

# 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.

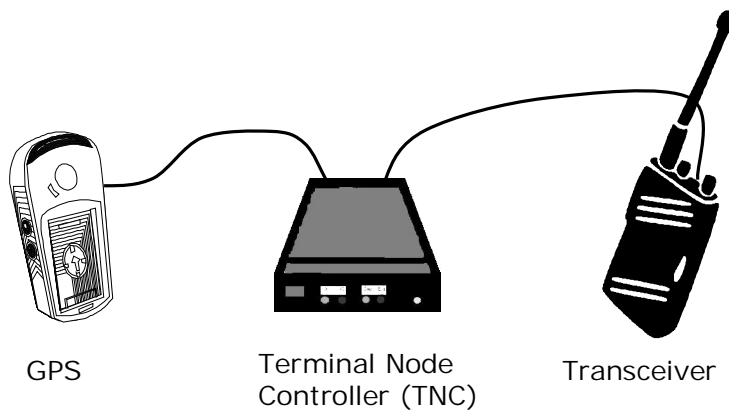
## APRS Applications

- ◆ 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



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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.



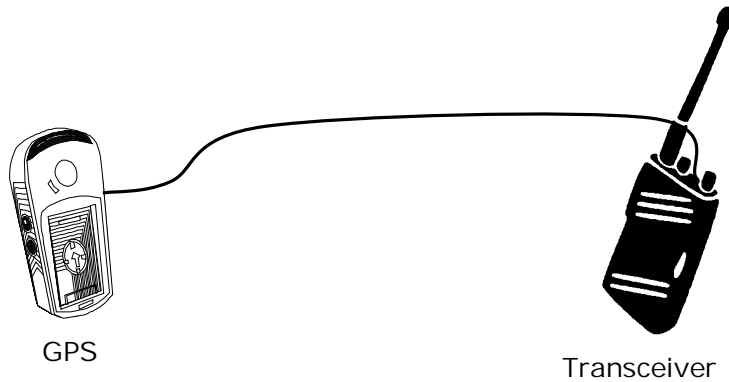
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## Radios with Built-in TNCs

- ◆ 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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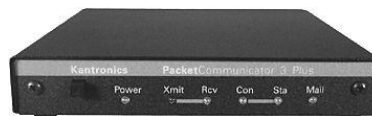
## Built-in TNC configuration



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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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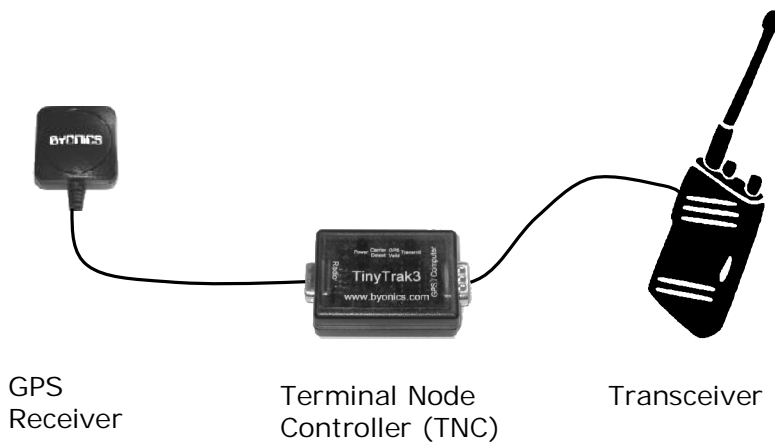
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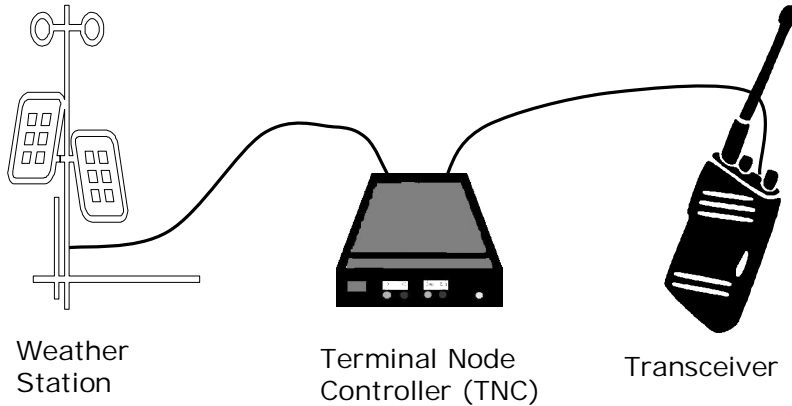
## APRS Hardware



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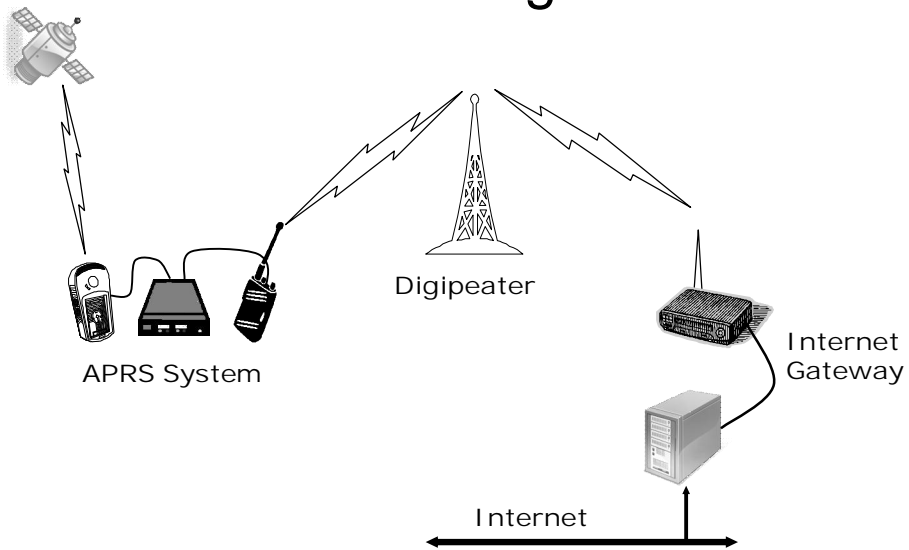
# APRS Weather Stations

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



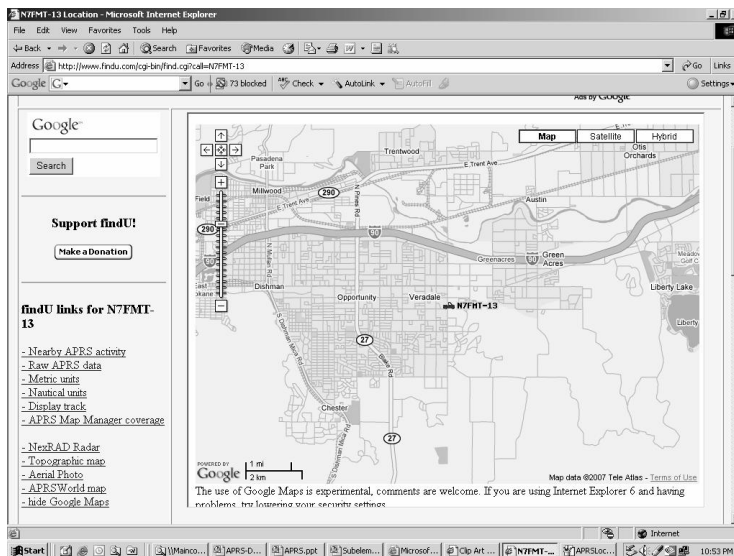
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# How does the signal travel?



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# Use the internet to plot location



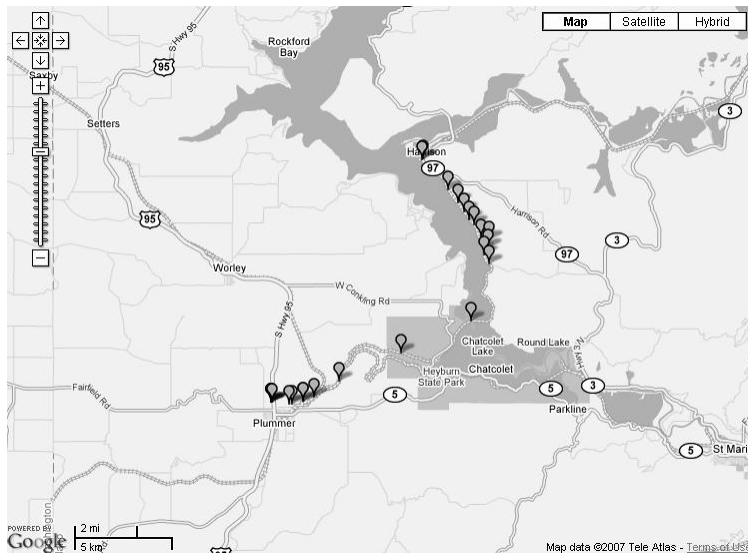
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# Plot Location



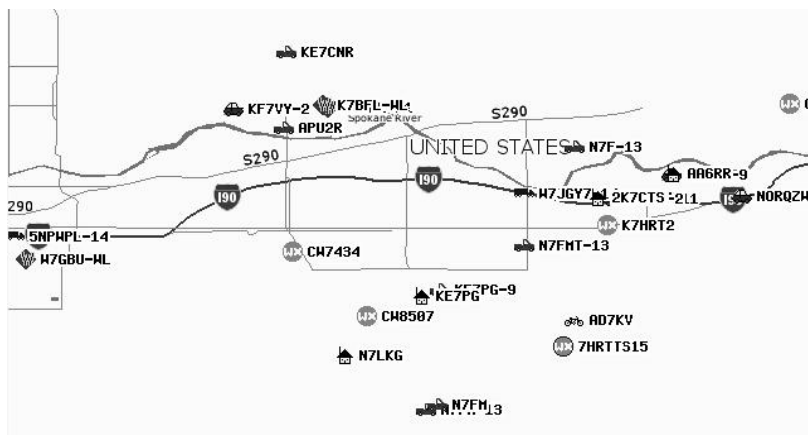
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# Track Objects



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# Show APRS Activity in an Area



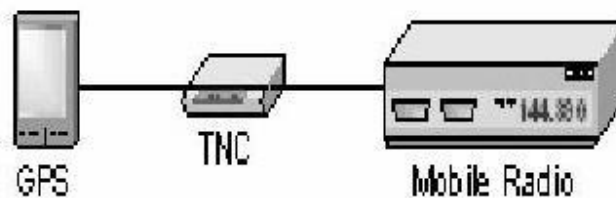
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- ◆ What is APRS.
- ◆ APRS receiver (GPS, TNC, Radio)
- ◆ APRS Mapping Software
- ◆ My system
- ◆ Track this week
- ◆ Bike event tracking
- ◆ Radios with TNC built in
- ◆ Other APRS systems.
- ◆ How signal travels
- ◆ Weather

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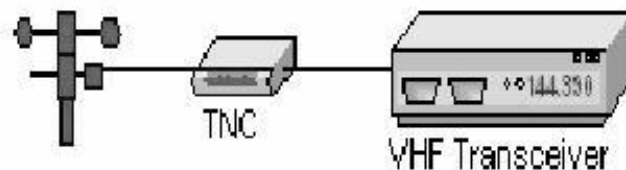
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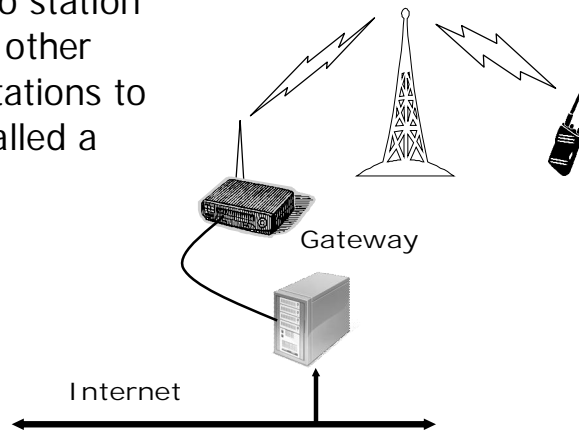
- ◆ In a APRS weather station the GPS unit is replaced by an outside Weather Monitoring Station.



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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.