

CT Region 1 Meshcore Project

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What is a Mesh network

A mesh communication network allows devices (nodes) to connect directly with one another and relay messages across the network without relying on a central hub or cellular infrastructure.

How It Works

- Each device acts as both a **sender** and a **relay**.
- Messages can "hop" through multiple devices to reach their destination.
- If one connection fails, data can automatically find an alternate path.

Key Advantages

- ✓ No single point of failure
- ✓ Extended coverage through multi-hop routing
- ✓ Self-healing and resilient networks
- ✓ Useful in remote or disaster-affected areas

MESH COMMUNICATIONS EXPLAINED

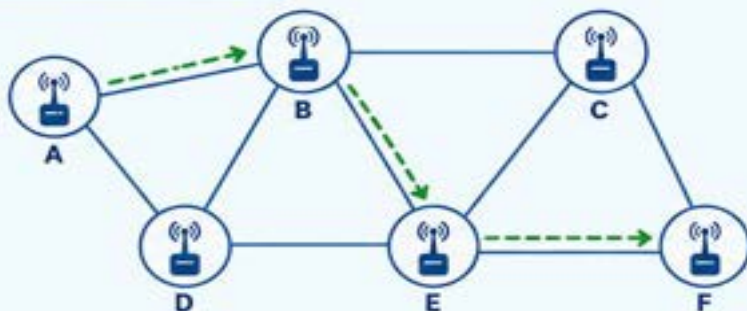
Mesh networks connect each node to multiple neighbors.
Data can hop from node to node to reach its destination.

1. MESH NETWORK – NORMAL OPERATION

MESSAGE PATH

A → H

Data travels from Node A to Node F through intermediate nodes.



— Direct Link
(Radio Connection)

- - - Data Route
(Multi-Hop)

Mesh Node
(Device)

HOW MESH WORKS



Every node connects to multiple neighbors.



Data is broken into packets and sent from node to node.



Packets may take different paths based on best available route.



If a path fails, the network automatically finds another way.

2. NODE FAILURE & SELF-HEALING

NODE E FAILS



The network detects the failure and automatically reroutes the data via other nodes.



NEW ROUTE

A → F

Data is delivered successfully using an alternate path.



3. MESH vs. TRADITIONAL NETWORK

MESH NETWORK



- ✓ No single point of failure
- ✓ Self-healing & reliable
- ✓ Scalable & flexible
- ✓ Better coverage

TRADITIONAL HUB-AND-SPOKE



- ✗ Central hub is single point of failure
- ✗ Failure stops the network
- ✗ Limited scalability
- ✗ Coverage depends on hub



Mesh communications provide resilient, reliable, and efficient connectivity by allowing devices to work together as a unified network.



Reliable



Self-Healing



Scalable



Wide Coverage

LoRA Long Range

LoRa (Long Range) is a wireless radio modulation technology designed for transmitting small amounts of data over very long distances while using very little power.

It operates in **unlicensed radio frequency bands** (such as 433 MHz, 868 MHz, and 915 MHz, depending on the region), allowing devices to communicate without cellular networks.

LoRa uses a modulation technique called **Chirp Spread Spectrum (CSS)**, which improves signal robustness and enables communication over long distances even in noisy environments.

Typical communication ranges can be:

- **2–5 km (1–3 miles)** in dense urban areas.
- **10–15 km (6–9 miles)** in rural areas.
- More than **20 km (12+ miles)** under ideal line-of-sight conditions.

LoRa is optimized for **low data rates**, typically from a few hundred bits per second up to tens of kilobits per second.

Devices using LoRa can often operate for **years on a single battery**, making it ideal for remote sensors and Internet of Things (IoT) applications.

Advantages of LoRa

Advantages of LoRa:

- Long communication range
- Very low power consumption
- Low infrastructure costs
- Good penetration through buildings and vegetation
- Supports large numbers of connected devices

Limitations of LoRa:

- Low bandwidth and data throughput
- Not suitable for voice, video, or large file transfers
- Duty-cycle and transmission limits may apply in some regions
- Potential interference in unlicensed frequency bands

MESHTASTIC vs MESHCORE

TWO DIFFERENT APPROACHES TO OFF-GRID MESH COMMUNICATION

 MESHTASTIC Open Source • Community Driven • LoRa Mesh		VS	 MESHCORE Open Source • Professional Support • LoRa Mesh
Open source firmware and ecosystem.		PHILOSOPHY	Open source firmware and ecosystem.
Free to use.		COST	Free to use.
DIY-friendly. Works on many supported devices (ESP32, nRF52, RP2040, etc.).		HARDWARE	Designed to run on official MeshCore devices (optimized hardware).
Flexible and highly configurable. Many plugins, modules and custom options.		FEATURES & FLEXIBILITY	Simple, polished experience with features focused on reliability and ease of use.
Uses LoRa (sub-GHz) for long-range mesh communication.		RADIO TECHNOLOGY	Uses LoRa (sub-GHz) for long-range mesh communication.
Public (unencrypted by default). Supports optional encryption.		ENCRYPTION	Private and secure by default. End-to-end encrypted with strong security model.
Text messages, MQTT, telemetry, position sharing, sensor data, custom apps via plugins.		USE CASES	Text messaging, telemetry, tracking, check-ins, emergency comms, team coordination.
Best for hobbyists, makers, researchers and anyone who wants full control and customization.		IDEAL FOR	Best for professionals, teams, organizations and users who want reliability, simplicity and support.
Does NOT use a backbone of repeaters. All nodes are equal and can route messages (peer-to-peer mesh).		BACKBONE ARCHITECTURE	Uses a backbone of repeaters. MeshCore repeaters form a high-capacity backbone that increases range, stability and throughput.
Up to 7 hops (configurable).		MAXIMUM NUMBER OF HOPS	Up to 64 hops.

NETWORK ARCHITECTURE



Open mesh network.
Anyone can join and relay.

Meshtastic



Backbone of repeaters creates
a resilient, high-capacity network.

MeshCore

DEVICE ECOSYSTEM

Meshtastic



Runs on many open hardware
options from different
manufacturers.

MeshCore



Runs only on official
MeshCore devices for
best performance.

AT A GLANCE

MESHTASTIC

- ✓ Open Source
- ✓ Free to Use
- ✓ DIY & Customizable
- ✓ Highly Flexible
- ✓ Best for Tinkerers and Makers

Up to 7 Hops

MESHCORE

- ✓ Open Source
- ✓ Official Hardware
- ✓ Professional Support
- ✓ Simple & Secure
- ✓ Backbone of Repeaters
- ✓ Best for Teams and Professionals

Up to 64 Hops



BOTTOM LINE:

Meshtastic is about freedom, customization and community. MeshCore is about reliability, security and professional support. Both use LoRa mesh networking to keep you connected when there's no internet or cell service.



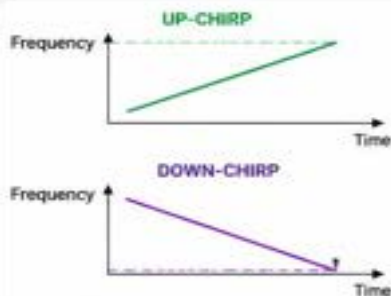
CHIRP SPREAD SPECTRUM (CSS)

CSS is a modulation technique used by LoRa that spreads a signal over a wide bandwidth using a chirp (a signal whose frequency increases or decreases over time).

910.25MHz 62.5kHz

1. WHAT IS A CHIRP?

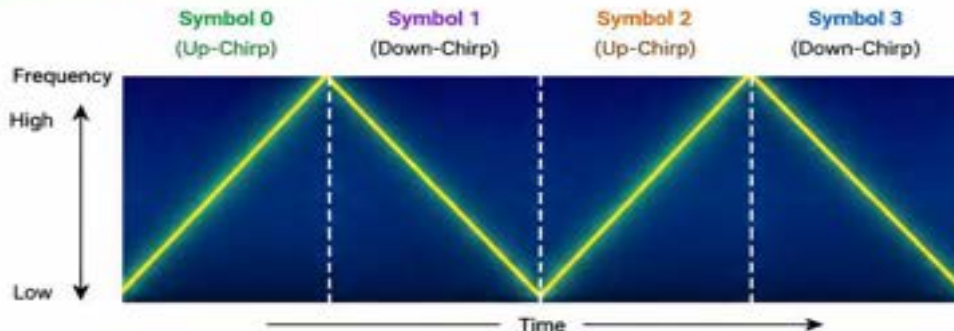
A chirp is a signal that sweeps linearly in frequency over time. It can sweep up (up-chirp) or down (down-chirp).



2. HOW CSS WORKS

Each symbol is represented by a chirp. Different starting frequencies (called chirp shifts) encode different symbols. The wide bandwidth of the chirp makes the signal robust to noise and interference.

3. EXAMPLE: 4 CSS SYMBOLS

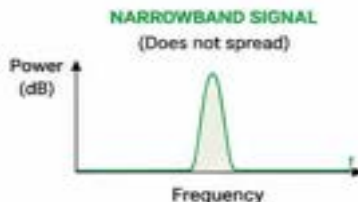


Chirp Shift
(starting frequency)



Different starting frequencies represent different symbols.

4. SPREADING OVER BANDWIDTH



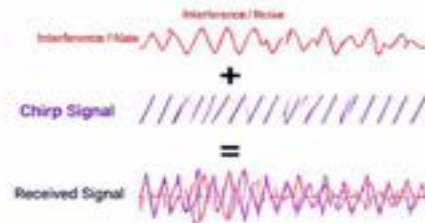
Uses narrow bandwidth
More susceptible to interference

VS.



Uses wide bandwidth
More resistant to interference and noise

5. WHY CSS IS ROBUST



Because the chirp is spread over a wide bandwidth, the receiver can still detect and decode the symbol even in noisy environments.

6. KEY BENEFITS OF CSS



Long Range
Better link budget
due to processing gain



High Robustness
Resistant to noise,
interference, and fading



Good Penetration
Works well in urban,
indoor, and rural areas



Low Power
Allows low data rates
and long battery life

Why should your club be involved?

Hank Magnuski, KA6M

Ecomm

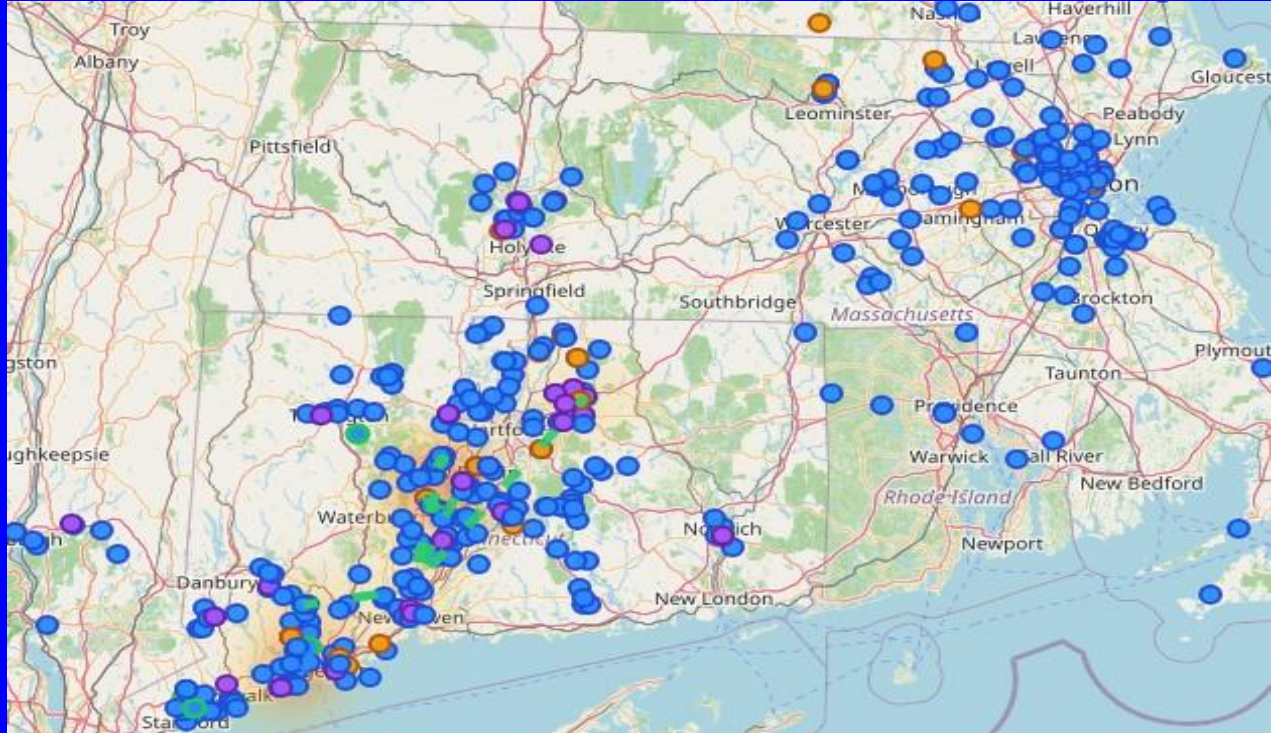
Grow your club

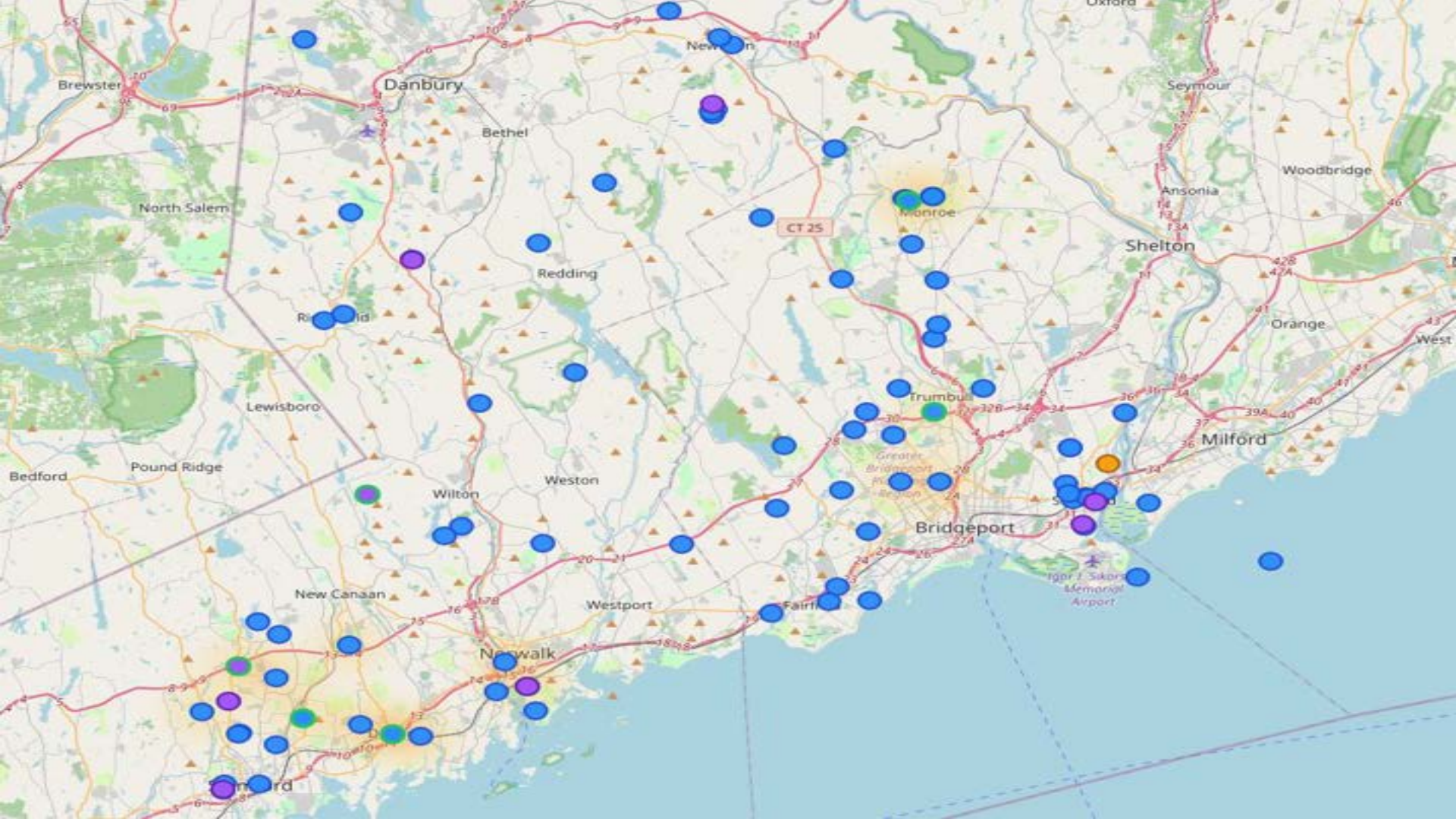
Create interest in radio

Support your community



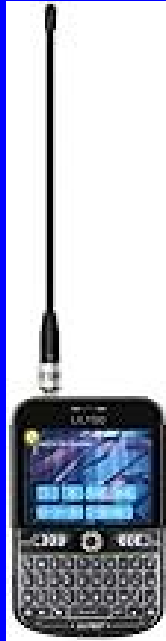
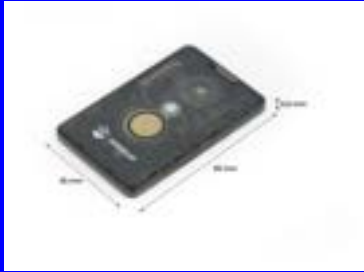
Create interest and expansion





Hardware

Companion Device



Repeater (ESP32 nRF52)

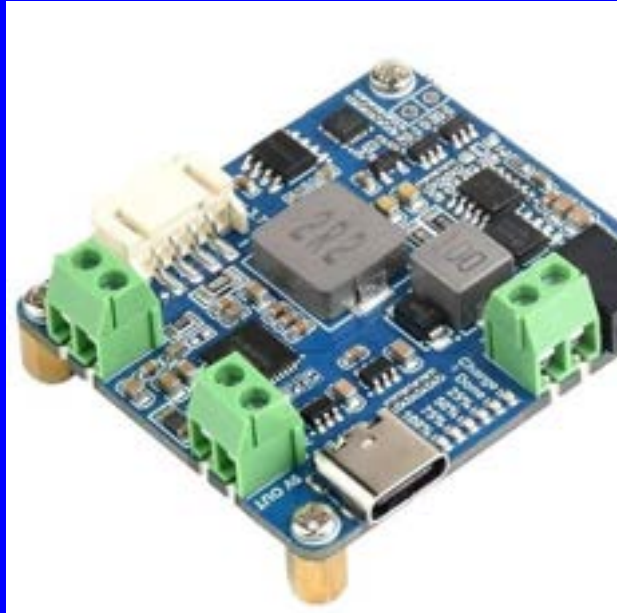


RAK Wireless Wisblock 1 Watt

RAK 1 Watt \$49



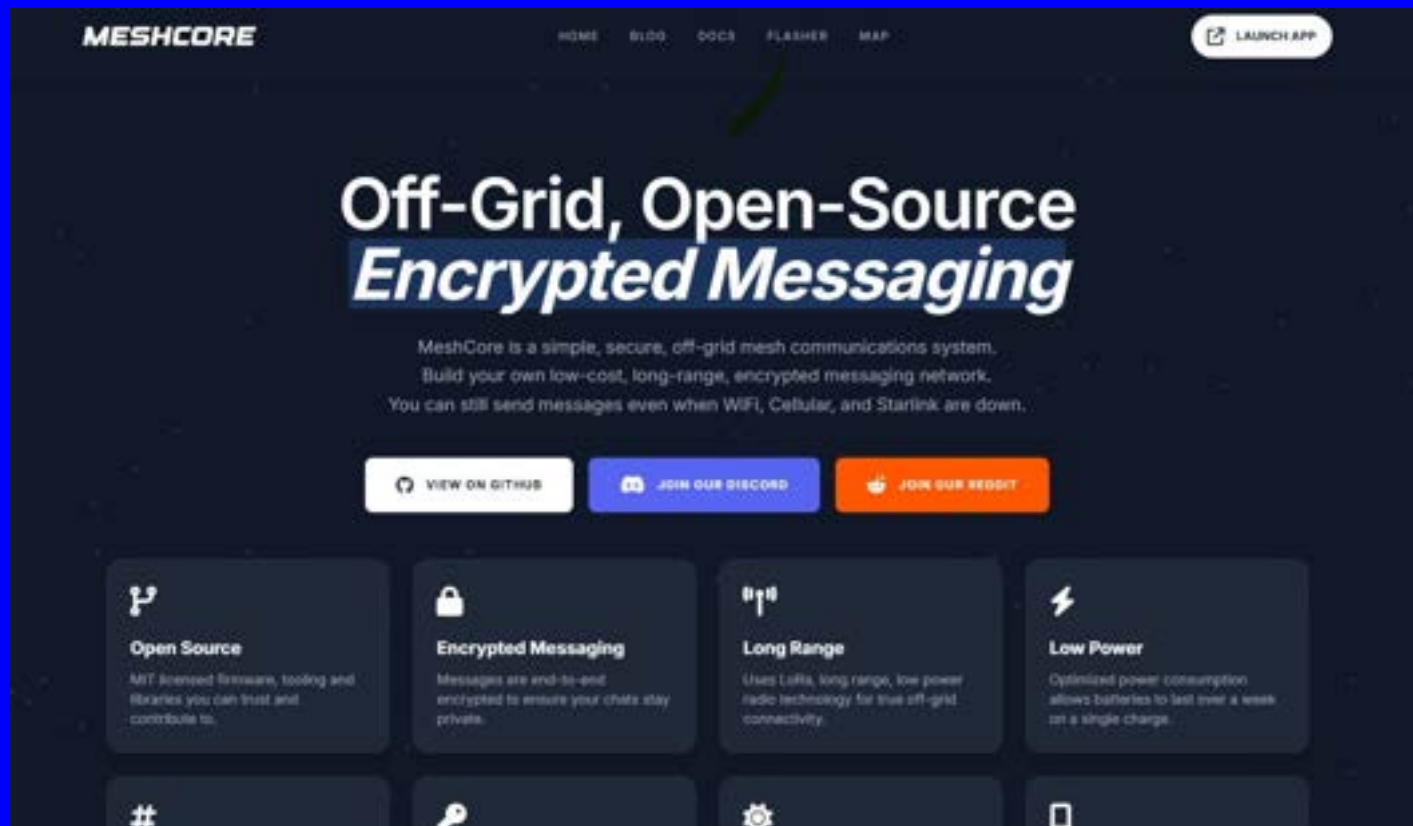
Wavesher solar controller \$18



\$16



Flashing & Setup [Meshcore.io](https://meshcore.io)



	Multi Works R1 Neo	
	ProMicro nRF52 (fakelink)	
	RAK WisBlock / WisMesh (RAK 4631)	
	RAK WisBlock 3112	
	RAK WisMesh YW Booster (3401 + 13302)	
	RAK WisMesh Tag	
	RPI Pico 2040 + WaveShare SX1262	
	Seed Studio SenseCAP Solar	
	Seed Studio SenseCAP T1000-E	
	Seed Studio Wo Tracker L1 LINK	
	Seed Studio Wo Tracker L1 Pro	
	Seed Studio Xiao C3	
	Seed Studio Xiao nRF52 WIO	
	Seed Studio Xiao S3 WIO	
	UniTag Nano G2 Ultra	



Seed Studio SenseCAP Solar

Choose role

Community Firmware



Companion Bluetooth



Companion USB



Repeater



Room Server

WARNING: We strongly recommend installing QTAFIX bootloader by @b0llaco if you plan to update firmware via OTA bluetooth, as factory bootloader does not support it! [Read more](#)

Version

v1.15.0

Changelog:

<https://blog.meshcore.io/2026/04/19/release-1.15.0>

Default Scope support

Support for New GROUP_DATA (binary) packets #1928 #2130

Heltec V4.3 support #1867

Heltec nRF Tracker (T096) support #2097

GAT562 Mesh EVB Pro repeater and room server support #2042

Radio rxgain now ON by default #2124

Radio freq range now supported down to 150Mhz #2126

GPS pref persistence fix #2018

New get/set dutycycle CLI command #1961

Muzi Works R1 Neo support #2007

GAT562 Watch support #2138 #2228

BME680 sensor init fix #2227

Heltec Wireless Paper battery read fix #2164

WiFi companion fixes for Heltec V4, TBeam 1W #1833

Waveshare RP2040: RXEN fix #2238

nRF companion, support for OTA updates #2323

Added companion for Heltec Wireless Paper #2315

Misc #2134 #2190 #1425 #2075 #2302 #2306

Xiao C3 bootloop fix #2328

✔ DFU mode active

✔ Flash Erased! Flashing erase firmware 100%

⚡ Flash

Info & Actions



Console



Import



Export

Version

v1.15.0-dee3e26 (Built: 19-Apr-2026)

Clock

11:06 - 1/6/2026 UTC

Public Key

EB571E271ED245947189129073CFE40600AF8326407A1DC40C



Role

repeater

Private Key

.....



Send Advert



Start OTA



Reboot



Factory reset

Name & Location

Name

SenseCap_Solar Repeater

23 / 32 bytes

Latitude

0

Longitude

0



Access

New Admin password

Guest password

Radio settings

Profile

Custom

Radio settings

Preset

Custom

Custom

Australia

Australia (Narrow)

Australia (Mid)

Australia: SA, WA

Australia: QLD

EU/UK (Narrow)

EU/UK (Deprecated)

Czech Republic (Narrow)

EU 433MHz (Long Range)

EU 433MHz (Narrow)

New Zealand

New Zealand (Narrow)

Portugal 433

Portugal 868

Switzerland

USA/Canada (Recommended)

Vietnam (Narrow)

Vietnam (Deprecated)

☒ Show advanced settings

Advanced settings

Loop detection

Off

Path hash mode

2-byte (1)

Interference threshold

0

AGC reset interval

0

RX delay base

0

TX delay factor

0.5

Direct TX delay

0.3

☒ Repeat ☐ Multi ACKs

Open the Meshcore app and connect via your companion

Under command prompt

Set tx 22

Gps on

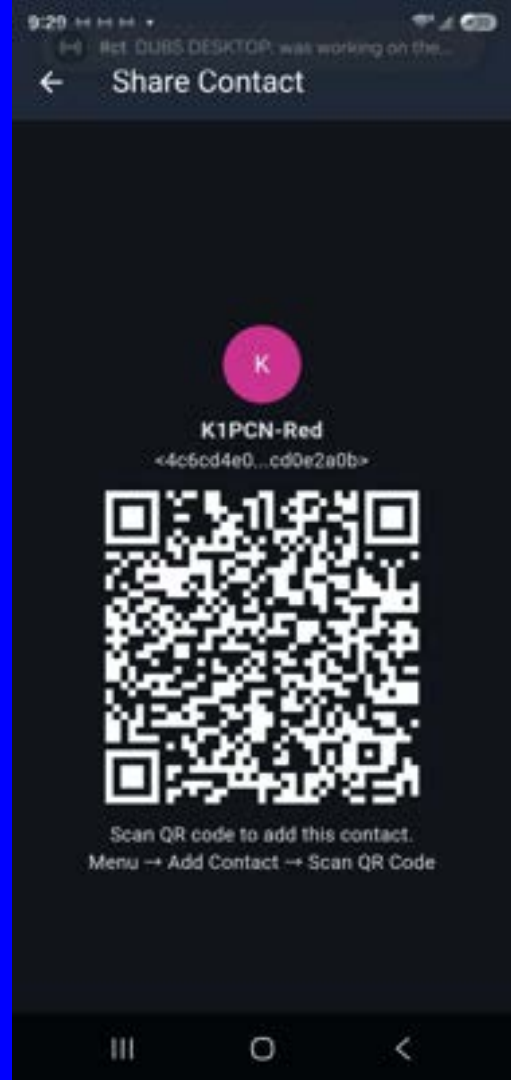
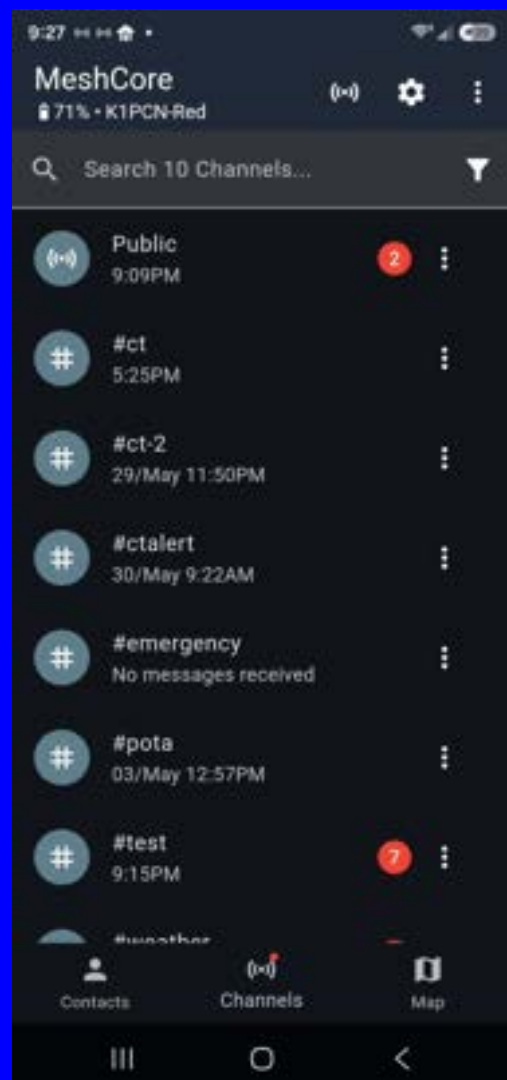
GPS setloc

GPS sync

Discover neighbors

Send advert

Reboot and check Clock!!!



CT Meshcore Channels for BDL

#public

#CT

#CT-2

#CTalert

#emergency

#pota

#test

#weather

Fairfield Hams



Fairfield Hams

Scan QR code to add channel.

Menu → Add Channel → Scan QR Code

Secret Key

d6dad0ffdbed7edae4cd3966

64af339

Anyone with the secret key can send and receive messages in this channel.

Repeater Placement

Height is Might LOS tool

Location, location, Location

Enlisting hams and non hams

Patience is a virtue

Better antenna

More power

trees



Meshcore

Innovation

Communication

Problem Solving

People interested in Technology

For Industry >

Products ▾ Local Warehouse ▾ Documents ▾ Customization ▾ Solution ▾ Support ▾ Open Claw

Home / LoRa & Meshtastic & 4G / SenseCAP Solar Node P1-Pro for Meshtastic



SenseCAP Solar Node P1-Pro for Meshtastic

SKU 114993633

★★★★★ 32 Reviews

[Request Custom/ Bulk Quote >](#)

It is a solar-powered communication node that integrates the XIAO nRF52840 Plus main controller, the Wio-SX1262 LoRa module, and the XIAO L76K GPS module. It is specifically designed for areas without network coverage. With a built-in battery, it supports long-distance communication, precise positioning, and low-power operation. It's suitable for expanding network coverage in outdoor areas.

USD **\$95.99**

10+: \$95.99

Ships from California

Duty-free. Sales tax & shipping applied at checkout.

Product Series: Solar Node P1-Pro

[Starter Kit](#) [T1000-E](#) [Solar Node P1](#)



SenseCAP Card Tracker T1000-E for Meshtastic

SKU 114993369

★★★★★ [142 Reviews](#)

[Request Custom/ Bulk Quote >](#)

The SenseCAP T1000-E is a compact **Meshtastic** device designed for off-grid communication and location sharing. About the size of a credit card, it can be easily carried or attached to gear for outdoor use. Powered by Semtech's LR1110 LoRa transceiver (863-928 MHz), Nordic's nRF52840 processor, and the Mediatek AG3335 GNSS module, it enables reliable long-range LoRa communication and location updates within Meshtastic networks.

USD **\$39.90**

10+: \$39.90

Ships from California

Duty-free. Sales tax & shipping applied at checkout.

Product Code: T1000-E



Antennas

Batteries

Cables/Connectors

LoRa

PCI/Mini PCI-E

PoE

WiFi

[Home](#) [Shop](#) [5.8 dBi N-Male Omni Outdoor Helium 915 MHz Antenna for RAK Miner Hotspots & Meshtastic](#)

5.8 dBi N-Male Omni Outdoor Helium 915 MHz Antenna for RAK Miner Hotspots & Meshtastic

\$42.97 ~~Stock: 89~~

★★★★★ 4.81

Style: WHITE/White

WHITE/White

Brush Black

Quantity

- 1 +

Add to cart

Last purchased Apr 28, 2026

[View order](#)



CablesOnline, 1ft RP-SMA Male to N-Type Bulkhead Female 50-Ohm RG316 Coax Low Loss Cable

Visit the [CABLESONLINE.COM ATLANTIC COMPUTERTECH](#) Store

4.5 ★★★★★ (152) [Search this page](#)

30+ bought in past month

\$12.99

Thank you for being a Prime member. Get \$150 off: Pay ~~\$8.00~~ \$18.99 upon approval for Prime Visa.

Customers usually keep this item.

Brand	CABLESONLINE.COM ATLANTIC COMPUTERTECH
Connector Type	RF Connector
Cable Type	RG-316
Compatible Devices	Radio Transmitters, Receivers, Antennas
Special Feature	High Speed

About this item

- (1) Gold Plated RP-SMA Male Connector w/ Female Pin

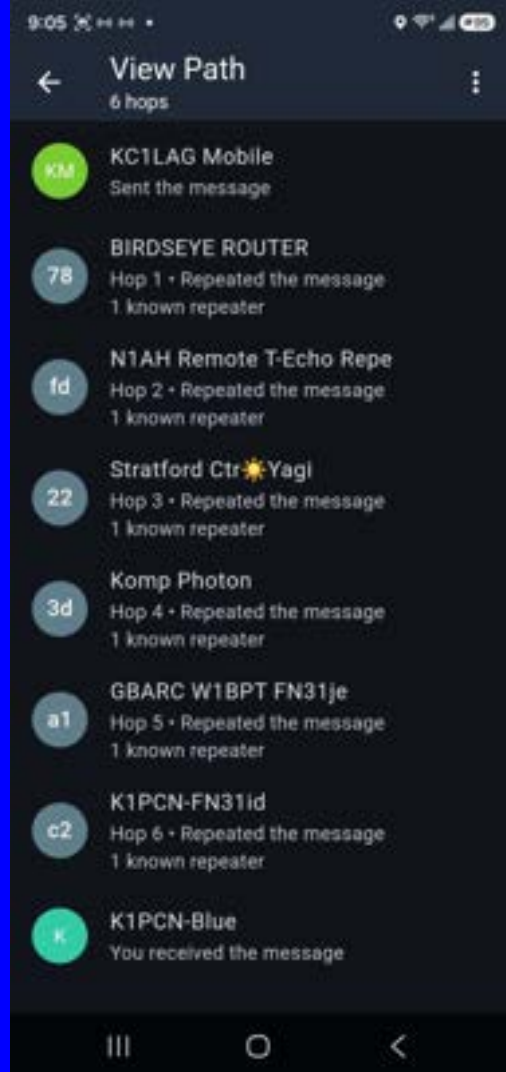
[Click to see full view](#)

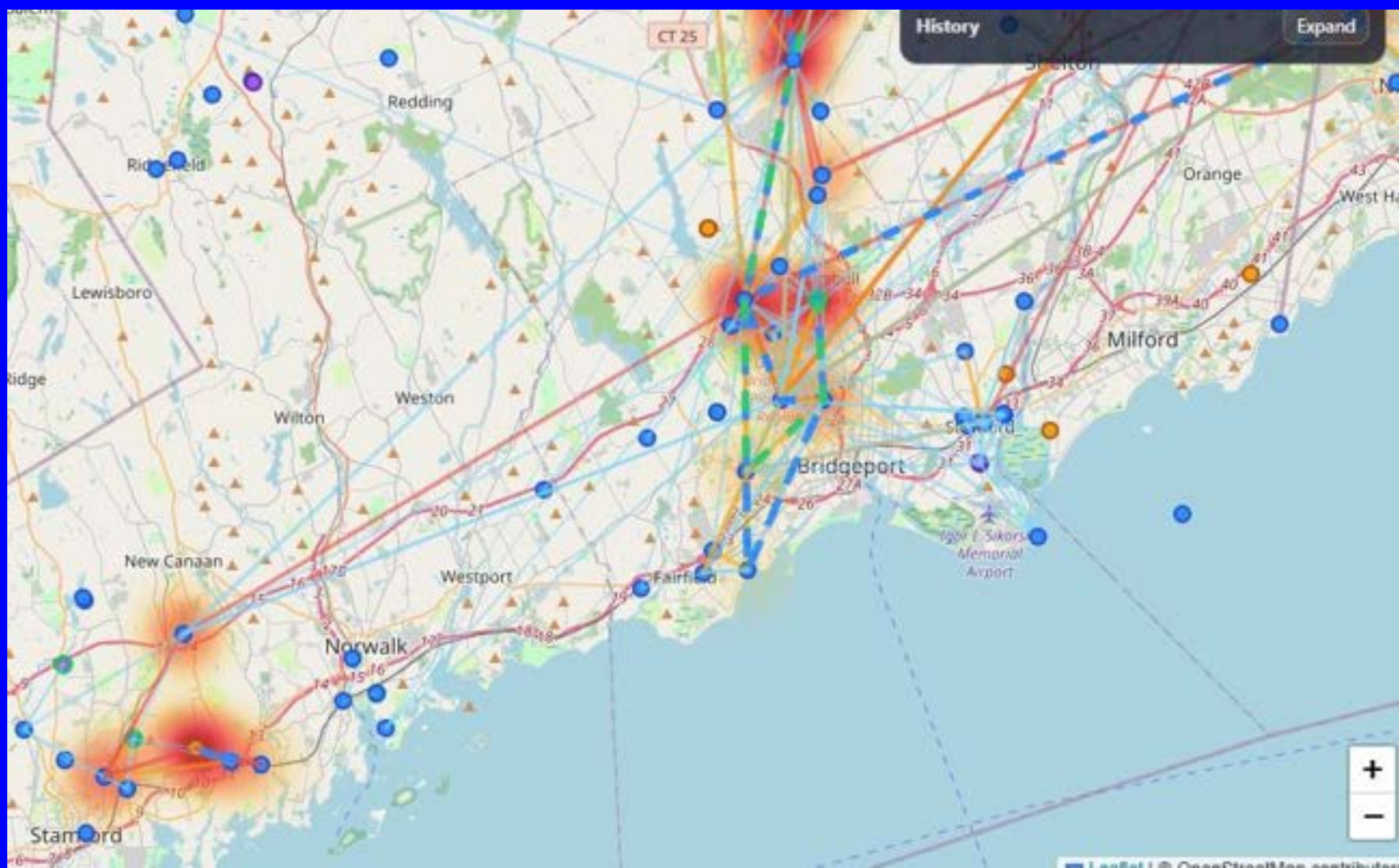
Meshcore Tools

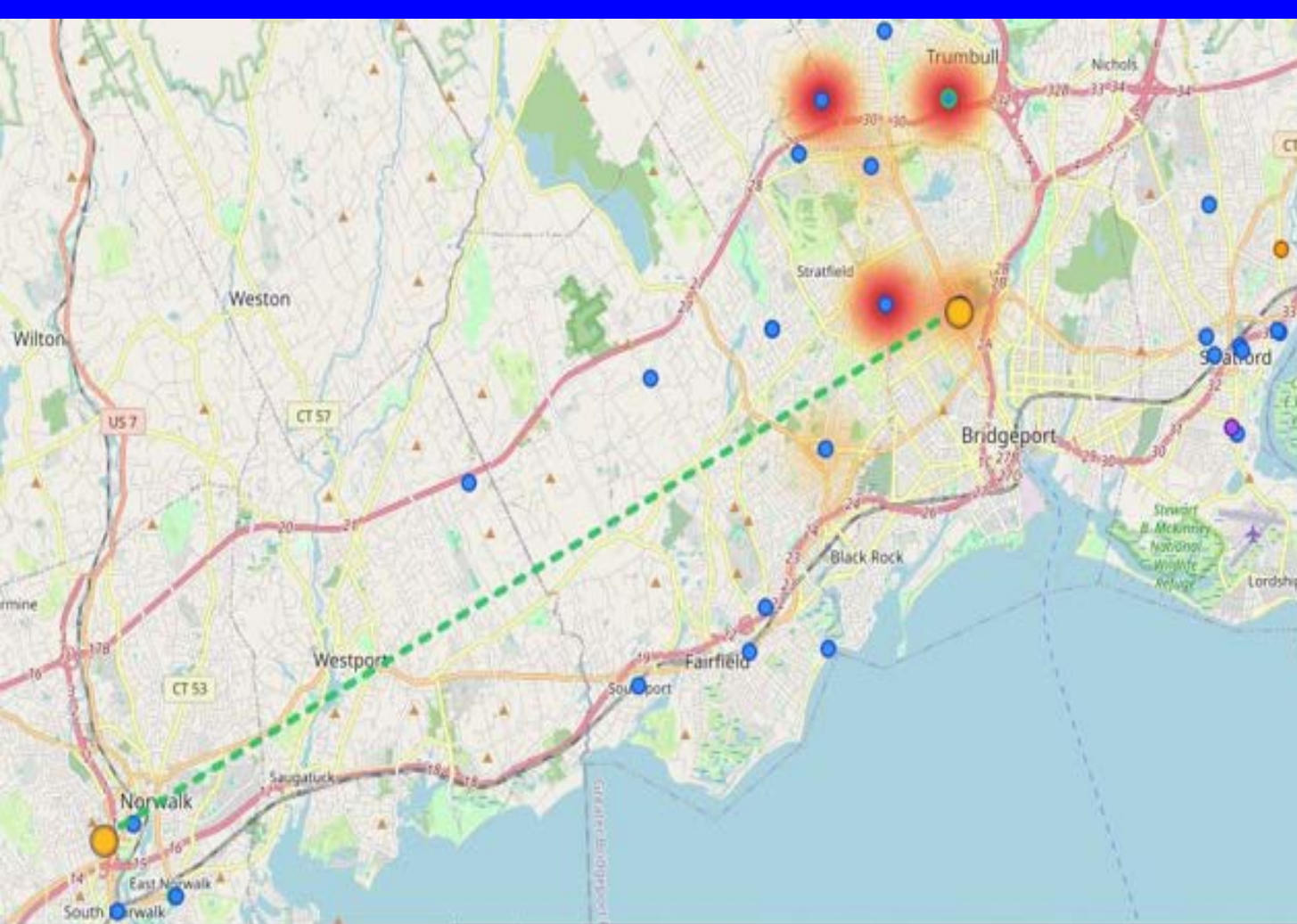
Meshcore app

CTmesh.org

Meshcore analyser







Longitude

151.209296

Pin height (m)

0

Medium

Add pin from coords

Move selected pin

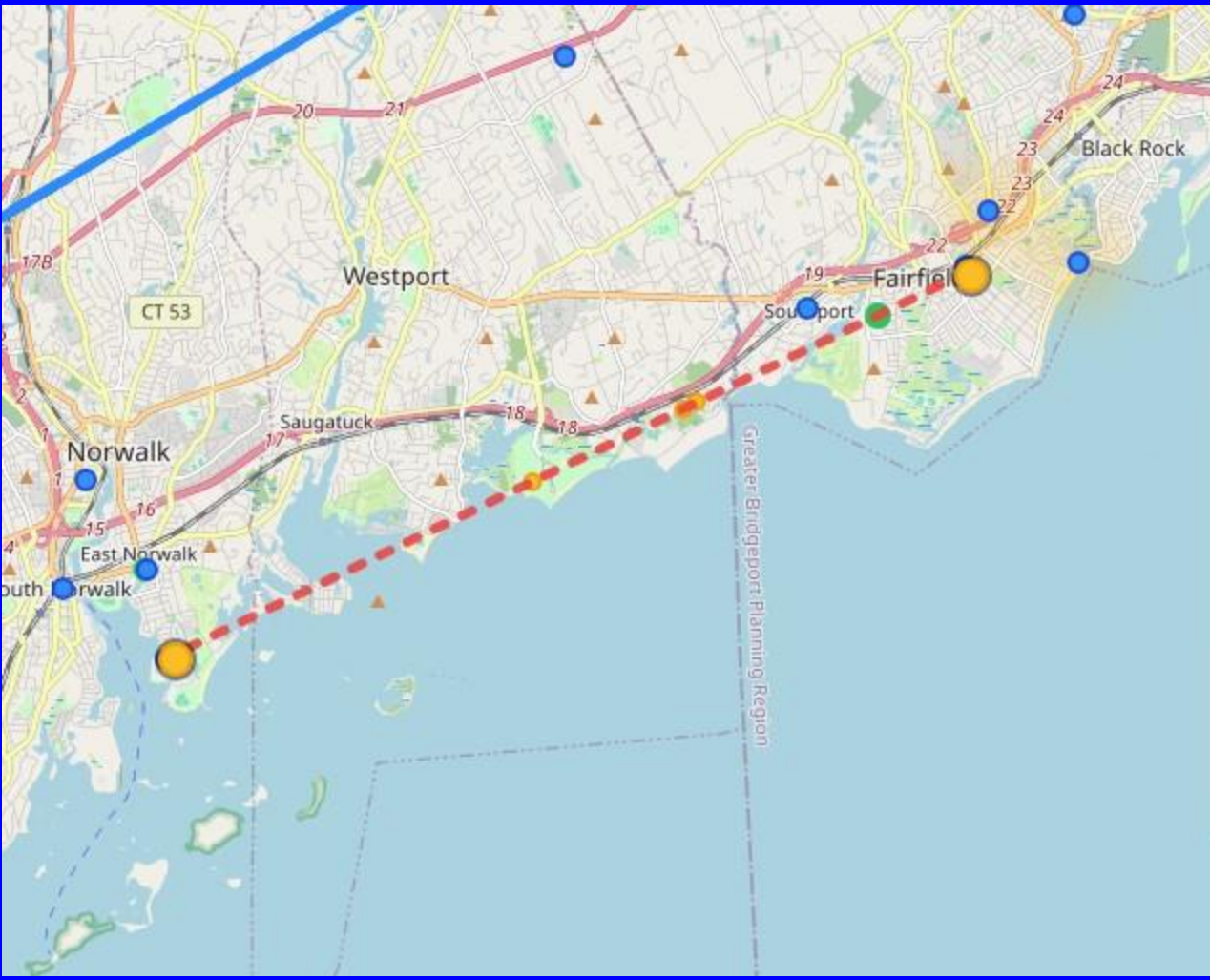
Add pins to build a route. Select a segment to edit its start and end pin heights. Heights are above ground at that pin. Click the profile to copy coordinates.

Remove last pin

Clear LOS pins

Elevation profile





Longitude
151.209296

Pin height (m)
0

Add pin from coords

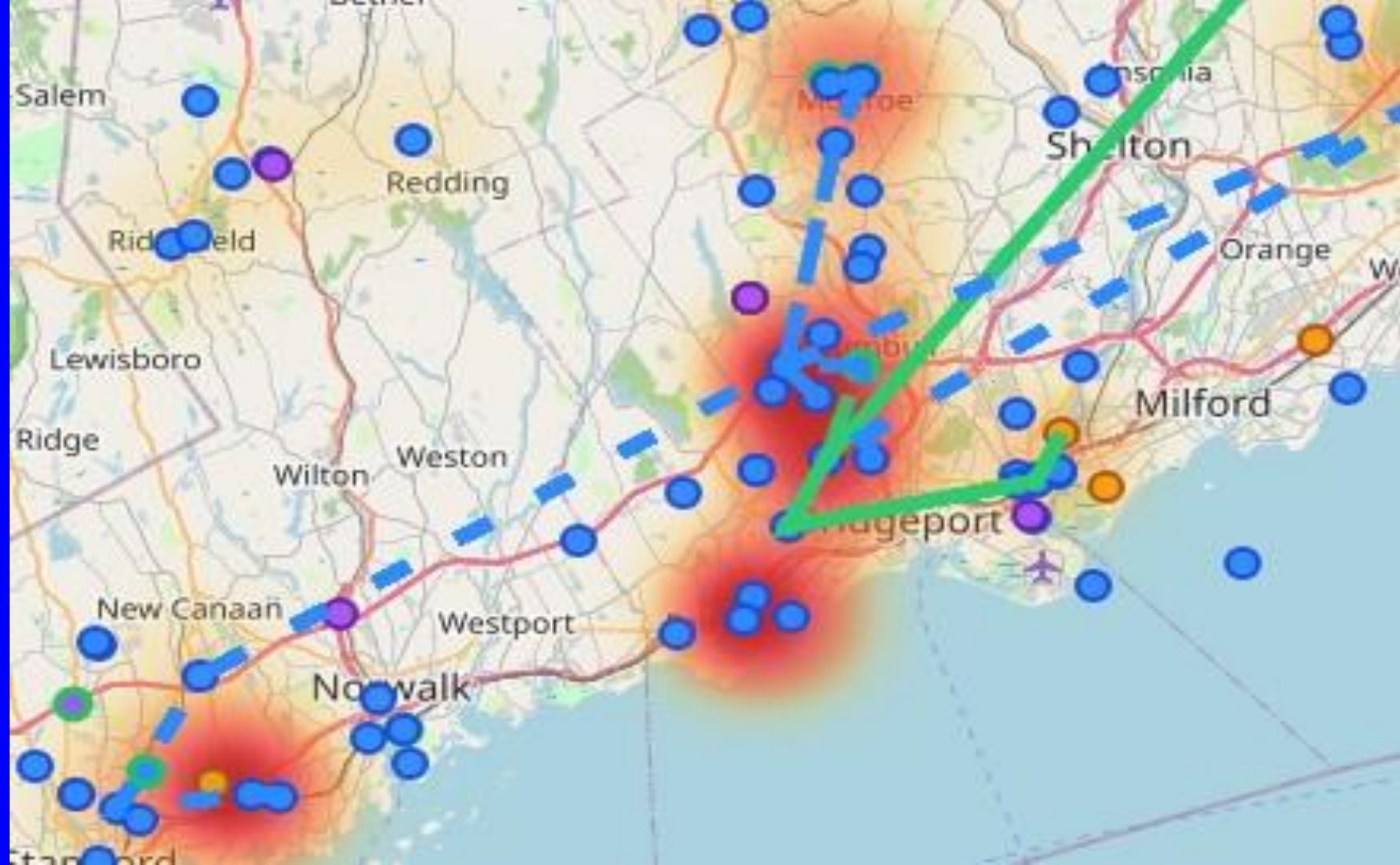
Move selected pin

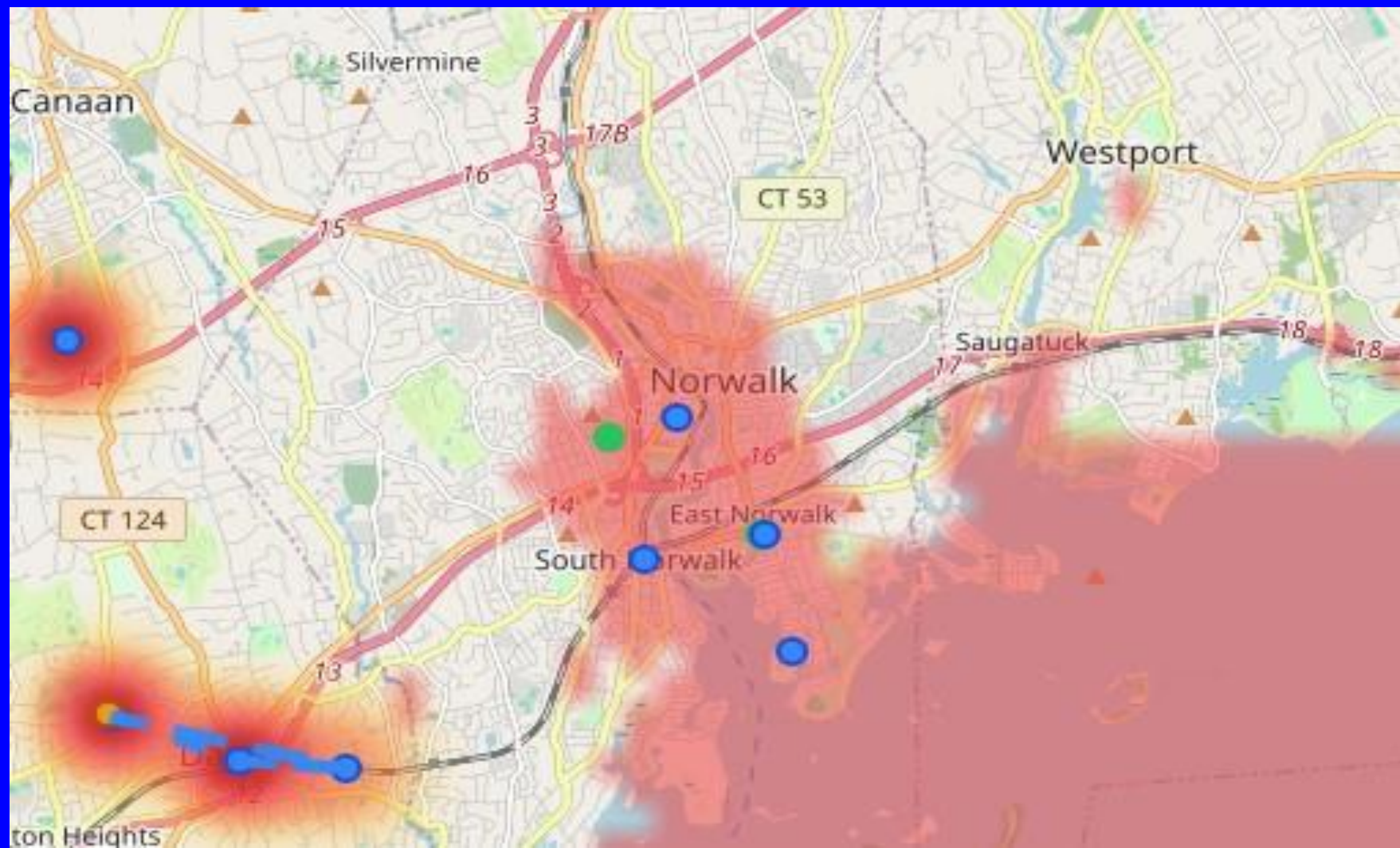
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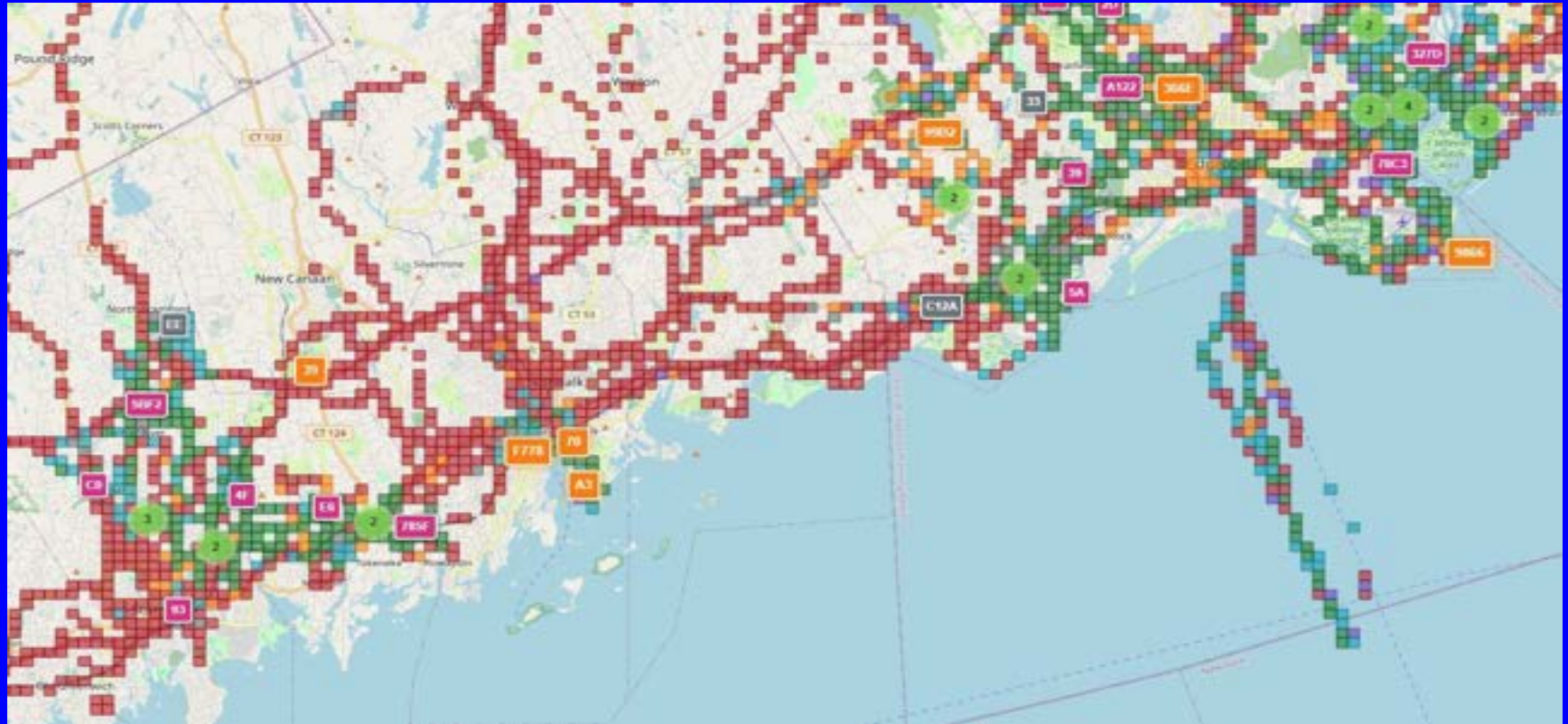
Clear LOS pins

Elevation profile





Meshcore War Driving meshmapper.com



Questions: K1PCN@arri.net

