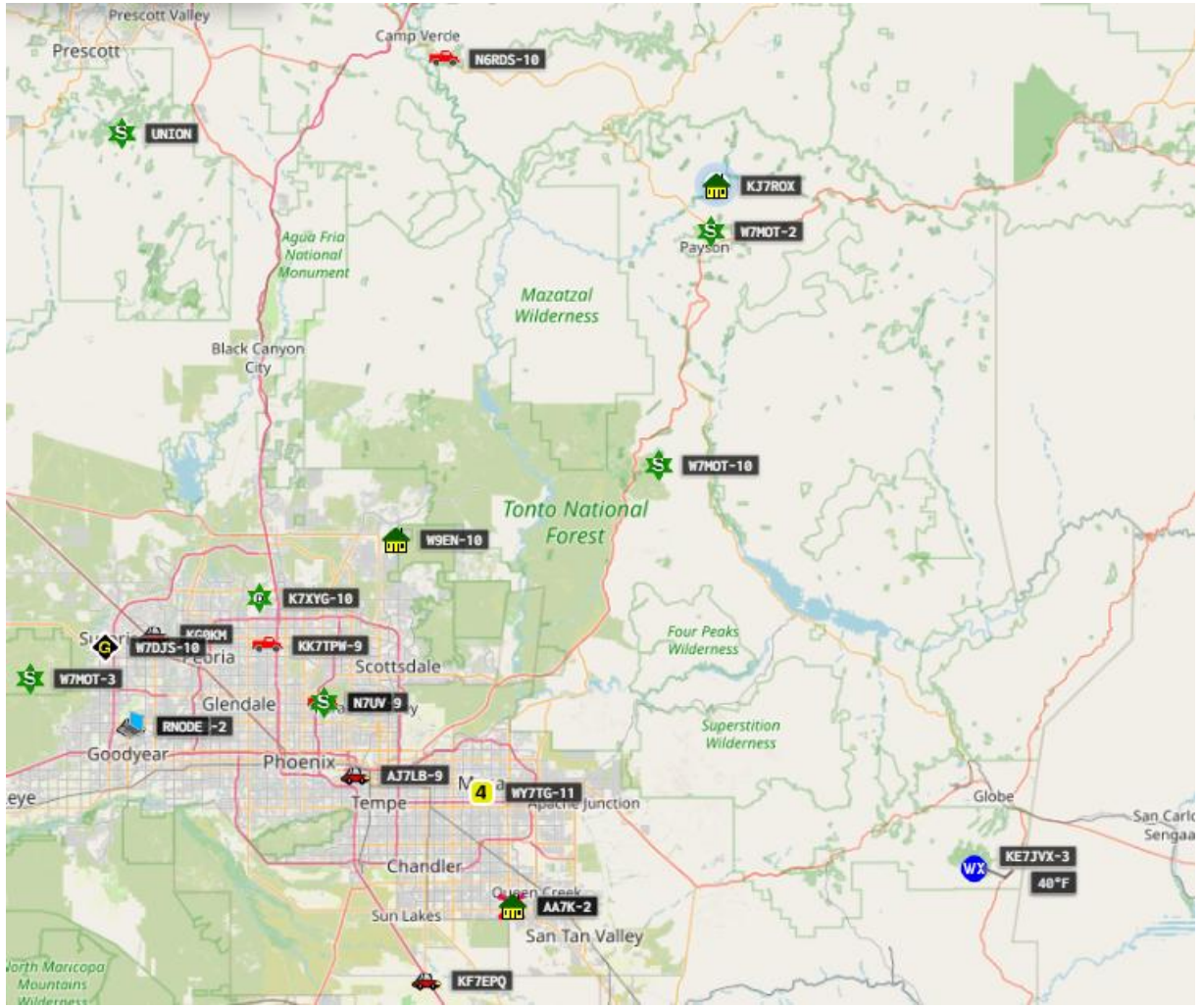


APRS

TARA - November 2026

Rick - KJ7ROX
Adapted presentation from DV7GDL

What is APRS?

- Automatic Packet Reporting System (*not* “Position Reporting System”)
- Originally developed as a ship tracking system for the US Navy. It is now much more than a mere location tracking system.
- APRS is a tactical information-sharing system providing real-time, situational and spatial awareness of your immediate area over RF.
- Also allows local and global communications via short text messages among many other uses and services.

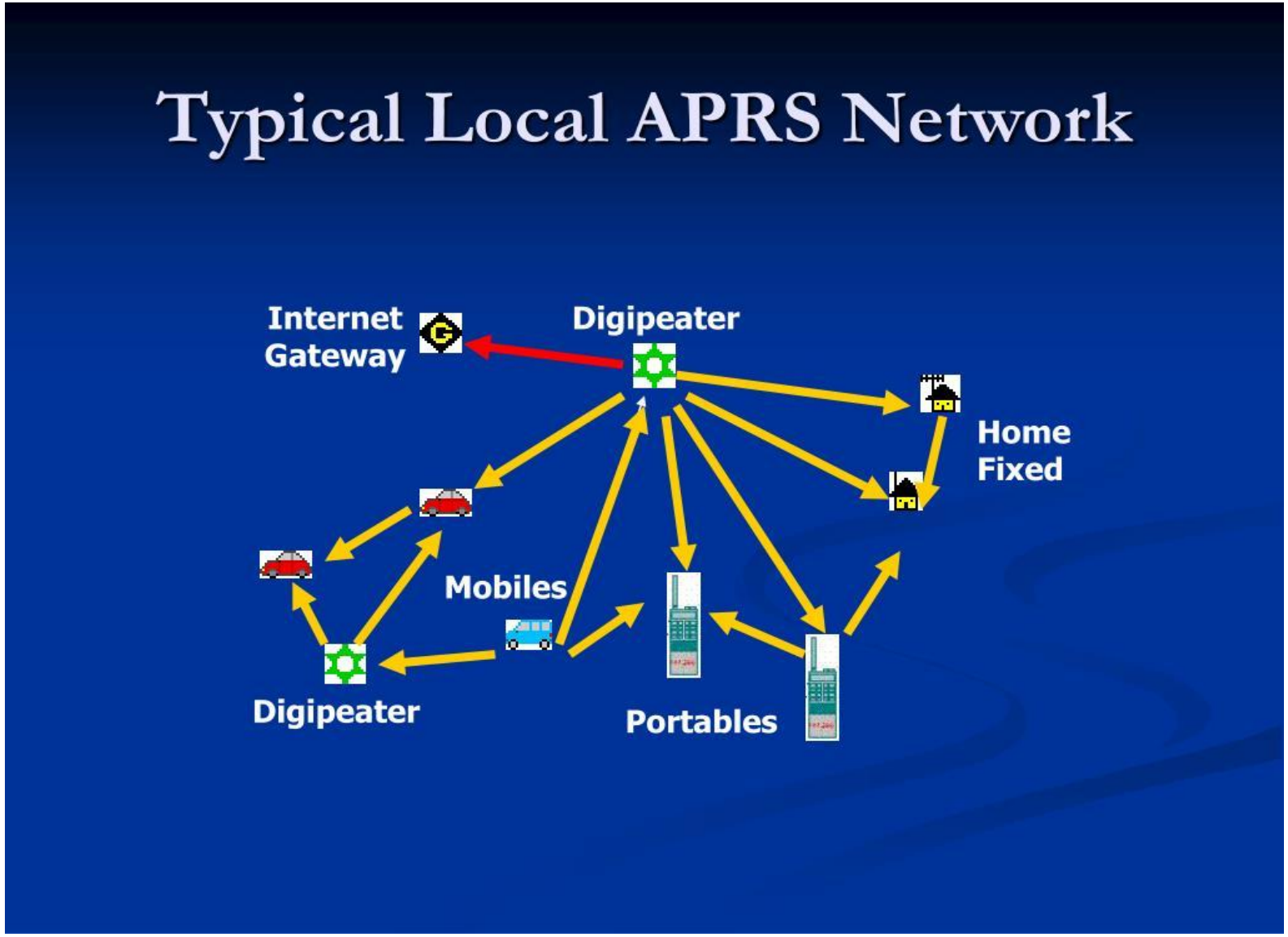
APRS Data Examples

- Positions
- Station capabilities
- Objects
- Weather reports
- Telemetry (example: monitoring remote radios)
- Text messages
- Bulletins
- Queries and responses
- Internet gateways to other services, information servers
- APRS of Things
- User-defined data types

How APRS works

- 1200 baud AFSK AX.25 packets
- Digipeaters and IGates form the local infrastructure
- Single shared simplex frequency on 2 meters
- One-to-many information-sharing
- No error-checking, “fire and forget”
- GPS used for obtaining position, altitude, direction and speed
- FM Radios, GPS receivers, TNCs (terminal node controllers: essentially modems)
- Internet connectivity for global messaging and maps (not essential)

How APRS works



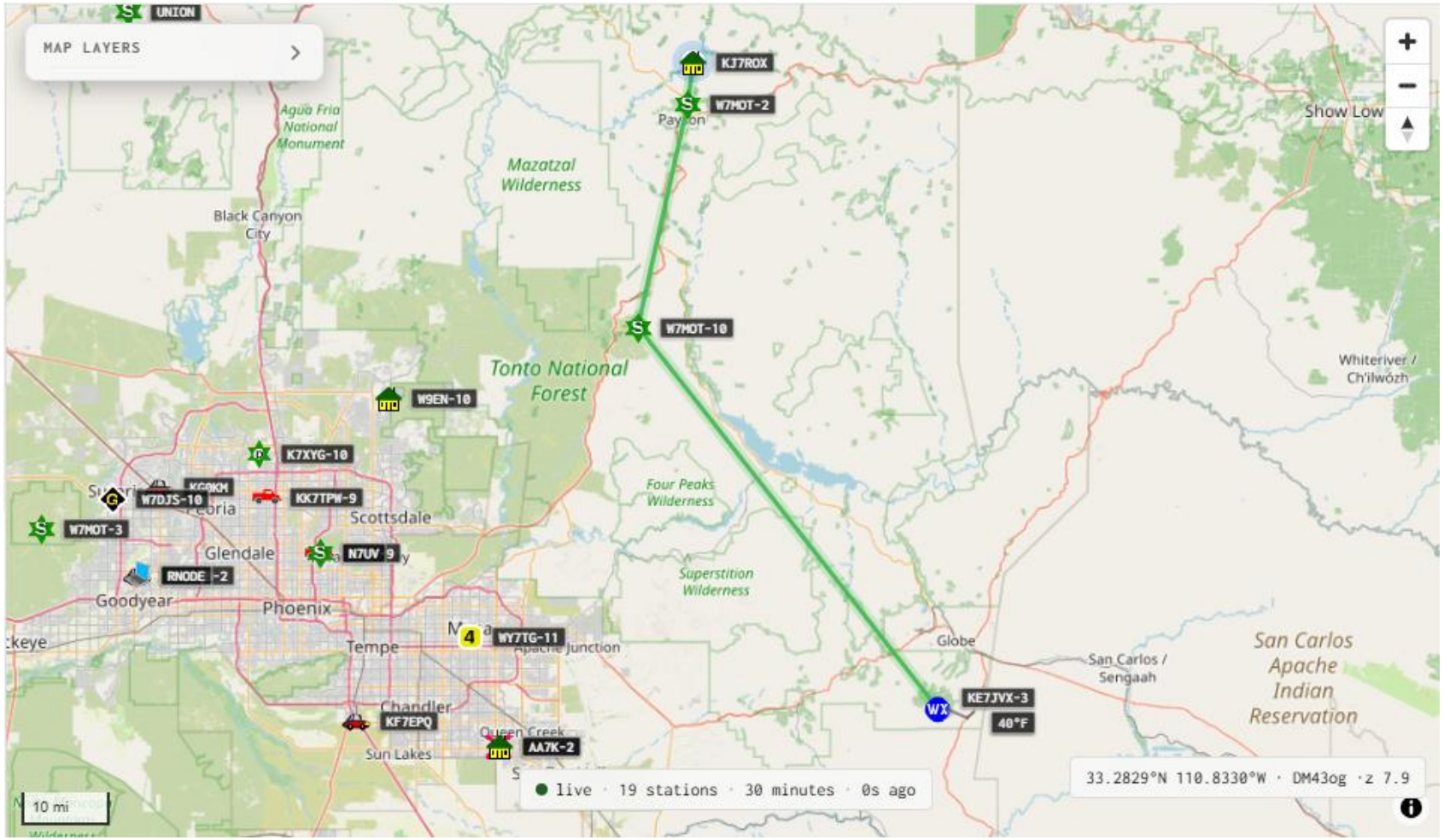
Digipeaters: Two types

- **Wide coverage**
- Usually located at high repeater locations
- Often no Internet access available at those sites
- **Local/fill-in**
- Less range than wide coverage digipeaters
- Multiple local digipeaters can extend coverage if desired
- Can fill in weak RF signal areas
- May reduce load on wide coverage digipeaters
- Often located at hams' QTHs and double as Igates
- Can be temporary (i.e. HT-based) for improved coverage at special events

APRS-IS

- APRS Internet System
- Global backbone network of interconnected Tier 2 APRS packet servers
- Value-added service to local RF APRS (my own observation)
- Receive packets from and send packets to IGates over the Internet
- Allows near real time text messaging between hams anywhere in the world
- Allows access to APRS information servers/gateways
- Clients (users or consumers) include map websites such as aprs.fi, aprs.to, aprs-map.info among others

“Google maps for amateur radio”



Igates: Two types

- Receive only
- Useful for receiving APRS from digipeater-equipped satellites and the ISS, otherwise discouraged for local terrestrial APRS.
- Transmitting
- May also digipeat though not absolutely required to.
- Ability to transmit over RF allows them to relay text messages from APRS-IS to local recipients.

APRS Use Cases

- Position reporting and tracking (lost or missing hams, S&R, special events)
- Short text messages (special events, off grid communications, APRS nets)
- Broadcast/group messages (just-in-time announcements)
- Locations of objects and places (floods, MVAs, blocked roads, emergency supply procurement sites: water, fuel, food, medicine, recharging stations, ATMs)
- Repeater frequency information (for visiting hams from elsewhere, new hams)
- Weather stations (storm tracking, emergency net readiness)
- Voice monitoring frequency (contacting mobile hams)
- Queries (examples: callsign lookups, local weather, ISS and satellite pass info, discussion groups, local resources)
- Gateways (examples: SMS, Internet email, ChatGPT, Twitter, Whatsapp, SOTA/POTA activation self-spotting)

Getting started: software and hardware

- Cell phone apps (**APRSDroid** for Android, Aprs.fi for Iphones/Ipads) Requires Internet access.
- FM HT or mobile/base, cable, old smartphone with headset jack, APRSDroid. Cheapest RF portable solution.
- FM HT with MobilinkD Bluetooth TNC, cable, smartphone/Iphone.
- Old packet radio TNCs
- TAPR NinoTNC kit
- Direwolf (software TNC) plus radio with digital interface box and USB sound card. Another cheap RF solution, for the shack.
- APRS trackers plus GPS receivers and radios (vehicle and amateur balloon tracking)
- APRS-capable radio (best all-in-one solution especially for field use)

APRS Radios

- Yaesu VX-8DR 5W FM and APRS HT (out of production)
- BTECH UV-PRO 7W HT (Baofeng) $165
- VCG VR-N76 7W HT (Vero Global Communications, Fujian, China) $189
- Radioddity GA-5WB 7W HT $180
- VCG VR-N7500 headless 50W dual band mobile $199
- VCG VR-6600PRO dual band dual VFO 50W mobile $349
- Anytone AT-D878UVII Plus 7.5W DMR HT $335
- Many Yaesu C4FM radios (FT-1D-5D HTs, FTM-100D-500D mobiles)
- Kenwood TM-D700A, 710A, 710GA 50W mobiles (out of production though the 710GA is still listed on Kenwood's website)
- Kenwood TH-D7A, TH-D72A and TH-D74A HTs (out of production) and TH-D75A
- Yaesu FTM-310, FTM510 50W FM and APRS mobile radios
- FM analog radios with DTMF capability (can send only, not receive and decode)
- Many DMR radios with GPS (some can send position beacons only)

APRS Frequencies (MHz)

- 144.390 North America (USA inc. Puerto Rico, Canada, Mexico), also Thailand, Malaysia, Singapore, Indonesia
- 145.010 Caribbean Region
- 144.800 Europe, also South Africa, Israel, Lebanon, Costa Rica, Senegal
- 145.175 Australia, Tasmania
- 144.575 New Zealand
- 144.640 China, Taiwan, Hong Kong, Japan
- 145.825 Worldwide (satellites, ISS)
- 7.083.500 40m (hf) VARA
- 10.148.200 30m (hf) VARA

APRS Role in Communications/EmComm

“Two is one, one is none.” -Ham radio saying

PACE: Primary, Alternate, Contingency, Emergency

- Primary: Facebook group chatroom, private/direct messages
- Alternate: Cell phone texts and calls, email
- Contingency: Voice via repeaters, APRS text
- Emergency: Simplex voice, APRS over RF-only with offline maps.
- Plan ahead! Be prepared for contingency and emergency communications capability/methods and practice using them

“Failing to plan is planning to fail.”

APRS Messaging

There are several client programs that enable *easy* APRS messaging:

Graywolf APRS	(Win, android, Rpi)
Pinpoint APRS	(Win)
APRStac	(Win, Linux, Rpi, Mac (coming))
APRSdroid	(android)
APRSconnect	(iOS)
HT Commander	(iOP & Android) for the UV-Pro

…and there are more

What do you need for APRS Messaging?

















Radio + Sound Card + Compute Device

Some radios have a built-in GPS & APRS modem



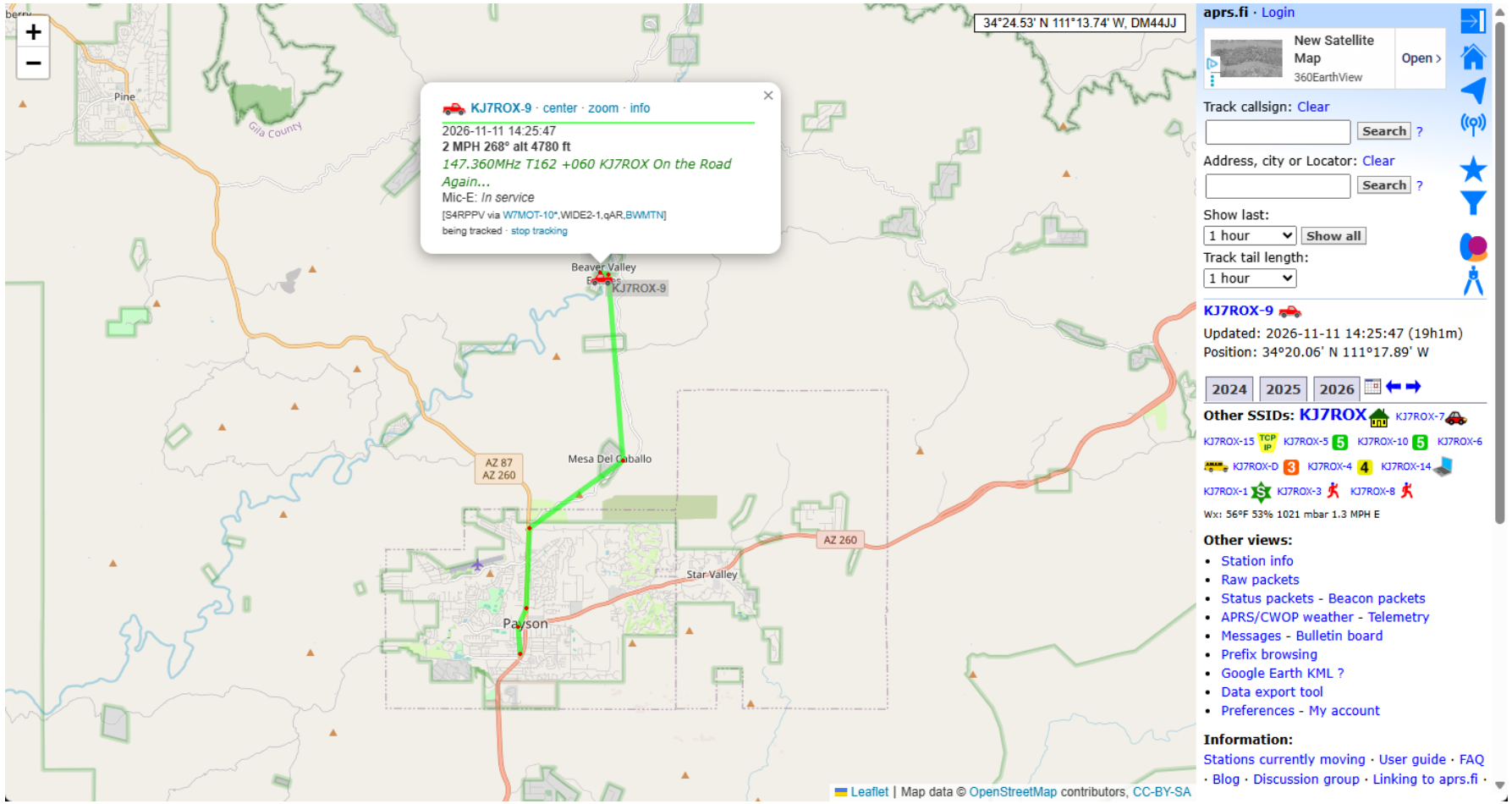






Most do not make it easy to send & receive text messages from their front panel. Some ONLY send position beacons.

APRS via the Internet – APRS-IS



- www.APRS.fi – a web-based service showing APRS stations on a map
  (does not require a radio)
- www.APRS.to – yet another web-based APRS service
- APRS-IS bridges APRS packets using the Internet

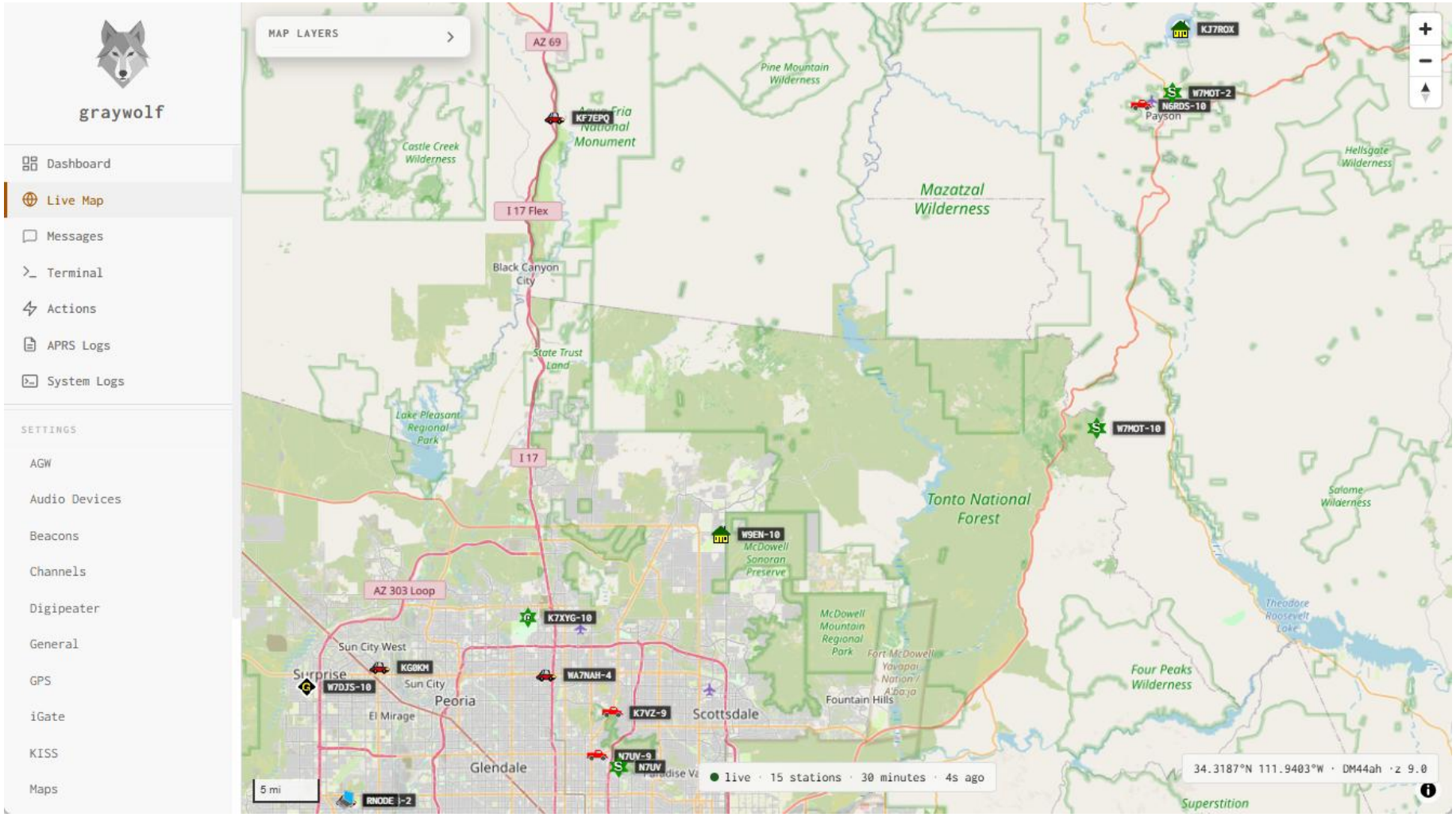
Graywolf APRS

- A Full-featured APRS app
- Self-contained (Does not require Direwolf)
- Mapping
- Messaging
- Messaging Groups (Tactical Chats)
- Packet Terminal



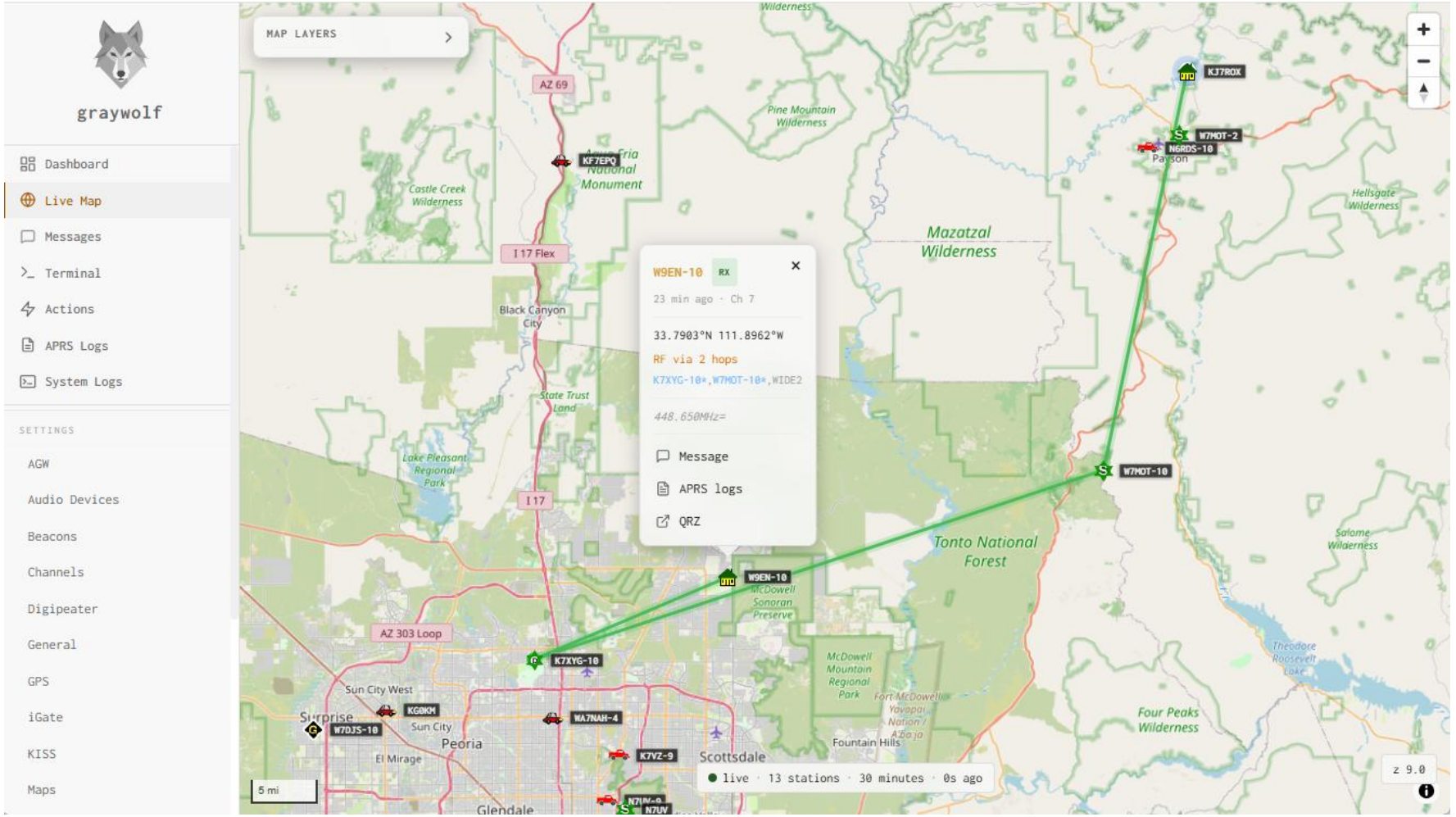
Graywolf APRS

Map View



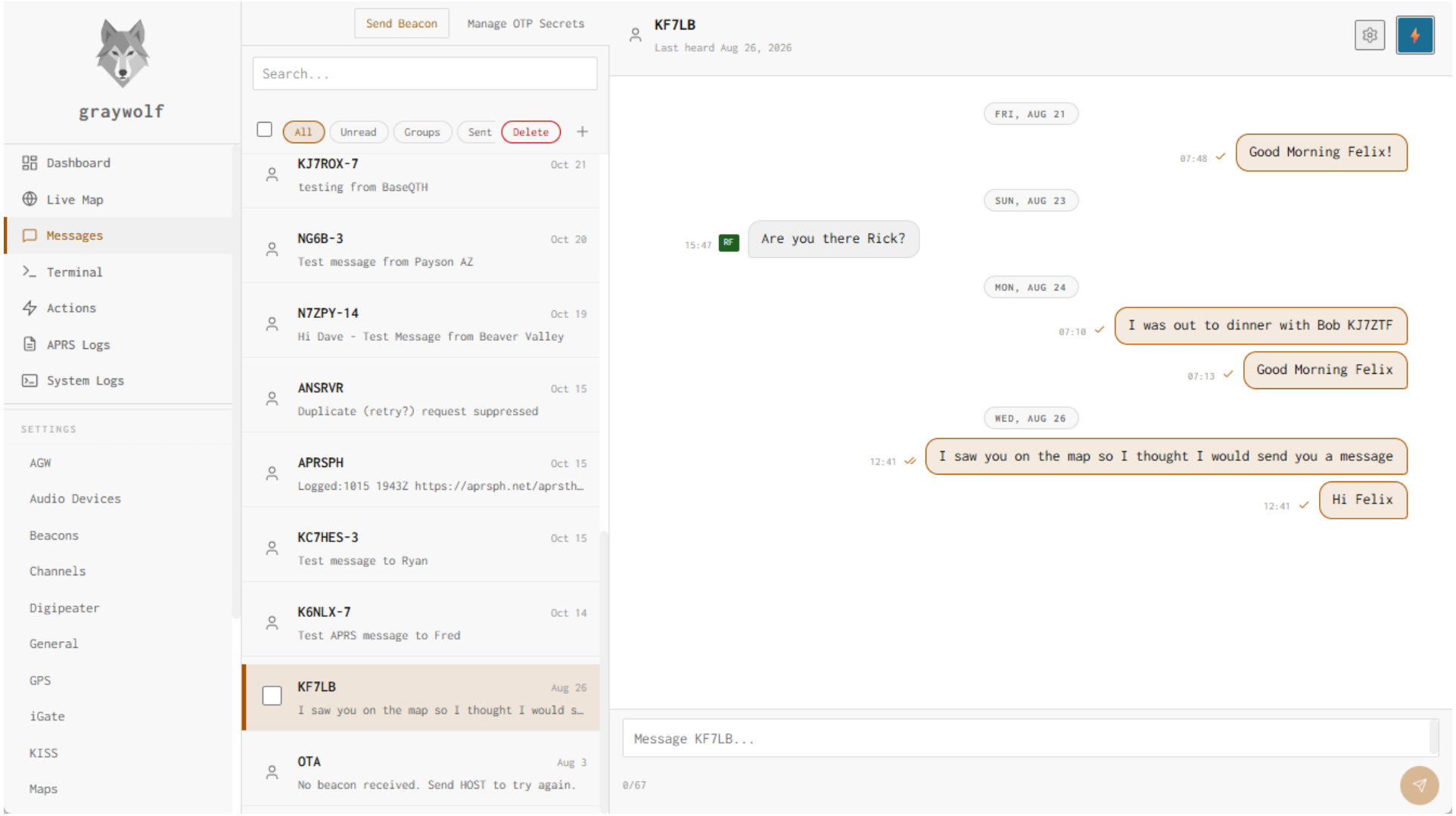
Graywolf APRS

Map
View



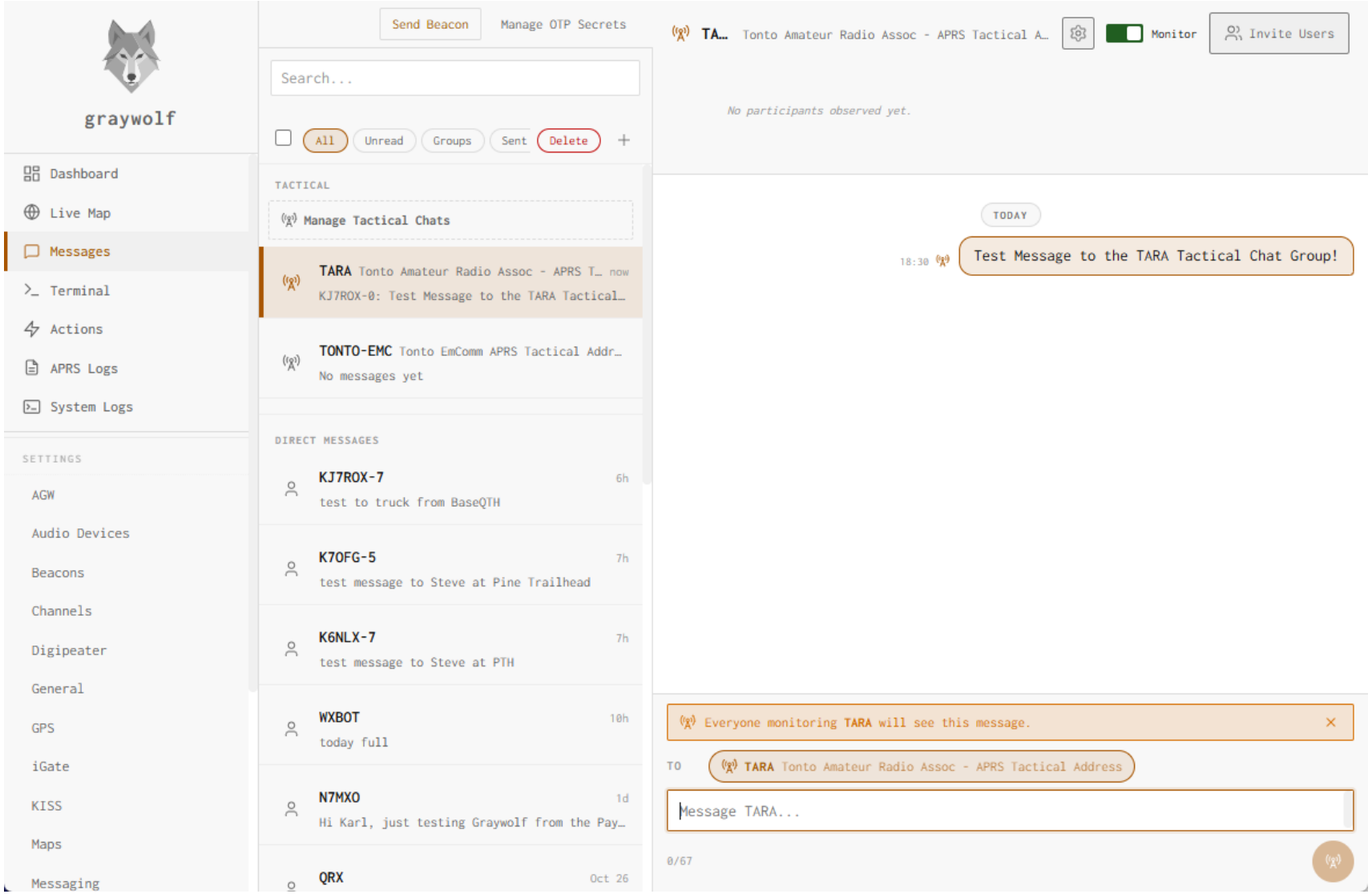
Graywolf APRS

Message View



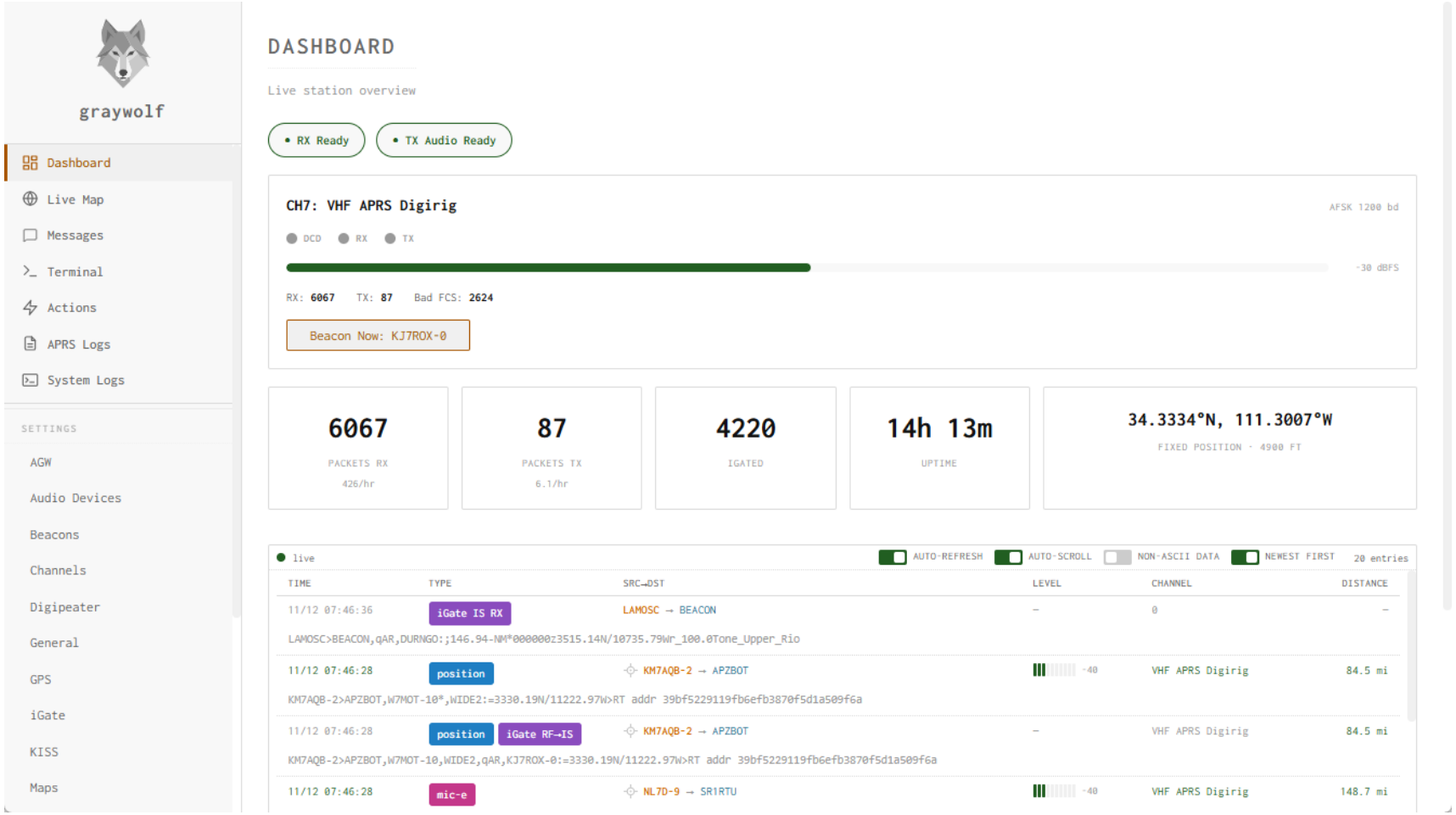
Graywolf APRS Tactical Chats

Tactical Address View



Graywolf APRS

Dashboard View



Graywolf APRS

Live Demonstration



Conclusion

- What APRS is
- How APRS is useful
- How APRS works and its infrastructure
- APRS-IS and mapping websites (“Google maps for amateur radio”)
- APRS data types and examples
- APRS frequencies
- APRS software and hardware
- APRS-capable radios past and present

The usefulness of APRS depends on what you do with it. *Everyone* gets out of it what *YOU* put into it. Track your car or HT, practice sending and receiving text messages, practice changing symbols to represent things on the maps along with beacon comments giving more information. Then you will be prepared to use APRS in emergencies to share valuable information and help the community.

Questions?

KJ7ROX@arrl.net

My BaseQTH:	KJ7ROX-0
My Truck:	KJ7ROX-9
HT:	KJ7ROX-7

Useful Links

- https://www.youtube.com/live/TnyLfDRqhUA?si=8VZgyzO_-p3XtwBc Hayden Honeywood's (VK7HH) YouTube video "Beginner's Guide to APRS" the thumbnail of which he gave kind permission to use as the first slide asking only that I link to the video. Also, check out Hayden's YouTube channel Ham Radio DX as well as his guest Steve's (KM9G) channel Temporarily Offline Ham Radio for many more videos about APRS and ham radio in general.
- KM4ACK's YouTube review of Graywolf: https://youtu.be/OBhkzZK-qAQ?si=ST1yCr2deVgUmOVj
- The Tech Prepper on APRS & Digirig-Lite: https://youtu.be/rcAjZ_6Dl0w?si=5C2qgUwoJl0SoD0P
- http://aprs.org/ Bob Bruninga's original APRS website (much info here though somewhat outdated)
- https://aprs-is.net/ Official website of APRS-IS
- https://how.aprs.works/ A central repository of all current and accurate APRS documentation (a work in progress.)
- https://aprsfoundation.org/ A recent APRS organization taking over from where Bob Bruninga left off and keeping APRS alive and well.
- https://groups.io/g/APRS For getting general APRS help
- https://discord.gg/yteKAEQ5Kb APRS Foundation's chat server on Discord.
- https://how.aprs.works/aprs-information-services/ List of APRS-IS bots, information servers and gateways.
- https://wcares.org/special-interests-3/aprs/ Nice summary of APRS use cases in an easy to read format.
- https://www.aprsdroid.org/osm/ Offline maps for APRSDroid plus a link to download older builds of APRSDroid for older versions of Android.