

Long-Distance Cycling and Bikepacking

Cycling Through Cellular Dead Zones

Long-distance cyclists and bikepackers regularly traverse hundreds of kilometres of terrain with no mobile phone coverage. Classic routes - the Tour Divide, the Pacific Coast, the TransAmerica - pass through remote river valleys, desert plateaus, and mountain passes where the nearest cell tower is hours away. In these environments, a Meshtastic node can be one of the few communication options that does not depend on fixed infrastructure - but mesh only works when another node is within LoRa range. For a solo rider with no nearby nodes, the mesh has nothing to talk to; in that case a two-way satellite communicator is the truly infrastructure-independent option.

This is not an emergency-only tool. Knowing that a riding partner a few miles ahead has stopped for mechanical work, or that you are approaching a named waypoint with water, is useful every hour of every day on a long route.

Friend and Family Tracking via MQTT Gateway

Meshtastic supports forwarding position data to an MQTT broker, which in turn can feed publicly accessible mapping services such as the community-run mesh map at map.meshamerica.com. When a cyclist passes through a town or rural area where an internet-connected gateway node is within LoRa range, their position can be forwarded to MQTT and become visible to anyone with the shared map link. Note that on the default public broker, location precision is intentionally degraded for privacy; full-precision sharing requires a custom channel/PSK and a self-hosted or configured broker.

Setup is straightforward:

1. Enable MQTT on the device and enter the broker address (the default public Meshtastic broker works for this purpose). Note that enabling MQTT alone does not upload your position - your node publishes to MQTT only by way of an in-range, internet-connected gateway node. A node with MQTT enabled but no gateway in range uploads nothing.
2. Share the map URL with family and friends before departure.
3. Position packets are forwarded to MQTT automatically by any in-range, internet-connected gateway node - no manual action required - but coverage depends on a gateway being within LoRa range.

Frequency of updates depends on gateway node density along the route. In populated corridors, updates may be near-continuous. In remote sections, gaps of several hours or days are normal. Family members should understand this is a check-in system, not a real-time tracker - for real-time coverage, a two-way satellite communicator (e.g. inReach, SPOT) is still required.

Daily Check-In Messaging Near Gateway Nodes

Many bikepackers use a simple daily check-in protocol: when riding near or through a town with a gateway node, send a brief status message over the mesh. This message can reach the MQTT network and be forwarded to a support contact at home - but only if that contact subscribes to the same channel via an MQTT client and holds the shared channel keys. This is not automatic. The [Meshtastic app](#) shows your own node's MQTT connection state (whether your node is connected to a broker); it does not detect nearby gateways. When your node is reaching MQTT, a brief text message via the app can reach anyone monitoring the same channel.

This requires no cellular data and no Wi-Fi on your end. However, gateway coverage is highly variable - do not assume a town has a gateway. Verify route coverage in advance and treat message delivery as best-effort: a message gets out only if an internet-connected gateway node is within LoRa range when you send it.

Offline-Capable App Operation

The Meshtastic app caches known nodes' last-known positions, channel configurations, and recent message history locally on the phone - it is not a complete persistent map or a full message archive. This means the app still works offline: you can view group members' last-known positions, send and receive messages, and navigate using downloaded offline map tiles without any internet or cellular connection.

Before a multi-day trip, download offline map tiles for the entire route using the app's built-in download function. On Android and iOS, offline tiles from OpenStreetMap or other providers load automatically when no internet is present. The mesh operates entirely over LoRa radio regardless of internet state.

Node Mounting on Drop Handlebars and Stem Bags

Road and gravel bikes with drop handlebars offer different mounting options than flat-bar mountain bikes:

- **Top tube bag:** A small top-tube bag with a transparent window panel is the preferred location for a T-Echo. The e-ink display is readable through the window. The bag protects the device from road spray and light rain, and the central mounting position keeps weight low and centred.
- **Stem bag:** Similar benefits to the top-tube bag; slightly further from spray thrown up by the front wheel. Works well on bikes where the top tube geometry does not suit a bag.
- **Bar bag outer pocket:** A small zippered outer pocket on a handlebar bag is accessible without dismounting on a flat road section. Less ideal in wet conditions unless the pocket is waterproof.

Avoid mounting the node or its antenna inside a bag packed with damp gear - wet camping equipment absorbs RF and will reduce effective range. The antenna should be positioned with a clear line toward the sky, even if the node body is inside a bag.

Solar Charging from a Rear Rack Panel

A 5 - 10 W flexible solar panel lashed to a rear rack and pointed skyward provides a steady trickle charge to an auxiliary battery throughout the riding day. With adequate sun, even partial cloud cover and non-ideal panel angles can produce enough current to offset Meshtastic's modest consumption. Typical active draw is roughly 30 - 130 mA depending on the device, GPS duty cycle, display, and TX rate; treat 50 - 80 mA during active GPS operation as a rough midpoint.

Practical setup:

- 5 W panel (e.g., SunPower flexible, 330 mm × 180 mm) attached to the top of rear rack with hook-and-loop straps.

- A solar lithium charge controller with input current limiting (e.g., the Adafruit Universal USB/DC Solar Lithium Charger or equivalent - note this is a current-limiting charger, not a true MPPT controller) connected to a 10 Ah lithium battery pack in the rack bag.
- Node powered from the battery pack via USB.

With adequate sunlight, the panel can keep the auxiliary battery topped up; a 10 Ah pack gives a few days of reserve at typical node draw in overcast conditions.

Realistic Range Expectations: Moving vs. Stationary

Range while cycling is meaningfully different from stationary operation. The figures below are approximate and depend heavily on antenna, terrain, and line of sight:

- **Stationary on a ridge or elevated location:** approximately 5 - 15 km to another stationary node in open terrain (best case, with line of sight).
- **Moving at road level in flat terrain:** roughly 1 - 3 km, limited mainly by terrain and the low antenna height of a road-level node.
- **Moving in hilly terrain:** Highly variable; roughly 200 m around a dense hill to 3 km on a ridgeline traverse.
- **Node to node via fixed relay on a hilltop:** Relay nodes dramatically extend practical coverage; a single well-placed relay can cover a 10 km valley that would otherwise have multiple dead zones.

For bikepacking, the most useful mental model is: assume the mesh works reasonably when you are within 2 - 3 km of another active node, treat anything beyond that as a bonus, and do not rely on the mesh as a sole safety system on a remote solo route. Use Meshtastic for coordination and awareness; carry a PLB or satellite communicator for emergency signalling.

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