

How do we improve the cost and availability of communication services in the Arctic?



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February 2014

Communication Constraints in the Arctic

- Largely satellite or fixed wireless dependent
- Expensive: \$1,000 to \$14,000 per Mbps/month
 - Compared to \$25 to \$75 per Mbps/month in urban Alaska; or \$5 to \$6 per Mbps/month in many US locations
- Industry and economic development constrained by lack of reliable high-speed communications
 - Machine-to-machine solutions that can improve safety and production cannot be reliably deployed without high-speed communications

Growing Need for Improved Capabilities

- National Strategies for Arctic Regions require improved communications to support, defense, resource development and management, and environmental protection
 - US Implementation Plan for the National Strategy for the Arctic Region
 - Canada Implementation Plan for the National Arctic Strategy
- Substantial need for improved high-speed bandwidth to support economic development, education, health care and delivery of government services
 - Alaska Statewide Broadband Task Force, draft report
 - Canada Northern Connectivity Report

Europe to Asia via the Northwest Passage



- 3 fiber pairs, 80 x 100Gbps λ 's
 - 2 express pairs - Asia to Europe (15,263 km)
 - 1 local pairs— Landings in US and Canada

Network Overview

- Scope: \$620 million subsea cable project from Tokyo to London through the lower Northwest Passage that provides both transoceanic and domestic connectivity
- Builder will be TE Subcom
 - Leading builder in ice-prone waters
- In Service Dates:
 - Arctic Alaska and Canada Q1 2016;
 - International Q3 2016
- International Landings at Ajigaura, Japan and Highbridge, England
 - opportunity for separate branches into Cork, Ireland and Tomakomai, Japan
 - Trans-Pacific Route Tokyo to Seattle in consideration and would provide lowest latency route across the Pacific

Arctic North America Landings

- **Alaska: Phase I**

- Prudhoe Bay
- Barrow
- Wainwright
- Pt Hope
- Kotzebue
- Nome
- Shemya subject to Federal Govt. approval.
- Unalaska under consideration

- **Nunavut: Phase 1**

- Cambridge Bay
- Gjoa Haven
- Taloyoak
- Cape Dorset
- Hall Beach
- Igloolik
- Iqaluit

Current Demand is Unmet

- **International Demand Drivers:**

- Physically diverse route from Europe to Asia
- Avoids physical trouble spots – fish trawling, anchorage
- Two fibre pairs avoid USA landings
- Avoids politically risky areas – Egypt terrestrial crossing
- Reduces network congestion in NY/NJ cable stations
- Lowest latency route from Tokyo to London (153 ms)
- Measurable ROI from ULL routes for financials and Internet companies

- **Arctic Demand Drivers:**

- Most Arctic communities in Canada and Alaska are dependent on high-cost satellite
- Fixed wireless options often cost as much or more than satellite with limited capacity
- Economic and resource development constrained by lack of true high-speed, affordable broadband
- Education, health care and delivery of government services limited by lack of high-speed affordable communications

Quintillion, Inc.

- US corporation, wholly owned subsidiary of Quintillion Networks Limited (Bermuda)
- Owner-Builder-Operator of middle mile infrastructure to connect Alaska through the Arctic Fibre cable
- Carriers' Carrier, open access – middle mile provider only
- Privately funded
- www.quintillionnetworks.com



Arctic Fibre Limited

- Headquartered in Toronto, Canada
- Doug Cunningham, Founder and CEO
 - Experienced developer and builder of submarine cable and other telecom networks
- Private company, privately funded
- Arctic Fibre Canada is a wholly owned subsidiary of AFL with exclusive rights to connect spurs in Canada
- www.arcticfibre.com

Connecting the Arctic to the World

- Improved affordability
- Virtually unlimited capacity – up to 100 Gbps per landing initially
- Industry cooperation reduces overhead and avoids duplicate costs: collocation of landing sites with existing Cos; outsourced O&M to local providers provides faster response times
- Substantially lower cost of operation than microwave or satellite
- Competition on product, price and service at user interface instead of on backhaul
- Provides more affordable base for connecting neighboring communities
- Design creates a redundant ring around the Arctic through Europe and Asia

Risks and Mitigations

- Arctic Fibre’s network backbone is exposed to fewer risks than most subsea cable systems by nature of its route in Arctic Ocean
- Tyco built 2,800 km Norway Svalbard Islands cable in 2003 – never had an incident
- ~ 20 other cable systems in ice-prone Arctic waters with few service disruptions
- Cable is buried at all shore landings to provide physical protection – use of horizontal directional drill in most Arctic locations
- Offshore pipelines have been buried along the Alaskan North Slope for several decades without incident
- Backbone cable is in deep water, well below ice cover and resilient against ice related damage

International Cable Protection Committee identifies majority of cable breaks caused by human activities that are largely absent in the Arctic region

Causes of service-impacting cable breaks	
Fish Trawling	40%
Ship Anchorages	28%
Subsea earthquakes or subsidence	8%
Shunt(electrical faults) failure	8%
Amplifier or branching unit failure	4%
Abrasion (wave or seabed)	3%
Other factors, sabotage, etc..	9%
Total	100%

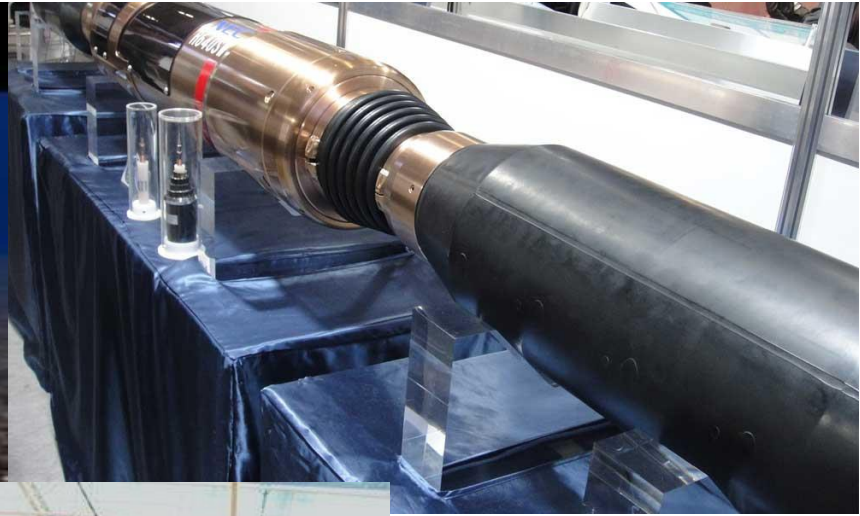
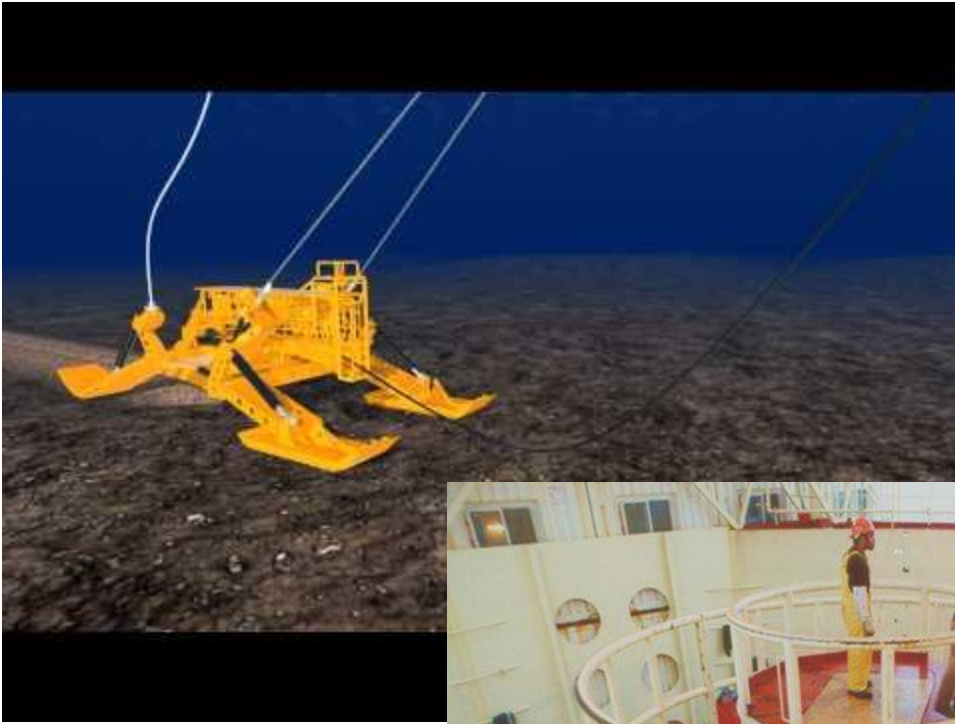
*International Submarine Cable Protection Committee

How the Arctic Benefits

- **UNDERSERVED:** Much of the coast Arctic is greatly underserved in terms of fast and affordable Internet access and this project will substantially improve access for rural Alaska
- **URBAN COMPARABILITY:** This project will build spurs to northern and northwestern communities from the Arctic Fibre backbone, providing global broadband access at virtually unlimited speed
 - Affordable terrestrial extensions can now be added to neighboring communities to deliver better service and lower cost
- **AFFORDABILITY:** Connecting to the international backbone reduces capital costs for Alaska network and lowers operating costs resulting in substantially improved affordability for modern communications

How Arctic Communities Benefit

- **EDUCATION:** Supports Digital Learning agenda; enables options for improving education and job training while lowering cost of delivery
- **HEALTH CARE:** Supports Tele-medicine solutions; remote diagnostics and specialist consultations and electronic health records
- **GOVERNMENT:** Improves efficient delivery of government services
- **ECONOMIC DEVELOPMENT:** Enables business opportunities dependent on high-speed communications and true online/remote work employment opportunities
- **EMERGENCY RESPONSE:** Allows real-time monitoring and management of resource development industries (oil & gas and mining) and improves Search and Rescue capabilities
- **PUBLIC SAFETY:** Improves capabilities for effective community public safety and security services





Thank you

