The Fascinating Hobby of Amateur Radio

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Some slides from Introduction to Amateur Radio

May 2, 2013

Presented by:

Syllabus

1. What is Amateur Radio?
2. What Hams do with Amateur Radio
3. How to Become a Radio Amateur
4. Your First Station
5. Why Join a Local Club?

What is Amateur Radio?

Amateur Radio is a community of people who use radio transmitters and receivers to communicate with other Amateur Radio operators.

CFR Title 47: Telecommunication

PART 97—AMATEUR RADIO SERVICE

Contents

Part 97 - Rules of the Amateur Radio Service
CFR Title 47: Telecommunication
Subpart A—General Provisions
§97.1 Basis and purpose.

The rules and regulations in this part are designed to provide an **amateur radio service** having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a **voluntary noncommercial communication service**, particularly with respect to providing **emergency communications.**

Part 97 - Rules of the Amateur Radio Service
Subpart A—General Provisions
§97.1 Basis and purpose.

(b) Continuation and extension of the amateur's proven ability to contribute to the **advancement of the radio art.**

(c) Encouragement and improvement of the amateur service through rules which provide for **advancing skills in both the communication and technical phases** of the art.

Part 97 - Rules of the Amateur Radio Service
Subpart A—General Provisions
§97.1 Basis and purpose.

(d) Expansion of the existing reservoir within the amateur radio service of **trained operators, technicians, and electronics experts**.

(e) Continuation and extension of the amateur's unique ability to **enhance international goodwill**.

Communicate, Experiment, Interact, Compete

- Amateur radio is a regulated, **non-commercial radio service**. Unlike other radio services, such as CB or GMRS, hams can transmit with as much **as1500 watts** PEP.

- **Experimentation is not only allowed, but it's encouraged**. Ham radio is truly a hobby, but often one that makes a difference especially in emergency or disaster situations. It is an activity of Self-Learning, Inter-Communication, and Technical Investigation.

- Amateurs talk to local friends over the radio waves using hand-held transceivers, communicate digitally using packet, to exchange personal messages, or vital information in an emergency, talk to other hams anywhere in the world, or engage in contests over the airwaves.

- There is truly something for everyone. In the U.S. there are over 700,000 licensed radio amateurs, and this number is steadily increasing.

Number of Licensed Amateur Radio Operators in: US = 757,638 (as of 06/01/19)

In Massachusetts:
Novice class = 212
Technician class = 5874
General class = 3402
Advanced = 794
Extra = 3211

Total 13493

What Do Hams Do?

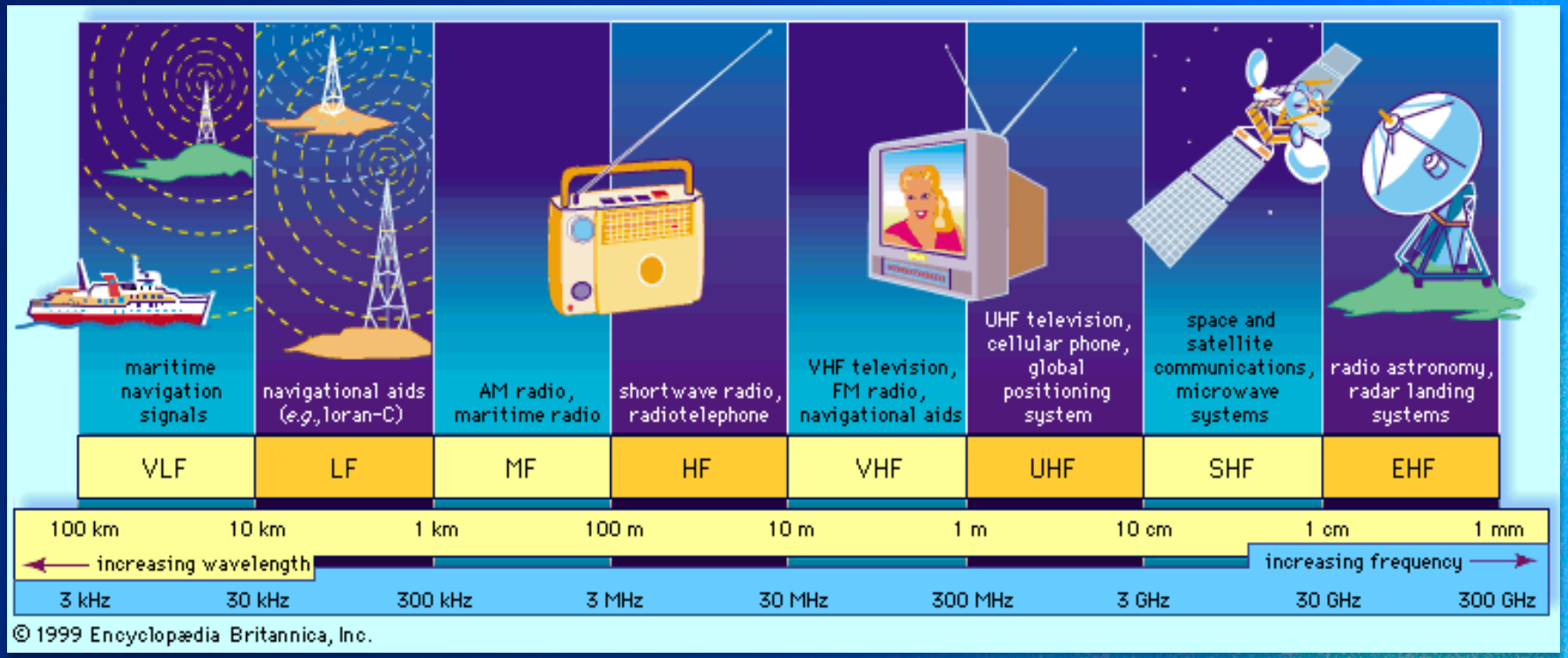
QRP HF VHF Dxing Emcomm Technical
Contesting Satellites Digital SSTV
Space Communications

HF Radio

- Hams can talk to other hams in literally any part of the world using the ‘short waves.’

- By bouncing signals off the ionosphere, signals can travel 1000's of miles.

The Radio Spectrum

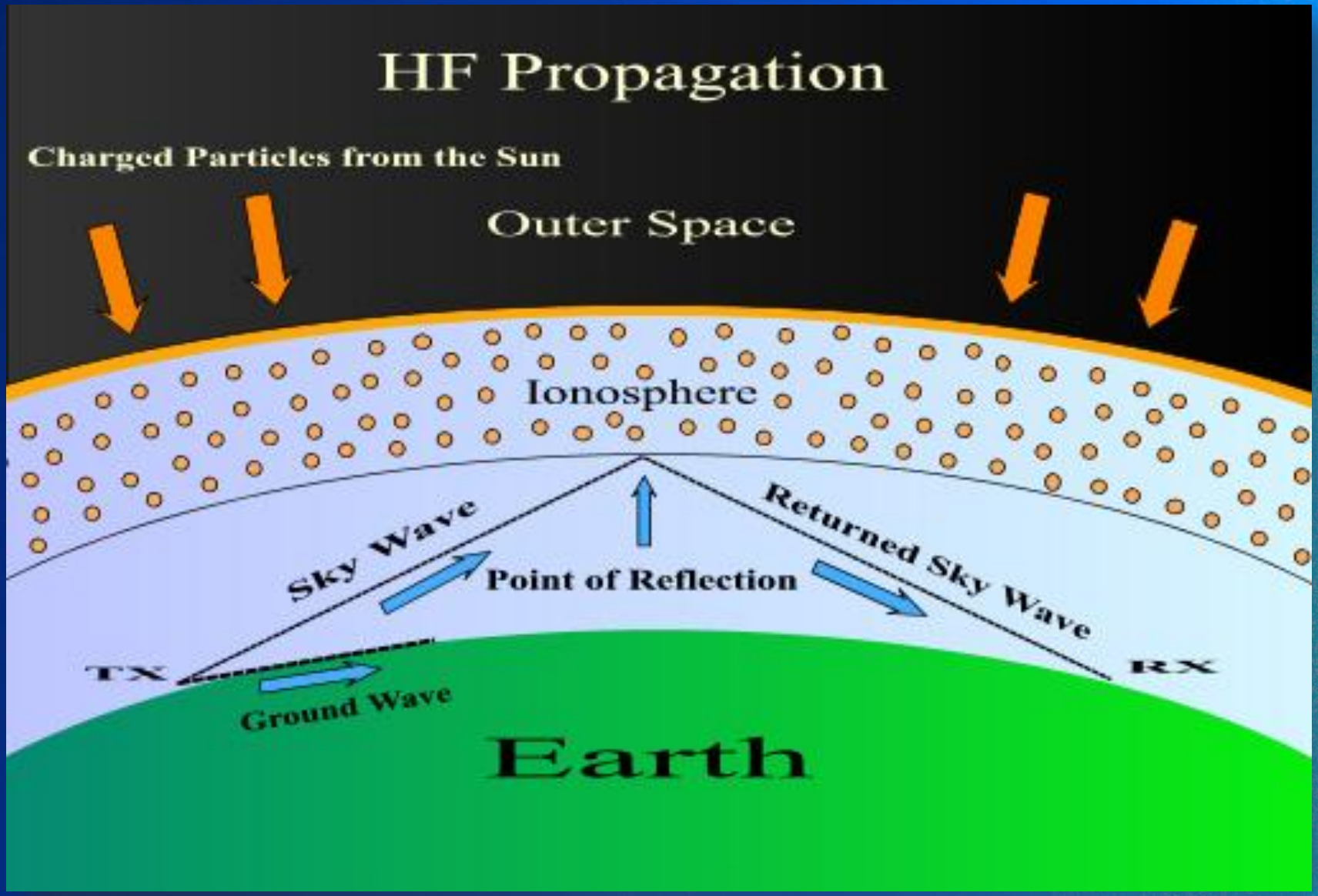


Radio Amateurs have privileges from 160 meters (MF) to the Microwave bands (SHF)

WMRC Milford, MA 1490 AM = 1.490 MHz

WDJM Worc. State College = 91.3 MHz FM

HF Propagation



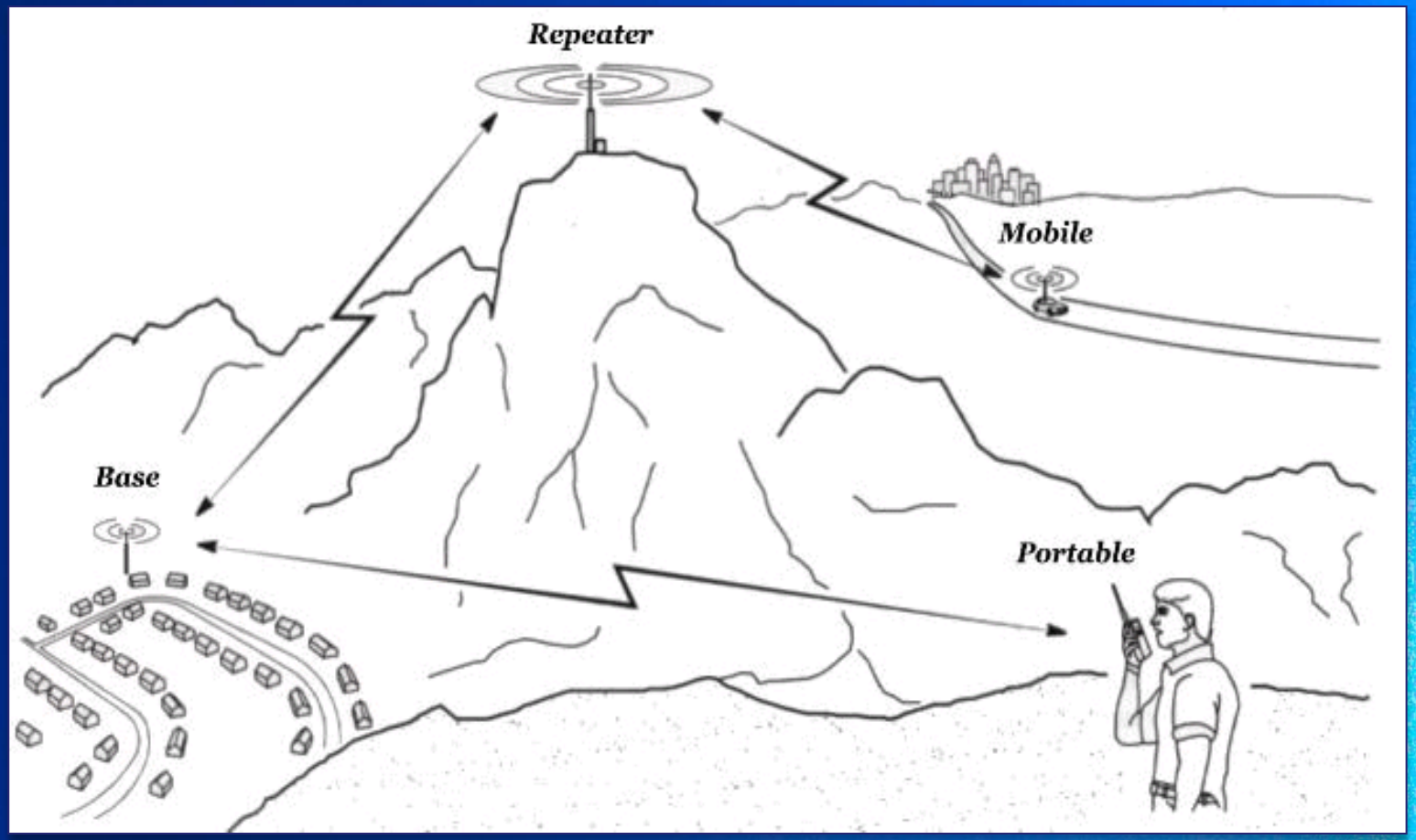
VHF & UHF

Hams enjoy extremely reliable communications within their local community via simplex communications, or make use of repeaters that can extend the range up to 50 miles or more.

Single-band handheld transceiver (right)

Typical dual-band mobile transceiver (below)

Repeater vs. Simplex Communication



Repeaters help extend the range of VHF and UHF handheld and mobile transceivers.

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'

Emergency and Other Volunteer Services

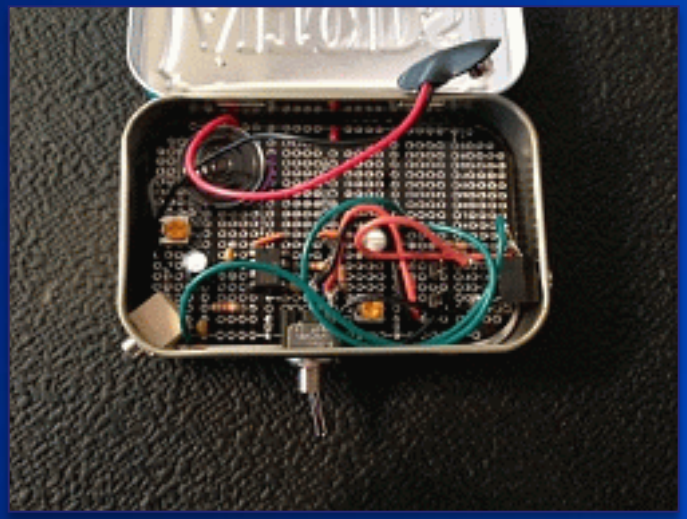
Floods, landslides, earthquakes, hurricanes, accidents (Rail / Road / Air), etc.

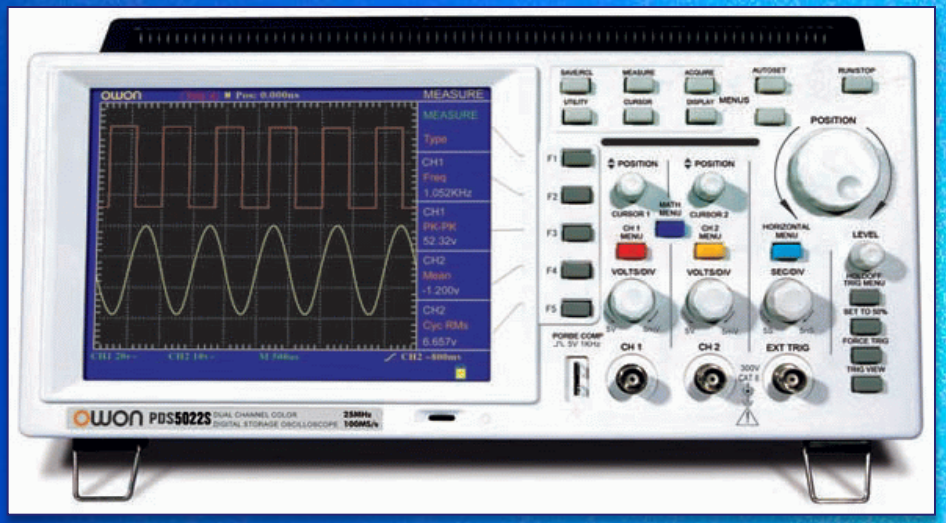
Whenever regular communications fail, hams are ready to use their radios to provide emergency communication services to their communities.

National Weather Service Skywarn Program

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.





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.**

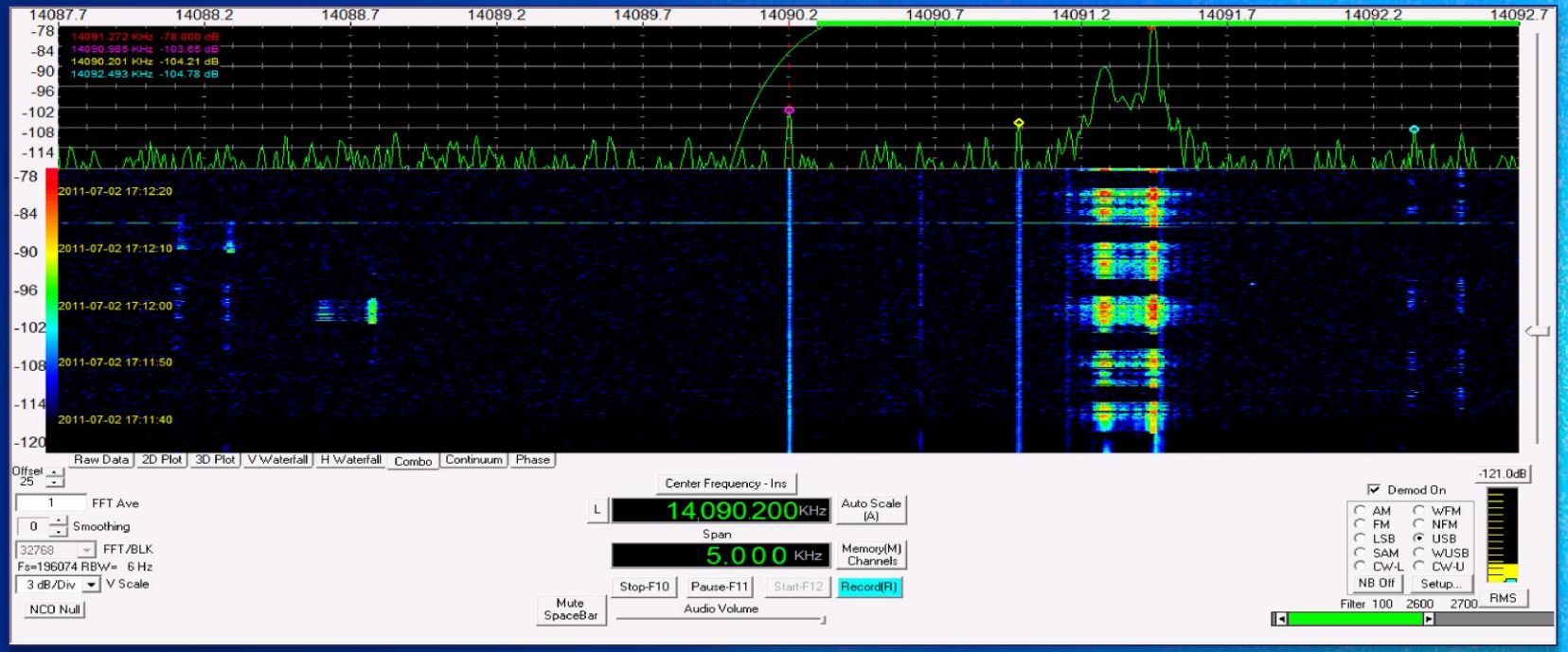
You can put your radio skills up against other hams and teams of hams.

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.

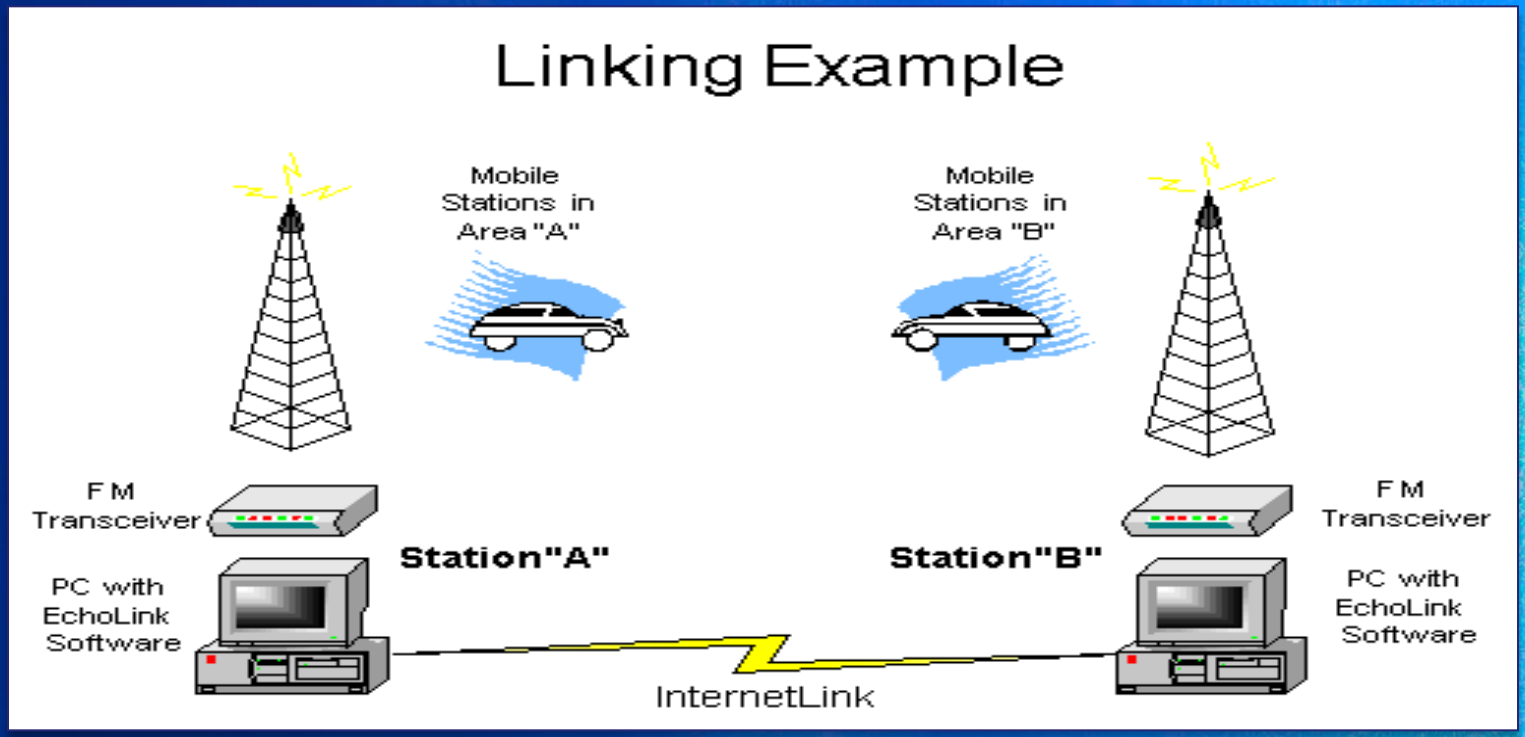
Digital Communication

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

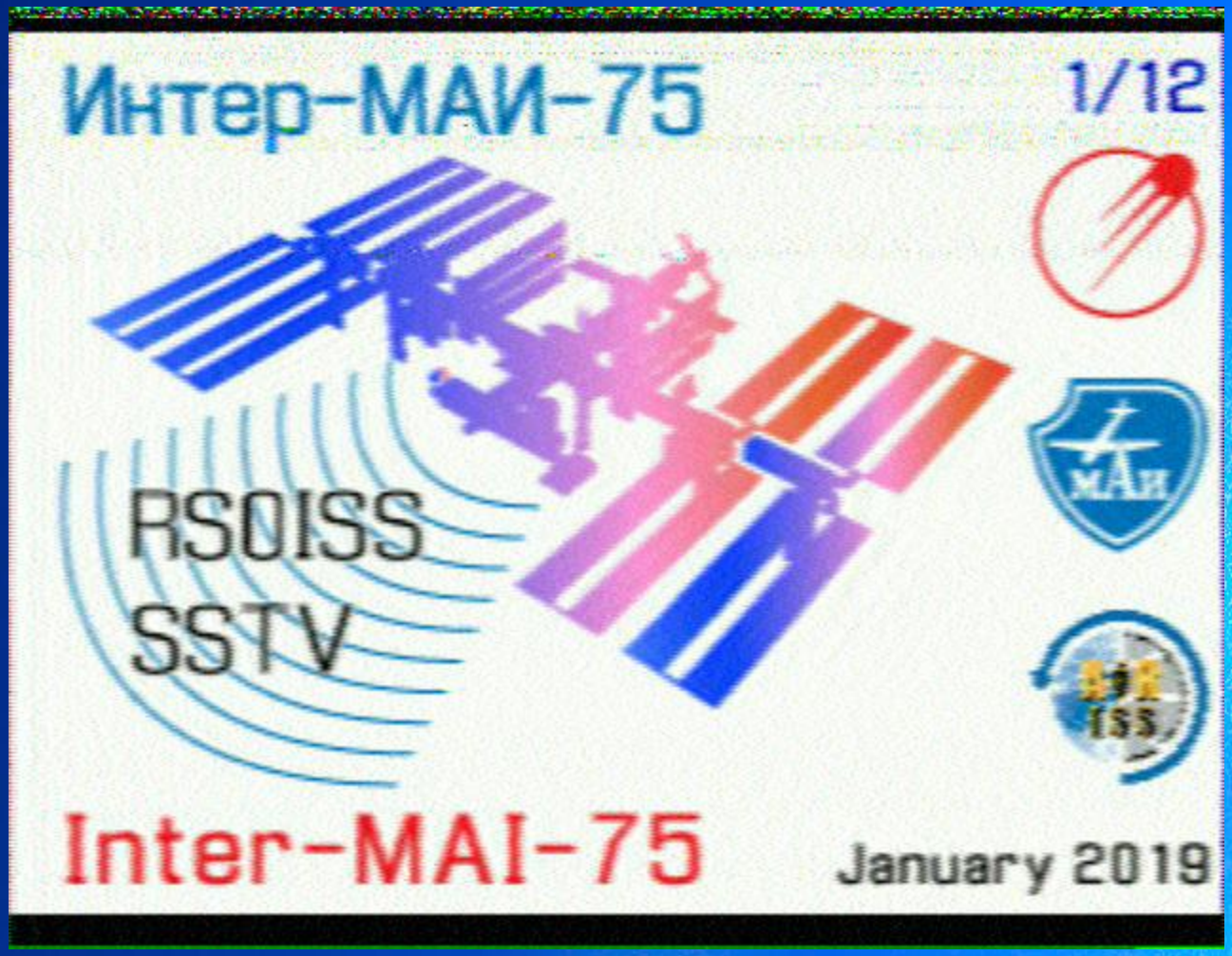
Using some of the latest technologies, hams can supplement a modest station with Internet connections. Using features such as D-STAR, Echolink, or IRLP on a local repeater, a ham in Maine can talk to one in Vancouver or even Australia using a simple hand-held transceiver.



Slow Scan Television

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

Slow Scan TV



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.

Morse Code (CW)

Morse Code is the original digital mode. It's a method of transmitting text as a series of on-off tones that can be directly understood by a skilled listener. The code consists of sequences of short and long signals called 'dits' and 'dahs' which represent all 26 Roman letters, as well as numbers, punctuation, and prosigns.

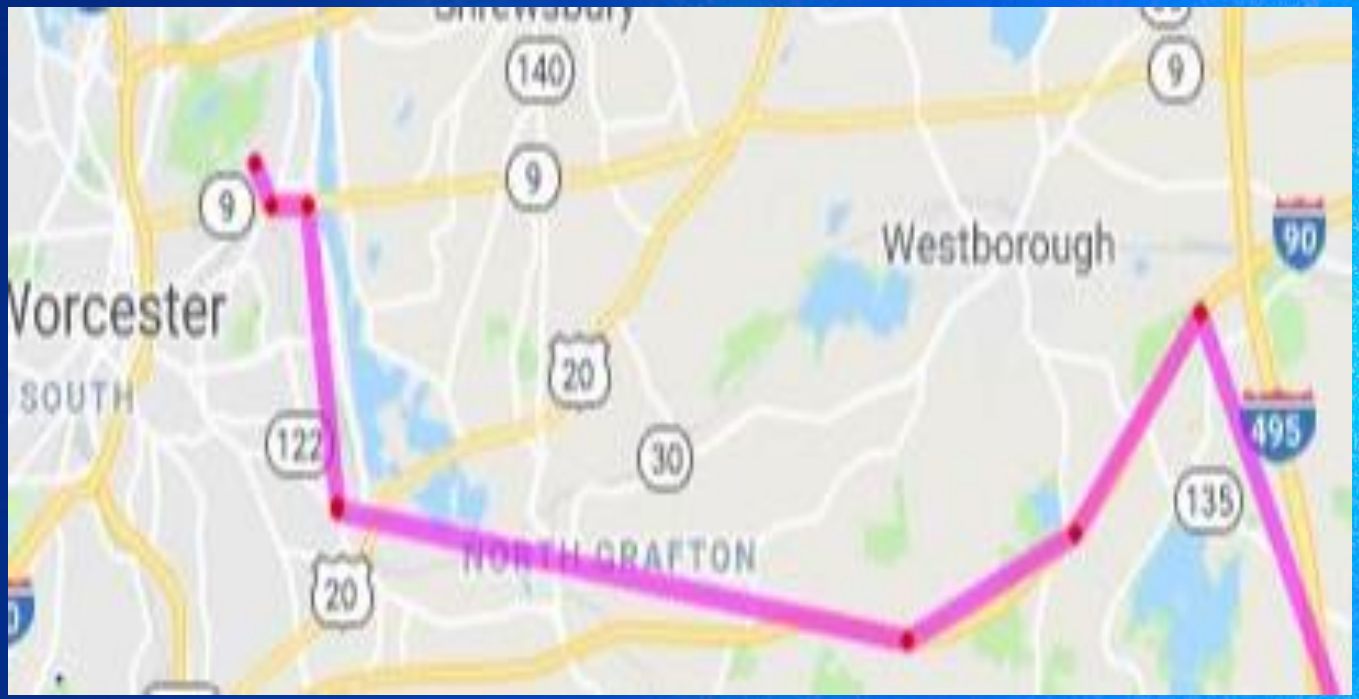
Though **no longer required for licensing** in most countries, "CW" or continuous wave is **still a popular operating mode** among amateur radio operators today. Many consider it to be the language of ham radio.

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.

Automatic Packet Reporting System



How to Become a Radio Amateur

The government regulatory agency that issues Amateur Radio licenses in the United States is the FCC.

To earn your initial 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 Regulations***
- ***Operating Regulations***
- ***Electrical and RF Safety***

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.

All tests in the U.S. are administered by Volunteer Examiners

Once licensed, you will be issued a call sign:

It will take a few days to get your call, but you can keep checking on the FCC website.

All Amateur Radio call signs are made up of a prefix and a suffix.

Maine is located in the W1 call district within the U.S.

What do I need to get on the air?

To get started, all you need is a hand-held transceiver. These come in several varieties and cost as little as $59. Most common are single band 2 meter or 70 cm transceivers, or dual band. Some high end models may include additional bands such as 6 meters (50 MHz), 1.25 meters (220 MHz), or even 33 cm, (902 MHz).

Some of these “handy-talkies” are capable of APRS operation, and include built in TNC’s and GPS units. Others include digital voice and messaging capabilities for use with the D-STAR network.

Going Mobile

Operating while mobile is one of the most popular ways hams communicate. A typical mobile setup includes a 50W VHF / UHF transceiver connected to a vertical mag-mount antenna.

Some take it to the extreme, however, and install a full fledged mobile setup, including multi-band antennas and even tuners.

Base Station

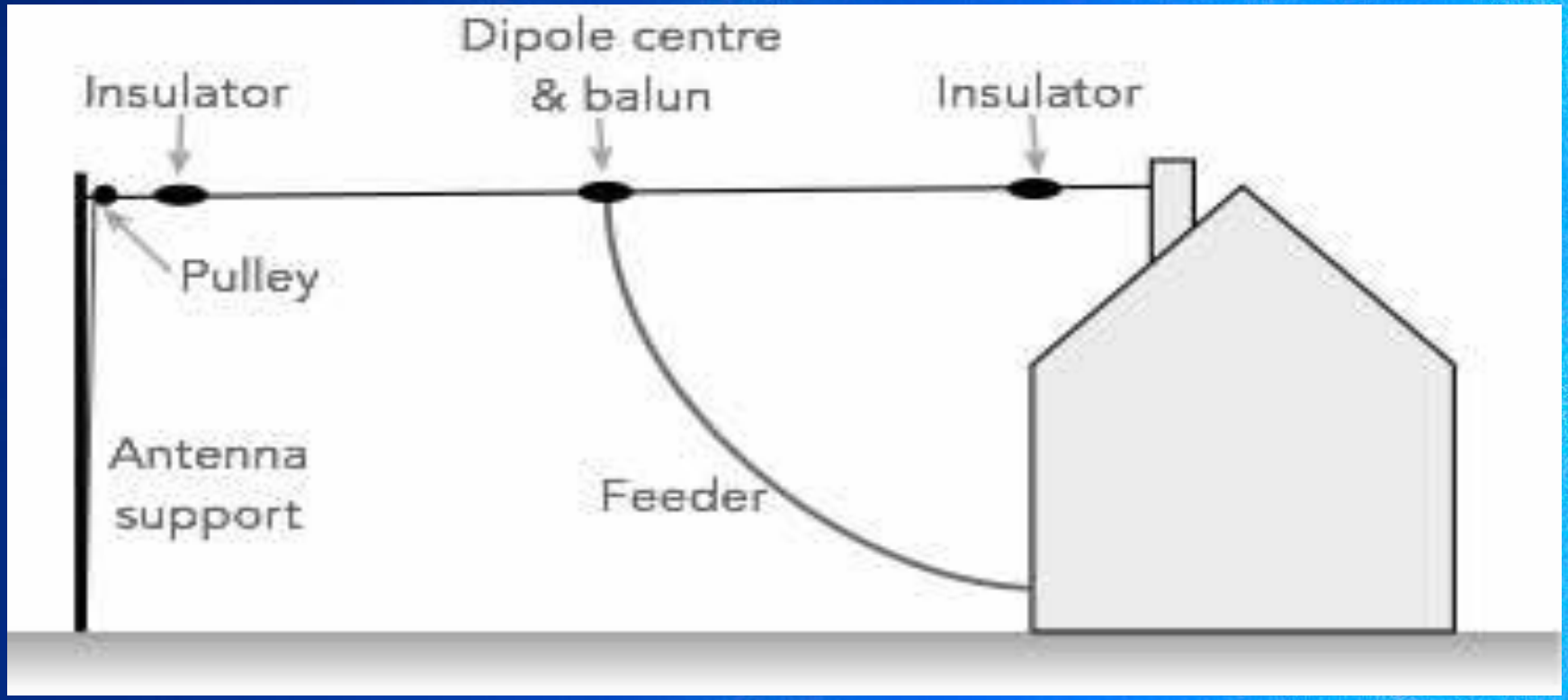
A typical base station for HF consists of a power supply, transceiver, antenna tuner, amplifier, and if you choose to use digital modes, a PC interface. A variety of antennas can be used, and these depend on band, available space, and preference.

Antennas

Wire Dipole

HF Yagi

Wire Dipole Antenna



(left) Multi-band HF Vertical

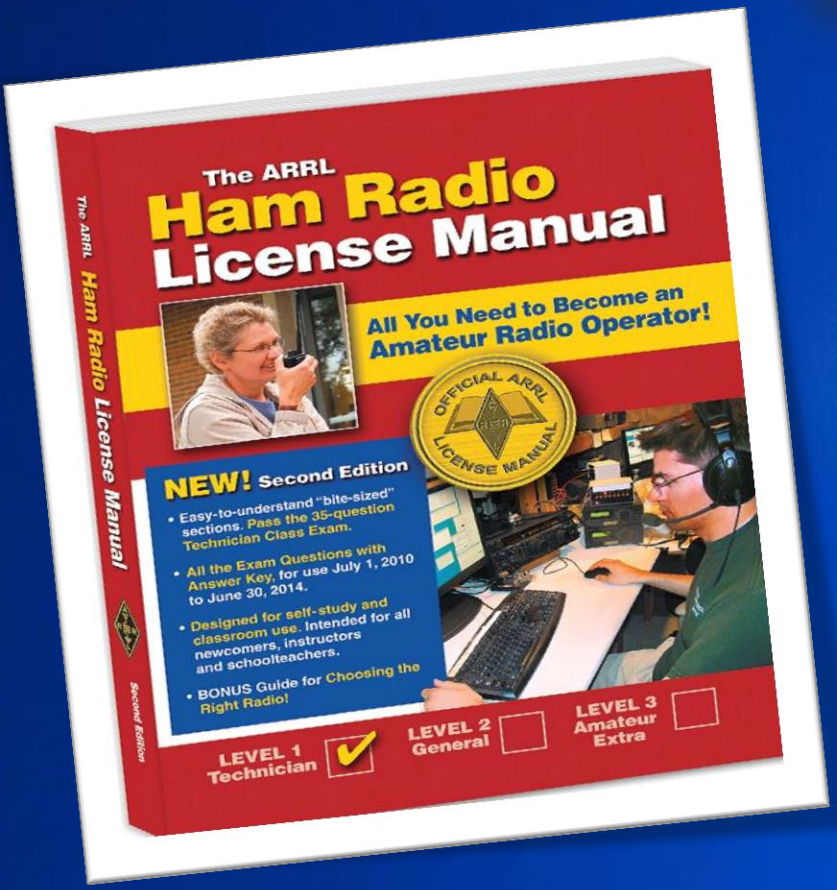
(top) VHF Mobile Antenna

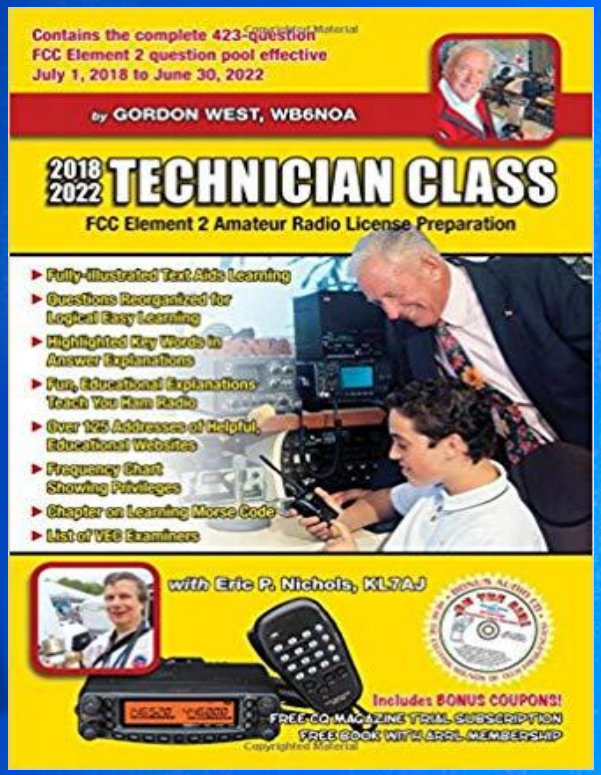
Resources

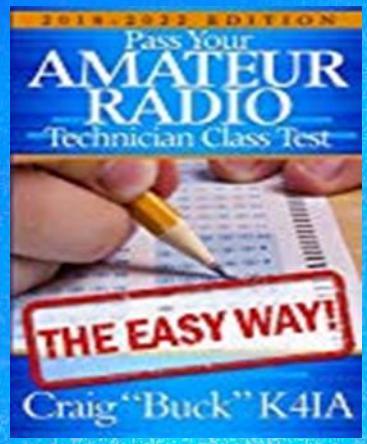
The No-Nonsense, Technician Class License Study Guide

(for tests given after July 1, 2010)

Dan Romanchik KB6NU







Other resources to get your technician class license:

- Download questions and practice them until you learn them all. (free)
- Do lots of practice exams until you consistently get 90% (Free)
- Hamradiolicenseexam.com ($25)
- Phone apps for droids and iPhones (Free)
- Take a course.
- Boxboro Tech in a Day course, Saturday 9/7/19, $20. http://boxboro.org/tech-in-a-day

Why Join a Local Club?

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

We are the Framingham Amateur Radio Association (FARA).

Each of our members must pass a technical exam in order to receive a license from the Federal Communications Commission (FCC).

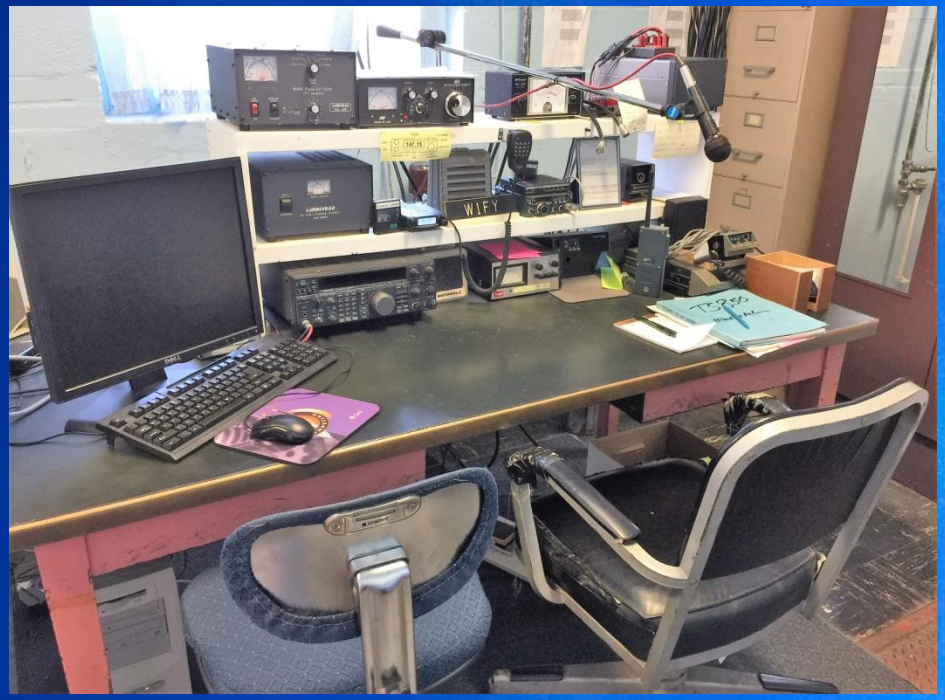
We were founded in Framingham in 1933, and have been here ever since.
This 1935 photo shows our President, Dr. C. R. Crosby.

Radio can be the beginning of a technical career.

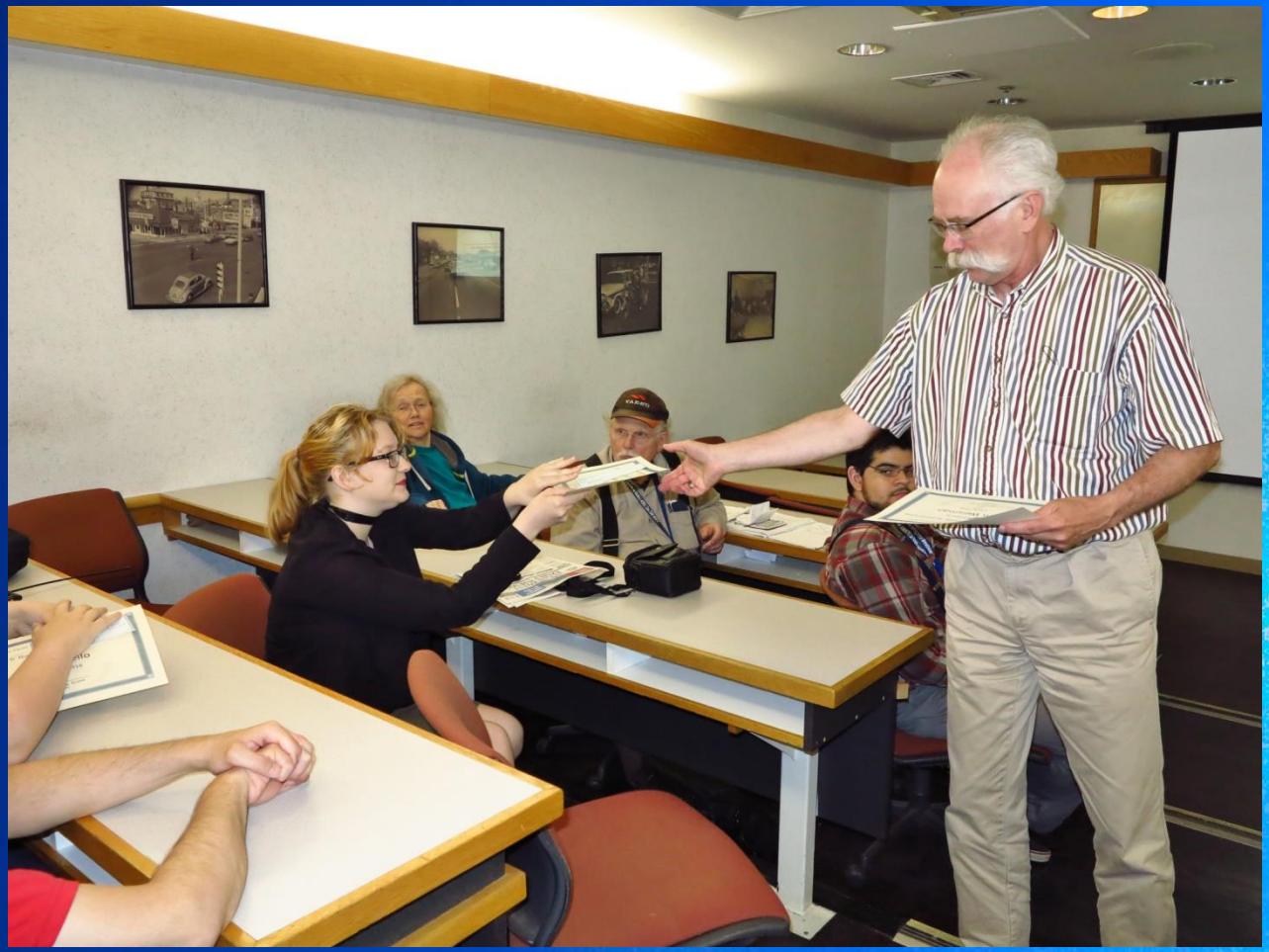
For many of us, getting our ham license has lead to a successful career in electronics, engineering, or software and computers.

Other hams are plumbers, doctors, EMTs, electricians, firemen, and hold almost any job imaginable.

This was our radio station in the Danforth building for many years. It was open to visitors on weekends as well as on special occasions.



We love handing out those scholarship checks!



We provide radio support to the Boston Marathon each year.

We help provide radio communications for various cancer walks and other charity walkathons, bikeathons, etc.

September 25, 2016

Framingham Amateur Radio Association:

Thanks again for allowing us the use of 147.150 MHz to support the Jimmy Fund Walk on Sunday. It served the entire west half of the course flawlessly. Given how much Net Control had to do that day, not having to worry about the repeater was a huge help. I can't thank you enough for your continued support.

All the best,

Brett Smith, AB1RL

Public Service Coordinator, Boston Amateur Radio Club

Field Day: Saturday June 22, 2019
Behind the McAuliffe Branch of FPL

We operate in the field, with battery power, every June. This gives us practice for Emergency Operations.

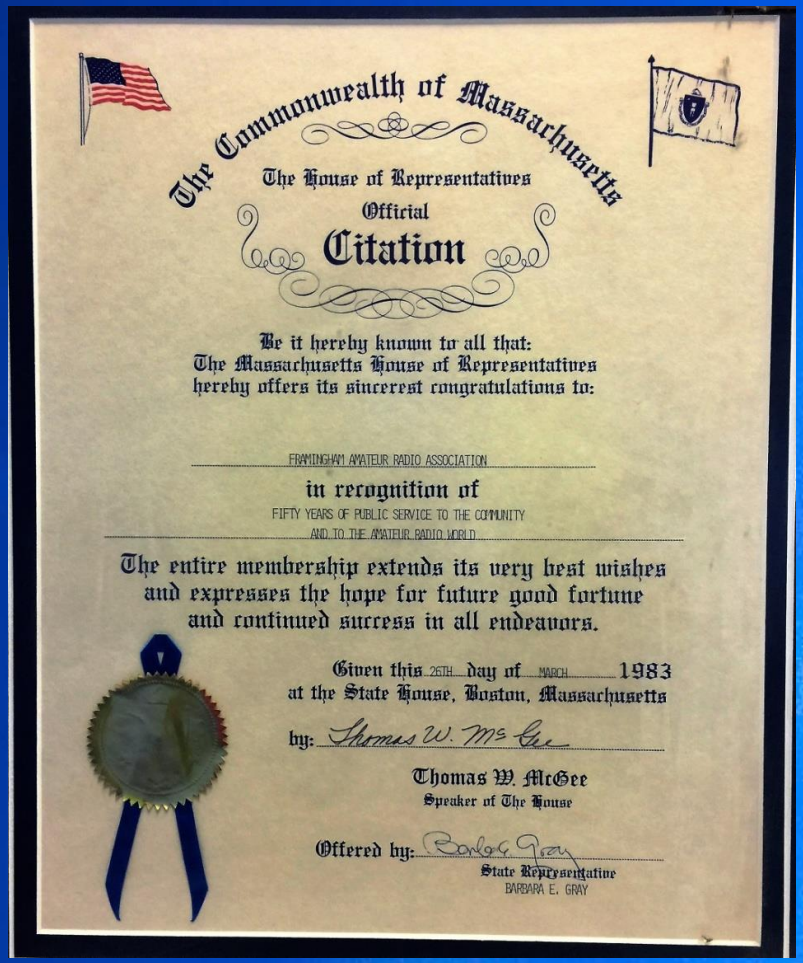
Ready for Disasters

Department of Homeland Security Formally Makes Amateur Radio Part of Emergency Communications Community

A section of the ***Department of Homeland Security*** (DHS) 2007 Appropriations Act, HR 5441, formally includes Amateur Radio operators as a part of the emergency communications community. Congress approved the measure and President George W. Bush signed the bill into law October 4, 2006.

Earth Day on the Common

We have been recognized by the State of Massachusetts



The Commonwealth of Massachusetts

The House of Representatives

Official

Citation

Be it hereby known to all that:
The Massachusetts House of Representatives
hereby offers its sincerest congratulations to:

FRAMINGHAM AMATEUR RADIO ASSOCIATION

in recognition of

FIFTY YEARS OF PUBLIC SERVICE TO THE COMMUNITY
AND TO THE AMATEUR RADIO WORLD

The entire membership extends its very best wishes
and expresses the hope for future good fortune
and continued success in all endeavors.

Given this 26TH day of MARCH 1983
at the State House, Boston, Massachusetts

by: Thomas W. McGee

Thomas W. McGee
Speaker of The House

Offered by: Barbara E. Gray

State Representative
BARBARA E. GRAY

Andy

Lafayette Comstat 25a CB radio, same model as mine

-5W AM

~20 miles with big antenna (5-element beam)

Dad’s electric company car Motorola 2-way radio. (Somewhat similar to image but newer.)

~100W FM

~70 mile coverage thanks to repeater

-very similar technology to that used by our modern day amateur VHF/UHF radios

Knight Kit Star Roamer, same model as the one I built

-HF SW Listening; BBC, European Stations

-not properly tuned, not much amateur radio

Example Drake Amateur HF Radio

-Home science museum had a very fancy amateur radio station with Drake radios

-Talk around the world

-I was very impressed!

After 38 years in the Danforth Building, we have lost our home.

- The Framingham Amateur Radio Association wants to remain in Framingham!
- We are looking for space in a Town building where we can continue to do our good work.
- We are not asking Framingham to fund us.

Does anyone know of an available small space in a Town-owned building for your local radio club? Contact President@W1fy.org or Director@W1fy.org

There is some slight editing of slides from original presentation.