An Introduction to APRS

Presented by Scott Grimmett

What is APRS?

- APRS stands for Automatic Packet Reporting System (although it is frequently also called Automatic *Position* Reporting System.)
- APRS can be used to track an object using a amateur radio and a GPS receiver.
- The position location information can be viewed on internet websites.

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APRS Applications

- Typical applications are:
  - Marathons, races, events and public service
  - Search and rescue
  - Family tracking
  - Weather data exchange and display

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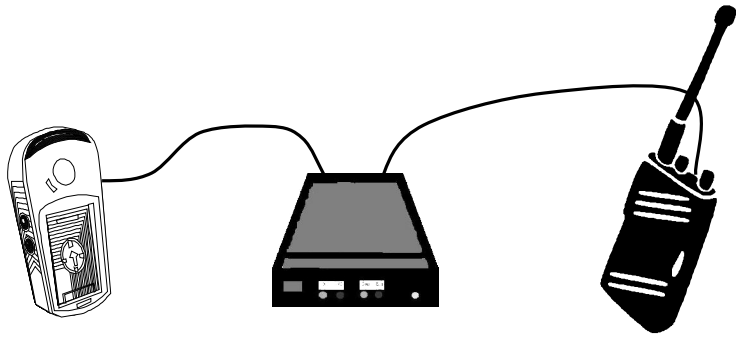
APRS Hardware

APRS needs three pieces of hardware



GPS

Terminal Node Controller (TNC)

Transceiver

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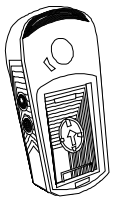
GPS – Global Positioning System

- A standard GPS unit with data output port.
- Uses 24 orbiting satellites to pinpoint anyone's specific geographic location.
- GPS also provides ground speed and altitude measurements.



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TNC – Terminal Node Controller

- A TNC which is basically a radio (or “RF”) modem.
- The TNC connects the GPS to the transceiver. It converts the GPS data into AX.25 Packet protocol to send via the transceiver.

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APRS Transceiver

- A VHF Amateur Radio Transceiver operating on 144.390 MHz. (USA).
- Should be a “transceiver” as APRS uses a collision detection system to know when to send data.
- Range of coverage depends on the power of the transmitter and terrain.

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Radios with Built-in TNCs

- These radios are specifically designed to support APRS functions in a single package. Just add a basic GPS unit and it is ready.
  - Kenwood TM-D700A
  - Kenwood TH-D7A
  - Alinco DR-135T MKII with EJ-41U TNC

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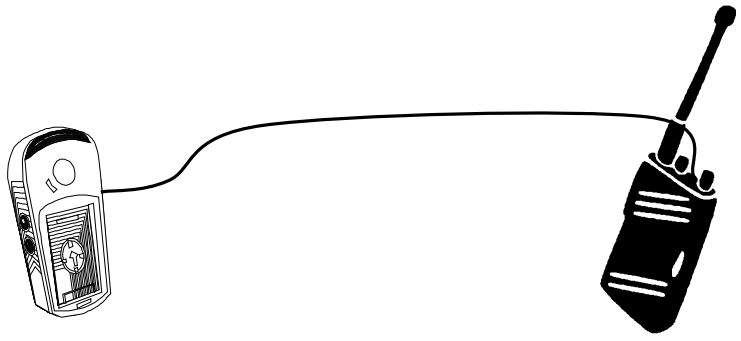
Built-in TNC configuration



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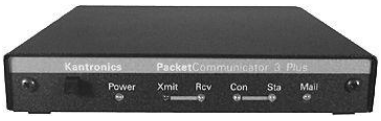
APRS TNCs

- This full featured Kantronics TNC can both transmit and receive.



- "TinyTracs" are simple "Transmit Only" stand alone APRS TNCs.

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APRS Hardware

GPS Receiver

Terminal Node Controller (TNC)

Transceiver

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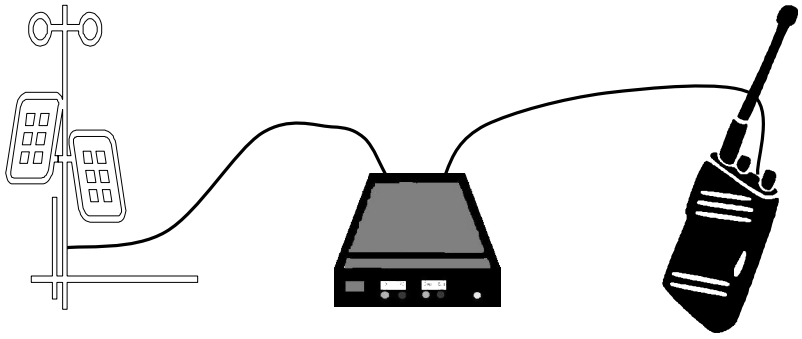
APRS Weather Stations

In a APRS weather station the GPS unit is replaced by an outside Weather Station.



Weather Station

Terminal Node Controller (TNC)

Transceiver

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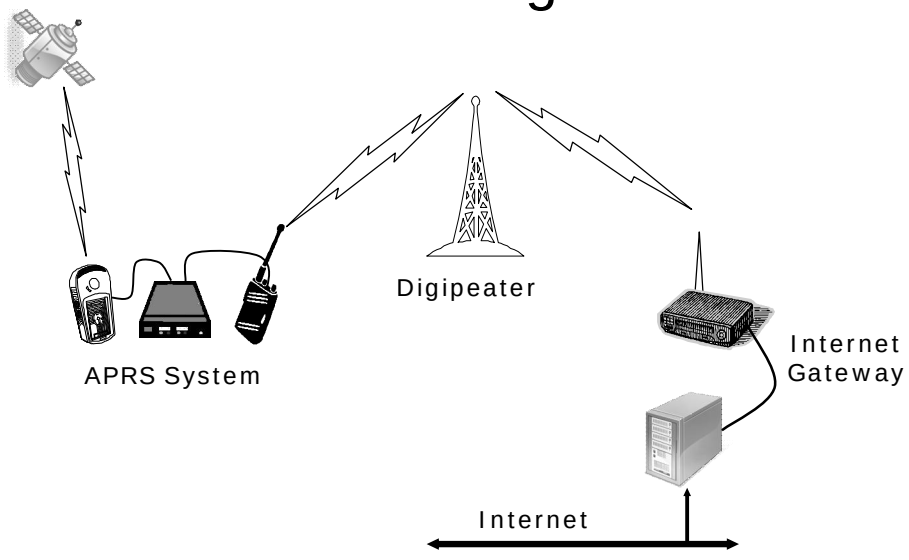
How does the signal travel?



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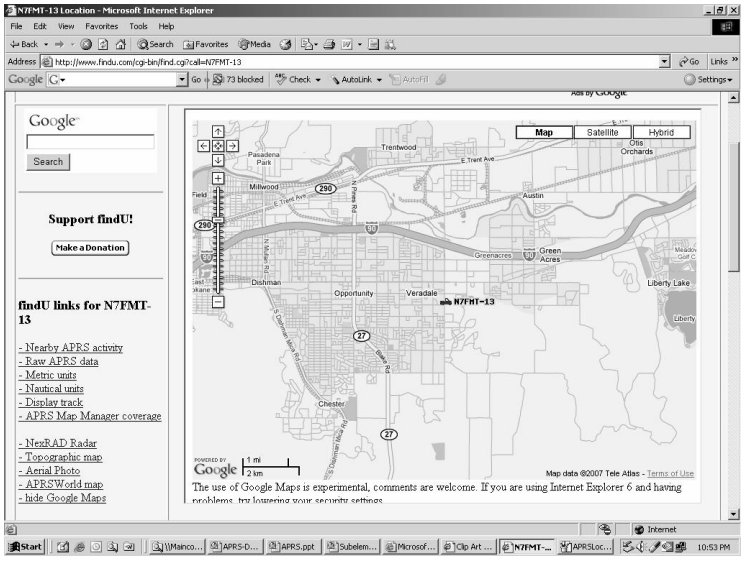
Use the internet to plot location



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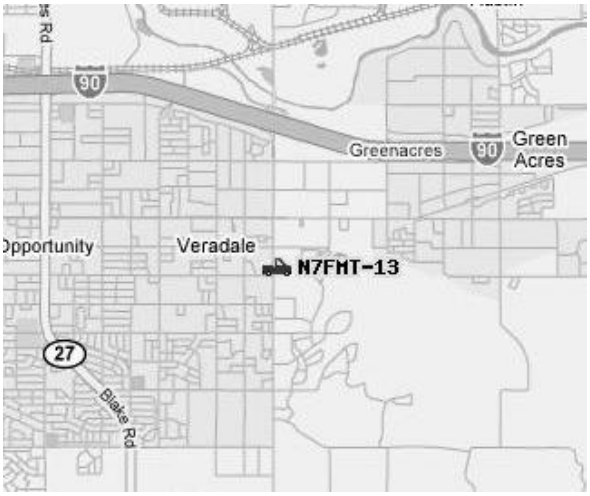
Plot Location



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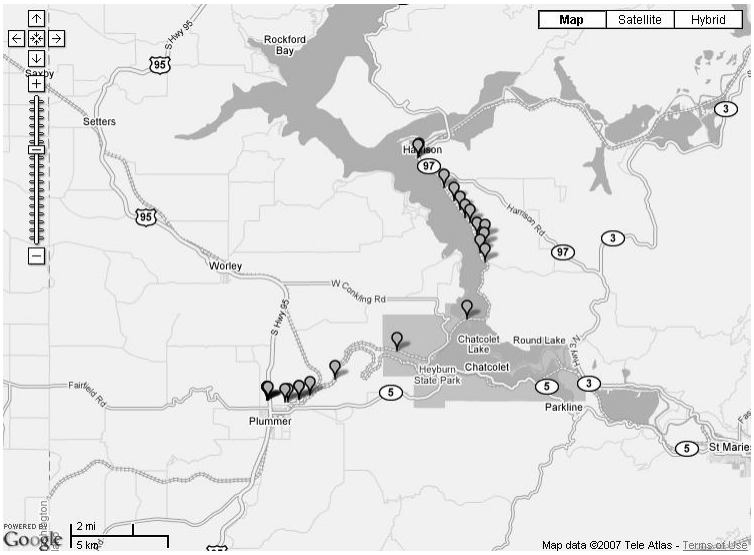
Track Objects



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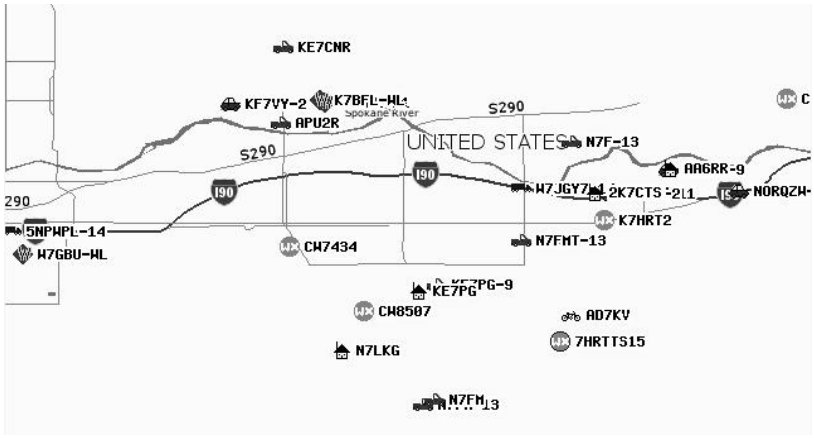
Show APRS Activity in an Area



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- What is APRS.
- APRS receiver (GPS, TNC, Radio)
- APRS Mapping Software
- My system
- Track this week
- Bike event tracking
- Radios with TNC built in
- Other APRS systems.
- How signal travels
- Weather

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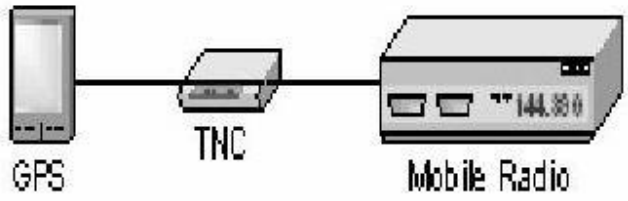
APRS

- APRS needs three pieces of hardware:
  - A Transceiver
  - A Terminal Node Controller TNC
  - A GPS receiver



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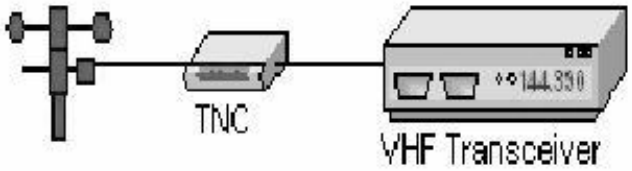

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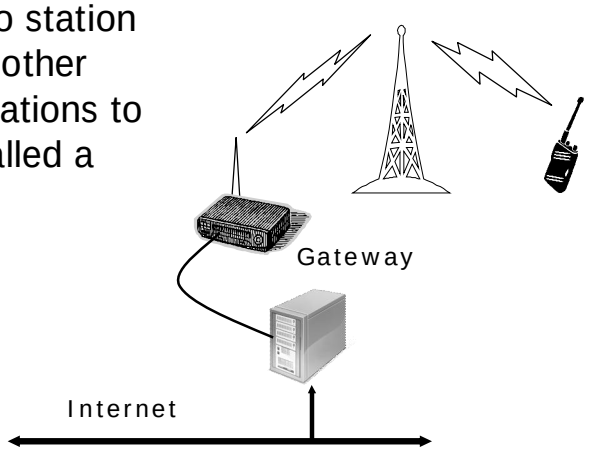
Gateway Station

An amateur radio station used to connect other amateur radio stations to the internet is called a gateway.



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- It uses graphical maps and other data displays.
- All communications use a “one-to-many protocol” so everyone is updated in real time.
- Uses Generic digipeating so knowledge of the network isn’t required.
- APRS turns packet radio into a real-time tactical communications and display system for emergencies and public service applications.

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- APRS consists of a very large land based wireless network. Almost 30,000 users around the world.
- This network works via RELAYS every 20-30 miles called “digipeaters.” And Globally via IGates to the internet.
- APRS is also used via some of the Amateur Satellites.
- It is also used to monitor telemetry values of weather stations for the National Weather Service (NWS)
- APRS has the capability to quickly relay telemetry values to research centers without the Internet.

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