Submarine Cables: Critical Infrastructure
Supplier Perspective

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World Undersea Telecom Cable Systems
Critical Infrastructure

Carry more than 95% of international internet, data, and telephone traffic
Over 420,000 km of lightwave systems delivered by TE SubCom alone
Cable Maintenance Agreement Zones shown in color shading
• Full Service provider of undersea telecommunication system construction and marine services
• Supplier of undersea fiber-optic systems
• Provider of marine installation and maintenance services
• An industry leader in undersea technology and R&D
• A subsidiary of Tyco Electronics; recently divested from Tyco International Ltd. as an ~ $15B stand-alone company
• Only US based supplier of integrated systems
Undersea Fiber Optic Network

- Maintain & Operate
- Test
- Deploy
- Manufacture
- Design
- Research

- Branching Unit
- Repeater
- Cable
- Line Terminating Equipment
- High Performance Optical Equipment
- Terminal

Project Manage
Undersea Fiber Optic Cable

**Undersea Cables…**
- Contain & protect optical fibers and electrical conductor
- Withstand harsh environmental conditions for 25 years
- Are durable, yet flexible, enough to support system deployment, recovery, repair, and re-deployment
- Are non-threatening to the undersea environment
- Survive a variety of stresses: temperature, tension, torsion, pressure, chemical exposure, bending/flexing

**SL Lightweight (LW) Cable…**
- For depths > 2500 meters (largest percentage of deployment)
- Serves as the core for all armored cables

- Lightweight (LW)
- Special Application (SPA)
- Single Armor
- Light-Wire Armor
- Double Armor (DA)
- Rock Armor (RA)
Global Presence
Manufacturing, Marine Depot, R&D
History – Roots in Bell Laboratories R&D

- Manufactured the cable for one of the first Trans-Atlantic Telegraph Cables - 1867
- Constructed TAT-1 – the first Trans-Atlantic telephone system - 1956
- Pioneered undersea fiber optics
- First optical Trans-Atlantic Network - TAT-8 1988
- Developed the world’s first seamless 10Gb/s global network operated by an integrated OSS
- Current Research and Development in Eatontown, NJ conducts core undersea technology development; about 20 patent applications per year.
Manufacturing – Key Facilities

- Newington, NH - Repeater manufacturing co-located with cable manufacturing
- Lowell, MA - SLTE and PFE manufacturing consolidated with Tyco Electronics’ facility
- Hitachi Cable Ltd., Japan - licensed subcontractor
Wet Plant Manufacturing

- Newington, New Hampshire, USA
- Occupy 550,000 Sq Ft on 85 Acres
- Founded in 1865
- Deepwater pier with 32 ft draft
- World’s only fully integrated cable and repeater factory
- Manufactured ~400,000 km cable
- Manufacture ~40,000km cable/yr
- Manufacture 500 repeaters/yr
- Leveraging Hitachi Cable (contract manufacture partner) to fill gap represents 45% industry output.
Marine Fleet Operations – Baltimore

- 20 Acre Facility, 150,000 sq foot office and warehouse space
- 4 Deep water berths
- MTSA regulated facility
- State of the art fleet of vessels and tools
- Approx. 100 marine engineering and seagoing professionals
- In-house route & cable engineering, GIS and documentation capability
- Extensive footprint, including pre-positioned repair ships and depots
- Jointing- customized training courses- Baltimore, MD and Algeciras, Spain
- Land and marine training
  - Baltimore, MD and Algeciras, Spain
  - Field training
  - Shipboard training
  - Land and marine training
Reliance Class
Cable Ship for Installation and Repair (6 in fleet)

Installation and repair ships equipped with state of the art equipment for navigation, cable handling, jointing and cable deployment

Range: 25,000 nm or 60 days
Overall Length: 140.0 m
Molded Beam: 21.0 m
Deep Draft: 8.4m

Speed: 14 knots
Gross Reg. Tonnage: 12,184
Accommodations: 80 personnel
Deadweight: 9,200 MT ; 9,056 LT
ABS Class: +ACCU,+AMC,+DPS-2,NBLES, UWILD
Year Built: 2001 by Keppel Hitachi Zosen, Singapore
Cable Burial Systems- Plows & ROVs

- Cable burial remains the most effective and economical method of protection.

- Towed cable plows remain the industry standard for cable burial (1 to 3m typical).
TE SubCom Cable Installed Last 3 Years

Understanding and complying with Coastal State maritime claim and regulations was a key driver in project cycles.
Cable Faults and Need for Rapid Repair

- Ship anchors, fishing and other activities cause cable damage
- A single fault sometimes affects communications including internet speed, but backup cables may restore communications
- Several faults occurring on different cables at the same time can cause more serious outages
- Notices & individual advisories using AIS data help avoid damage
Cable Repair Ships on Call

- Proximity of repair ship to fault has strong impact on repair time
- Maintenance agreements & ship teaming agreements can improve asset distribution
- If permits are required, they are obtained before the ship leaves port
- The ship is directed to sail to the estimated fault location
Message to the Conference

Key Drivers for Undersea Cable Projects
• Reliability
• Schedule
• Cost
• Safety and Environment

Regulatory Compliance
• UNCLOS used as a guideline
• Coastal State laws/regulations are investigated and followed in practice. (these supersede UNCLOS and often present obstacles in conflict with UNCLOS)
Key Issues - UNCLOS
Faced By Installers and Maintenance Providers

- Coastal States are extending provisions, reserved for Territorial Seas, to EEZ in conflict with UNCLOS
  - Lengthy process to obtain vessel operating permits in EEZ of many coastal states

- Overlapping maritime claims, unknown or unpublished maritime claims
  - Coastal States often use undersea cable projects to confirm their jurisdictional assertions drawing suppliers into boundary disputes
  - Time-to-market considerations make it impractical for suppliers to attempt to resolve disputes

- Continental Shelf jurisdiction is not well defined
  - Allows Coastal State greater influence on cable routing

- Coastal States applying UNCLOS scientific research provisions to cable route surveys
  - Cable route surveys are part of cable laying and afforded such rights
Key Issues – Indirect to UNCLOS
Faced By Installers and Maintenance Providers

- Unknown and unpredictable permitting process and intervals
  - Result in vessel standby and added cost (installation and maintenance)

- Congested routes and seabed not conducive to burial make it difficult to route and protect cables
  - Increasing conflict with other seabed users particularly with renewed emphasis on energy exploration

- Little or no deterrence to cable damage by fishing, anchors, or theft.
  - UNCLOS would provide better protection

- Significant influence by fishing unions for compensation well beyond Territorial Seas

- Piracy attacks
Overlapping Maritime Claims
Summary Message to the Conference

• Undersea Telecom projects are greatly impacted by regulatory requirements around the world
• Coastal states regulatory requirements are currently not consistent, are prone to change, and subject to interpretation making project planning uncertain
• UNCLOS articles governing laying of undersea cables form a solid baseline for a common understanding of regulatory requirements
• US ratification of UNCLOS will allow US greater clout when discussing UNCLOS compliance with other coastal states
• Consistent permitting processes with established timeframes will allow more efficient project planning and execution
• Undersea Telecom is a critical infrastructure. US based workers, factories, ships and mariners supply these systems world wide
• We are ready to listen and understand issues facing government organizations and offer solutions were we can
Contact me with any questions!

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