

# Amateur Radio

- Non-Commercial, two-way radio *hobby and service*
- Hobby: we do it for fun
- Service:
  - Licensed by the FCC
  - Emergency and community service



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# The Fun Part

- World-wide High Frequency Comm.
- Local VHF/UHF FM and repeaters
- It can be used at home
- You can take it with you:
  - Mobile
  - Handheld



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# World-Wide Radio



- A well-equipped “ham shack”



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# World-wide radio



- A well-equipped “mobile”



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# World-wide radio

- How it works:
- High Frequency (Shortwave) Radio
  - Skip: the Ionosphere  
(Mother Nature's Internet server)
  - Look Ma – no wires!



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# World-wide radio

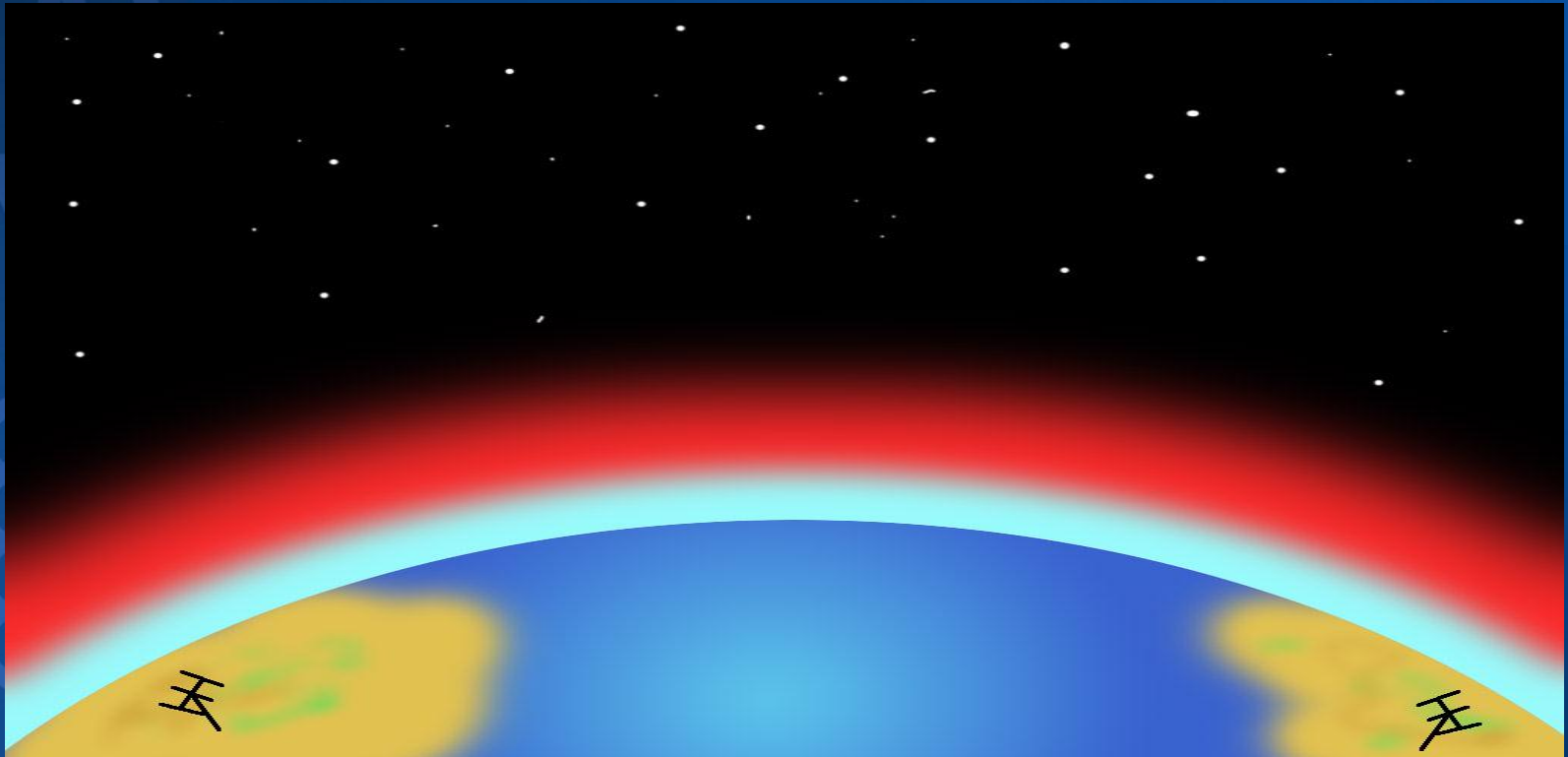
- Space



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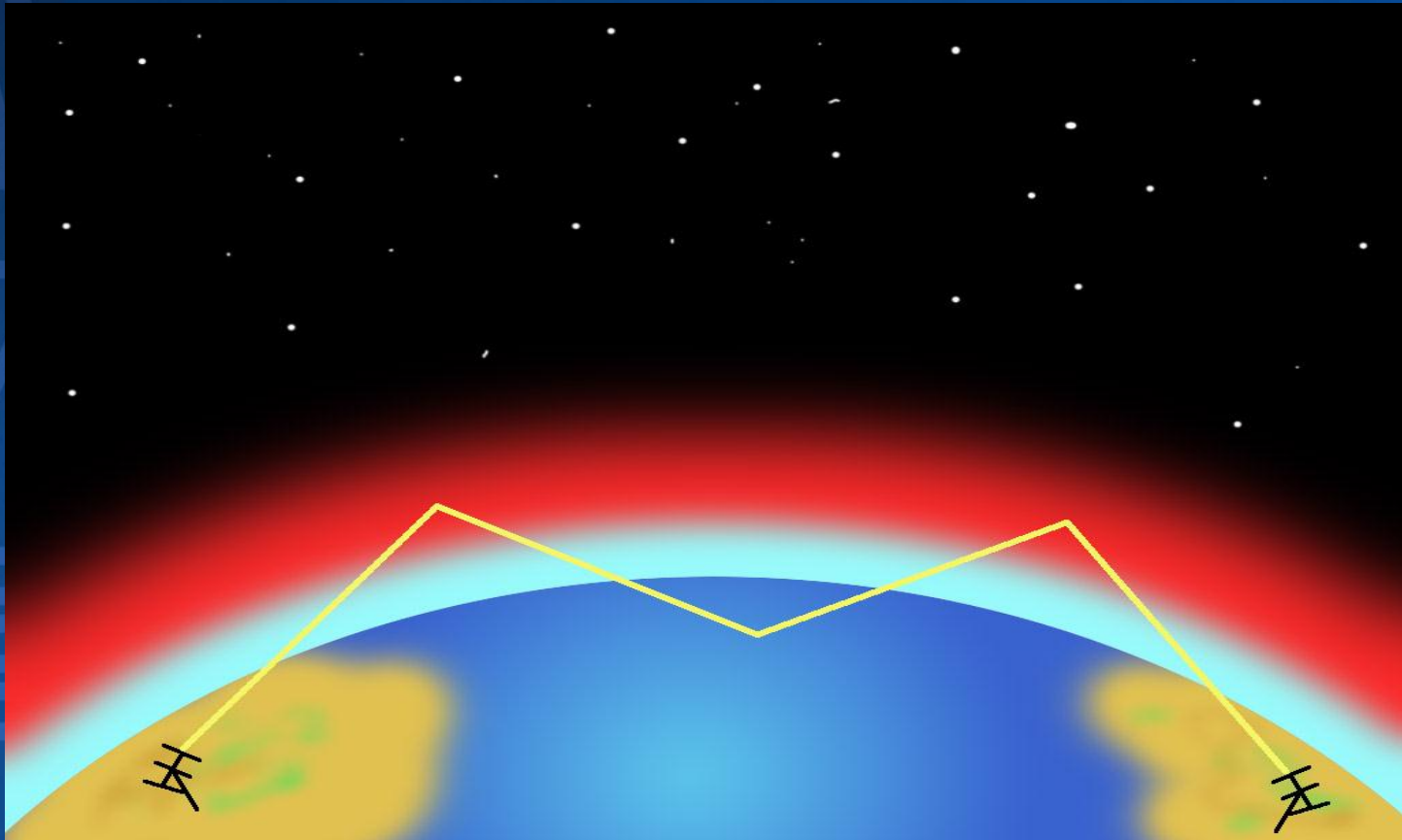
# Ionosphere



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# Ionospheric HF bounce



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# World-wide radio

- Language Barrier?
  - English is very common, but not everyone speaks it, even in ham radio
  - CW is a common language, but no longer required by ITU & some Administrations
  - ITU 'Q' signals is a common language



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# What do hams talk about?

- Radio
  - transmitter/receiver equipment
  - transmitter power
  - antenna
  - location (QTH)
  - radio technology
  - everything else



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# Amateurs in space

- Our own satellites – lot's of 'em
- On the space shuttles since 1983
- First “ham in space” – astronaut Owen Garriot, aboard Columbia



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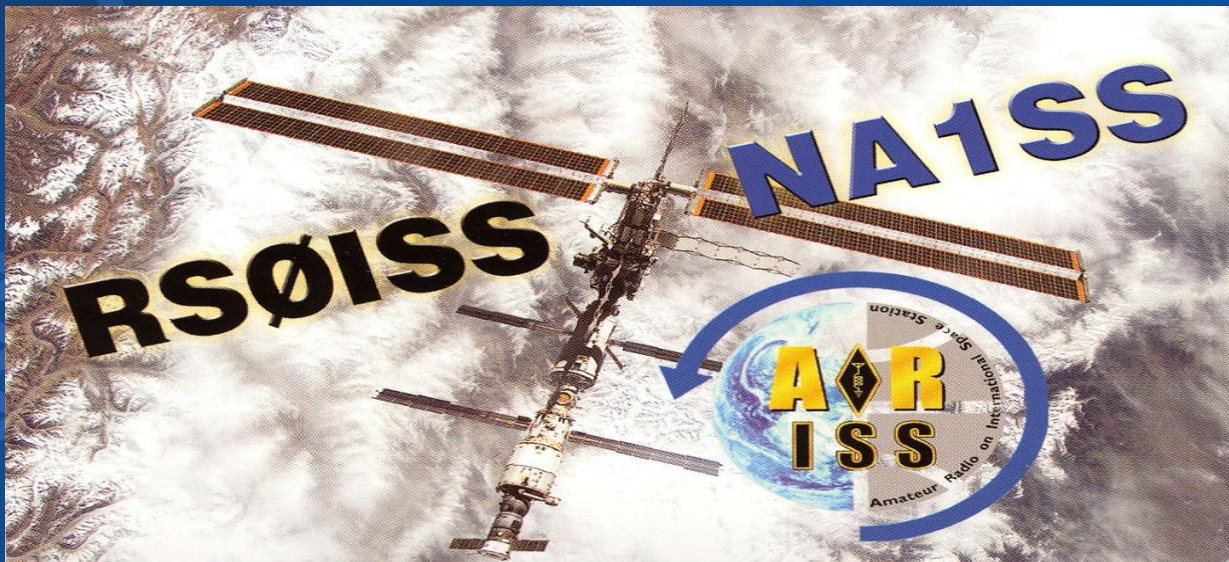


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# Amateurs in space

- Today, a full-time ham station on the ISS



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# Hams in space

- Most astronauts are licensed hams, including the three currently on the ISS, and three of the astronauts who died on Columbia.
- *SAREX*:  
Hams in space talk to kids on Earth.



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# SAREX



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# Antennas

- Some hard realities:
- Big antennas up high work better than little antennas down low
- Everyone prefers little antennas



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# Antennas

- for example: this 2000 foot tower supports:
- WRAL and WRDC TV
- 6 FM broadcast stations
- many commercial and public-safety repeaters
- 6 amateur radio repeaters



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# Antennas

- A plug for cell phone towers:
  - They have to be somewhere...
  - ... nearby, or
  - the phone doesn't work!



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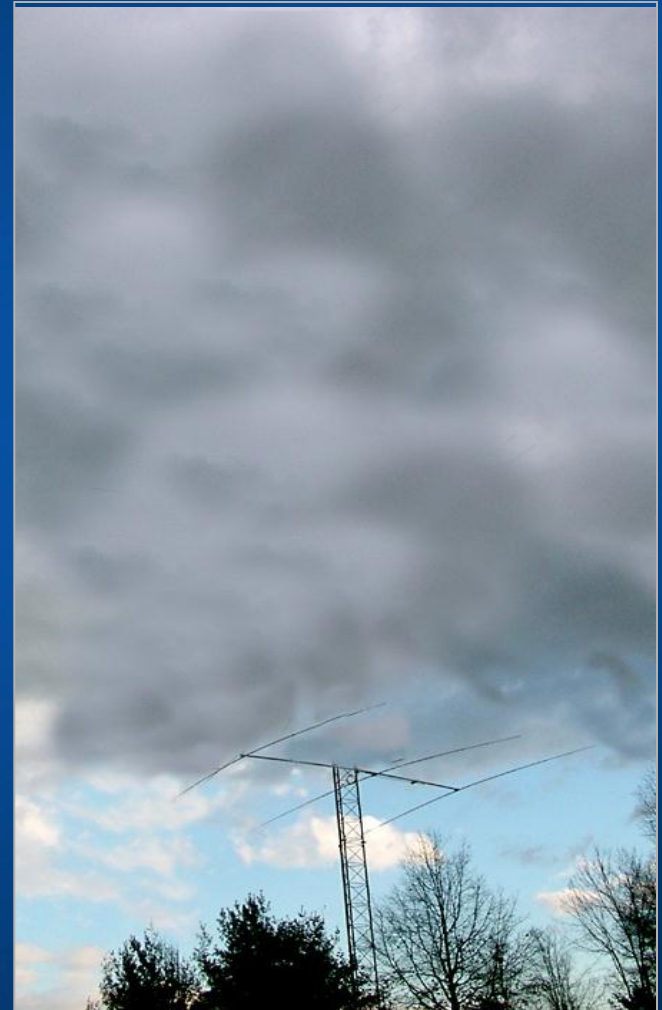


# Ham antennas in the neighborhood



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Count the  
antennas in  
this picture



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# Our Nemesis:

- Deed restrictions, aka CC&R's
- Homeowner's Associations (HOAs)
- Restrictions, outright prohibition of antennas, transmitting
- “Antenna friendly” neighborhoods are hard to find!
- Sometimes, state and local governments



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# Our other evil....

- RFI: Radio Frequency Interference,  
Typically to:
  - TVs
  - Phones
  - Audio systems



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# What to do:

- (the short course – this is a half-hour presentation later in the course!)
  - Contact the ham...
  - Diagnose the problem
  - Contact the manufacturer and/or vendor
  - Install filters

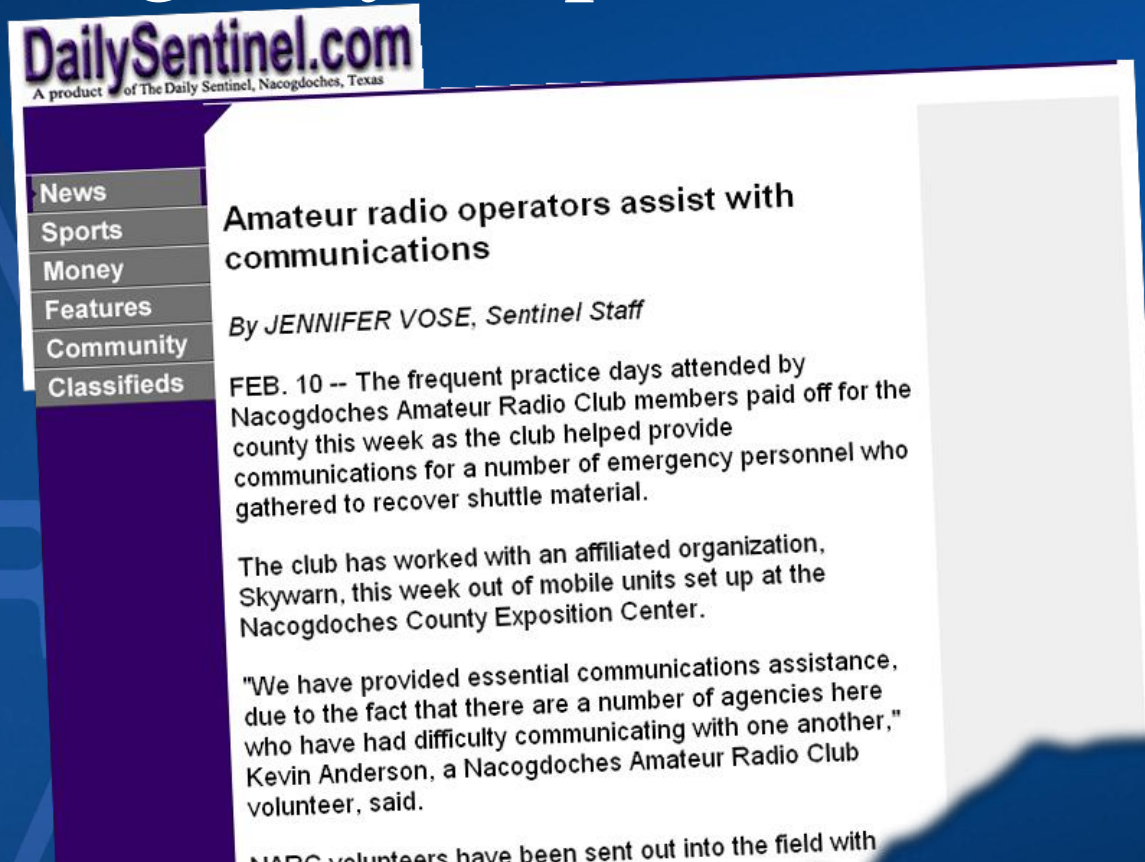


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# Emergency & public service



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# Emergency & public service

- Our unique capabilities include:
  - trained volunteers
  - communications “Off The Grid”
  - generator and battery power
  - no phone lines, no Internet
  - from anywhere, to anywhere (almost)



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# Emergency & public service

- When the power goes out and the phones go dead . . .Hams are there
  - Hurricanes
  - Floods
  - Fires
  - Earthquakes
  - Tornados



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# Emergency & public service

- When the power goes out and the phones go dead . . .
  - hurricanes
  - floods
  - ice storms
  - tornados
  - earthquakes
  - fires



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# Emergency Operation Centers

- county EOCs
- command posts
- shelters
- in the field
- State EOCs



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# EOCs include coordination



- Skywarn: 146.88 MHz



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# Amateurs and public service

- Event support:
  - bike tours
  - Walks
  - Field days
- Shadow officials
- Rest stops
- Medical teams



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# Amateur Field Day

(Emergency communications practice)

- usually a weekend
- 24 hour emergency exercise/contest
- totally off the “grid” (power)
- public is welcome



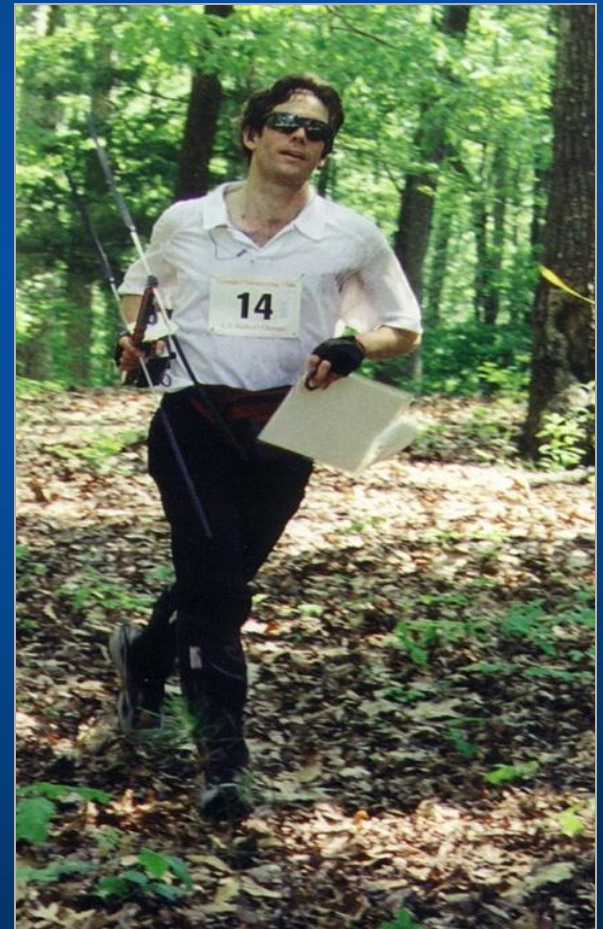
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# Some times athletic?

- Amateur radio DFing, or 'Fox Hunting'
- Combines orienteering with radio direction finding
- No license needed



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# Where did the word “Ham” come from?

- We don't know for sure
- In the late 1800s railroad telegraphers called the new guys “hams” or “ham-fisted”
- Early radio was all telegraphy
- Commercial operators came from the railroad telegraphers
- They probably called the amateurs “hams”
- We take it as a compliment!



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# Becoming a Ham

## 3 Classes of licenses:

- ◆ Technician – *no Morse code*
  - entry level exam, electronics, operation, safety, FCC regs
- ◆ General - *no Morse code*
  - tougher exam
- ◆ Amateur Extra - *no Morse code*
  - toughest exam



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UNITED STATES OF AMERICA  
FEDERAL COMMUNICATIONS COMMISSION  
AMATEUR RADIO LICENSE  
KN4AQ


PEARCE, GARY J  
116 WATERFALL CT  
CARY NC 27513

Special Conditions/Endorsements  
NONE

Grant Date	Effective Date	Print Date	Expiration Date
6-23-2000	6-23-2000	6-23-2000	8-21-2010

File Number	Operator Privileges	Station Privileges
0000174773	Amateur Extra	PRIMARY

THIS LICENSE IS NOT TRANSFERABLE

  
(Licensee's Signature)

FCC 600 111 V 1000

# Becoming a Ham

- Local classes
- Internet classes
- Elmers
- Self study
  - Technician license in about six weeks



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# Amateur's Competition

- Internet and cell phones
- video games
- growing slowly; about 650,000 + US hams, about 2.5 million worldwide
- average age creeping up



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# The ham advantage

- We are still more “mobile” – for now
- We keep working when the phones and power quits
- We have more fun!
- Ham radio is not for everyone



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# *Some different perspectives of Amateur Radio*



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# Notable amateurs of the world

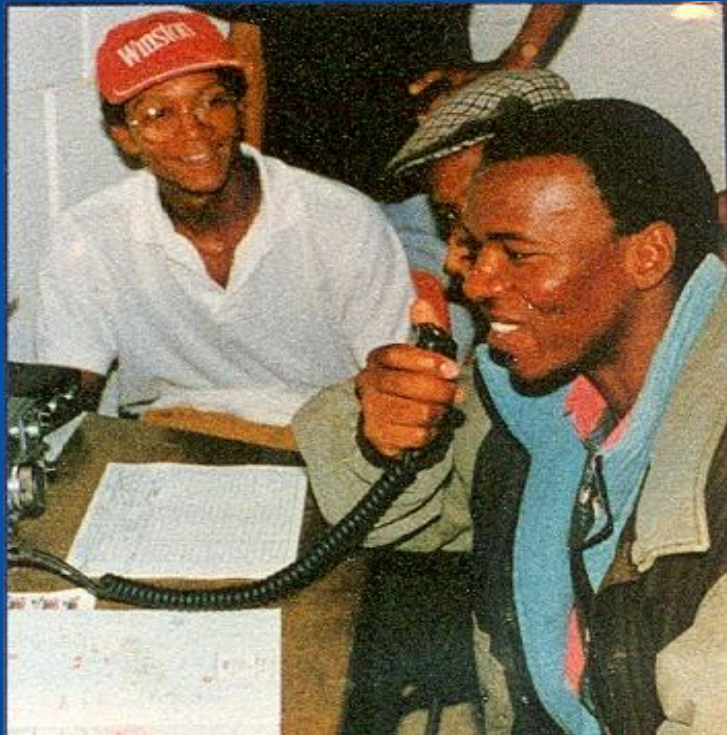
- King Bhumiphol Adulayadej, Thailand
- His Highness Shaikh Sabah Al-Salem Al-Sabah, Kuwait
- Qaboos bin Said Al-Said, Sultan of Oman
- Prince Talal Abdul Aziz, Saudi Arabia
- President Hugo Banzer S., Bolivia
- Fernando Belaunde Terry, former President of Peru
- King Juan Carlos, Spain
- President Cossiga, Italy Crown
- Crown Prince Abdullah Feisal, Saudi Arabia
- Yuri Gagarin, Cosmonaut SK
- King Moulay Hassan II, Morocco SK
- King Hussein, Jordan SK
- President Carlos Menem, Argentina
- Dr Mamoru Mohri, Astronaut, Japan
- King P. T. Namgyal, Sikkim
- Tunku Abdul Rahman, First Premier of Malaysia
- Luz Marina Zuluaga, Miss Universe 1959, Colombia



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# A Lesotho student makes his first Amateur Radio contact



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# Amateurs come from all walks of life

- children (No age limit in the U.S.)
- adults, working people, homemakers
- astronauts/cosmonauts
- professionals
- the disabled
- the arts
- Heads of State



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# Young adults learn radio



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# Some operate HF stations



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# Some like CW



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# Some like mobile operations



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# Some use solar power



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# They enjoy a field-day outings



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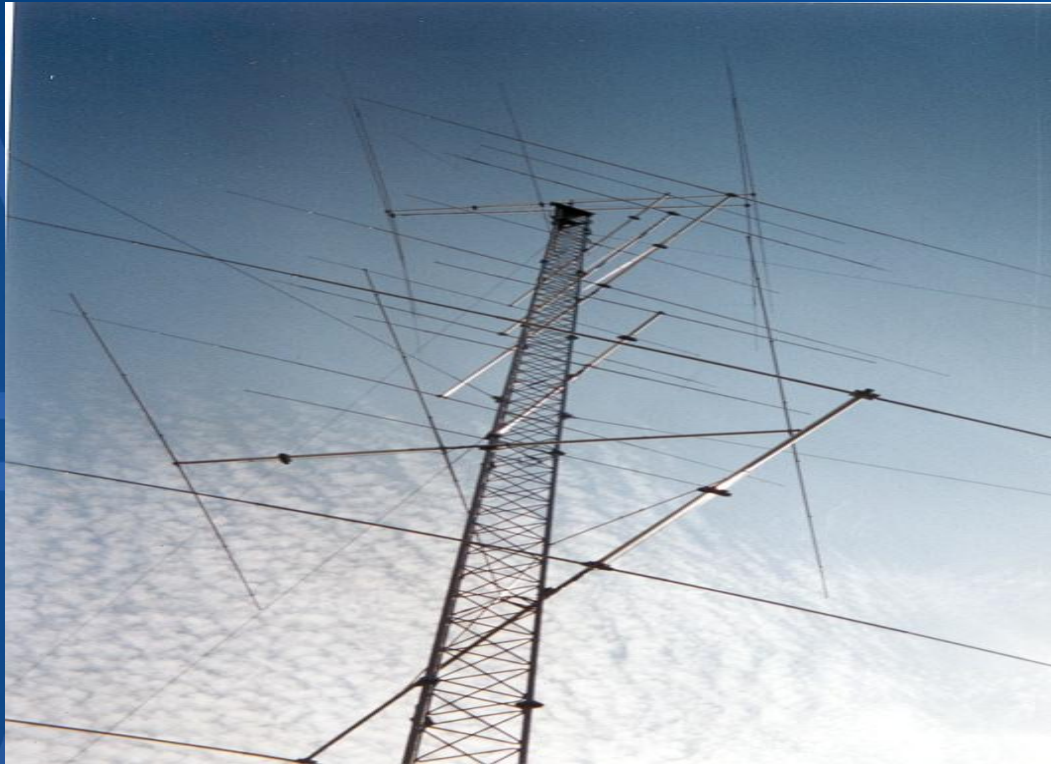
# Some like Earth-moon-Earth (EME) operations



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Amateurs love antennas  
& are very creative in design



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# Microwave operations - (line-of-sight or use of passive/active repeaters)



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# Amateurs like to build radios, antennas & other electronic equipment



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# Amateurs gather at large ham-fests and conventions

- *Ham Fair*, Tokyo
- *HamVention*  
Dayton, Ohio, USA
- *Ham Radio* at  
Friedrichshafen,  
Germany
- Local ham-fests



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