



Introduction to Mesh Networks

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Introduction to Mesh Networks

Agenda



What Are Mesh Networks?

- LoRa, Meshtastic and MeshCore
- Use Cases
- Demonstration
- Conclusion



Introduction to Mesh Networks

What Are Mesh Networks



- A MESH Network is a network topology that uses networked devices to relay packets to other networked devices beyond the range of the originator
- In recent years, mesh networking applications have been developed using LoRa Radio technology to create ad hoc networks to support short text messages.
- These applications use low power devices transmitting on unlicensed frequencies and can create ad hoc or fixed networks covering large areas.



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore



- LoRa is the underlying radio technology used by the networks we are discussing.
- Spread spectrum modulation technique can transmit small data packets over line-of-sight range using low power.
- Originally developed as a system for IOT telemetry transfer, it has been adapted to support text messaging applications
- In the U.S., the 915 MHz ISM band is frequently used for LoRa



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore



- Meshtastic was introduced in 2020 as a means to provide off-grid communications using low power unlicensed IOT devices.
- It uses a flood routing model, where every message is repeated by every device that hears it (unless configured not to).
- Messages are repeated up to 7 times (hop limit).
- Meshtastic assigns one of about a dozen roles to each node: Client, Router, Repeater, Tracker, Sensor, etc.
- Presets are packages of different configuration settings that are optimized for different ranges and speeds (Long_Fast, Short_Turbo, Medium_Fast, etc)



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore



- MeshCore is a newer application, introduced in 2025 that aims to overcome some of Meshtastics weaknesses to create a more reliable communications tool.
- MeshCore Companion devices do not repeat packets, dedicated repeaters are used instead (only 3 device roles).
- Hop limit is 64.
- Fewer beaconing or telemetry broadcasts, pull messaging used instead.
- Private channels and direct messaging using encryption are supported.



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore



- Meshtastic is most suitable for off-grid communications in areas with no infrastructure. Its client repeat model can quickly build an ad hoc mesh that can expand and contract as needed.
- MeshCore is better for covering a large area, such as a county or region, where fixed repeaters can be installed.
- MeshCore reduces excess transmissions by using directed routing for private messages.



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore



System Maps:

Meshtastic: <https://map.areyoumeshingwith.us/>

MeshCore: <https://fl.meshmapper.net/>



Introduction to Mesh Networks Use Cases



- Evacuation Shelters: Text based communication with encryption for privacy.
- CERT Teams: Provides communication with position reporting for teams in the field.
- Public Information: Could be used for communication with the public



Introduction to Mesh Networks Demonstration



- Messaging on the Public Channel.
- Messaging on a Group Channel.
- Direct Personal Messaging.



Introduction to Mesh Networks LoRa, Meshtastic and MeshCore

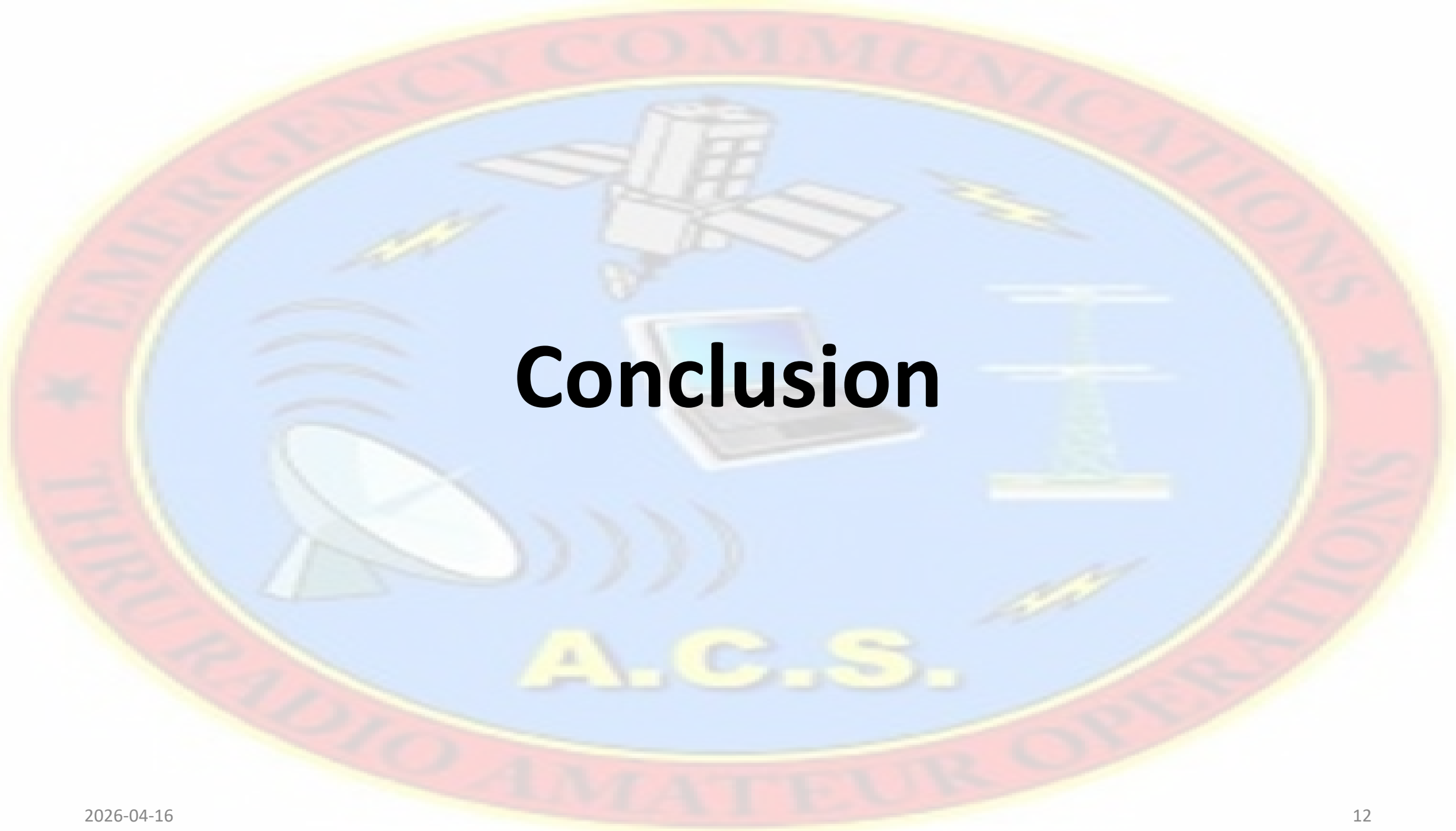


Internet Resources:

[Meshtastic.org](https://meshtastic.org)
meshcore.co.uk

Vendors:

[Atlavox.com](https://atlavox.com)
[Rokland.com](https://rokland.com)
[SpecFive.com](https://specfive.com)



Conclusion