Meshtastic 101

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What I have learned in two months
(A very broad, 10,000 foot view)

What is Meshtastic? from Meshtastic.org:

Meshtastic® is a project that enables you to use inexpensive LoRa radios as a long range off-grid communication platform in areas without existing or reliable communications infrastructure. This project is 100% community driven and open source!

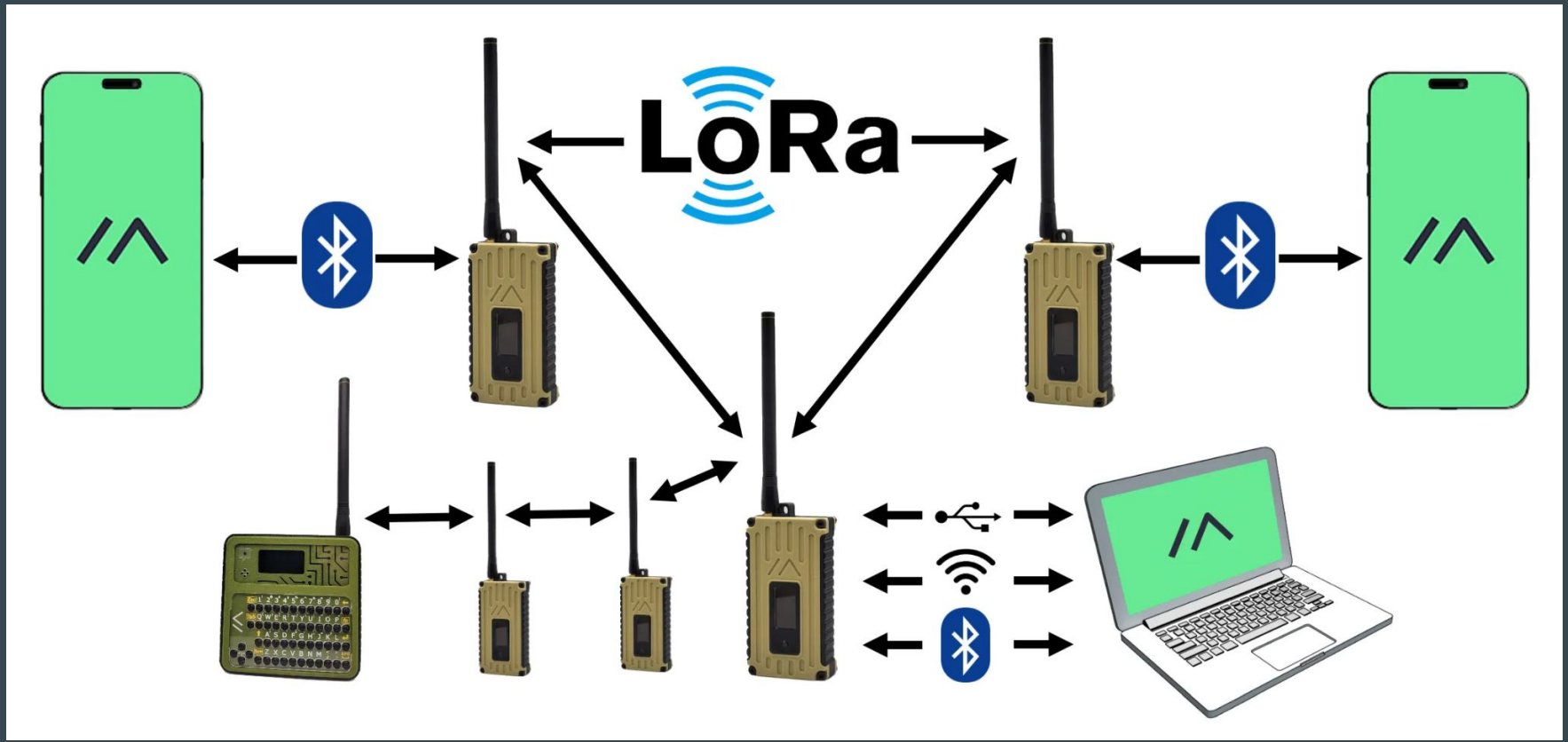
Meshtastic utilizes LoRa, a long-range radio protocol, which is widely accessible in most regions without the need for additional licenses or certifications, unlike HAM radio operations.

Features of Meshtastic: again, from Meshtastic.org

- Long range (158mi record by kboxlabs)
- No phone required for mesh communication
- Decentralized communication - no dedicated router required
- Encrypted communication
- Excellent battery life
- Send and receive text messages between members of the mesh
- Optional GPS based location features

- To be fair, this was mountaintop to mountaintop (MT, US to AB, CA)
- No phone required, but it certainly helps as an input device
- Correct, but centrally placed routers help tie users together
- 256 bit encryption possible
- Depends greatly on the device used
- This is one of the best uses of this technology
- Location and sensor sharing possible

What is a “Mesh?”



Basic Specs:

- Uses proprietary LoRa radio protocol (brief spread spectrum packets called chirps)
- Many possible modem settings that can utilize shorter to longer range and slower to faster chirps to suit user needs. Most common, and default modem setting is the “Long-Fast” setting.
- US uses ~915 Mhz for unlicensed transmissions.
- Unlicensed transmit power is limited to around 500mW.
- Communication is limited to largely line-of-sight with minimum obstructions (O&M (~151ft) is 4.66mi from my house (~18ft) and has a good signal between nodes)

What do I need to use Meshtastic?

- A LoRa device - flashed with Meshtastic firmware
- A smartphone or computer (not strictly needed, but it will be needed for most user configurations).
- At least one more person with whom to create a mesh network.

I need a device?

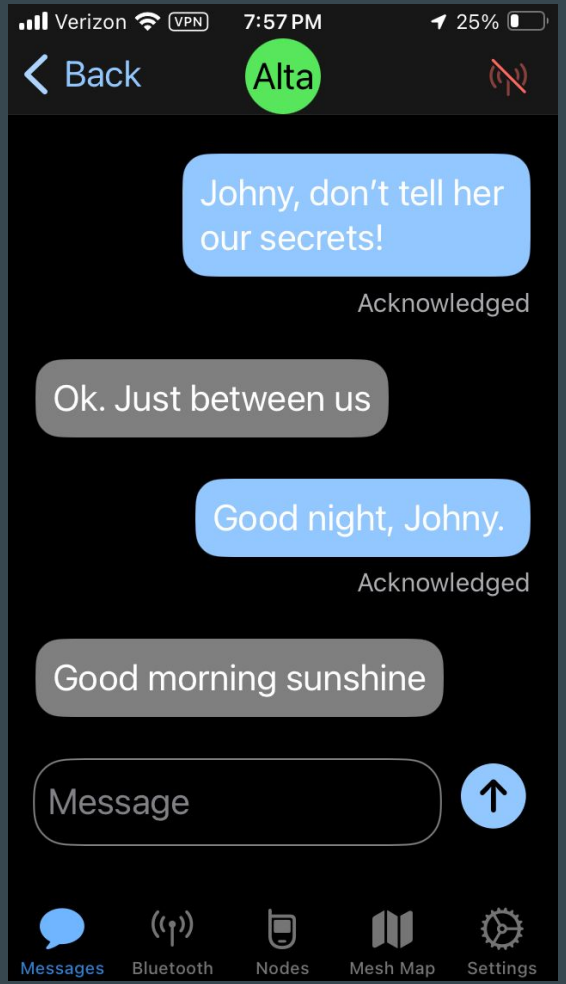
- General use devices:
  - Heltec V3
  - LilyGo T-Beam
  - LilyGo T-Beam Supreme
  - LilyGo T-Echo
  - RAK Wireless Wisblock
- All in one devices:
  - LilyGo T-Deck
  - DIY with rotary encoder
- Special use devices:
  - Heltec Capsule
  - LilyGo Watch

I need a smartphone?

- Devices can be set up using a computer or a smartphone. Unless you are using a laptop, you will want a smartphone for portability.
- Messages can be read on the device screen, but without a keyboard or rotary encoder to select canned messages, most users will need their smartphone to use as the input device.
- While a smartphone is needed, connection to the cell network or wifi is not required.

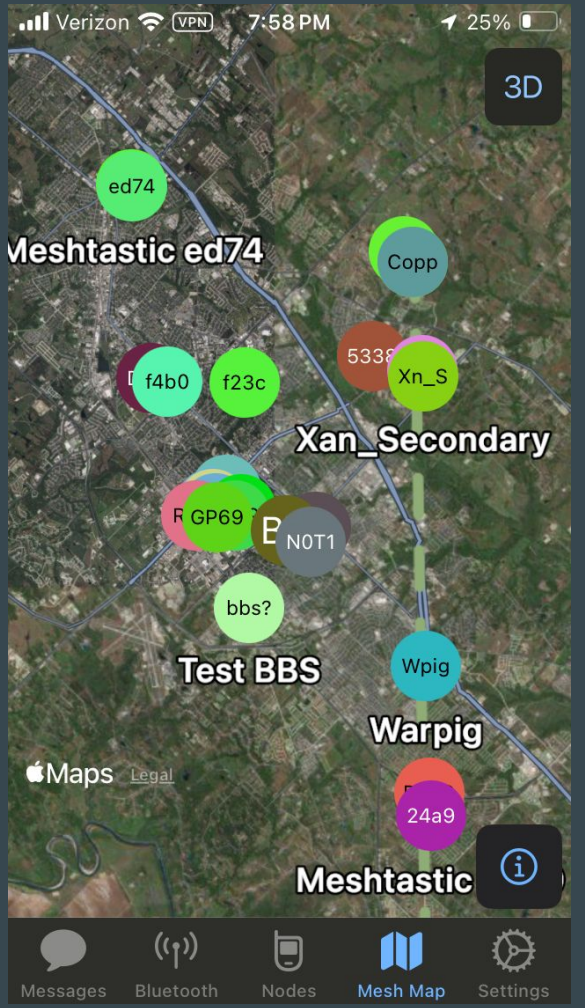
Communicating with Meshtastic

- Messages can be sent to groups or to individuals.
- Messages can be encrypted.
- Interface is very similar to a regular text message layout.
- GPS locations and sensor data can be shared with everyone or select users.
- Messages do not need to go directly to the recipient. They can “hop” through the network until they reach the targeted individual.



GPS Location Sharing

- GPS can be shared with everyone or just select users.
- Some devices include GPS onboard, some can have GPS added.
- Your Meshtastic device can use your phone GPS for location data.
- Stationary devices have be told their fixed location and will transmit that data without the need for GPS.



What Meshtastic is:

- An inexpensive, fun toy.
- A secondary method for text based communication in case of cell network failure. (I can see distinct benefits for ARES)
- A useful method of creating an ad hoc text messaging system (for remote locations or special events).
- A useful way to securely track party members or assets (I will be using mine when I go hiking or hunting).
- Accessible to everyone - licensed or not.
- Decentralized and does not rely on corporations to maintain a network.
- An additional tool in your arsenal of communication methods.

What Meshtastic is not:

- It is not more reliable.
- It is not more user friendly.
- It is not a replacement for cell or radio communications.
- It is not necessarily better if you use your license privileges.

My recommendations:

- If you want minimum barrier to entry, get a Heltec V3 and use a USB cable with shore power.
- Unless you really need a custom mobile device, use a T-Beam Supreme. (it has GPS, temperature, barometric pressure, and humidity sensors, and a built in 18650 battery slot).
- Get 2 devices - one for a permanent station in your home (as high as you can get it) and one for mobile use.
- Practice using your device. Like training to use your radio in emergency situations, practice using Meshtastic in the event that you feel you need it for. (Practice makes permanent, not perfect)

Questions

If we have time. . .

If not, go to Meshtastic.org