

Top of the World Arctic Broadband Summit Sapporo June 2018

Presented by Captain David Tossell – Director of Marine Engineering



ASN AT A Glance

Alcatel Submarine Networks (ASN) world leading fully integrated provider of turnkey submarine network solutions. Part of **Nokia**, we bring all of the products and know-how needed to design and build optical communications links across the world's oceans

https://networks.nokia.com/solutions/submarine-networks



ASN at a Glance – The Facts

- More than 160 years of submarine cable system experience
- ✓ 2 decades of Arctic installation management
- ✓ More than 600,000 km of cable laid
- ✓ More than 330,000 km of cable under maintenance
- ✓ More than 220 fiber optic cable systems delivered
- ✓ More than 180 upgrades completed
- ✓ More than 6500 repeaters manufactured
- ✓ A fleet of six installation and maintenance vessels





ASN At A Glance – The Fleet

- Six vessel fleet providing global coverage:
 - 3 'lle de Class' Installation Vessels
 - Average 60 crew members
 - DPII Class
 - Pre-Lay Grapnel Run / Route Clearance
 - Surface-Lay Cable Installation
 - Plough Burial (up to 4m)
 - Post-Lay Burial & Inspection (ROVJet400 Series)
 - 3 Maintenance Vessel
 - DPI & II Class
 - Undertake repairs up to 7000m WD
 - Pre-Repair Location & Inspection
 - De-trenching capability (up to 3m)
 - Post-Repair Inspection and Burial

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Peter Faber



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ASN at a glance

ASN Install submarine cable systems globally

Route engineered systems are buried into the seafloor to protect the fiber optical cable against external threats and aggression by means of Ultra heavy-duty subsea tooling technologies operating down to water depths of 1500 meters and full ocean depth capability for transoceanic systems





ASN At A Glance - Capacity

- Ile de Class Cable Tank Capacity:
 - Volume 2 x 1500m³
 - Capacity 2 x 2500t
 - Largest single load up to 9400km









ASN At A Glance – Cable Lay Equipment

- DOWTY 21 Wheel Pair Cable Engine
- 25t Drum Engine
- 6 Wheel Pair DOHB









ASN At A Glance – Installation Technologies

- ASN Plough Technology (up to 4m Depth-of-Burial)
 - 50 t A-Frame Stern Launch & Recovery
 - 130t Bollard Pull Capacity
- ROVJet400 Series Trencher
 - Dedicated LARS







Arctic Operations History: North West Passage Transit

- Transit from Taiwan to Greenland via the NW Passage reducing the traditional Suez route by **4280nm**.
- Passage planning supported The Canadian Coast Guard Ice Control Centre.









Arctic Operations History: Greenland Post-Lay Burial (PLB) Operations





- Working late-season west-coast Greenland to complete remedial post-lay cable protection (jet trenching).
- Departed operational grounds late-November.
- Ice Pilots required for local ice navigation.



Arctic Operations History: Greenland Connect Shore-End Reconfiguration

- Over-winter cable damage due to grounding icebergs.
- Remedial work including direct HDD pull-in by ROV operations.
- Ice-management support vessels required.
- Shore-based Ice Radar & Ice Surveillance









Arctic Operations History: Greenland Connect St Johns, Canada to Nuuk, Greenland



- Ice Pilot support from Greenland Maritime Services
- Ice Coordination and Satellite Imagery provided by Danish Meteorological Institute (DMI).
- Navigational ice familiarization training also provided by DMI.







Arctic Operations History: Quintillion Subsea Phase I, Alaska

- Ice Expertise, coordination and Satellite Imagery / Forecasting service provided by Viking Ice Consultancy (VIC).
- Short operational window due to ice (August to October).
- Requirement for ice-management vessels supporting operation.
- Ice features created a unique threat to cable installation (seabed gouging).









Arctic Operations History: Greenland North Extension







- Glacial till presence increases plough risk; multiple erratic boulders.
- Logistical challenges due to remoteness (personnel transport, ice pilot support, shore/ship coordination).



The ASN Arctic Cable Operations Manual (ACOM)

- The ASN ACOM is a common operating manual for all involved operational parties providing Arctic operation specific guidance and familiarization.
- Provided specific guidance on vessel operations in the polar region.
- Acted as a reference point for preparation of QHSE documentation including HAZID.
- All marine personnel provided with a copy and briefed on ACOM contents.





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Arctic Survey Operations

- Limited operational season.
- Local suppliers with local applied experience and expertise.
- Seabed geology is extremely chaotic due to continuous 're-working' by ice features.
- Geotechnical information particularly critical in this area to properly determine burial capability & risk:
- Recommendation for 4D survey techniques i.e. multiple season bathymetric survey to determine level of dynamic activity.







Arctic Shore End Management

- Unique environment for shore-end landings:
 - Low temperature consideration for personnel & physical processes.
 - Permafrost presents challenging burial conditions and earth resistivity issues.
 - Low temperature consideration for HDD management saline solution / brine solution brings environmental considerations.
 - Wildlife management / personnel safety considerations; polar bear 'lookout' and specific procedure development.
 - Remote locations (no road access, limited flights) present unique logistical considerations.
 - Increased levels of down-time due extreme/severe weather.









Polar code Compliance Operations Pre inspection and briefing of Marine spreads



- When to start/Seasons Monitoring (Ice/Metocean)
- Weather and Ice Information(Onboard/Shore)
- Operational Risk Assessment with Crew/3 parties
- Go/No Go Decision Matrix (Position Description)
- Damage Stability
- Low Temp operations/Winterization needed
- · Icing allowance. Freezing of tanks/vents
- Avoid HFO
- No Pollutants against shell (Possible?)
- Survival Suits Arctic Type
- MMO/WLO (Local) Mammals area avoidance
- SAR/Medevac (Liase with Local Airline)
- Hull, P&I, Increased premium/deductable
- Clothing onboard (How to dress)
- Communication. (VSAT and Iridium)
- Navigation (Ice Radar)
- Ice advisor
- Reporting eNOA
- Check lists/Procedures
 - Preparation for Cold Environment
 - Voyage planning
 - Navigation in Ice
 - Entrapment In Ice
 - Polar Bear Avoidance (Weapon Course)
 - Collision with Iceberg (Floeberg)



ICE MANAGEMENT 2016 and 2017 Quintillion





Polar Code compliance 10 vessels in marine spread inspected
Hazop and Risk assessment support
Marine Operational Manual
Training and familiarization onboard 10 support and lay vessels
Shore Operational Center
Ice advisors onboard project vessels
Satellite imagery
Operational ice charts
Met Ocean forecast
Long range Ice(Breakup/Freezeup), Metocean forecast and historical overview presentations



Multi-Purpose Ice-Class Vessel Utilisation

- ASN Marine Engineering specialise in the management and implementation of mobilisation of 3rd party vessels of opportunity for:
 - Pre-Lay Grapnel Run (PLGR)
 - Surface-Lay Operations
 - Plough Burial Operations
 - Post-Lay Inspection & Burial (PLIB) Operations
- Allows utilisation of 3rd party ice-class vessels when & where conditions require.
- Towed operations (plough / screeding / PLGR) present a particular challenge in high ice-concentration or ice-breaking conditions, though feasible engineering solutions have been identified and studied.





HSE in the Arctic

- Planning is key.
- All-Party HAZID required, including all operators.
- Emergency Response plans consider remote location and limited resource availability / weather restrictions local emergency service providers notified of activity where appropriate.
- Vessel winterization audits (deck safety, evacuation, fire safety systems, PPE).







Arctic Installation Technologies

- Specific subsea tooling developed to cope with arctic environment:
 - Share design developed specific to identified geotechnical conditions.
 - 2m and 4m pre-trenching shares developed to allow depth-ofburial >3.5m to protect the cable below the threat of grounding ice.
 - High capacity jetting to allow trenching to >2m in stiff clays and dense sands.





Protected Species Management

- Operations in the Arctic require Protected Species Observers in *all* areas of operation.
- This requirement should be anticipated for much of the Arctic due to the unique and fragile environment.
- Environmental permitting requirements can impose restrictions on operations.
- Consideration of and communication with local communicates, particularly the whaling communities.
- Operations cannot impact on subsistence fishing.





ASN a Qualified Arctic Partner

Building subsea communication infrastructure in the frozen expanse and remoteness of the Arctic is without comparison the most challenging of any telecommunication network project on the planet.

Understanding the complexities and risks of operations in polar environments and identifying a path to achieve successful construction can only be reached by mobilizing the strongest and most experienced teams where proven and tested capability is the only true reference of project execution capabilities.

Alcatel Submarine Networks has a true reference in the Arctic







Thank you