An Introduction to APRS

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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.
APRS Applications

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

APRS Hardware

APRS needs three pieces of hardware

- GPS
- Terminal Node Controller (TNC)
- Transceiver
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.

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.
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.

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
Built-in TNC configuration

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
APRS Weather Stations

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

How does the signal travel?
Use the internet to plot location

Plot Location
Track Objects

Show APRS Activity in an Area
APRS

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  - A Transceiver
  - A Terminal Node Controller TNC
  - A GPS receiver
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  - Kenwood TM-D700A  (includes front panel display)
  - Kenwood TH-D7A  (includes front panel display)
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APRS Weather Stations

- In an APRS weather station the GPS unit is replaced by an outside Weather Monitoring Station.
Gateway Station

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

- 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.
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.