateur

1. The FCC issues Amateur Radio licenses in the United States
2. To earn your initial (Technician) license, you must pass a 35-question multiple choice examination that covers topics such as:
 - Radio and Electronic Fundamentals
 - Operating Station Equipment
 - How to Communicate with Other Hams
 - Licensing and Operating Regulations
 - Electrical and RF Safety



BARC offers free License training and examinations

US License Classes

In the United States there are three license classes currently available. Each one builds upon the previous and offers more privileges.

- ❑ **Technician** - Your first Amateur Radio license offers privileges on portions of the 10 meter band, as well as 6 meters, VHF, UHF, and the microwaves. The intent of the exam is to affirm understanding of rules, station components, basic electronics, and how to operate in accordance with good engineering and amateur practice.
- ❑ **General** - The General Class offers many more privileges in the HF bands, which allow for regular international communications on the short wave frequencies (between 160-10m). The exam takes a closer look at frequency allocations and added focus on technical proficiency.
- ❑ **Extra** - This is the highest level Amateur Radio license currently offered in the U.S. It offers extra portions of the HF bands and has an extensive focus on radio theory, advanced electronics, operating modes, radio wave propagation, etc.

Join A Local Club

- ✓ Friendship
- ✓ Camaraderie
- ✓ Technical Expertise
- ✓ Events & Activities
- ✓ Education
- ✓ Public Service
- ✓ Competitions



www.barnstablearc.org

Personal Observations:

50+ Years as a Ham

- Hard to find a hobby with the power and magic to bridge, culture, nationality, distance or varied interest as Ham radio
- Very few hobbies offer the opportunity for public service, personal development, technical advancement or for camaraderie and sheer excitement like ham radio.

Thank You

Back-Up

Emergency and Other Volunteer Services

Floods, landslides, earthquakes, hurricanes, accidents (Rail / Road / Air), etc.

Whenever regular communications fail, hams are ready to use their radios to provide emergency communication services to their communities.



Contesting

Contesting is often called the 'sport' of ham radio. Almost every weekend there is some form of amateur radio contest. Hams get on the air and compete to see who can make the most contacts in a limited period of time.

You can put your radio skills up against other hams and teams of hams.



Dxing

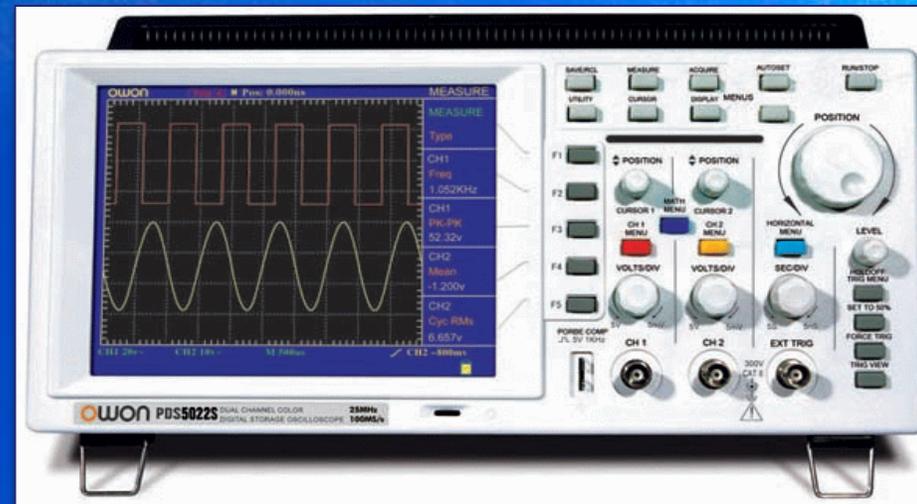
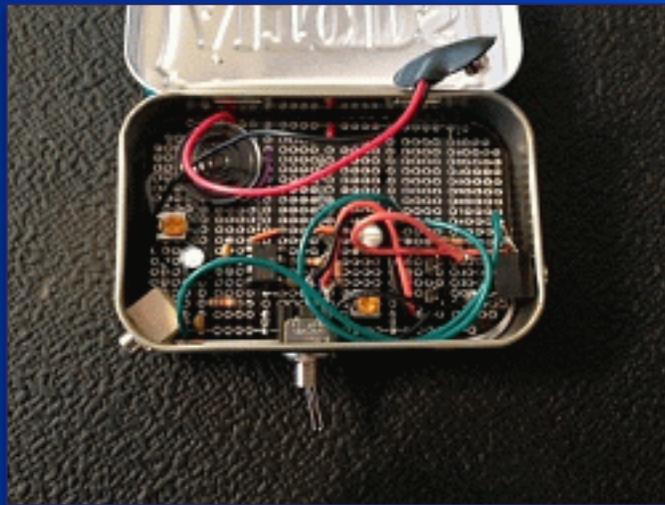
DX means distance communication, and with the right equipment, worldwide communication on the HF bands (10 through 160 meters) is a regular possibility.

Many DXers like to contact stations on rare islands and countries which aren't frequently present on the airwaves. This is sometimes called 'chasing DX'



Technical Experimenting & Kit Building

Hams come from all walks of life, ranging from technicians to engineers, teachers to scientists, and students to retirees. For many of them, the attraction to the hobby is to build their own equipment whether it is just a simple antenna, something as complex as a transmitter, or an interface between their radio and a computer.



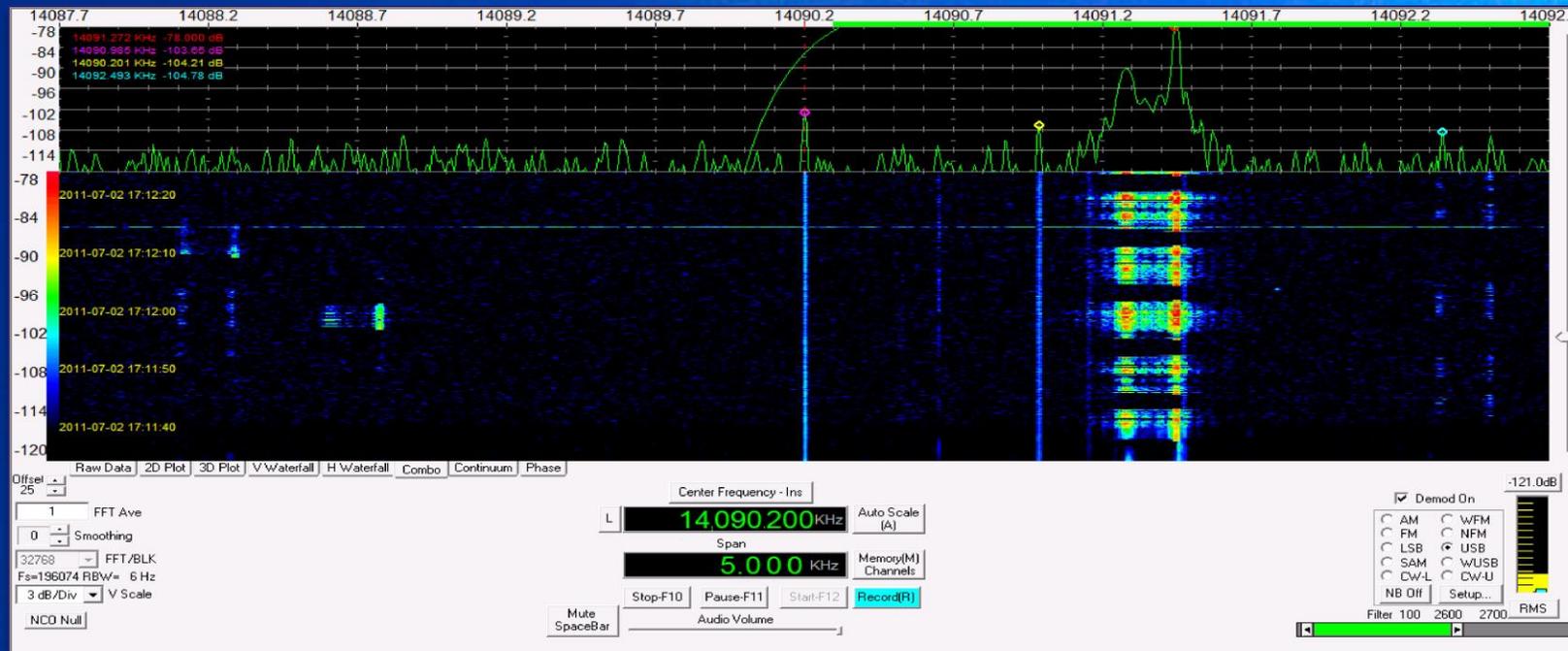
Talk to Astronauts

Yes, it is really possible. Space stations do have ham radio equipment and licensed ham astronauts often take the time to make contacts with amateurs on earth. Hams also can use satellites as 'repeaters in the sky' to make contacts with other earth stations over great distances.



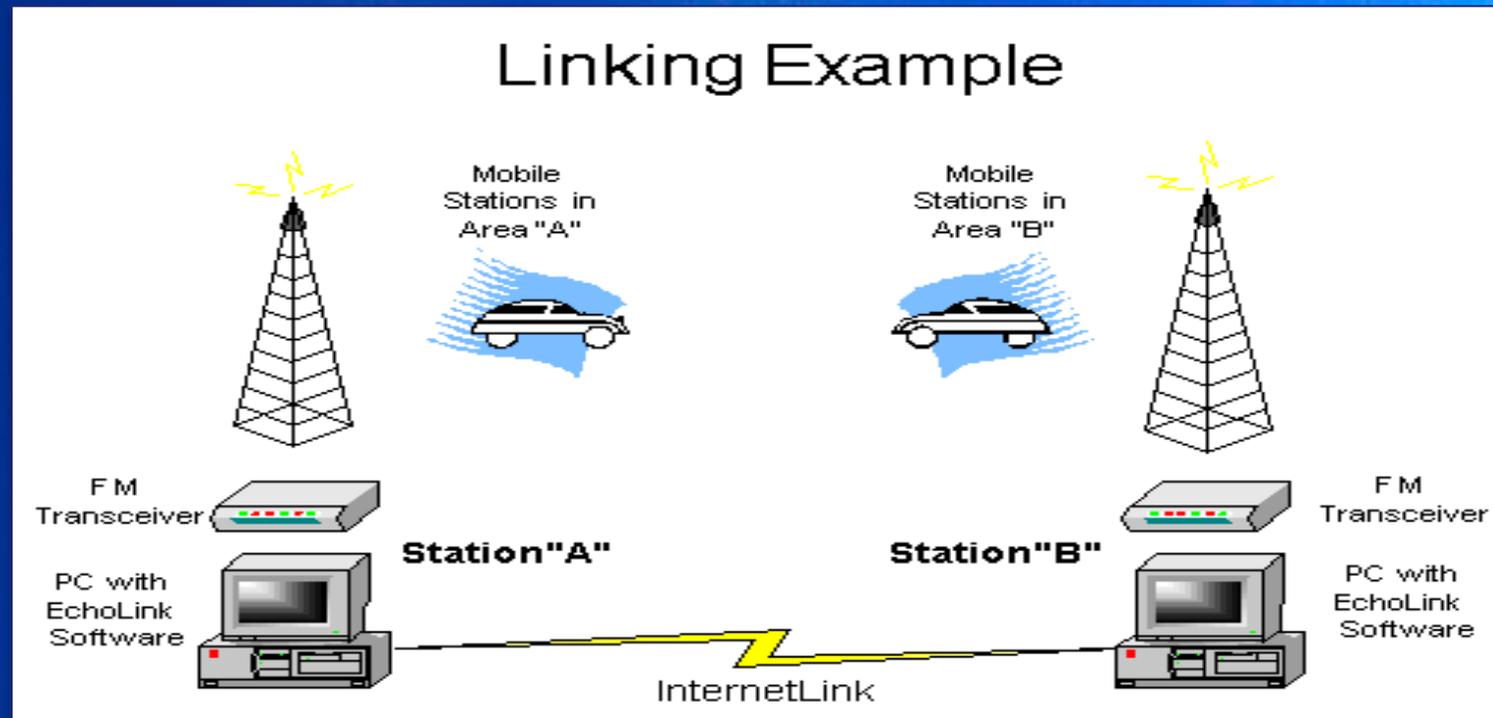
Digital Communication

Connect a computer to your radio and install some software and you can be communicating digitally over the air. Some of these digital modes can be more effective in marginal transmission conditions and some even sport error free transmission, using methods of Forward Error Correction.



Internet Communication

Using some of the latest technologies, hams can supplement a modest station with Internet connections. Using features such as D-STAR, Echolink, or IRLP on a local repeater, a ham in Maine can talk to one in Vancouver or even Australia using a simple hand-held transceiver.



Slow Scan Television

Using a PC with specialized software, you can send pictures around the world.



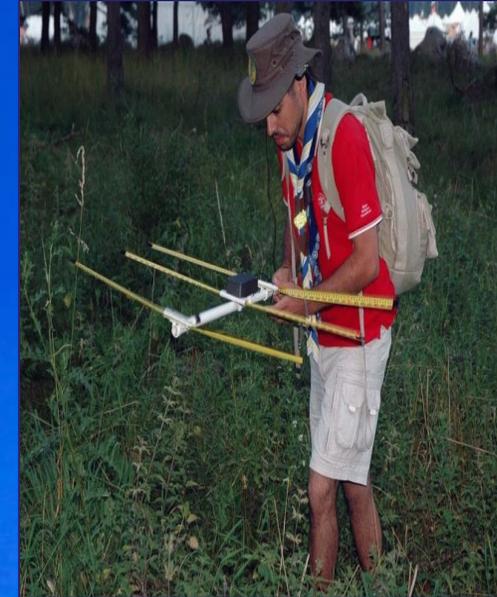
Satellite Communications

Amateur Radio satellites use specially allocated frequencies to facilitate communication between amateur radio stations.

These satellites can be used for free by licensed amateur radio operators for voice and data communications. Currently, satellites in orbit act as repeaters, linear transponders, or store and forward digital relays.



Amateur Radio Direction Finding (ARDF)



Radio Direction Finding has many purposes, both practical and fun. It can be used to track down interference, assist in search and rescue, find hidden transmitters in a fox hunt, or even track animals that have been equipped with radio transmitting devices.

In some places, ARDF competitions are organized, which awards those who can locate hidden transmitters the fastest. This specialized skill combines knowledge of radio signals and orienteering.