LoRa Mesh vs Ham Radio (VHF/UHF)

Licensed amateur radio operators have a wide range of VHF and UHF options for off-grid communications. LoRa mesh fits into this landscape as a complementary technology rather than a replacement.

Where LoRa Mesh Fits in the Ham Toolkit

Amateur radio offers multiple communication modes - voice (FM, SSB, digital), digital text (Winlink, APRS, JS8Call, Vara FM), and data networks. LoRa mesh adds:

- License-free operation on ISM band (no ham license needed to use)
- Automatic multi-hop mesh routing (no repeater coordination needed)
- Built-in GPS position sharing (comparable to APRS)
- Strong encryption for private messages
- Long battery life (especially nRF52840 hardware)

Where Ham VHF/UHF Wins

- **Voice communication** - FM voice on 2m/70cm is irreplaceable for emergency operations; no text-only mesh can substitute
- **Wide area repeater networks** - Many metros have linked 2m repeater systems with 50-100 mile coverage; LoRa mesh coverage depends on local deployment density
- **Winlink/email** - Formal message traffic, ICS forms, file attachments over the radio - Winlink capabilities far exceed LoRa mesh message capacity
- **No range limit with satellite** - EME, OSCAR satellites, or HF extend ham communications to global range
- **Established infrastructure** - Many communities have established ham repeaters; LoRa mesh may have zero local infrastructure

Where LoRa Mesh Wins for Hams

- **Auto-updating position map** - The Meshtastic app's live map is more intuitive than APRS tracking for non-ham team members
- **No licensing barrier** - Non-ham team members (CERT volunteers, event staff, family members) can use LoRa mesh without licensing
- **Encryption** - Part 97 prohibits transmissions encoded for the purpose of obscuring their meaning (47 CFR 97.113(a)(4)), which effectively bars encrypted content; LoRa mesh on the Part 15 ISM band has no such restriction
- **Battery life** - An nRF52840 LoRa node running for weeks vs a dual-band HT running for hours
- **Cost** - $25 Heltec vs $200+ for a quality HT

How Licensed Hams Use Both

One sensible way to layer these tools is to assign each a distinct role rather than treating them as interchangeable:

1. **Voice (VHF/UHF)** - Good for tactical coordination, net control, and served-agency interface
2. **LoRa mesh** - A supplemental data layer: position tracking, short message routing through terrain shadows, sensor telemetry
3. **Winlink** - Formal message traffic: ICS forms, resource requests, situation reports

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