Automatic Packet Reporting System

An introduction

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What is APRS?

- Real time digital communications system
- Primarily AX.25 packet radio over RF
- Enhanced by an internet component but not necessary for most functionality
- Broadcast and two way information exchange
- Self organizing network, fast deployment of ad hoc resources
  - Not a “mesh” per se, but has mesh-like qualities

But first, a little history

- Created by Bob Bruninga WB4APR (SK) in the mid-1980s
- First used by the US Naval Academy to track patrol boats
- Built on AX.25 packet radio networking
- Differs from traditional “connected mode” packet
- Uses “broadcast mode”

APRS Features

- Location tracking
  - Vehicles (Ambulance, Fire Engine, Supply truck, SAG wagon)
  - Places (EOC, Hospitals, Fire Station, Distribution Point, Shelter)
  - Objects (crash site, traffic jam, repeater*, other resources)
  - Areas (Severe weather alert, wildfire area, radiation zone)

APRS Features

- Two way communications
  - Text messages between stations
  - Bulletins (one way messages to groups of recipients)
  - Position status (NIMS compliant e.g. off-duty, enroute, returning)

APRS Features

- Data transmission
  - Weather data
  - Sensor data (balloon telemetry, stream hight sensors, equipment alarms)
  - Custom messages

APRS-IS (Internet System)

- Worldwide message delivery
- APRS <-> Winlink
- On demand weather forecast for your location (WXBOT)
- Chat server (ANSRVR)
  - “Hams on the ‘Gram” (HOTG) every Thursday
- POTA / SOTA / WWFF spots via APRS (APSPOT)
- APRS to phone text message (SMSGATE)

Digipeaters and iGates

- Digipeaters (digital repeater) allow over-the-horizon use
- iGates move APRS packets between RF and APRS-IS
  - Insert iGate rant here
- None of the advanced APRS functions work without iGates

Beacons

- APRS beacon packets contain compressed position information
  - K2ZA-9>SYSV0Y,WIDE1-1,WIDE2-1,qAR,K2ZA-1:`g['I!Xk/ `147.180MHz C131 +060 MCC Auxcom WLNK-1_%
- Can add additional information (beacon text)
  - K2ZA-9>SYSV0Y,WIDE1-1,WIDE2-1,qAR,K2ZA-1:`g['I!Xk/ `147.180MHz C131 +060 MCC Auxcom WLNK-1_%
  - The highlighted beacon text enables QSY function and checks for Winlink messages
- Not to be confused with Status Text (Off Duty, Enroute, In Service, Returning)

Beacon Triggers

- 3 or 4 methods to trigger a beacon transmission
  - Manual
  - Push to talk
  - Automatic (time based)
  - Smart (looks at speed and turning changes to variably trigger a beacon

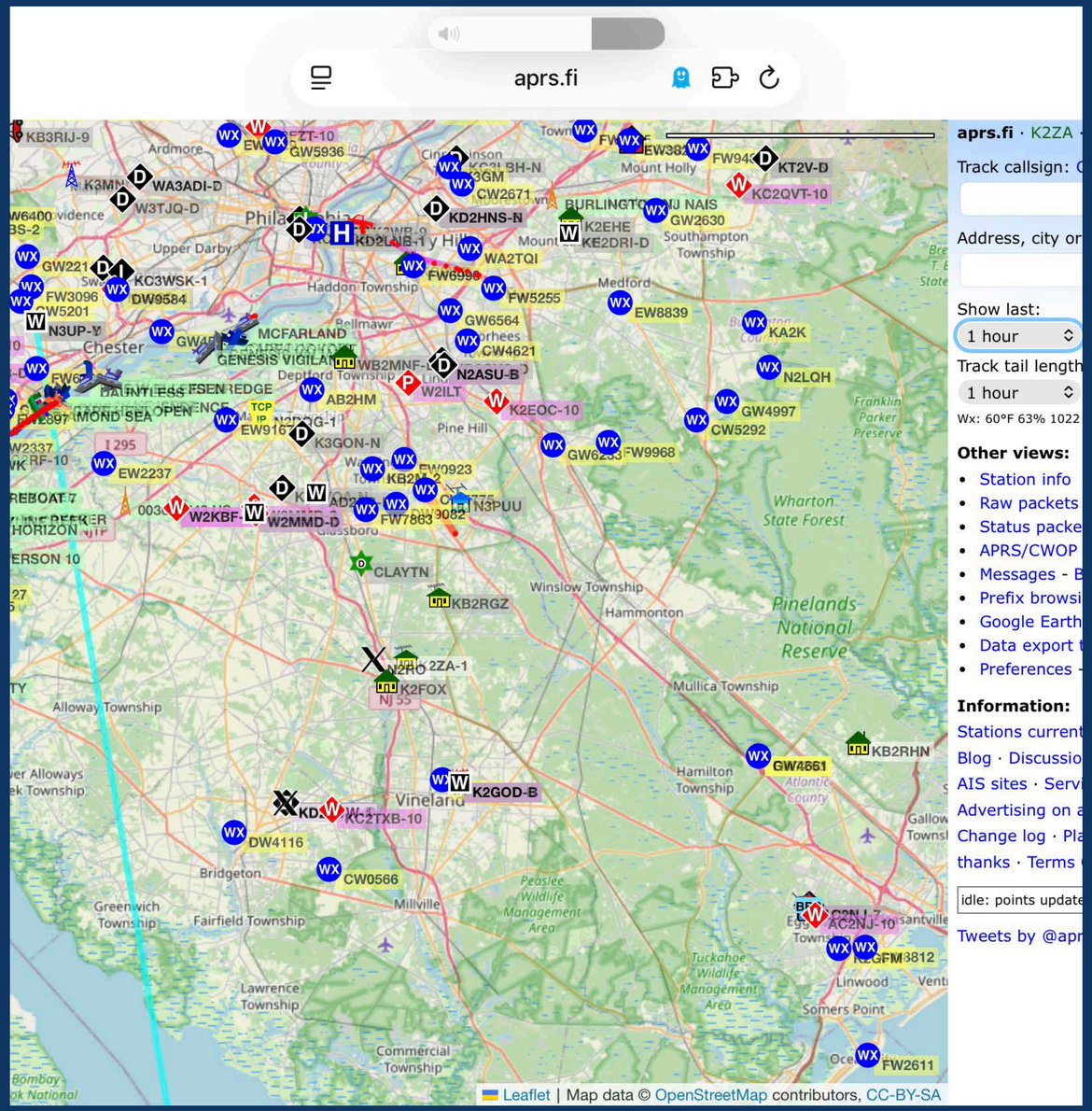
Paths

- Digipeaters have special reserved aliases
  - WIDE1-1 (Special Case)
  - WIDEn-n
  - TRACEn-n
  - State alias (NJn-n, PAn-n, DEn-n)
- K2ZA-9>SYSV0Y,WIDE1-1,WIDE2-1,qAR,K2ZA-1:`g['l!Xk/ `147.180MHz C131 +060 MCC Auxcom WLNK-1_%


Measure
Move
W3JBS-2
T:78°F H:64%
G:0mph
KC3SCT
KD2LNB-1
KE2DRI-D
WA2TQI
KC2IFP
T:80°F H:71%
S:1mph G:2mph C:167°
KE2DPQ
KC3WSK-1
N3GSD-1
KB3PCY-10
W3DRA-10
N3UP-D
KI6OM-D
146.73-DE
WB2MNF-D
N2ASU-NB
K2WB-9
0mph
KC2QVT-3
K2EOC-10
N2DQG-1
WB2MNF-7
38mph
K3GON-N
K9WX
AC2RF-10
KB2M-2
KD3ABW-1
KA3VSP-5
KD2VQA-N T:82°F H:64%
S:1mph G:1mph C:195°
W2KBF-11
W2MMD-4
W2MMD-D
N3PUU-1
K2MPR
KC2FAY
CERDETIANA
CLAYTN
KA3VSP-8 A3VSP-10
KB2RGZ
0mph
KB3GVC-13
T:80°F H:67%
S:0mph G:0mph C:5
N1PFJ-1
55mph
K3JRZ-10
N2RL
K2ZA-1
K2FOX
K2GOD-YB
KD2DWW-0
KC2TXB-10

Getting Started

APRS.fi



The easiest way to get started

- Web based, but also an iOS application.
- Lots of features are free
- Paying helps support maintaining the service
- Not just APRS information

Handheld with Integrated TNC

Baofeng UV Pro and VGC VR-N76

- Connects with phone / tablet via Bluetooth
- APRS Droid / APRS.fi iOS
- Also works with Winlink Packet
- Limited APRS functionality from from front panel

Mobilinkd External Bluetooth TNC

- Add APRS (and Winlink) to your existing radio
- Adapter cables for handhelds and mobiles
- Uses phone/table for user interface
- No stand alone capability
- Another battery to charge
- Pretty expensive ($150 with adapter cables)

Integrated APRS radios

- Kenwood TH-D7, TH-D72, TH-D74, TH-D75, TM-D700, TM-D710, TM-D750
- Yaesu FT-1D, 2D, 3D, 5D, FTM-100, 200, 300, 350*, 400, 500, 510
- Almost all APRS functionality available from front panel
- Newer Kenwood also have D*STAR
- Newer Yaesu radios also have C4FM

Integrated APRS radios, continued

- Some DMR radios have analog APRS functionality
- Kenwood radios have full TNC access allowing Winlink use
- Yaesu only implements a subset of AX.25 functions to support APRS
- Most APRS functions from front panel feel like 90’s cell phones
- Both Kenwood and Yaesu have QSY function

DIY APRS with Digi-Pi

- Add APRS functions to radios you already own cheaply
- Web front end via wifi hotspot
- Adds APRS chat function
- Adds Digipeater and iGate functions
- Adds traditional AX.25 packet
- And…
  - WSJT-X, FLDigi, JS8Call
  - Winlink E-mail client and server
  - Slow Scan TV and much more!

Questions?