



## Introduction

### Key Regional Broadband Connectivity Challenges:

- Lower population density and remote island geography make traditional cabled internet economically challenging, deepening the digital divide [1].
- Dense tree cover and coastal weather variation disrupt **Line-of-Sight (LOS)** networks such as fixed wireless, **Low-Earth-Orbit (LEO)**, and cellular.
- Internet access throughout the marginalized region falls short [2][3] of the **Universal Service Objective (USO)** benchmark of 50Mbps down / 10Mbps up (Fig. 1), leaving many users with insufficient speeds for critical online tasks.

## Key Regional Infrastructure

- **Fiber**
  - Delivers a high-speed, future-proof connection exceeding the **USO** through subterranean or aerial cables, often using existing telephone infrastructure.
  - The **Connected Coast** [4] initiative is delivering middle-mile fiber landing stations (Fig. 1) to underconnected communities, including Galiano, Saturna, Salt Spring, and Pender Islands.
- **Line-of-Sight (LOS) Networks**
  - Use radio waves in a point-to-point or mesh topology to provide internet access. Although generally more volatile than cabled connections, they enable rural coverage.
  - Locally run **Internet Service Providers (ISPs)** like **GAIA** [6] use creative tree-mounted fixed wireless networks, while national **ISPs** such as **Rogers** and **Telus**, as well as **LEO** satellite **ISPs** such as SpaceX's **Starlink**, also contribute to bridging the regional divide.

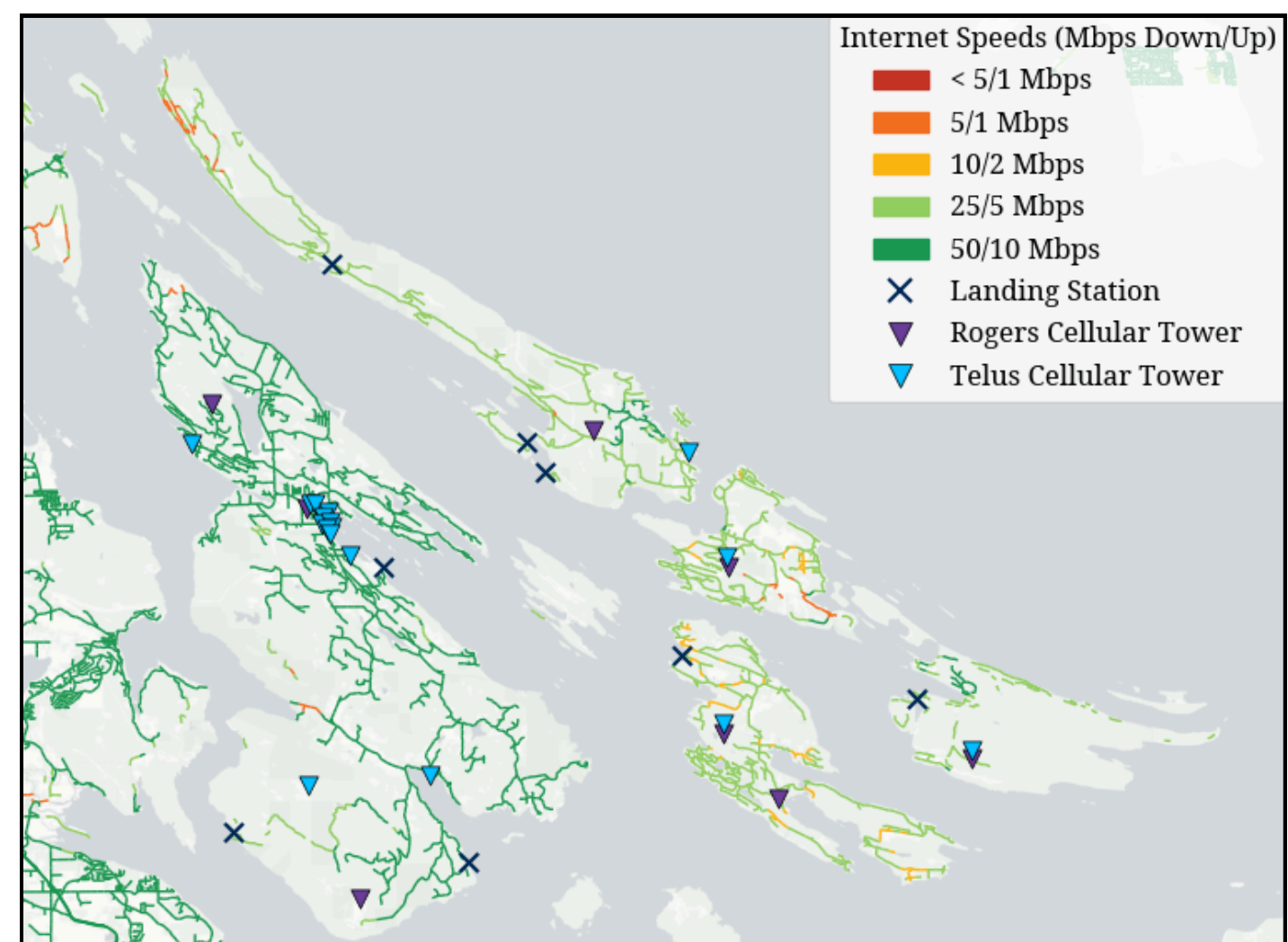


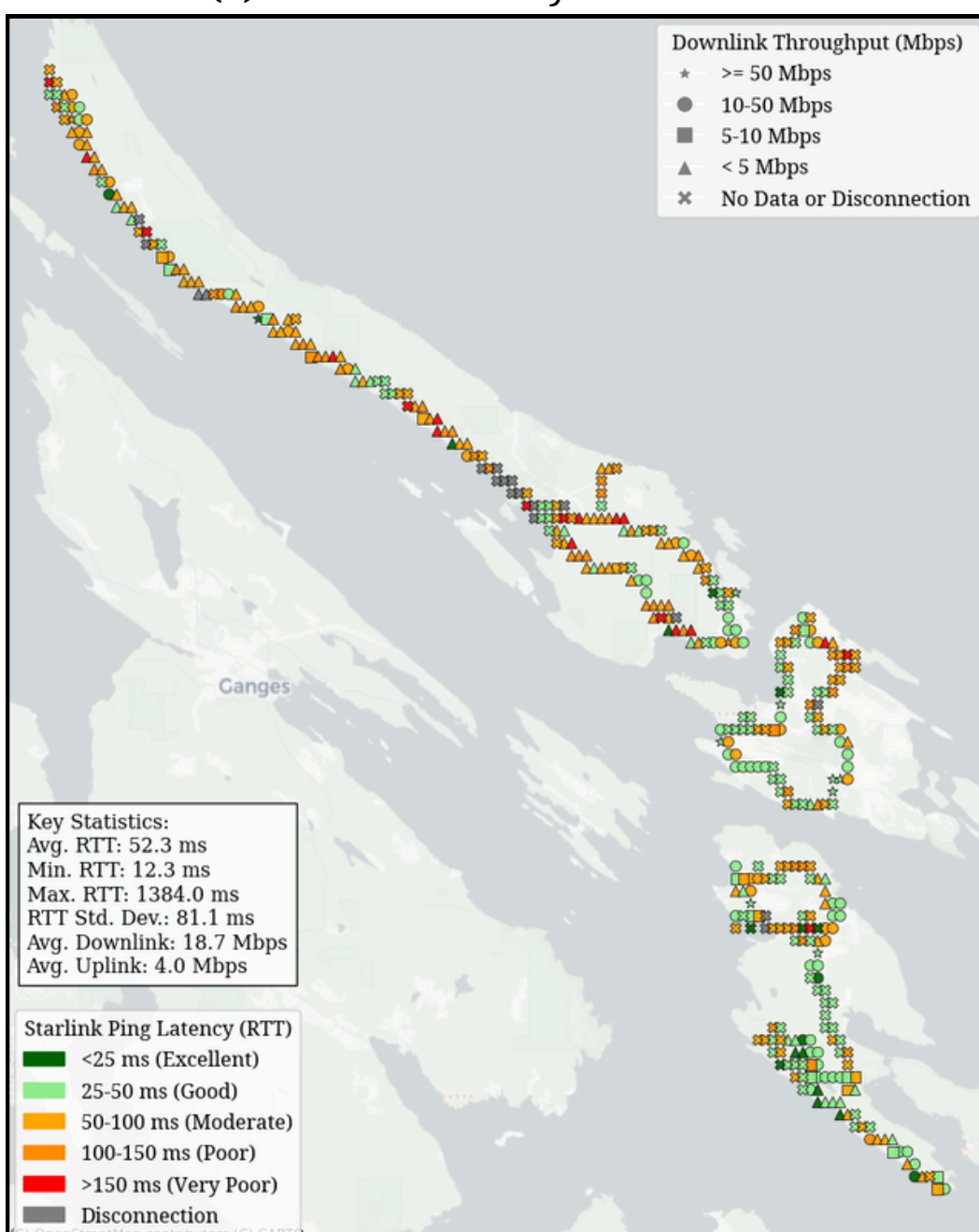
Fig. 1: Map of the Southern Gulf Islands showing internet speed availability [2], Connected Coast fiber landing stations [4], and locations of Rogers and Telus cellular towers [5].

## Empirical Network Performance Testing

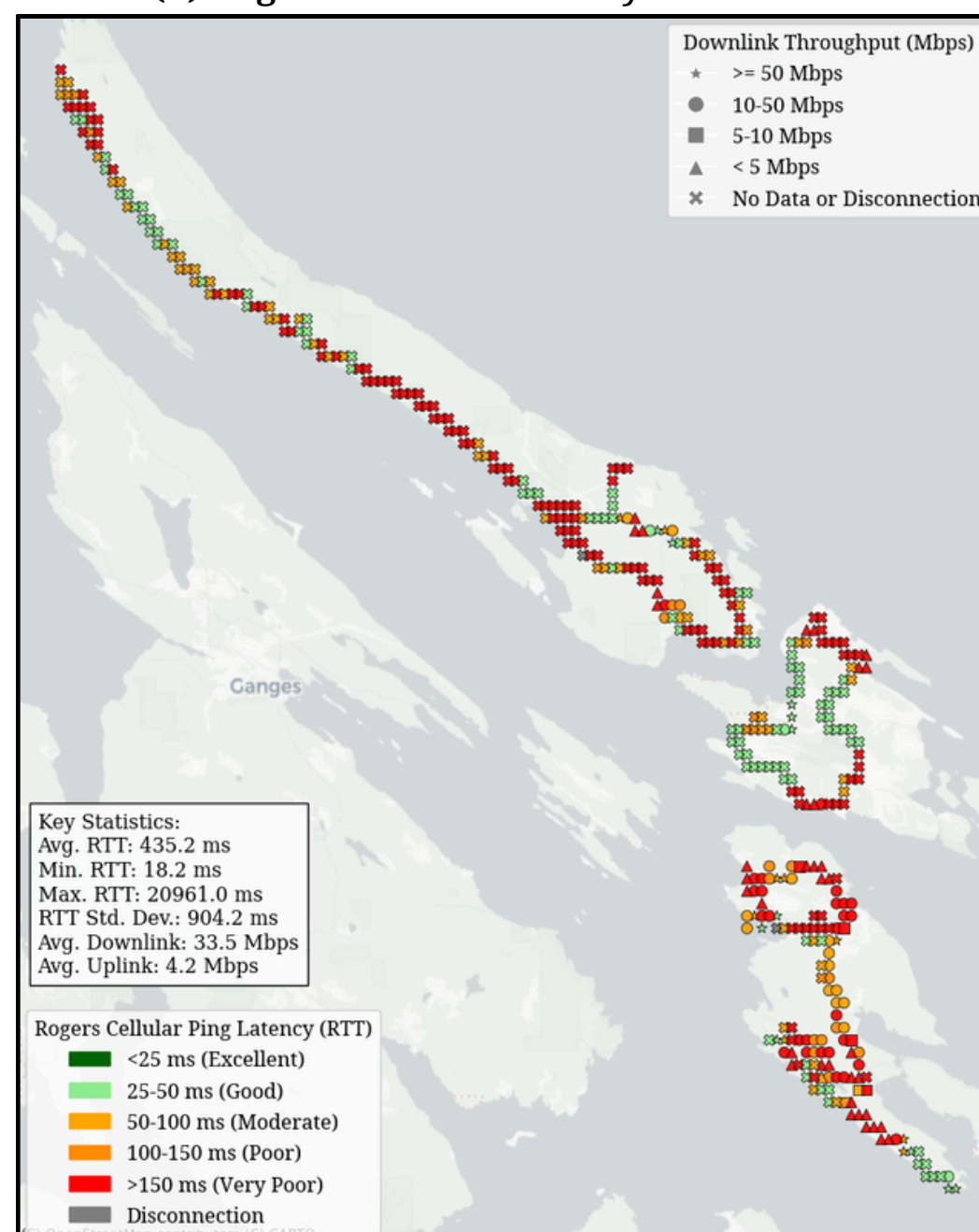
- **Regional Testing**
  - Collected real-world network performance data across Galiano, Mayne, and Pender Islands using a vehicular setup equipped with a **Starlink** Mini dish, an external GPS module, and cellular modems carrying **Rogers** and **Telus** SIMs. Regular iperf3 throughput tests and continuous ping latency measurements were conducted to assess on-the-ground broadband performance.
  - Findings (Fig. 2) show that **Starlink** delivers the most consistent performance in terms of latency. Still, in certain regions, such as **Telus** on Mayne Island, the cellular **ISPs** offer higher throughput and experience fewer disconnections.

Fig. 2: Maps of the Southern Gulf Islands depicting measured network performance in terms of latency (colouring) and downlink throughput (shape) for Starlink, Rogers, and Telus, respectively.

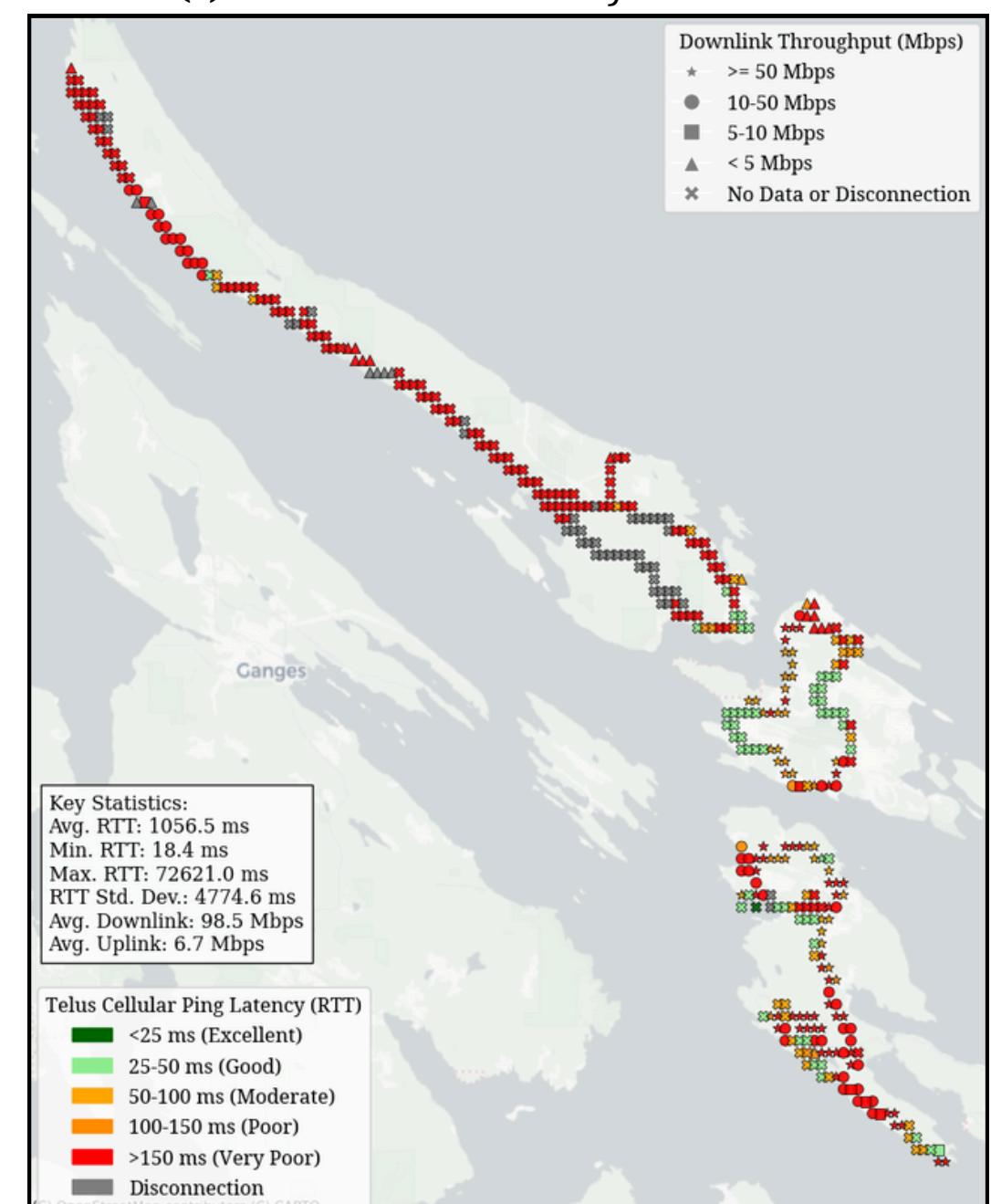
(a) Starlink: Latency & Downlink



(b) Rogers Cellular: Latency & Downlink



(c) Telus Cellular: Latency & Downlink



## Interested?

Scan the QR code to access related project materials.

## References

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