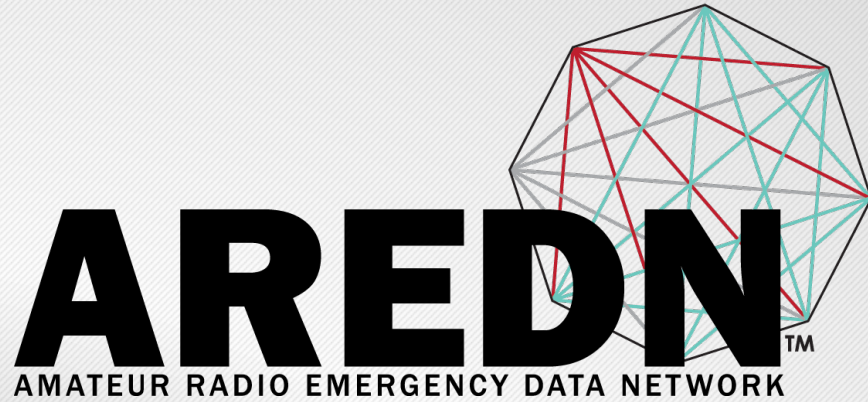




AREEDNTM

AMATEUR RADIO EMERGENCY DATA NETWORK

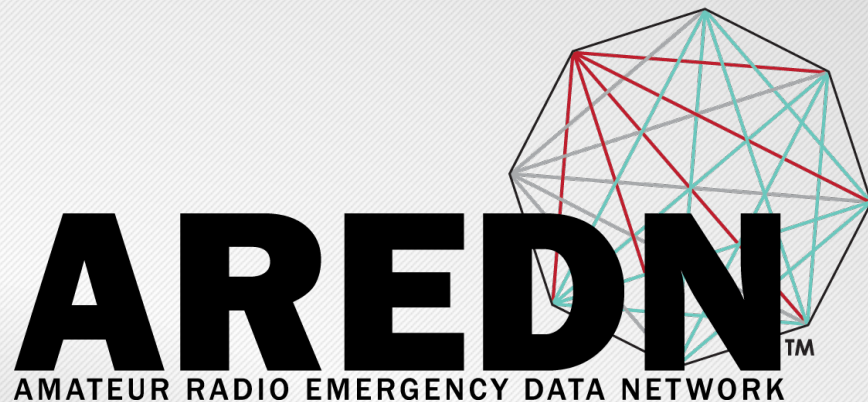


Amateur Radio in Public Health & Medical Services

Cooper University Hospital MCC
Camden, NJ

Randy Smith, WU2S

16 February 2019



High-Speed Multi-Media Mesh Network

Keep your data moving when the lights go out

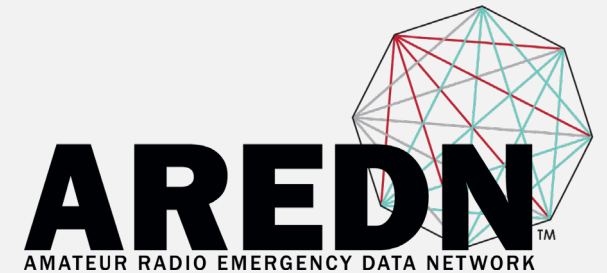


How many of you have used
microwave radios to send data?

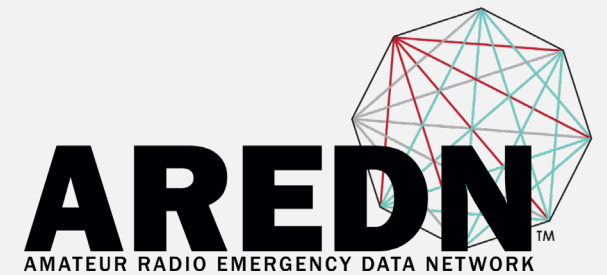




I would have figured most of you...

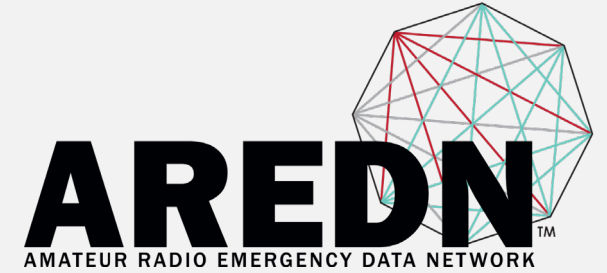


Introduction



What is it?
Why AREDN?
What can I do with it?

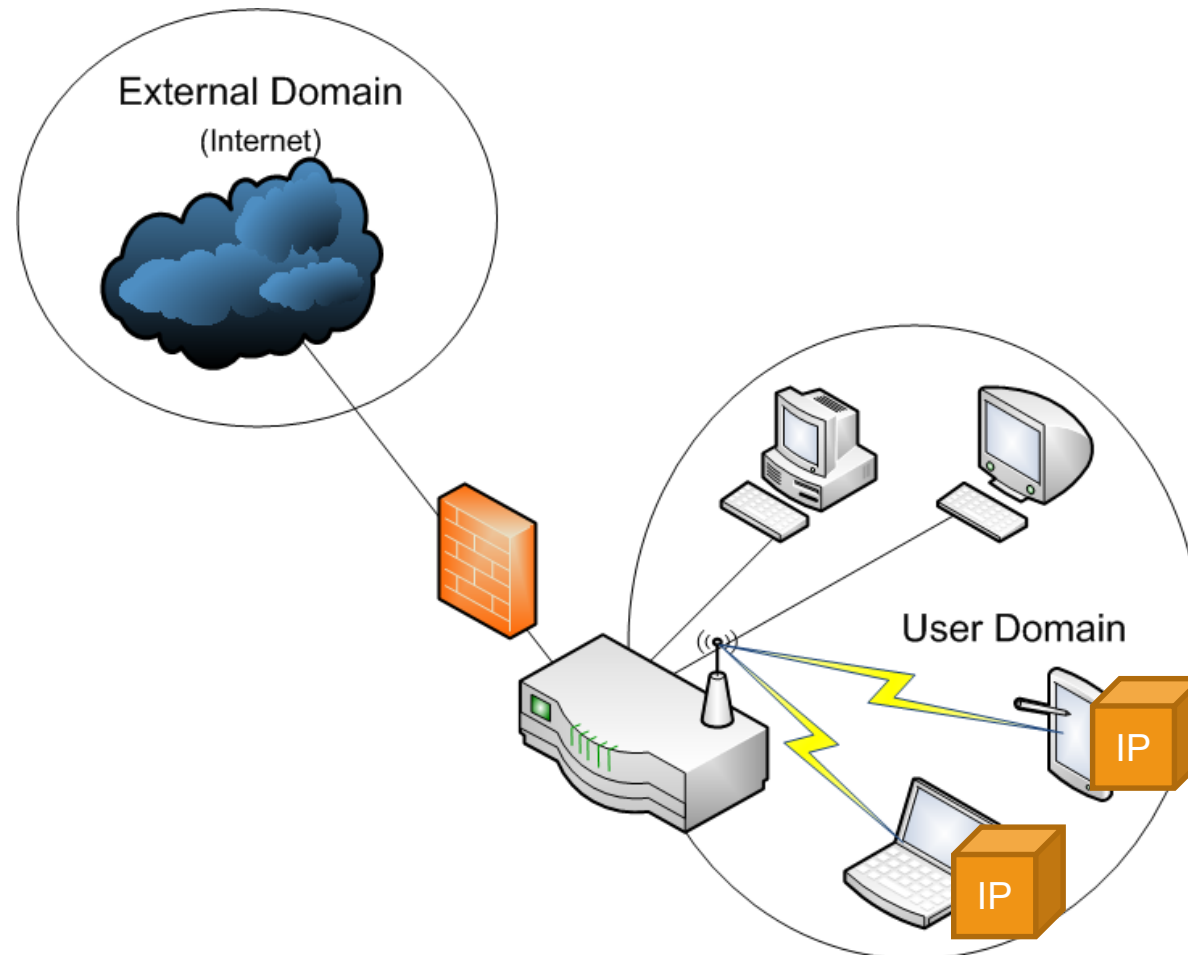
What is an AREDN Mesh Network?



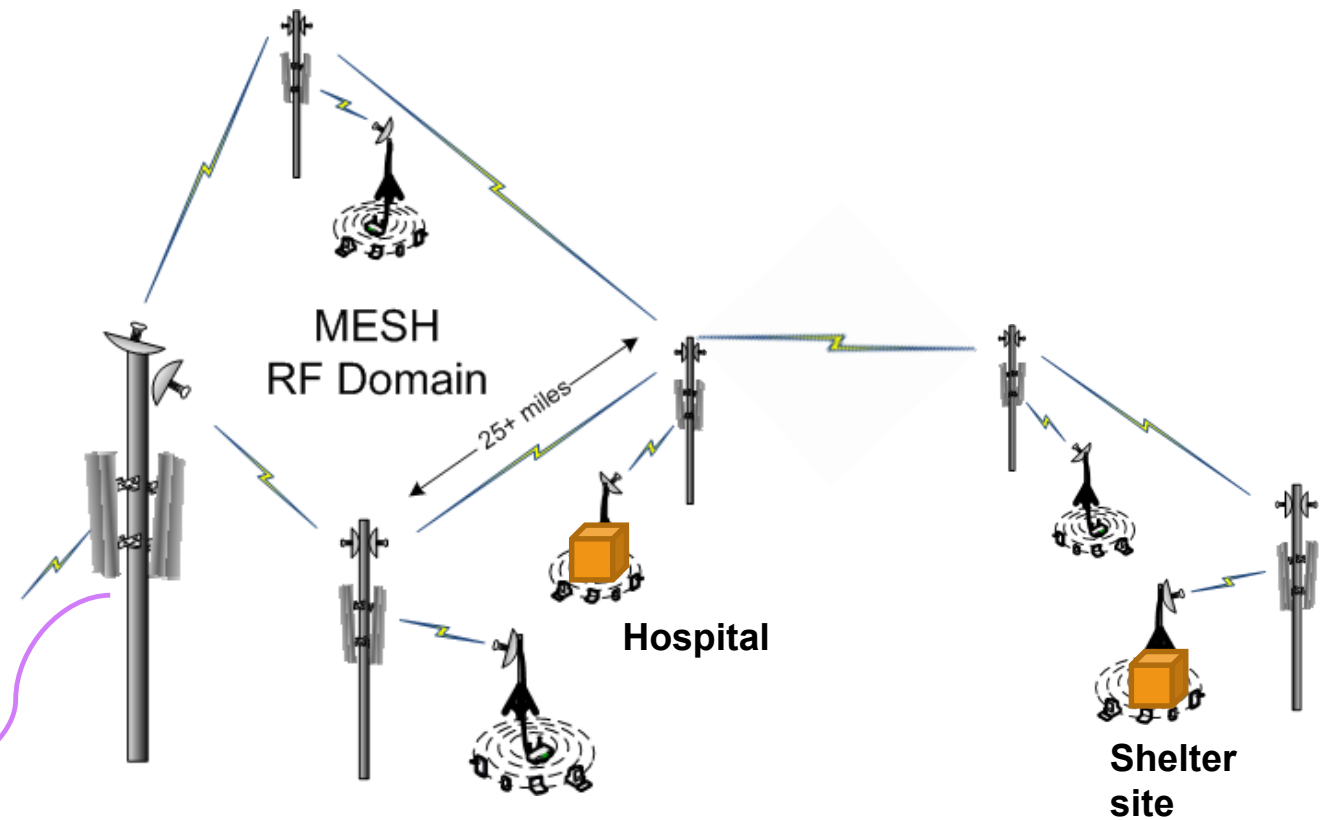
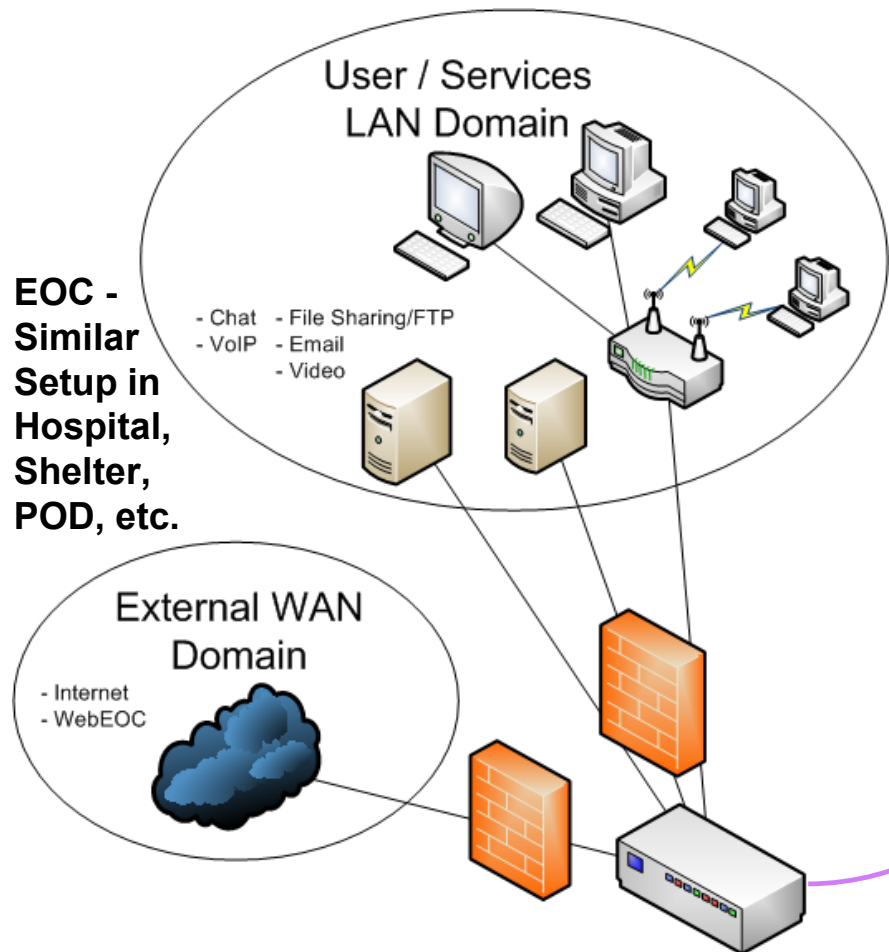
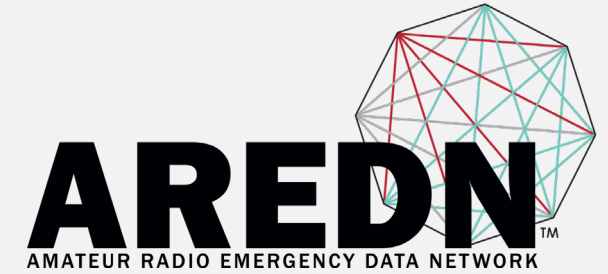
Radio links replace wires between locations.

An AREDN mesh network uses standard, proven Internet protocols to connect devices.

Standard WiFi Access Point



AREDN Mesh Network



What is AREDN ?



Software

- Open Source
- Agile, flexible dev model
- Highly active forums
- Developers also implement
- Focused on EmComm
- Nightly Builds available

Wireless Mesh

- Repurposed WISP routers (radios)
- In the Ham Bands
- Up to 144 Mbps IP Network (802.11n)
- Part 97 (Tech, General, Extra)

The Team

- Randy, WU2S
- Andre, K6AH
- Joe, AE6XE
- Darryl, K5DLQ
- Trevor, K7FPV
- New Contributors
- KG6WXG, KK4ZUZ, KF5DEB, KC0EUW, KK6RAY

How Do I Build a Mesh Network ?



Backbone

Mountains, water
towers, buildings,
antenna towers

24-30dB Dish

Rocket M2/M3/M5

Relay Nodes

Hills, tall masts,
buildings

RadioMobile to
determine location

NanoBeam,
PowerBeam,
NanoStation,
Rocket

Deployed Nodes

NanoBeam,
Nanostation,
Powerbeam

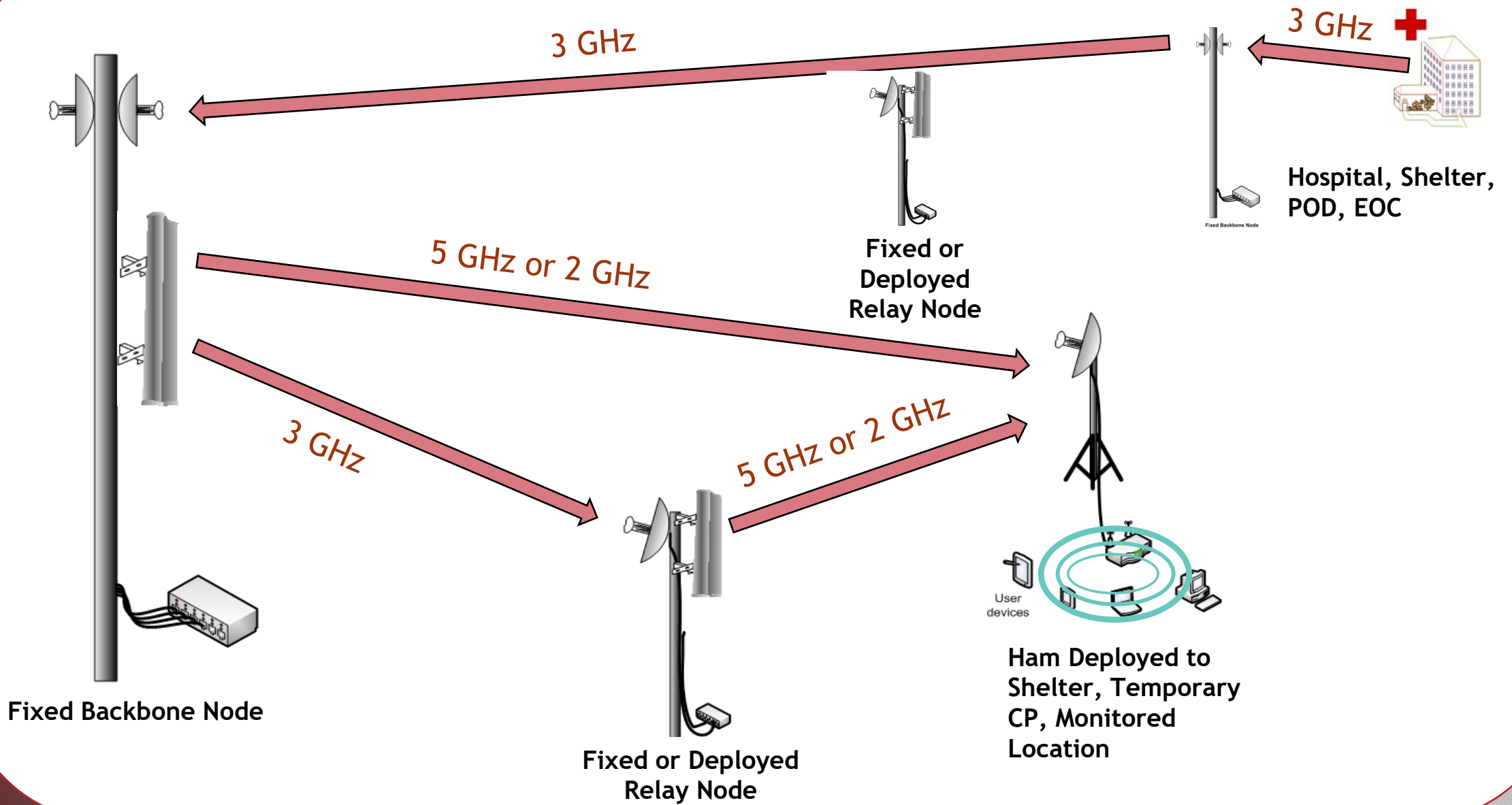
WIFI Access Point

10-20' mast

Suction cup window
mount

Solar panel

12VDC Battery



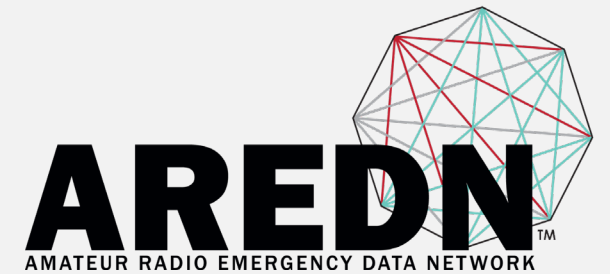
Why AREDN?

Actively Supported

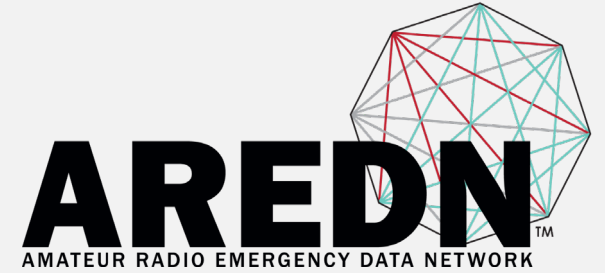
Low Cost

Easily Deployed

Easily Maintained

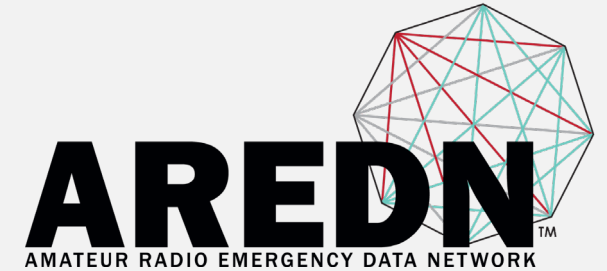


Why AREDN? - Actively Supported



- By the AREDN project team and hundreds of hams who have deployed AREDN mesh networks.
- Active community Forum is averaging 90 posts weekly.
- Frequent software updates address bug fixes, feature enhancements and support for new hardware. Since 9/23/2108, there have been 77 changes put into the code.
- The documentation is on Read The Docs. It is up to 112 pages and growing. Available as a PDF and open-source too.

Why AREDN? - Low Cost



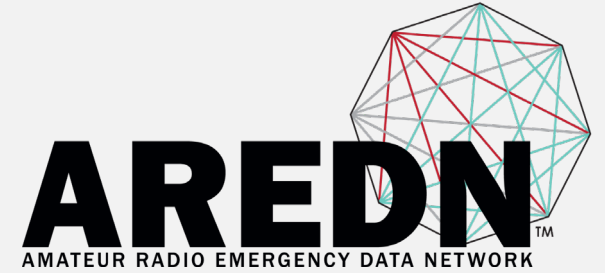
Ubiquiti airMAX M-series

- AirGrid (\$65)
- AirRouter (\$35 and \$60)
- Bullet (\$79) (+ antenna)
- NanoBridge (\$100)
- NanoStation (\$85)
- PicoStation
- PowerBeam (\$79 - \$200)
- Rocket (\$80) (+ antenna)
- (and TP-Link equivalents)

Mikrotik

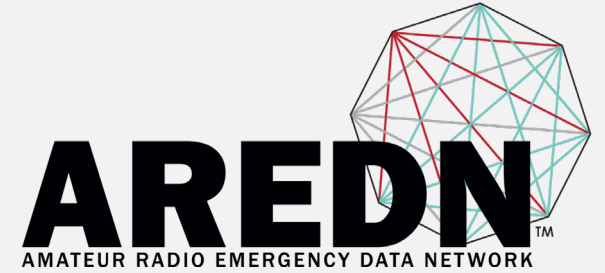
- BaseBox 2 & 5 (\$89)
- hAP ac lite (\$54)
- Lite Head Grid (\$53)
- LHG HP XL (\$75)
- Lite Dish Feed (\$39)

Why AREDN? - Easily Deployed



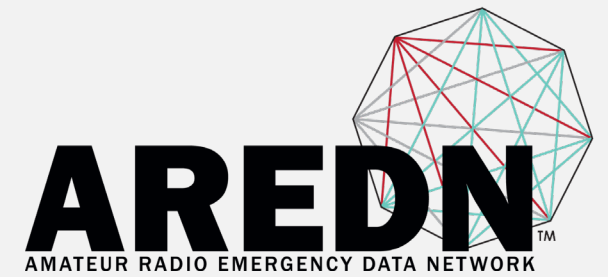
- Power and data go to each unit via one cable (PoE).
- Able to power devices with 12 VDC from batteries and solar panels.
- Devices are lightweight and rugged.

Why AREDN? - Easily Maintained



- Supported hardware is commercial WISP gear designed to be outside in the weather for years.
- Software updates are select and click.
- Software updates can be done over-the-air.
- Tools are available to monitor SNR, network performance and other device characteristics.

What Can I Do With It?

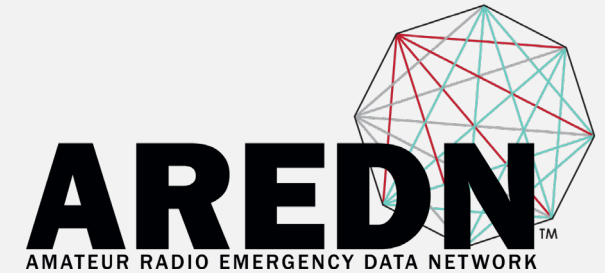


Applications

Services

Get Through the First 49 Hours

What Can I Do With It? - Applications



Chat

MeshChat
IRCd server
Jabber/XMPP
Let's Chat
Mattermost
Matrix

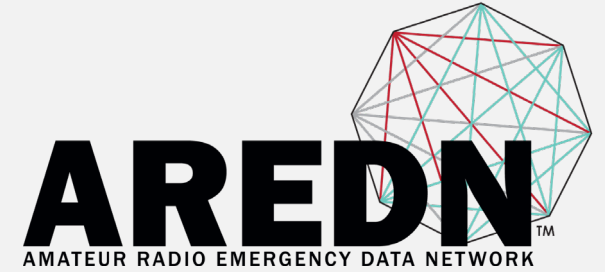
Email

WinLink
Citadel
Sendmail
Exim
Postfix
Dovecot

CAD and Web

TicketsCAD
EmComMap
Web server
File Sharing
OwnCloud
NextCloud

What Can I Do With It? - Services



VoIP

Asterisk

FreePBX

Linphone

TeamTalk

Zoiper

CSipSimple

Video

PTZ and Fixed Cameras

Blueiris

iSpy

MotionEye

ZoneMinder

Shinobi



Mobile Command Center

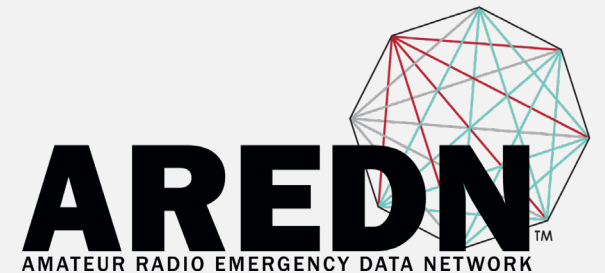
San Juan Capistrano, CA



“ This mesh camera system provided by RACES members was a valuable tool for our command staff. The parade was the safest in years. As we were taking the calls, we could see the activity occurring in realtime. Incredibly, there was only one arrest for fighting, which just happened to take place in the camera’s view.”

Sgt. Joseph Cope - Orange County Sheriff’s Administrator

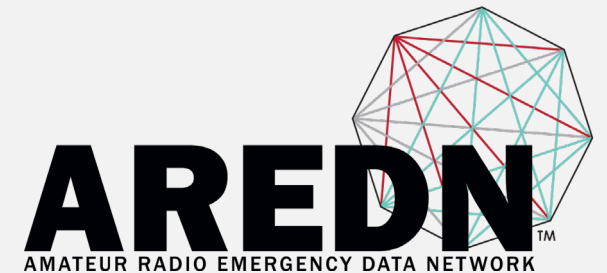
Streaming Video Services





Installing a Permanent PTZ Camera

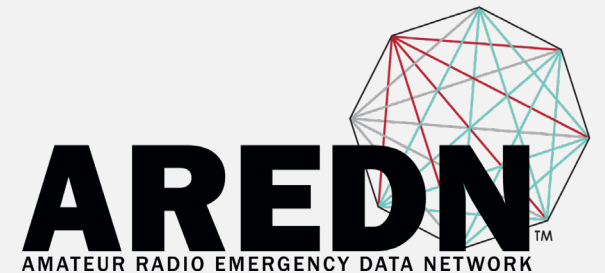
Orv Beach, W6BI



“Cameras are a valuable part of our growing ham network. But they come with their own set of challenges: configuration, management, bandwidth consumption, etc. But there's another challenge with cameras that have zoom capabilities.”

Orv Beach, W6BI, January 22, 2019

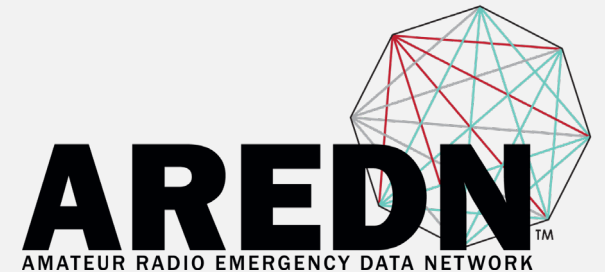
Manage Streaming Video, Stabilize Mount



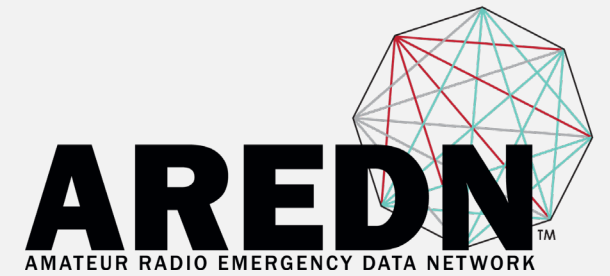
“The flexibility of a mesh network makes it ideal for public service. Even in the worst disasters, there will still be a point outside the affected area where internet access is still available. With a mesh network, amateurs can quickly deploy wireless nodes from the point of access all the way into the disaster area.”

Steve Ford, WB8IMY, QST February 2019

Why use an AREDN mesh network?



Summary

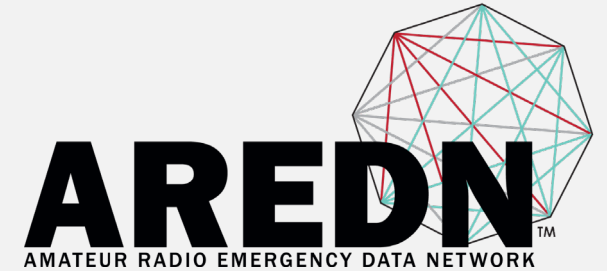


Features and Benefits

New Release September 2018

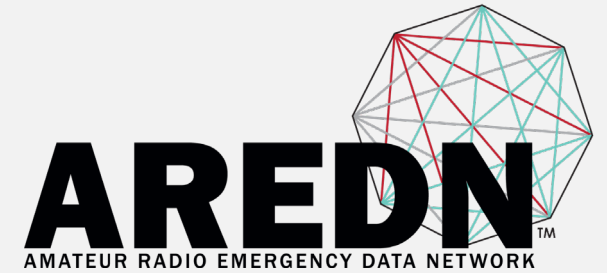
Frequent Improvements

Features & Benefits



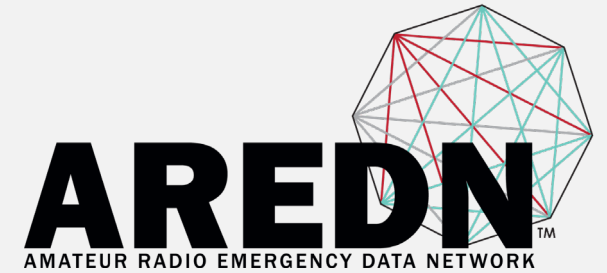
- Exclusive Part 97 Channels
- Over-the-Air firmware upgrades
- Maximum data rate of 144 Mbps
- Low investment entry
- Rapid deployment and implementation
- Multiple antenna choices
- Interfaces easily with other Internet capable devices

New Features September 2018



- OpenWRT 18.06.1 released in August 2018
- Can be loaded onto any supported Ubiquiti device by using the TFTP method
- Supports many of new Ubiquiti XW devices
- Available for specific Mikrotik Basebox models
- SSID, Channel and Bandwidth are now displayed on the main page

New Features September 2018



- Reduced code size for better performance and more memory
- SNR displays above the real-time chart to aid aiming
- Pages are now accessible via HTTP port 80
- Show the OLSR routing table size
- Node description on the Mesh Status page
- Display node's Latitude and Longitude on the main page



At the Center of Emergency
Prep**ARED**Ness



Thank You from the AREDN Project Team

Randy Smith, WU2S

wu2s@arednmesh.org

Semper Certus, Saepe Falsus

