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
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
World-Wide Radio

A well-equipped “ham shack”
World-wide radio

- A well-equipped “mobile”
World-wide radio

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

Space
Ionosphere
Ionospheric HF bounce
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
What do hams talk about?

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

November 12
Amateur radio in space

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Amateurs in space

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

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

• A plug for cell phone towers:
  – They have to be somewhere…
  – … nearby, or
  – the phone doesn’t work!
Ham antennas in the neighborhood
Count the antennas in this picture
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
Our other evil....

• RFI: Radio Frequency Interference, Typically to:
  – TVs
  – Phones
  – Audio systems
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
Amateur radio operators assist with communications

By JENNIFER VOSE, Sentinel Staff

FEB. 10 -- The frequent practice days attended by Nacogdoches Amateur Radio Club members paid off for the county this week as the club helped provide communications for a number of emergency personnel who gathered to recover shuttle material.

The club has worked with an affiliated organization, Skywarn, this week out of mobile units set up at the Nacogdoches County Exposition Center.

"We have provided essential communications assistance, due to the fact that there are a number of agencies here who have had difficulty communicating with one another," Kevin Anderson, a Nacogdoches Amateur Radio Club volunteer, said.

ARRL volunteers have been sent out into the field with
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)
Emergency & public service

• When the power goes out and the phones go dead . . . Hams are there
  – Hurricanes
  – Floods
  – Fires
  – Earthquakes
  – Tornados
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
EOCs include coordination

- Skywarn: 146.88 MHz
Amateurs and public service

- Event support:
  - bike tours
  - Walks
  - Field days
- Shadow officials
- Rest stops
- Medical teams
Amateur Field Day
(Emergency communications practice)

• usually a weekend
• 24 hour emergency exercise/contest
• totally off the “grid” (power)
• public is welcome
Some times athletic?

- Amateur radio DFing, or ‘Fox Hunting’
- Combines orienteering with radio direction finding
- No license needed
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!
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
Becoming a Ham

- Local classes
- Internet classes
- Elmers
- Self study
  - Technician license in about six weeks
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
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
Some different perspectives of Amateur Radio
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 Banzar S., Bolivia
• Fernando Belaunde Terry, former President of Peru
• King Juan Carlos, Spain
• President Cossiga, Italy

• 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
A Lesotho student makes his first Amateur Radio contact
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
Young adults learn radio
Some operate HF stations
Some like CW
Some like mobile operations
Some use solar power
They enjoy a field-day outings
Some like Earth-moon-Earth (EME) operations
Amateurs love antennas & are very creative in design
Microwave operations - (line-of-sight or use of passive/active repeaters)
Amateurs like to build radios, antennas & other electronic equipment
Amateurs gather at large ham-fests and conventions

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