



Alaska Broadband Network Project

A Plan and Cost Estimate

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Member



Preface

- Thanks to the Technical Committee members
- Cooperative Work Amongst Market Competitors
- Oversight / Involvement from non-telecom professionals



Expanding the Alaska Network: The Starting Point

- ***100 Mbps internet access to all Alaskans***
- Ideal configuration – deliver terrestrial middle mile network to all population/commerce centers
 - Included all population centers as defined on 2010 census
 - Augmented with any other sites that already have some telecom service
- Initial surveys done with Interexchange and local carriers to assess their current networks

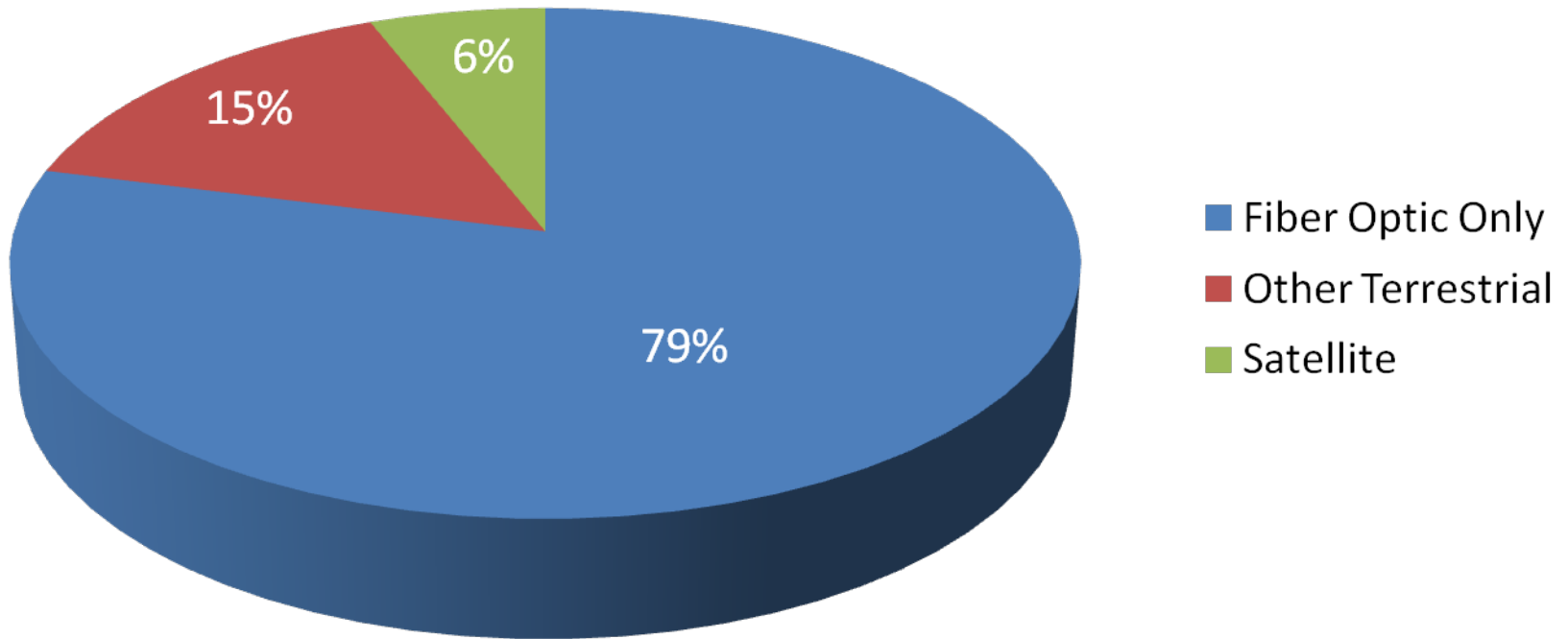


Network Design Criteria

- Middle Mile:
 - Expand the current network by adding and upgrading digital terrestrial capacity to reach all population/commerce centers
 - Include the capacity of existing networks in the design
 - no cost for these in the model
 - Build optic fiber systems and digital microwave systems on a cost-optimized basis
- Last Mile:
 - Each village / location is unique
 - Assume all last mile facilities meet at the middle mile Point of Presence (POP)



AK Middle Mile Technology Preliminary Data



- Data represents percentage of Alaska population whose home area connects to the global internet via which technology.
- "Other Terrestrial" includes copper cable, microwave radio and other non-satellite technologies.
- "Satellite" means that some portion of middle mile is transported via satellite.
- Data includes completion of the GCI Terra SW project

Initial Network



Cost Modelling

- Experiential information used to estimate construction costs for fiber optic and digital microwave systems
- All design characteristics are conservative – recognizing actual costs will vary widely
 - Performing even preliminary route-specific designs would cost \$ millions and likely take more than one year



Cost Estimates

- Fiber optic systems – assume buried cable
 - \$120,000 / mile
 - Initial cost provides 10,000 Mbps (approx.)
 - Additional capacity of 10,000 Mbps is an additional \$500 / mile
 - Construction and turn up cost only
- Digital Microwave Systems
 - \$650k per 25 mile hop
 - 150 Mbps capacity
 - Max. practical capacity of 900 Mbps at \$830k per hop

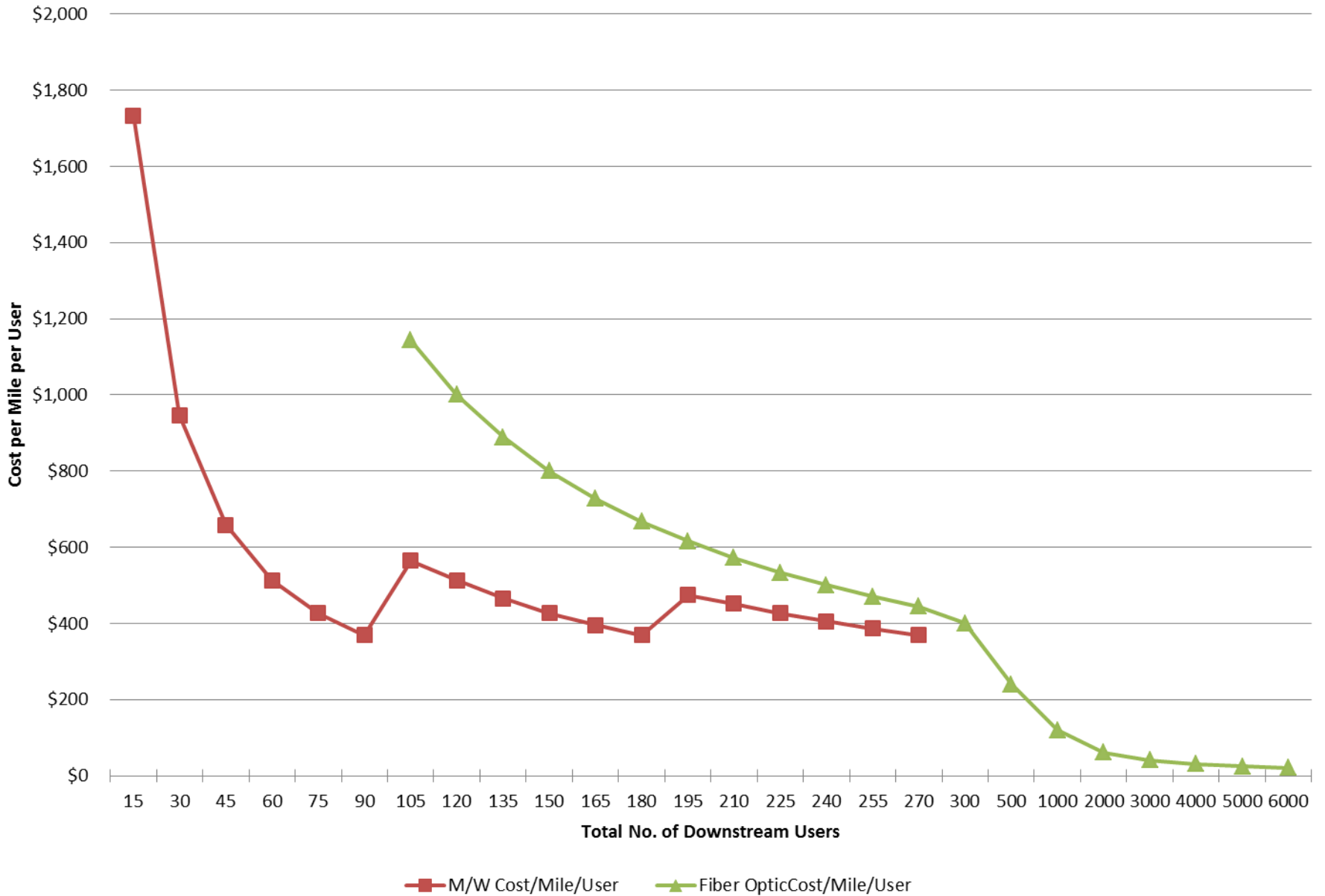


Capacity Estimates

- Assume 100 Mbps with a 10X over-subscription (effective capacity need of 10 Mbps simultaneously for every user)
- Assume current fiber networks can support this need, current microwave networks may need upgrading
- Use microwave for lower capacity links, until economy of scale makes fiber optic more cost-efficient



Middle Mile Network Extension Cost (est.)

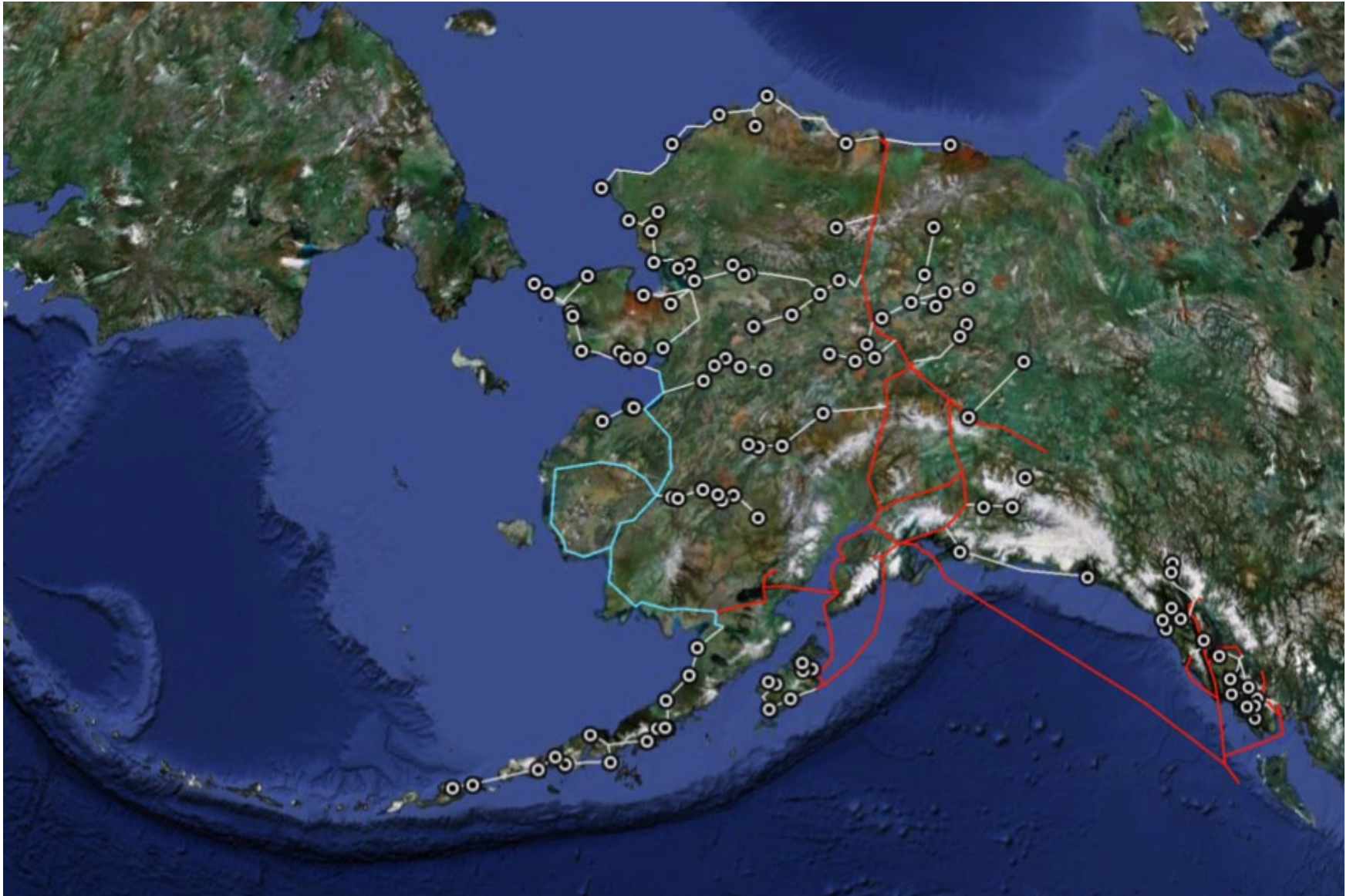


Applying the Middle Mile Model

- SNAP built a “minimum spanning tree” design
 - A little “common sense” directed the design
- Starting from the end points the design used microwave until total users exceeded 300, then began to use fiber
- Current microwave systems were “overbuilt” or replaced with fiber per design criteria



Modeled Network



Last Mile Cost Estimate

- Each local network must be treated as the unique environment it is
 - Initial survey indicated that most villages could support 10 Mbps, but none could support 100 Mbps
- Current high capacity last mile technologies in use are fiber (to the door/curb/etc.) and variants of DSL
- Options continue to increase and new/improved technologies emerge, reducing costs
- Model assumes \$2,000 per delivery point for entire state, or \$580 Million



The Satellite Options

- Latency is a valid issue, but
 - New low earth orbit satellite designs minimize it
- Spot beams can provide good capacity to select locales
- Current satellite technology can be a short term “fast” implementation method, with limited total capacity
- Satellite is not included in the model or in the costs, but could play a significant role in a deployment and long term design
- Deploying a new satellite solution would take 3 to 4 years to fully implement



The “Bottom Line”

Middle Mile Construction Cost (Fiber and Microwave)	\$ 610	Million
Overbuild of Existing Microwave Systems Cost	\$ 30	Million
Last Mile Costs (all state households/businesses)	<u>\$ 580</u>	<u>Million</u>
Estimated Cost - Total Construction	\$ 1,220	Million
Additional Alaskans with High Speed Fiber Access	80,000	
Additional Alaskans with High Speed Microwave Access	20,000	

- Recent construction/commitments have reduced this total by \$100 Million since the original model, including:
 - TERRA Expansion (GCI)
 - Arctic Fibre extensions to the Arctic Slope region (Quintillion)
- Portions of Anchorage to soon have 100 Mbps available (GCI)
- VDSL and other wired and wireless last mile options will continue to emerge



Thank you!

