NIPISSING FIRST NATION PROJECT OVERVIEW
Kirby Koster, Senior Manager Broadband Programs
Northern Ontario Community that needs to extend broadband service from a part of the community that is well served in the community centre, or a more-densely populated area, to an area that is underserved in one or more out-lying lower-density residential areas greater than 5 km out, but still within the municipal boundaries of the host community.
Nipissing First Nation

- Good Match for Problem Statement
  - Relatively flat terrain and good wireless access over lake
  - Over 5km from tower site to outlying communities
  - Relatively flat terrain and good wireless access over lake

- Progressive First Nation
  - Motivated to grow urban housing
  - Easy to extend support to 4 new subdivisions
  - Available optical POP in the Community

- Community open to building new towers
- Single tower design feasible

Single tower design made possible by hybrid TVWS and 5GHz radio design and flat terrain and distributed lakeshore community
Leepfrog Telecom

- Strong Local Support Presence in North Bay Area
- Extensive Experience in designing wireless distribution networks in Northern Ontario.
- Significant Growth over last 2 years in staffing and support
- Proven willingness to provide innovative solutions and adjust design to scale to changes in available budget
- Innovative and low-cost approaches to tower deployment and hybrid radio technology for distribution.
- Very good pricing for broadband internet POP access in community from Eastlink.
Key Innovation – Single Tower with TVWS and 5GHz LTU

Middle Km TVWS and 5GHz FWA distribution using single 100 ft non-penetrating tower instead of conventional steel self-supporting or guyed Telecommunication Towers. This approach allows fast and low-cost rollout of fixed wireless distribution with excellent tree foliage penetration.

Key Advantages of Single Tower with TVWS/5GHz

- **Minimal Environmental Impact** – no foundation excavation and no concrete foundation required.
- **Fast Installation and Service Rollout** – Radio equipment installation and tower raising only takes about 3-4 days.
- **100’ Tower is Lower Profile** – lower visual impact to the community.
- **Significantly lower cost**, use of TVWS reduces need for 1 - 2 additional towers (Up to $150,000 to $300,000 saved per tower in cost saving)
- **Significantly lower time to deploy**, single tower build saves months of permitting and build time for other towers.
Wireless Technology Used

6Harmonics
- Point to Point. Point to Multipoint or Mesh
- Support dual channel operation
- Up to 60 Mbps UDP per radio link
- Up to 23 dBr transmit power
- Low latency (< 5 ms)
- Adjacent channel blocking
- 256bit AES encryption
- IP67 enclosure

Distribution
- 700 MHz Point – Point High-Capacity Microwave Radios
- Used to distribute internet access to residents through dense foliage
- Service delivery up to 50 Mbps Down/ 10 Mbps Up
- Up to 30 km range

Distribution & Backhaul
- 5 GHz Point to Multi-point – Microwave Radios
- Used to distribute to residents with clear LOS
- Service delivery up to 200 Mbps Down/ 20 Mbps Up
- Up to 30 km Range

LTU Rocket

LTU LR
- 5 GHz PtMP LTU Client,
- functions in a PtMP
- Works with LTU-Rocket as base stn
- 26 dBI Antenna Range: up to 30 km

LTU Rocket
- 500+ PtMP performance
- Up to 256 connections per tower
Wireless Technology Overview

- No Side Lobes
- Very selective reception just to the main beam
- Facilitates spectral reuse for broadcast in different directions
  - Ideal for small towers or dense configurations

- Hybrid fixed wireless solution
- Supports 5.0 GHz Unlicensed internet access services and Licensed TVWS internet access Services
- Range of services offered
  - New 25/5 Mbps and 50/10 Mbps internet access services (TVWS)
  - New 50/10 Mbps, 100/10 Mbps, 150/10 Mbps, and 200/20 Mbps internet access services (5G Hz)
5 GHz LTU Coverage Area

- Coverage Area will reach entire Nipissing FN with greater than 50/10 performance
- All 5 areas of community could get up to 150 Mbps service
- Garden City and Jocko Point could get better than 150 Mbps service support
TVWS Coverage Area

- Coverage Area will reach entire Nipissing FN with 50/10 performance
## New Service Offerings

<table>
<thead>
<tr>
<th>Service Offerings</th>
<th>Download Speeds</th>
<th>Upload Speeds</th>
<th>Data</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 50/10 Unlimited</td>
<td>up to 50 Mbps</td>
<td>up to 10 Mbps</td>
<td>Unlimited Data</td>
<td>$80/month</td>
</tr>
<tr>
<td>- 100/10 Unlimited</td>
<td>up to 100 Mbps</td>
<td>up to 10 Mbps</td>
<td>Unlimited Data</td>
<td>$100/month</td>
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<tr>
<td>- 150/10 Unlimited</td>
<td>up to 150 Mbps</td>
<td>up to 15 Mbps</td>
<td>Unlimited Data</td>
<td>$110/month</td>
</tr>
<tr>
<td>- 200/20 Unlimited</td>
<td>up to 200 Mbps</td>
<td>up to 20 Mbps</td>
<td>Unlimited Data</td>
<td>$145/month</td>
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</tbody>
</table>

**Home phone service** could also be installed with this solution
- $19 unlimited Canada-wide calling or $22 monthly with unlimited North American calling

**TV packages** can be added for $40 - $95 per month
<table>
<thead>
<tr>
<th>Benefits to the Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Significantly Better Internet Access + Low-Cost Telephone + Low-Cost Video for residents.</td>
</tr>
<tr>
<td>✓ Only single 100’ Non-Penetrating Tower Required for whole community.</td>
</tr>
<tr>
<td>✓ Fast deployment to meet needs of pandemic internet work at home, learn at home demands.</td>
</tr>
<tr>
<td>✓ Access to 50/10 Mbps and up to 200/20 Mbps Internet Access Service with no data caps.</td>
</tr>
<tr>
<td>✓ Proven cost-effective method to add new tower for expanding improved internet services if required as community grows.</td>
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<tr>
<td>✓ Wider 50/10 Mbps or higher service access to remote parts of the community.</td>
</tr>
<tr>
<td>✓ Minimal environmental impact due to non-ground penetrating tower.</td>
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