

Strategic Proposal: The McMinnville Community Mesh Network

Deployment of a 100% Solar-Powered, Off-Grid, Resilient Communication and Operational Utility

Prepared by: Jonathan Elder

Project Management: ElderStack / Tech Unlimited Group

Digital Resource Hub: CivicMesh.net-----1. Executive Summary

The McMinnville Mesh is a privately-owned, community-level, license-free radio network designed to establish a resilient, off-grid communication infrastructure for the city. Leveraging open-source **Meshtastic** technology, the network enables residents and commercial entities to exchange text messages, GPS coordinates, and critical emergency alerts independent of conventional cellular or internet service providers.

The infrastructure is built upon **100% solar-powered Civic Beacons** and its deployment is optimized using **high-resolution LiDAR data**. This technical approach ensures sustained network operation and effectiveness during prolonged grid-down scenarios, such as severe weather events or a Cascadia Subduction Event.2. Challenge and Value Proposition

Challenge: Grid Dependence and Underutilized Assets

Current emergency communication systems face two primary vulnerabilities:

1. **Systemic Grid Failure:** Most communication platforms require home power or stable internet connectivity to maintain operational status.
2. **Operational Readiness Deficiency:** Equipment that is not used regularly is often unmaintained and users are unprepared for deployment during a crisis (termed "Shelfware").

Solution: Resilience Through Daily Operational Integration

We mitigate these risks by integrating the mesh network into the daily economic and social fabric of McMinnville through structured programs and commercial utility. This daily utilization ensures high **operational readiness** and citizen proficiency in crisis communication protocols.

The Operational Readiness Cycle

- **Daily: Merchant Incentive Program** Participating local businesses broadcast "Mesh-Exclusive" coupons. This initiative reinforces user behavior to maintain device power and monitor communication channels daily.
- **Weekly: System Health Validation Protocol** Adopting a structured Ham Radio protocol, we host a weekly digital roll call. This allows for continuous verification of signal integrity across all geographic zones and confirms hardware status.
- **Monthly: Community Data Acquisition Event** A scheduled town-wide exercise where network clues are transmitted over the mesh. The successful acquisition of clues guides residents to participating sponsors for certificate-based rewards.
- **Ongoing: Technical Proficiency Seminars** Regular sessions are hosted to facilitate

the procurement, assembly, and programming of network nodes. These cover hardware deployment, community engagement strategies, and scholarship opportunities for new users.

4. Network Features and Technical Capabilities

The McMinnville Mesh is built on professional-grade protocols, offering a robust suite of communication and data services:

- **Secure Encrypted Communications:** User-to-user direct messages utilize end-to-end encryption (AES-256) to ensure the privacy of sensitive transmissions.
- **Public Information Channel:** A dedicated channel for community-wide announcements, local events, and daily operational pulse updates.
- **Incident and Emergency Notification:** Rapid, high-priority broadcasting of urgent alerts (e.g., weather, road closures, safety incidents) capable of reaching users when conventional cellular infrastructure is congested or non-operational.
- **Off-Grid GPS Sharing and Mapping:** Users can share real-time location data. High-detail vector maps are integrated directly into the local application, maintaining full functionality without internet or cellular data.
- **Environmental Telemetry:** Nodes can be equipped with sensors to report local temperature, air quality, and humidity, generating a community-sourced environmental monitoring map.

5. Commercial Utility: Fleet Tracking and Operational Cost Reduction

The McMinnville Mesh provides a powerful, subscription-free alternative to expensive commercial tracking and communication services for local businesses:

- **Zero Operational Fees:** Unlike cellular or satellite services, the network involves **no recurring subscriptions, no SIM card fees, and no monthly costs**. Network access is perpetual following the initial purchase of a node.
- **Private Encrypted Business Channels:** Businesses can establish dedicated, private "sub-networks" on the shared mesh for internal staff coordination and data transmission, utilizing the wide-area coverage of the Civic Beacons while ensuring data confidentiality.
- **Real-Time Asset Tracking:** Service-based organizations (e.g., HVAC, delivery, landscaping) can track the live GPS locations of their vehicle fleets across the city, with data transmitted directly over the mesh to a central office dashboard.
- **Encrypted Dispatch:** Secure, private channels enable staff coordination, delivery assignments, and status updates, removing reliance on vulnerable or congested public networks.
- **Low Operational Overhead:** The fixed Civic Beacon infrastructure is 100% solar-powered, minimizing concerns regarding power consumption and wiring for participating businesses; the network is entirely off-grid and self-maintaining.

6. Technical Excellence: LiDAR-Powered Infrastructure Deployment

We utilize DOGAMI LiDAR (Light Detection and Ranging) data to precisely map every building and tree canopy in McMinnville. This high-resolution planning enables the surgical placement of our **Civic Beacons**, ensuring maximum radio frequency (RF) coverage for the valley floor and eliminating "RF shadows."

These Civic Beacons are exclusively solar-powered, a crucial design feature to guarantee sustained operation during extended power grid failures when communication is most essential.7. Partnership and Investment Tiers

We offer local businesses a structured opportunity to invest in this critical infrastructure while gaining valuable marketing and community visibility.

Tier Name	Investment Level	Impact and Funding Allocation	Key Benefits and Recognition
Tier 1: Infrastructure Seed	\$100	Funds three (3) scholarship-subsidized mobile nodes (Heltec V3) for low-income residents.	Listed on the public "Hall of Heroes" website and receives an official Mesh Partner window decal.
Tier 2: Core Network Sponsor	\$350	Funds one (1) permanent, high-site Solar-Powered Civic Beacon , establishing a neighborhood backbone.	Naming Rights for the sponsored beacon on the digital map (e.g., "The [Your Business] Beacon"), priority placement for Daily Pulse broadcasts, and a dedicated website profile.
Tier 3: Deployment Partner	\$1,000	Funds a mass deployment package (20 Mobile Nodes + 1 Solar-Powered Civic Beacon) and title sponsorship of a "Build-a-Node" seminar.	Title rights for the seminar, top-tier branding on the web portal, and physical reward distribution opportunities during the Monthly Data Acquisition Event.
Special Limited Tier: Pioneer Anchor Investor	\$2,500 (First 5 Only)	Provides the foundational capital to build the primary core of the McMinnville Mesh, funding three (3) Solar-Powered Civic Beacons and fifty (50) mobile nodes for schools and emergency volunteers.	Permanent Recognition: Logo permanently displayed as a "Pioneer Founder" on the website and all future maps. Physical Plaque: An engraved "McMinnville Mesh Founding Partner" plaque. Priority

			Broadcast: A permanent, daily "Community Message" slot on the Public News Channel. Network Legacy: Direct naming rights to one of the five primary "Star Nodes" that anchor the city-wide grid.
--	--	--	---

8. Digital Strategy: The Hybrid Mapping System

The McMinnville Mesh employs a dual-map strategy to optimize sponsor visibility and user reliability:

- The Web Portal (Online):** All sponsors are showcased on the public-facing site at CivicMesh.net. This portal features a live coverage map, a "Hall of Heroes" sponsor gallery, and a feed of active business pulse offers.
- The Local App (Offline):** Users interface via the Meshtastic mobile app, which connects via Bluetooth to their physical node. The app provides a high-resolution, non-internet dependent map, allowing users to track team locations and identify active Civic Beacons during a total blackout.
- MQTT Long-Range Bridging:** When internet connectivity is available, the Civic Beacons can utilize MQTT bridging to link McMinnville to the global mesh. This feature enables **inter-city communication**, allowing connectivity with distant family members or business locations in other states.

9. Next Steps: Commitment to the Grid

We offer pre-programmed, ready-to-use hardware for seamless integration by residents and businesses. Each hardware purchase includes a direct contribution to the public infrastructure fund, ensuring the long-term maintenance of the Civic Beacons.

Hardware Option	Price	Primary Use Case
Standard Mobile Node	\$45	General community use for residents.
Pro Mobile Node	\$65	High-performance users and emergency volunteer personnel.
Professional Fleet Tracker	\$145	Commercial vehicles (hardwired or self-sustained installation).
Family Safety Bundle	\$160	Household emergency preparedness kit (includes 4

		Standard Nodes).
--	--	------------------

We invite you to partner with us in establishing this critical, resilient infrastructure. We are available to conduct a property assessment using our LiDAR data to determine the optimal placement of your building as the next Solar-Powered Civic Beacon.