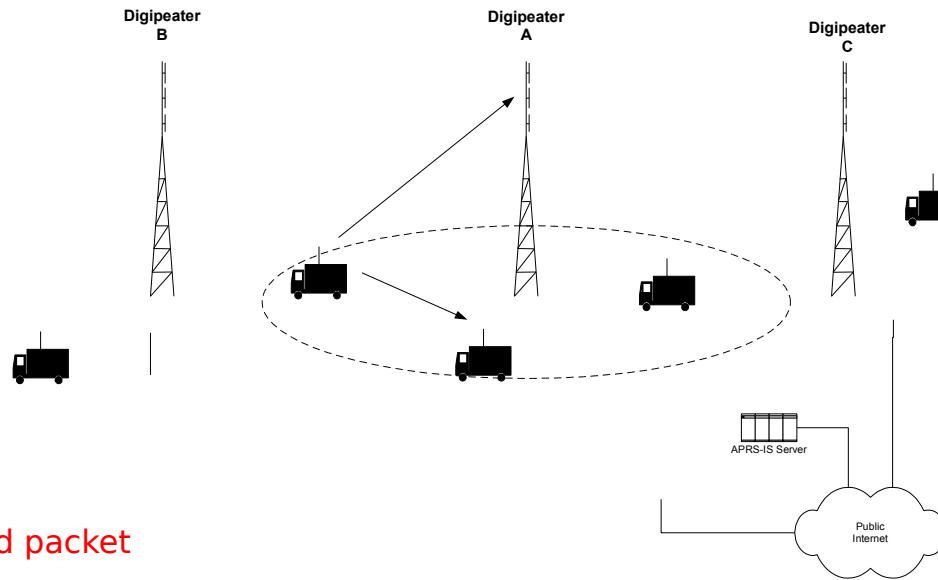


Automatic Position Reporting Systems Overview



144.39Mhz, 1200bd packet

by Bob Felt W4RYF

Content

What's in the name - APRS

What do we do with it

What do you need - Station
Configuration

Operations

Views

Backup - Glossary, Stuff and Links

What's in the name

1980's

Automatic Packet Reporting System

In the beginning there was packet radio -

- APRS was developed as a simple tactical (LOCAL) packet link for basic text messaging information among a large open group of users, via packet radio (AX25) protocols
- **1990's**

Automatic Position Reporting System

Then there was GPS -

- Basic text messaging and real-time position reporting of stations and objects, via packet radio (AX25) protocols.
 - Position, course and speed, altitude, status, short email, voice alerts, text size email
- Precise GPS based user position information and status info can be exchanged with local or distant fixed and mobile users, direct or over digipeater networks or through the Internet and displayed using GIS and mapping software to show the transmitted data superimposed on a variety of map displays.
- Provides local view or global picture of portable beacons, users and objects.
APRS is a Registered Trademark to Bob Bruninga, WB4APR. www.aprs.org

What do we do with it

- Provides means of exchanging short digital text data.
- Powerful navigation tool for locating and
 - Tracking moving assets in SAR operations
 - Tracking race events – FLETCHER FLYER
 - Tracking balloon launch operations
 - Locating and contacting other APRS hams –voice alert
 - Red Cross damage assessment
 - Direction finding – Foxhunts
 - Skywarn
 - Weather station reports
 - Relay short text and position via ground-based network or through direct contact with the International Space Station

APRS activity in Washington DC This Morning

Google Maps APRS#lat=32.97220&lng=-96.73760 - Internet Explorer

http://aprs.fi/#!addr=washington%20dc

File Edit View Favorites Tools Help x Google aprs.fi Search More >> robertfe...

38°47.53' N 77°2.56' W, FM18LT

Washington

Overlays Map

aprs.fi - Login

Found: Washington, DC, USA

PC Help Online

- helpouts.google.com/computer_help
- PC & Laptop Repair Experts. Live Help Over Video Conference.

Track callsign: Clear

Address, city or Locator: Clear

washington dc Search ?

Show last: 1 hour Show all

Track tail length: 1 hour

Wx: 52.8°F 90% 1014 mbar 0.0 MPH SW

Other views:

- Station info
- Raw packets
- Status packets - Beacon packets
- APRS/CWOP weather - Telemetry
- Messages - Bulletin board
- Prefix browsing
- Google Earth KML ?
- Data export tool
- Preferences - My account

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- Credits and thanks
- Terms Of Service

idle: points updated 2, deleted 0

WB1HAI-9 · center · zoom · info X

2014-05-06 06:40:14
54 MPH 274' alt 79 ft
146.52
[DIEW5W via WIDE3-3, QAR, N4FKH]
start tracking - track in Street View

PHANTOM 2 VISION+
CLICK TO LEARN MORE

Map data ©2014 Google 2 km

100%

8:36 AM

What Equipment Do I Need

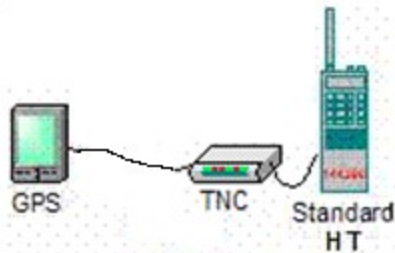
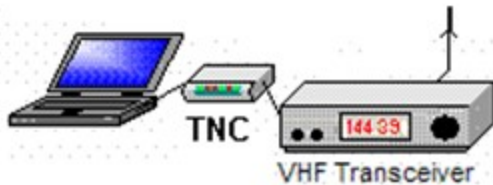
FIXED Position (Home or Incident Command Center):

- Internet based , all you need is a computer to follow the APRS world with software like www.aprs.fi or www.findu.com
- RF over the air - FM Transceiver & TNC / Modem and a Laptop Computer Running APRS Client Software such as [WinAprs](#), [UIView](#), [APRS+SA](#), [APRSPoint](#)

Portable:

- GPS (with NMEA Serial output)
- Transceiver
- TNC with GPS capability or APRS Tracker Hardware

Station Configuration



or

- Internet Based
- Fixed Base station
- Portable “one way”
 - Tracker one way
- Portable “two way”
 - Send and receive, “all in one” and display

What are the Components?

One Way Tracker

(send only)

GPS satellite receiver -
position data.

Terminal Node Controller TNC
modulate audio and
control radio

FM Transciever - 144.39Mhz



One way tracker - No APRS Data display

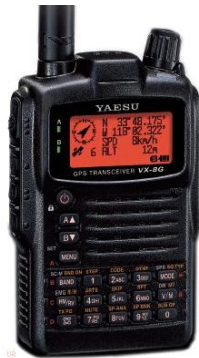
What are the Components?

Two Way All in One Send & Receive

FM transceiver with built in GPS
receiver, & TNC (laptop
computer display optional)



Kenwood TH-D72A
5 watts



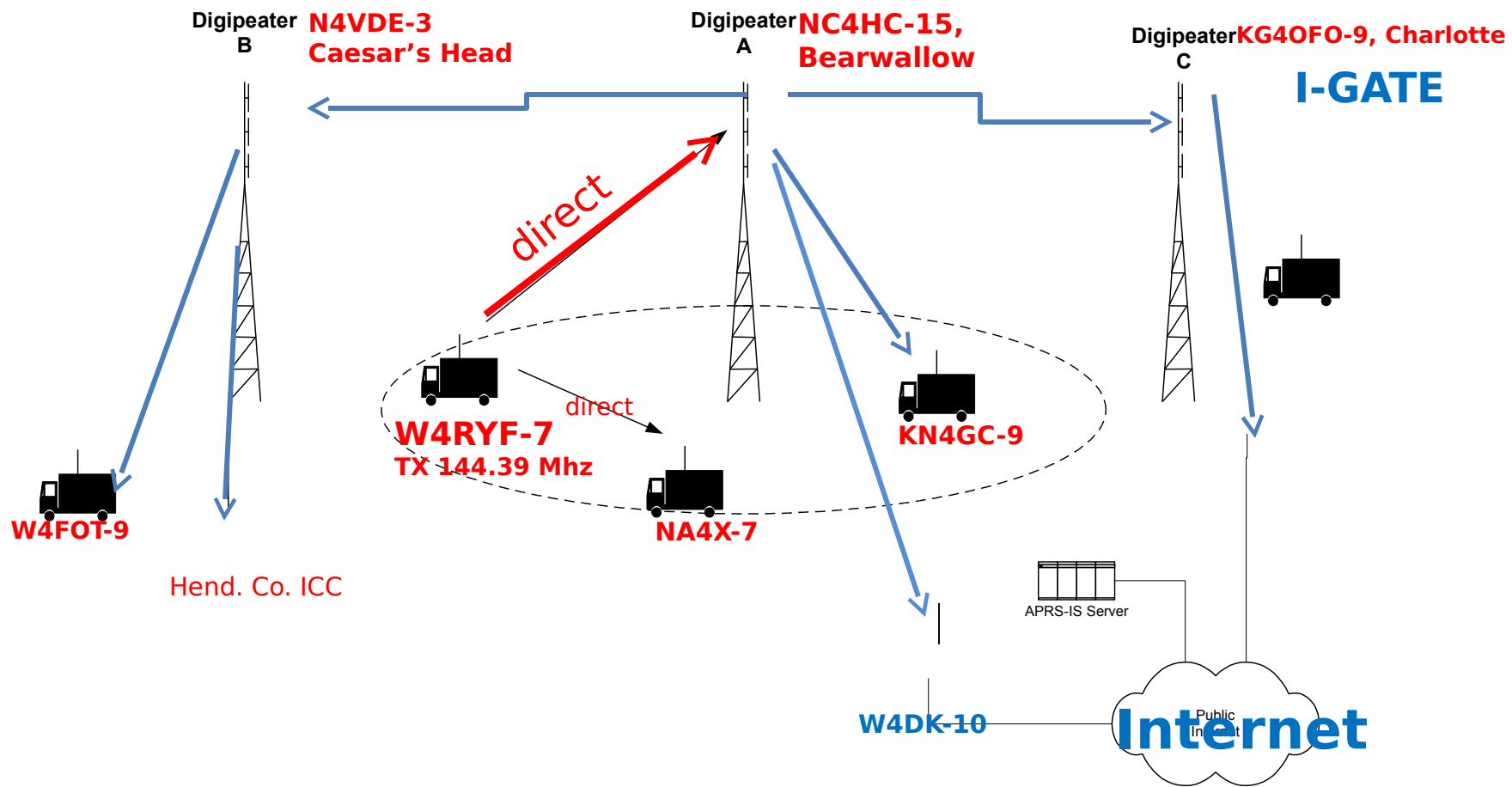
Yaesu VX-8GR
5watts



Kenwood TM-D710GA
50 watts



Operations



Tracking the Fletcher Flyer SAG Car - W4RY

Google Maps APRS - Windows Internet Explorer

http://aprs.fi/#!mt=roadmap&z=13&call=a%

File Edit View Favorites Tools Help

Google Search More >>

GG Log In 2013 Grant Applications - Sk... https--grants.rotary.org-s... SPARTA Workstation Viewer WebEOC 7 MARS-ALE Technical Forum ...

35°20.22' N 82°28.54' W, EM85S1

Arden AJ40G-2 NC4HC-15

Overlays Map

aprs.fi · Login

Free Cell Phone # Trace
FreePhoneTracer.com
1) Enter Any Cell Phone Number Free 2)
Get Full Owner Info - Try Now! AdChoices

Track callsign: Clear
 Search ?

Address, city or Locator: Clear
28739 Search ?

Show last:
3 days Show all

Track tail length:
2 days

W4RYF
Updated: 2013-06-02 12:42:01 (1d9h)
Position: 35°25.51' N 82°29.81' W

2011 2012 2013

Wx: 64.4°F 86% 1016 mbar 0.3 MPH S

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Information:

Google 5 km 2 mi

Map data ©2013 Google - Terms of Use Report a map error

100%

10:22 PM 6/3/2013

Atlanta - Hendersonville W4RYF 5-2-14

Google Maps APRS#!ts=1398988800&te=1399075200&call=a%2FW4RYF - Internet Explorer

http://aprs.fi/#!ts=1398988800&te=1399075200&call=a%2FW4RYF

File Edit View Favorites Tools Help x Google aprs.fi Search More >> robertfe... >

BBC News - In picture... My Rotary My Rotary Rotary Grants Website Map produced by Gm... Home Feeds (1) Read mail Print Page >>

35°21.06' N 81°55.34' W, EM95A1

Overlays Map

aprs.fi - Login

Computer Help Online
helpouts.google.com/computer_help
PC & Laptop Repair Experts. Live Help Over Video Conference.

Track callsign: Clear
Search ?

Address, city or Locator: Clear
Search ?

Show last:
1 hour Show all

Track tail length:
1 hour

W4RYF
Updated: 2014-05-02 11:39:50 (3d12h)
Position: 35°18.94' N 82°28.69' W
Showing:
from: 2014-05-01 19:00:00
to: 2014-05-02 19:00:00

2012 2013 2014

Other views:

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stopped

USB Stick RF Synthesizer
runsetmicrowave.com

Map data ©2014 Google 20 km Terms of Use Report a map error

100%

Start 1:20 AM

Station Info - W4RYF

Station info for W4RYF - Google Maps APRS - Internet Explorer

http://aprs.fi/info/a/W4RYF

File Edit View Favorites Tools Help

Google aprs.fi

Search More >>

robertfe...

BBC News - In picture... My Rotary My Rotary Rotary Grants Website Map produced by Gm...

Home Feeds (1) Read mail Print Page >>

X yext.com/Google_Local

Check your listing everywhere. Enter business address to start now

APRS station **W4RYF** - show graphs

Mic-E message: Off duty

Location: 35°18.94' N 82°28.69' W - locator **EM85SH250S** - [show map](#) - [static map](#)
 3.7 miles Northwest bearing 326° from Flat Rock, Henderson County, North Carolina, United States [?]
 4.0 miles Northwest bearing 308° from East Flat Rock, Henderson County, North Carolina, United States
 20.2 miles South bearing 168° from Asheville, Buncombe County, North Carolina, United States
 72.8 miles West bearing 273° from Gastonia, Gaston County, North Carolina, United States

Last position: 2014-05-02 11:39:50 CDT (3d 12h30m ago)
 2014-05-02 12:39:50 EDT local time at Flat Rock, United States [?]

Course: 314°
Speed: 2 MPH
Device: Kenwood: TH-D72 (ht)

Last path: W4RYF>SUQX9T via **N4VDE-3***,**KI4WXS-5***,**WIDE2***,**qAR**,**KG40FO-9** **Good path!**

Positions stored: 11433

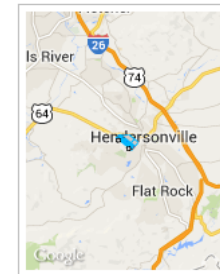
Packet rate: 81 seconds between packets on average during 4069 seconds.

Stations near current position of **W4RYF** - show more

callsign	distance	last heard - CDT	callsign	distance	last heard - CDT
A14GR-4	2.3 miles 307°	2014-05-03 21:02:33	W4DK-7	2.4 miles 51°	2014-04-29 07:27:43
CW3151	3.8 miles 151°	2014-05-05 23:18:26	EW1057	5.4 miles 196°	2014-05-06 00:10:05
W4FOT	5.8 miles 275°	2014-05-04 18:37:25	KJ4JAL B	6.5 miles 209°	2014-05-06 00:02:47
KJ4JAL C	6.5 miles 209°	2014-05-06 00:02:47	KJ4JAL-C	6.5 miles 209°	2014-05-06 00:02:22
KJ4JAL-B	6.5 miles 209°	2014-05-06 00:02:22	NC4J-14	7.5 miles 4°	2014-04-23 20:46:56
CW8735	7.7 miles 247°	2014-05-05 23:52:54	KK4YXV-7	7.7 miles 50°	2014-05-01 13:37:24
NC4J	7.8 miles 354°	2014-04-29 18:02:31	W4DK	7.9 miles 280°	2014-05-05 23:42:30
EW0871	8.7 miles 7°	2014-05-06 00:10:18	W4DK-10	8.8 miles 290°	2014-05-05 16:56:39
CW1203	10.5 miles 141°	2014-04-30 22:59:33	AJ4OG-3	10.6 miles 2°	2014-04-18 07:38:25
DW1971	10.6 miles 174°	2014-05-06 00:06:29	AJ4OG-9	10.8 miles 358°	2014-05-03 13:22:49

Stations which heard **W4RYF** directly on radio - 2014-05

callsign	pkts	first heard - CDT	last heard	longest	(tx => rx)	longest at - CDT
N4VDE-3	63	2014-05-02 08:35:08	2014-05-02 11:39:50	EM84GG > EM85QC	76.8 miles 38°	2014-05-02 08:35:08
AB4KN-2	32	2014-05-01 19:13:59	2014-05-01 20:13:56	EM73MC > EM73RL	34.5 miles 36°	2014-05-01 19:13:59
AE4XO-2	2	2014-05-01 19:59:22	2014-05-01 20:06:18	EM73TS > EM82CX	63.6 miles 149°	2014-05-01 20:06:18
W4TL-3	28	2014-05-01 20:20:38	2014-05-02 09:01:05	EM73VW > EM84CM	46.3 miles 28°	2014-05-01 20:20:38
KE4LTT-2	14	2014-05-01 17:49:50	2014-05-01 18:16:38	EM72FM > EM72AM	25.1 miles 271°	2014-05-01 18:16:38
KI4ELU-7	17	2014-05-01 13:42:22	2014-05-01 14:17:55	EM50UM > EM60DN	34.2 miles 83°	2014-05-01 13:42:22
K4FI-3	3	2014-05-02 09:24:53	2014-05-02 09:41:40	EM84RQ > EM94HE	72.6 miles 117°	2014-05-02 09:24:53
KI4WXS-5	1	2014-05-02 11:21:00	2014-05-02 11:21:00	EM85TG > EM95PG	97.0 miles 90°	2014-05-02 11:21:00
W4LEE-1	25	2014-05-01 18:05:58	2014-05-01 19:04:00	EM72LX > EM72HN	32.0 miles 211°	2014-05-01 19:04:00
W4IDO	3	2014-05-01 20:57:56	2014-05-02 08:42:35	EM84HH > EM84FG	12.5 miles 246°	2014-05-02 08:42:35



Weather Station at W4DK -10 last night

Google Maps APRS - Internet Explorer
http://aprs.fi/#!mt=roadmap&z=11&call=a%2FW4DK&timerange=3600&t

File Edit View Favorites Tools Help x Google aprs.fi Search More >> robertfe... >>

35°31.70' N 82°17.09' W, EM85UM

W4DK · center · zoom · info
2008-07-27 18:48:25 - 2014-05-06 00:12:26
APRS/CWOP weather 2014-05-06 00:12:26: [show weather charts](#)
Temperature 66.0°F Humidity 55% Pressure 1011.6 mbar
Wind 86° 0.0 MPH (Gusts 0.9 MPH)
Rain 0.0 inches/1h 0.0 inches/24h 0.0 inches/since midnight
[APRS via TCPIP*,qAC,FOURTH]

aprs.fi · Login
Computer Help Online
helpouts.google.com/computer_help
PC & Laptop Repair Experts. Live Help Over Video Conference.
Track callsign: Clear Search ?
Address, city or Locator: Clear Search ?
Show last: 1 hour Show all
Track tail length: 1 hour

W4DK
Updated: 2014-05-06 00:12:26 (14m)
Position: 35°20.18' N 82°36.93' W

2012 2013 2014

Other SSIDs: W4DK-10 W4DK-7
Wx: 64.0°F 57% 1012 mbar 0.8 MPH W

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idle

USB Stick RF Synthesizer
quonsetmicrowave.com

http://aprs.fi/?c=logon

100% 1:27 AM

Glossary

Digipeaters

Are stations that retransmit/relays the packets that it hears. There should only be a few digipeaters in a given area. (Types - **Wide**, **Fill-in** and **I-Gate** relay into Internet)

- **WIDE Area** digipeaters - Each WIDE covers a large area is coordinated at a state level and operates with dedicated APRS digipeater firmware.
- **Fill-In** Digipeaters - Set up in areas where access to a WIDE is not possible .
- **I-Gates** - Pass traffic heard via local WIDE digipeaters to I-Gate selected traffic from the Internet onto RF.

Internet Gateways

An internet gateway **I-Gate** relays packets from radio to the internet and vice versa. Can be combined with a digipeater and / or a fixed station. Requires a computer and internet connection

Fixed Station

A fixed station transmits packets, but remains in one place. Can be used to monitor other stations or to transmit local information objects

Trackers

A tracker is an APRS station that is capable of only transmitting a packet containing location information. Usually small and portable for moving between vehicles. One Way!

Mobile Station

Now days it is a self contained all in one transceiver/TNC/GPS radio with data display.
Computer optional

Glossary(2)

TX Beacon Type

Manual, PTT, Auto-timed , SmartBeaconing (.2 - 30 MIN)

SmartBeaconing optimizes beaconing interval rate based on your speed, turn angle, slope speed change, change direction

Packet Path

Set the number of time your beacon will be passed from digipeater to digipeater , or “hops”. (variable *-Wide1-1, Wide2-1*). In order to constrain your packet info to local area coverage.

Messages

Status Text Message - Your 42 character text message that is transmitted you're your position data. Some radios have up to five memory channels for preprogramming the text.

Special status msg **QSY function** - Used to embed the voice frequency on the non-data band in the status text. By placing xxx.xxMhz as first word in character string, receiving stations will know where to meet you. Some radios tune automatically.

Position Comment(Message) - one/two word amplifying info about your situation . *“Off Duty, Enroute, In-Service, Returning, Committed, Special, Priority, Custom0-6, Emergency”*

APRS Voice Alert - Voice Alert is effectively another Radio channel for APRS radios with internal TNC's. Good for finding another APRS stn and holding a quick line of site voice exchange. Good for long haul traveling and meeting other APRS users on your way to Dayton this year. Set APRS Band A to CTSS-100, Volume UP! All packet-racket is MUTED. You are available now for a voice call using PL-100 on 144.39. Will hear* a Ping ALERT if another VA-station comes in line-of-site to you.

SSID

(Secondary Station Identifier)

New (wiki aprs)

- 0 Home station, or a home station running [IGate](#).
- 1 Digipeater, home station running a relay [Digipeater](#) and/or WX Digipeater
- 2 Digipeater on 70 cm
- 3 Digipeater
- 4 HF to VHF gateway
- 5 IGate (not home station)
- 6 Operations via satellite
- 7 Handheld radios ([Kenwood TH-D7](#), [Yaesu VX-8R](#), ICOM D-Star, etc)
- 8 Boats, sailboats and ships (maybe 802.11 in the future)
- 9 Mobiles
- 10 [APRS-IS](#) only - APRS with no radio
- 11 APRStouch-tone users (and the occasional balloon)
- 12 Portable units such as laptops, camp sites, etc.
- 13 *Not defined*
- 14 Truckers
- 15 HF stations

- 0 Your primary station usually fixed and message capable
- 1 Generic additional station, digi, mobile, wx, etc
- 2 Generic additional station, digi, mobile, wx, etc
- 3 Generic additional station, digi, mobile, wx, etc
- 4 Generic additional station, digi, mobile, wx, etc
- 5 Other networks (Dstar, Iphones, Androids, BB's, etc)
- 6 Special activity, Satellite ops, camping or 6 meters, etc
- 7 walkie talkies, HT's or other human portable
- 8 boats, sailboats, RV's or second main mobile
- 9 Primary Mobile (usually message capable)
- 10 Internet, Igates, echolink, winlink, AVRS, APRN, etc
- 11 balloons, aircraft, spacecraft, etc
- 12 APRStt, DTMF, RFID, devices, one-way trackers*, etc
- 13 Weather stations
- 14 Truckers or generally full time drivers

Links

SOFTWARE:

If you want to see APRS stations, you'll need some software. There are software packages for most operating systems

APRSDos

<ftp://ftp.tapr.org/aprssidosstuff/APRSDos/>

WinAPRS

<ftp://ftp.tapr.org/aprssidostuff/WinAPRS/>

MacAPRS

<ftp://ftp.tapr.org/aprssidostuff/MacAPRS/>

APRS+SA

<http://www.tapr.org/~kh2z/aprsplus/>

APRSPoint

<http://www.aprspoint.com/>

UI-View

<http://www.uiview.com/>

PocketAPRS

<http://www.pocketaprs.com/>

PalmAPRS

<ftp://ftp.tapr.org/aprssidostuff/>

APRS+CE

<http://www.tapr.org/~aprsce/>

JavAPRS

<http://www.aprs-is.net/javAPRS/>

Very Useful Internet Sites for (Passive) viewing

www.aprs.fi

www.findu.com