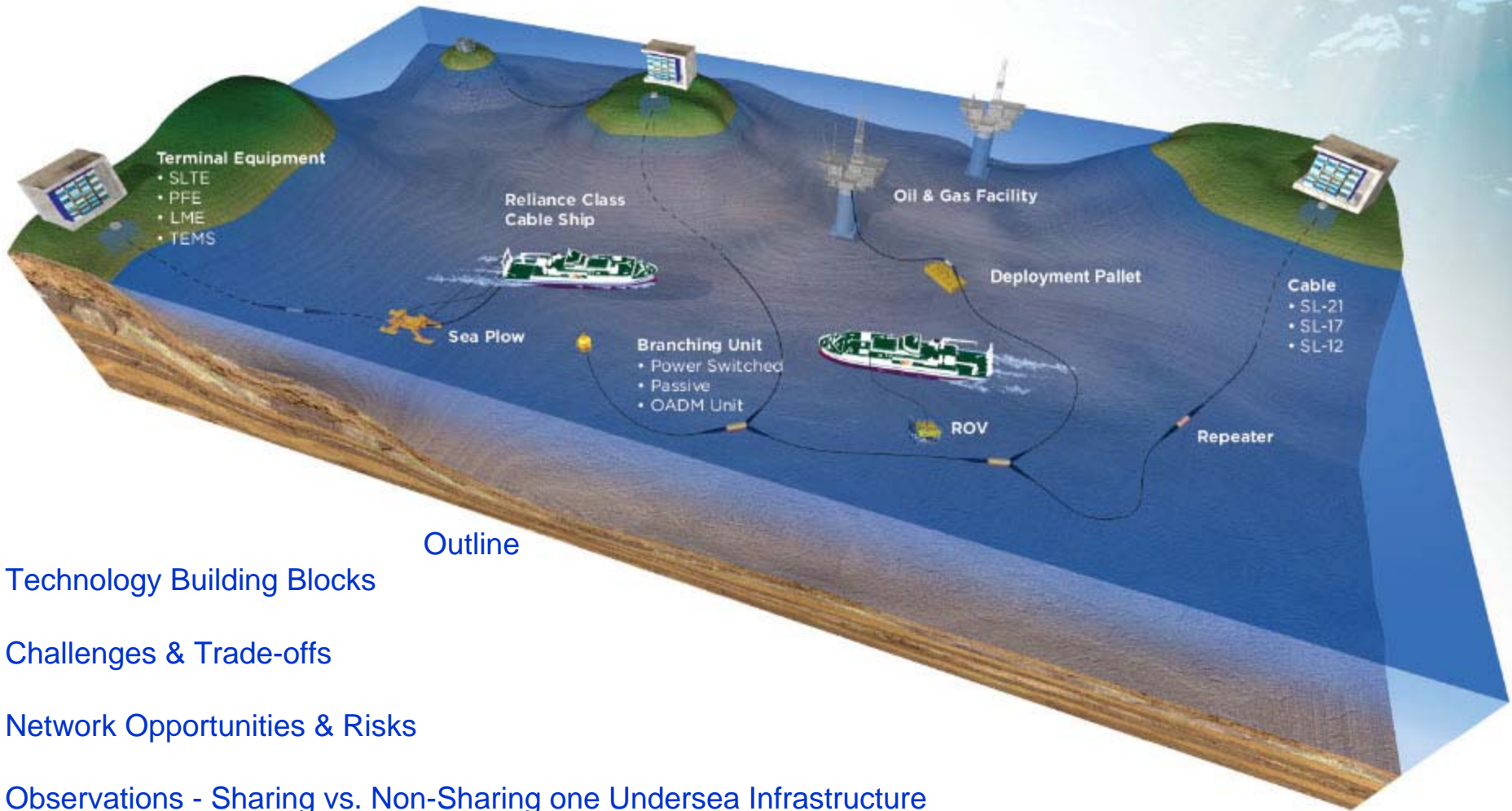# Undersea Technology & Tools

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Managing Director, TE SubCom
Eatontown, New Jersey, USA

ITU Symposia on ICTs and Climate Change 2012
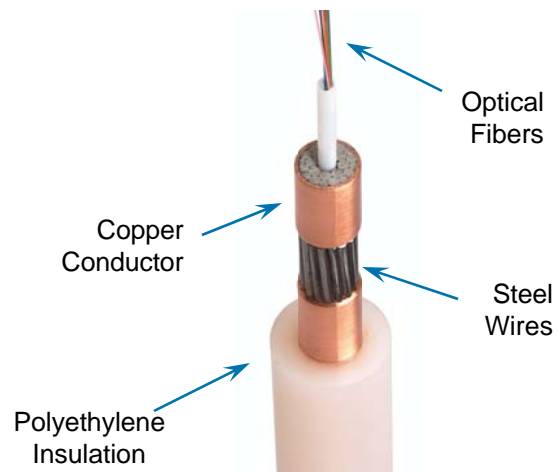May 31, 2012
Montreal, Canada

≡TE
connectivity

SUBCOM

Undersea Technology & Tools

Terminal Equipment
• SLTE
• PFE
• LME
• TEMS

Reliance Class Cable Ship

Oil & Gas Facility

Deployment Pallet

Cable
• SL-21
• SL-17
• SL-12

Sea Plow

Branching Unit
• Power Switched
• Passive
• OADM Unit

ROV

Repeater

Outline

Technology Building Blocks

Challenges & Trade-offs

Network Opportunities & Risks

Observations - Sharing vs. Non-Sharing one Undersea Infrastructure

Undersea Hardware - SL Cables

Armorless & Armored Cables
Dynamic Riser Cables
Dual Conductor Cables

Optical Fibers
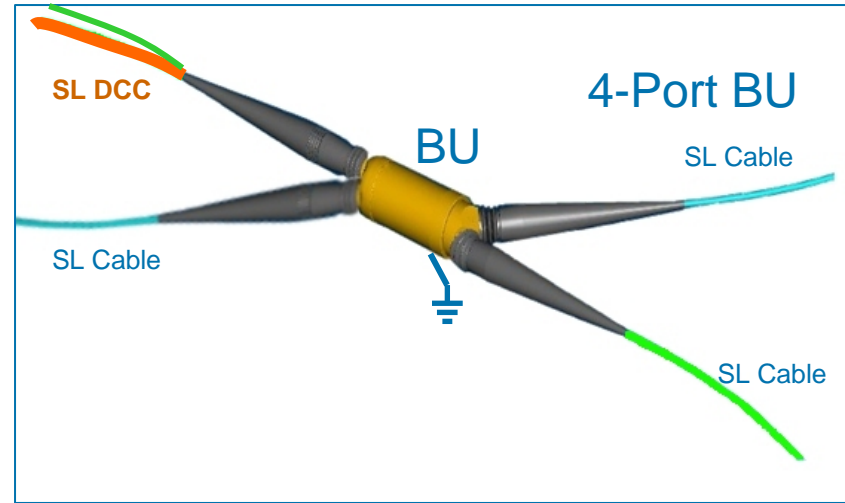
Copper Conductor

Steel Wires

Polyethylene Insulation

Undersea Hardware - SL Amplifiers

Optical Amplifiers

Joints & Couplings

Millennia Joint
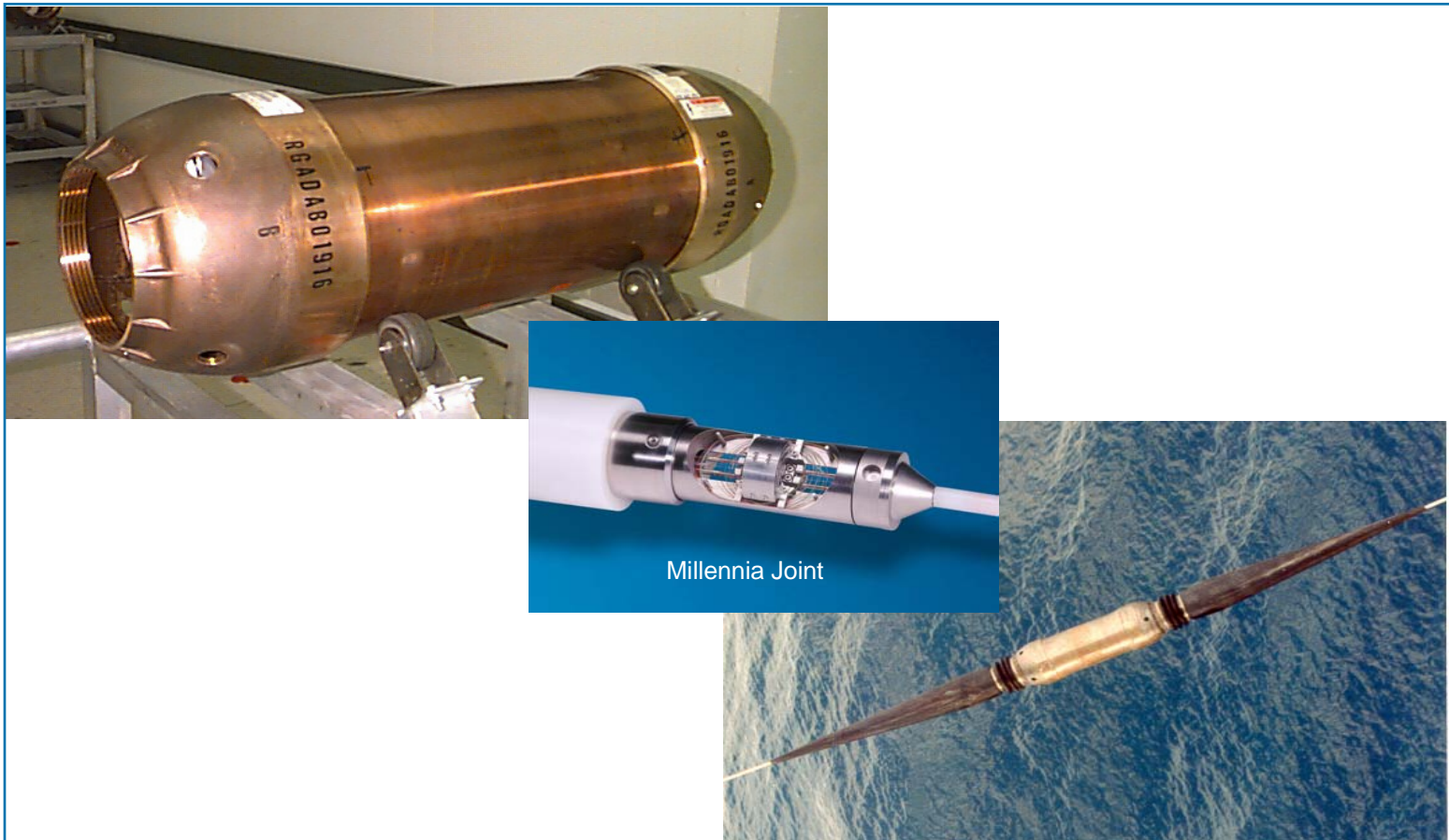
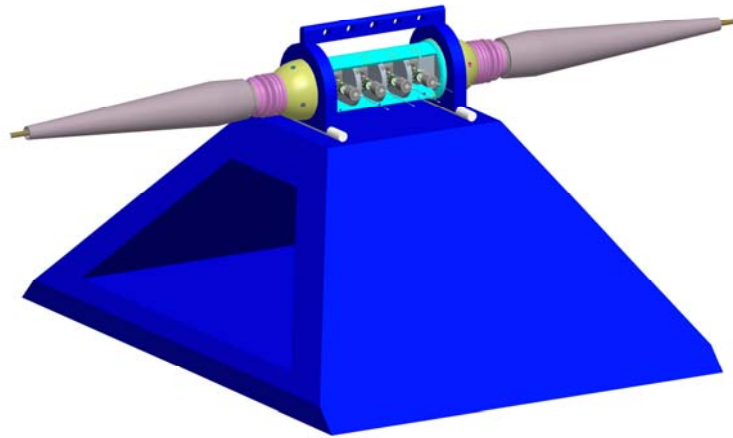# Undersea Hardware - SL OADM Branching Units

3-Port BU

SL DCC

4-Port BU

BU

SL Cable

SL Cable

SL Cable
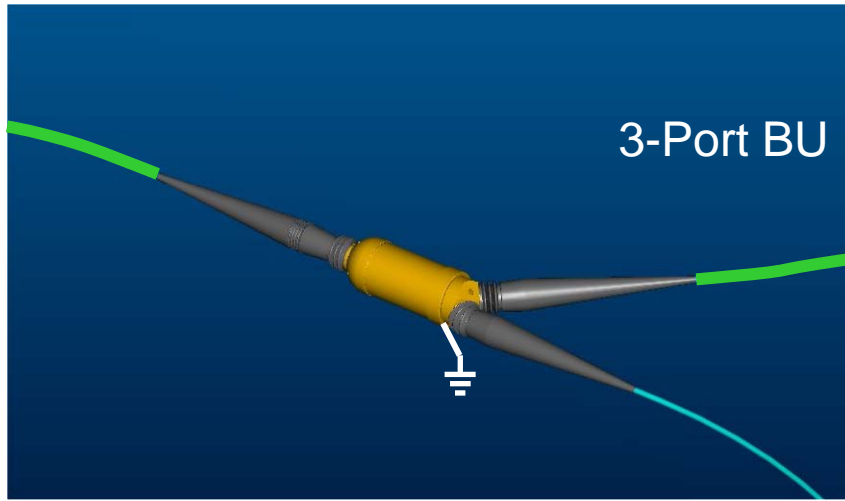
Undersea Hardware - SL Specialty Hardware

Integrated Wet Mate Gateway

Allows future network expansions

Rig Termination

SL Dynamic
Riser Cable

FDC

SL OADM BU

Interconnection
Joint

SL17 LWA

SL DRC

Riser
Positioning
Anchor
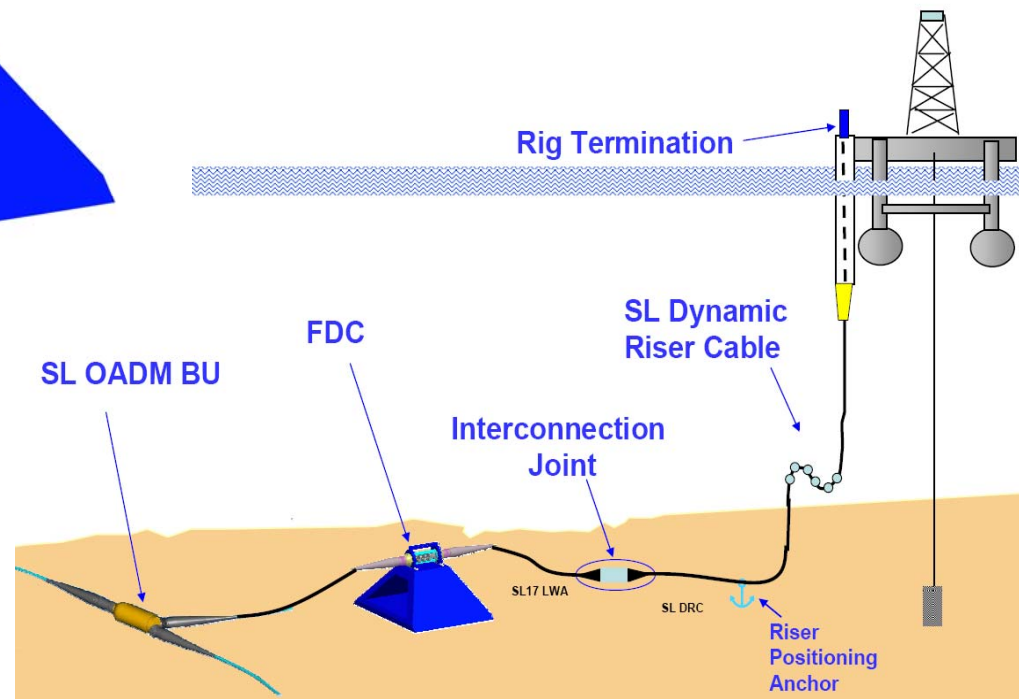
Challenges & Trade-Offs

Network Differences – Data Topology

	Telecom Network	Oil & Gas Network	Scientific Network
Topology of Data	Data Transmission across Oceans from **end to end**	Data Transmission from **Oil & Gas Fields back to shore**	Data Transmission across **vast ocean areas to shore**
Capacity needs	**Terabits** – 100's of wavelength @ 40/100G Concentrated between few landings	**Gigabits (nom.)** most – Distributed between platforms	**Megabits (nom.)** – Distributed between sensors

Classic Undersea Networks

Technology Challenges – Power & Data connectivity & independence
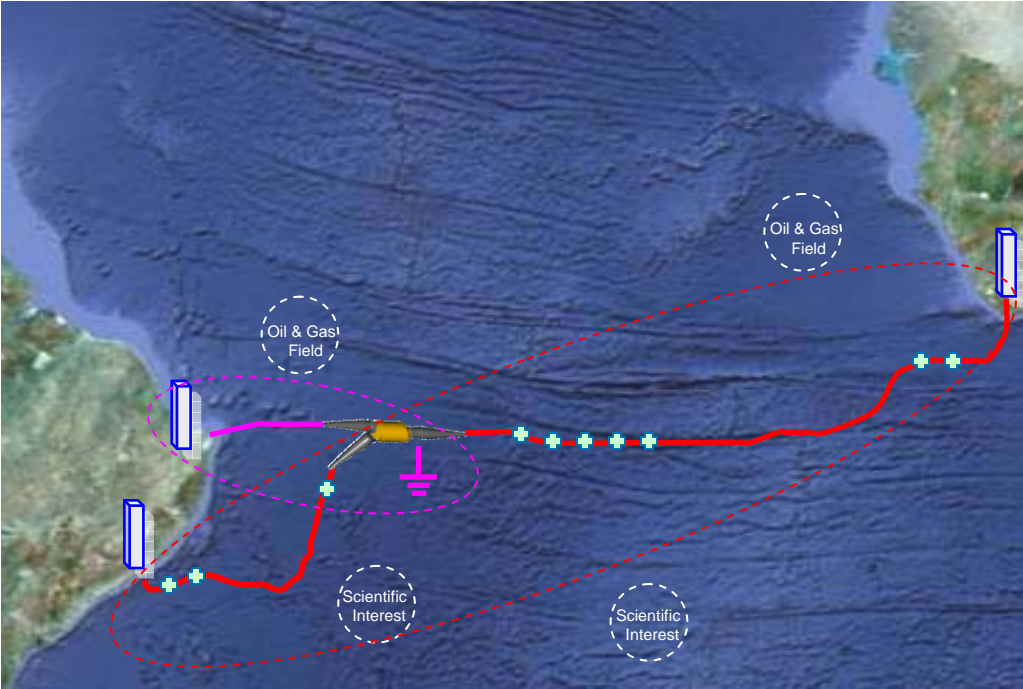
Telecom Network Characteristics:

High Reliability
High Capacity (Terabits/sec)
High Voltage (15KV)
Powering the main trunk from two terminals
Small number of fibers (< 20)
Rapid Deep Water Installation (up to 7 knots)
Rapid Repair (24 hr dispatch)

Modern Transoceanic Undersea
Telecommunications Network →

Primary function is to push vast amount of data between population centers through large data pipes with minimal energy under the sea

Opportunities for Undersea Networks
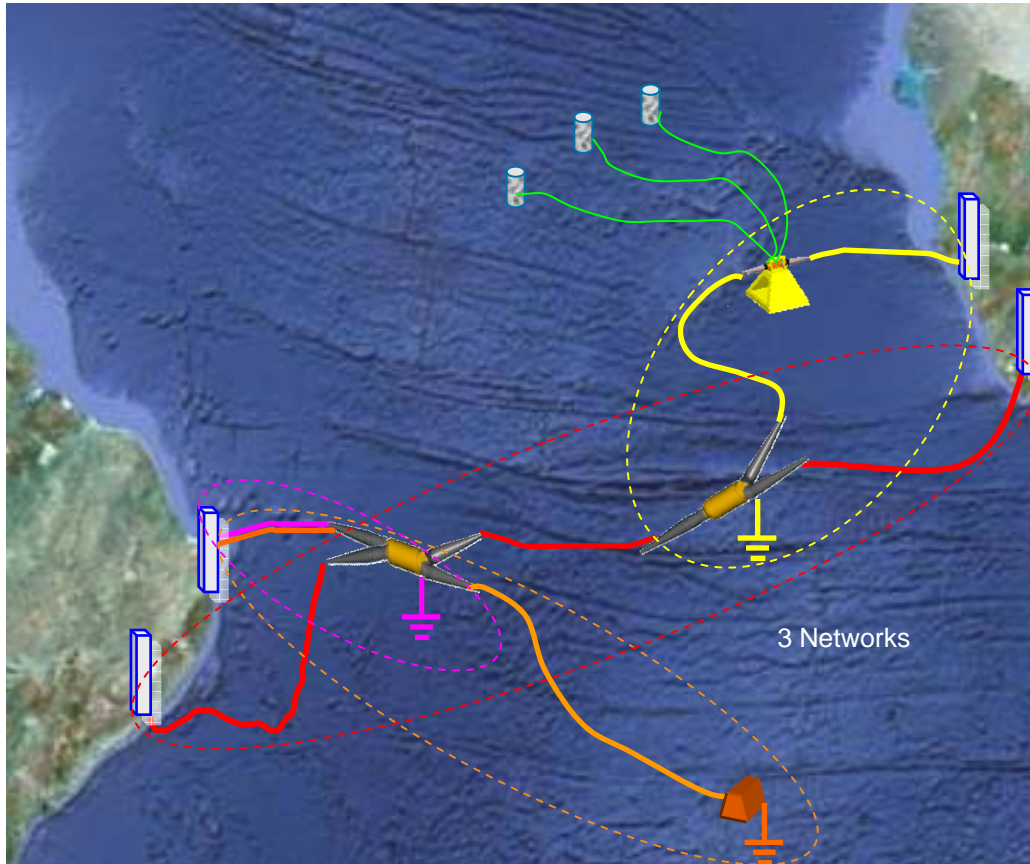
Dual Conductor Cable

4-Port Branching Unit

SL Optical Add Drop Multiplexer BU

Fiber Distribution Canister, etc.

3 Networks

Limited Network "Independence" could be met through special hardware → Non-telecom markets collect small distributed data and could use appreciable energy to operate sensors, lights, etc.

Sharing Undersea Networks ?

Sharing the same undersea infrastructure presents difficult challenges to the different undersea communication markets:

- Telecommunications (High speed & high capacity)
- Oil & Gas (lower capacity, monitoring & control functions)
- Scientific Research (lower capacity, monitoring & some control)
- etc.

- Technology Challenges – Power & Data connectivity & independence

- Cost Challenges – Additional initial costs

- Commercial Challenges – Ownership rights and priorities

- Operation & Maintenance Challenges – Interdependence, Sparing & Restoration

Summary

• Tools & Technology exist today to provide solutions to data gathering on the bottom of the ocean

• Many of the tools presented here are qualified and have been used on many systems around the world

• Appreciable funds are needed to implement such features into commercial systems

• There are commercial challenges to be overcome to satisfy the needs of owners of the different sub-networks