Next Generation Network, and Transoceanic Subsea Cable Updates

Presented by:
City of Virginia Beach
Department of Information Technology
October 4, 2017

City of Virginia Beach
Information Technology

Strategic Planning & Partnerships

- **Master Technology Plan**
  - A roadmap for how the IT department will partner with other city departments to implement the right technologies needed for long-term business success.

  - Includes four major pillars that all IT department initiatives support:
    1. Transforming service delivery
    2. Building better business solutions
    3. Strengthening IT governance
    4. Improving infrastructure and operations

  - Next Generation Network (NGN) – Initiative I-1
    - The "Improving infrastructure and operations" pillar included a recommendation to explore ways to create a Next Generation Network.
      - Documents the city's progress in creating the NGN
      - Assesses the city's need and market for future NGN capabilities
      - Provides strategic and technical recommendations for achieving the city's goals related to broadband infrastructure and operations

- **Broadband Resolution**
  - Adopted by City Council in March 2015
  - Charged staff to explore and create opportunities to leverage NGN investments made by the city and VBCPS to advance high-speed broadband across the region.
  - Broad Band Task Force (2015-2016)

Strategic Planning & Partnerships for Next Generation Network

- **CVB Broadband Task Force Goals**
  - Purpose and Objective: Build a Next Generation Network that:
    - Provides excellent city services
    - Reduce digital divide for families and businesses
    - Grow our economy
    - Support 21st century jobs
    - Expand fiber network to connect additional off-campus locations to municipal campus and create network redundancy
    - Leverage NGN for the following:
      - Expand educational opportunities
      - Contribute to regional opportunities
      - Utilize "Dig Once" strategy for road and utility projects to include fiber and conduit

- **CVB Broadband Strategy**
  - Support city council goal of a financially sustainable city that provides excellent services by making strategic investments in NGN and Transoceanic Cable.
  - Create a Middle Mile infrastructure that enhances opportunities in economic development, education, and regional connectivity.
  - Enhance the build out new businesses and growth areas (e.g., Biomed) and make business parks fiber ready to attract new businesses.
  - Lease excess capacity (dark fiber) vs. providing lit services to create opportunities for expanding internal government services.
  - Create internal and external partnerships to take advantage of Transoceanic Cable opportunities.

- **Regional CIO Broadband Task Force**
  - City Manager and CIO met regularly with regional City Managers to discuss regional broadband opportunities.
  - Collaborated with other municipalities to explore potential regional broadband opportunities.
  - Shared education of emerging clusters.

- **City Manager's Directive**
  - Directive to include fiber expansion in all Public Works construction projects.

Strategic Planning & Partnerships for Next Generation Network

- **Broadband White Paper**
  - A High-Speed Broadband White Paper was developed to:
    - Provide a history of broadband on a local, state and national level
    - Identify the current trends in broadband
    - Provide an overview of the laws surrounding broadband
    - Support the city's broadband vision for Virginia Beach, as outlined in the Envision Virginia Beach 2040 report:
      - "Citizens, businesses and visitors have access to advanced broadband technologies that efficiently and effectively supports regional interconnectivity as well as global commerce."
    - Meet market demand

- **Business Case**
  - A business case was developed to provide a financial analysis and comparison between leased network fiber and City-owned network fiber.
  - This document assisted city leadership and stakeholders with determining if the project would provide value to the enterprise.
  - The document also served to justify the capital outlay for the project.
  - Stakeholders from various departments were involved with the assessment of current and future bandwith needs.
  - Costs and savings were identified and entered into a ROI calculator to provide the quantitative benefits of implementing fiber.

- **Formalized Process for Fiber Provisioning Management**
  - Document that describes the processes that will be required for building out the fiber infrastructure
    1. Provisioning fiber to a building location that is not part of the NGN
    2. Provisioning fiber to a building that is being newly constructed by Public Works
    3. Provisioning fiber for road, sidewalk and Intelligent Traffic System projects
    4. Repairing a confirmed fiber service outage
    5. Repairing damaged NGN network infrastructure

Strategic Planning & Partnerships for Next Generation Network

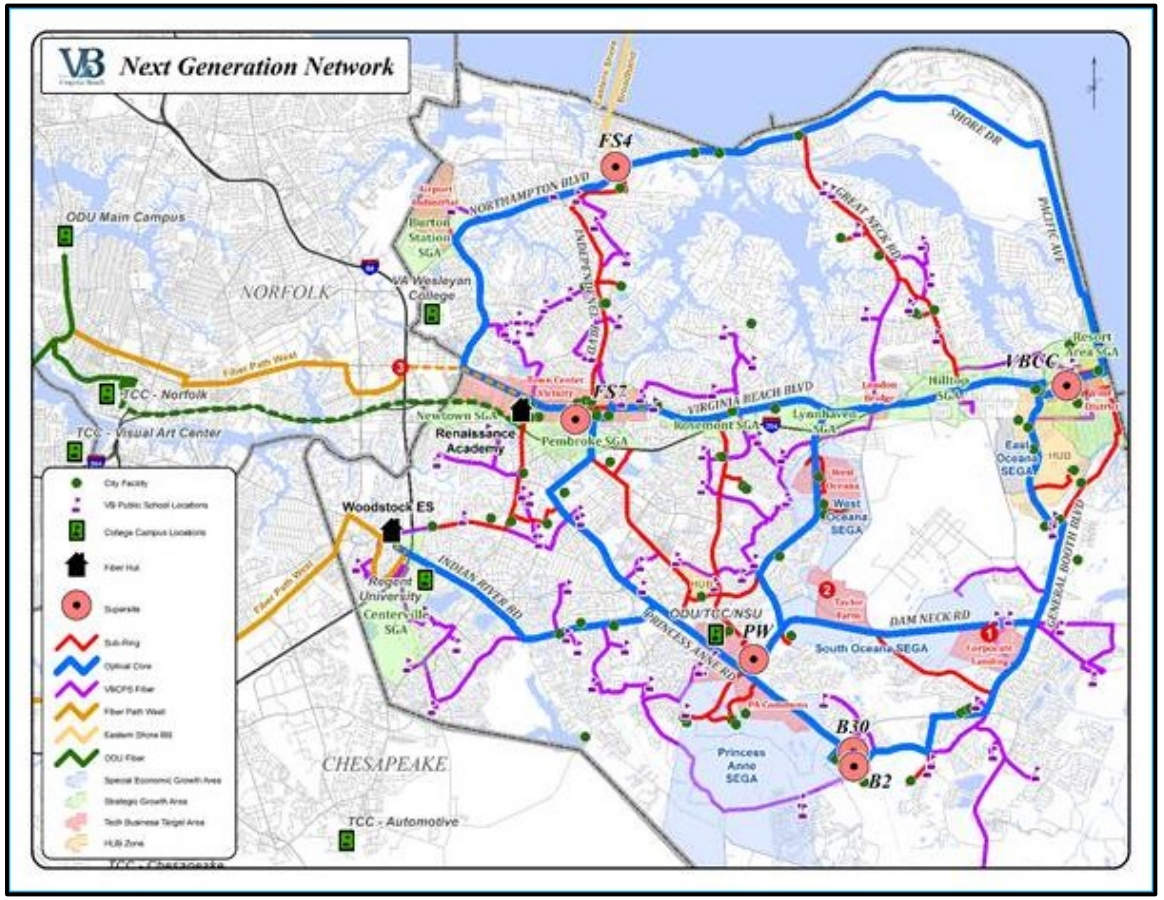
- **CBG Communications**
  - Telecommunications and cable television consulting firm that conducted both residential and business broadband surveys to gauge the community's need for broadband services.

- **3U Technologies**
  - International business consulting, project management and engineering services firm that developed a Proposal for Support of Submarine Cable Landing

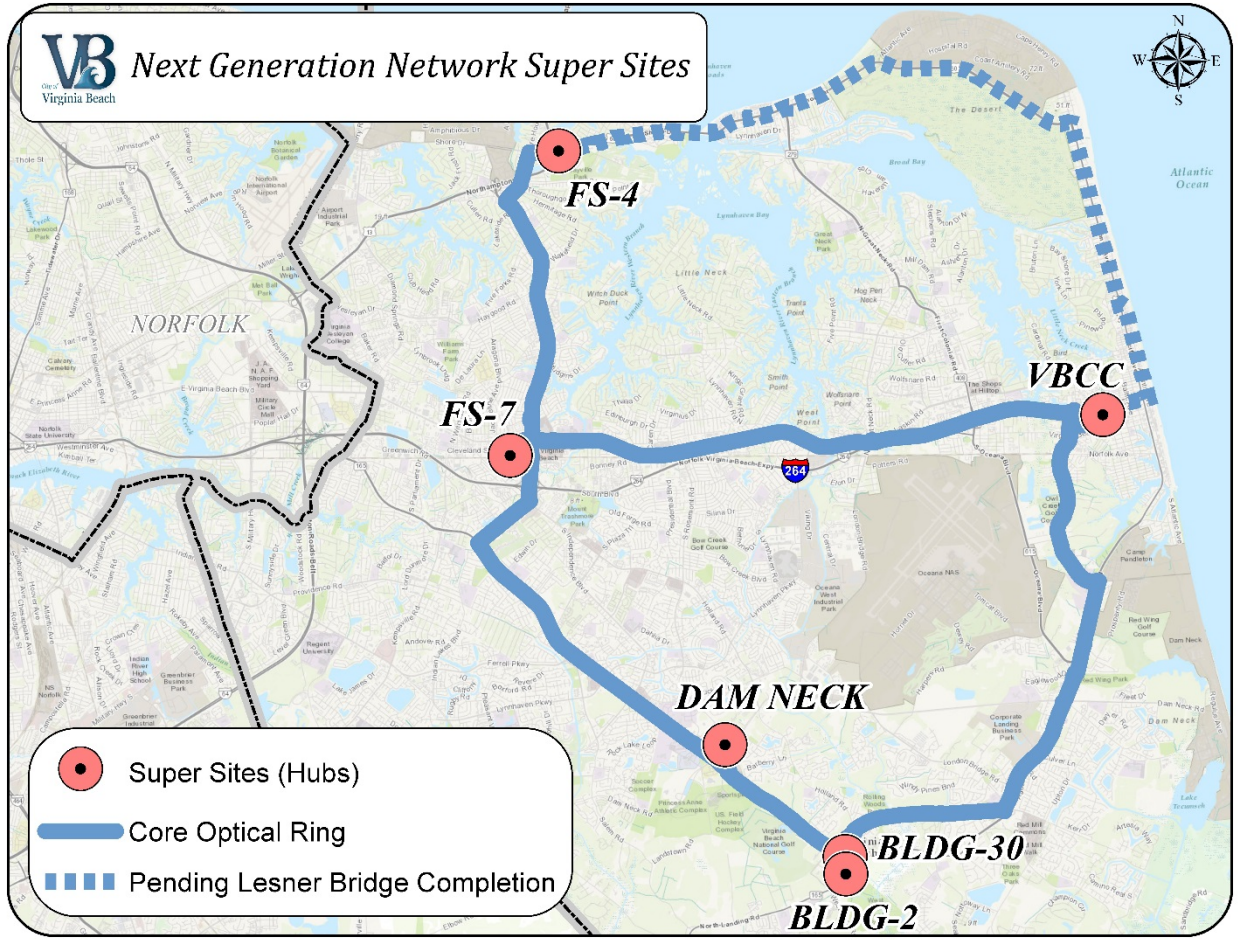
- **CTC Technology & Energy**
  - An independent communications and IT engineering consulting firm that assisted with developing middle mile leasing strategies.

Next Generation Network Buildout

- City of Virginia Beach invested $4.1 million in their FY 15 budget
- Leveraged the existing infrastructure to buildout and connect facilities
- Mapped strategic routes to 60 connected locations
  - Designed for future economic opportunities
  - Taking into consideration the proximity of corporate parks
  - City road projects will include conduit/fiber
  - Put infrastructure in place to support NGN



Next Generation Network

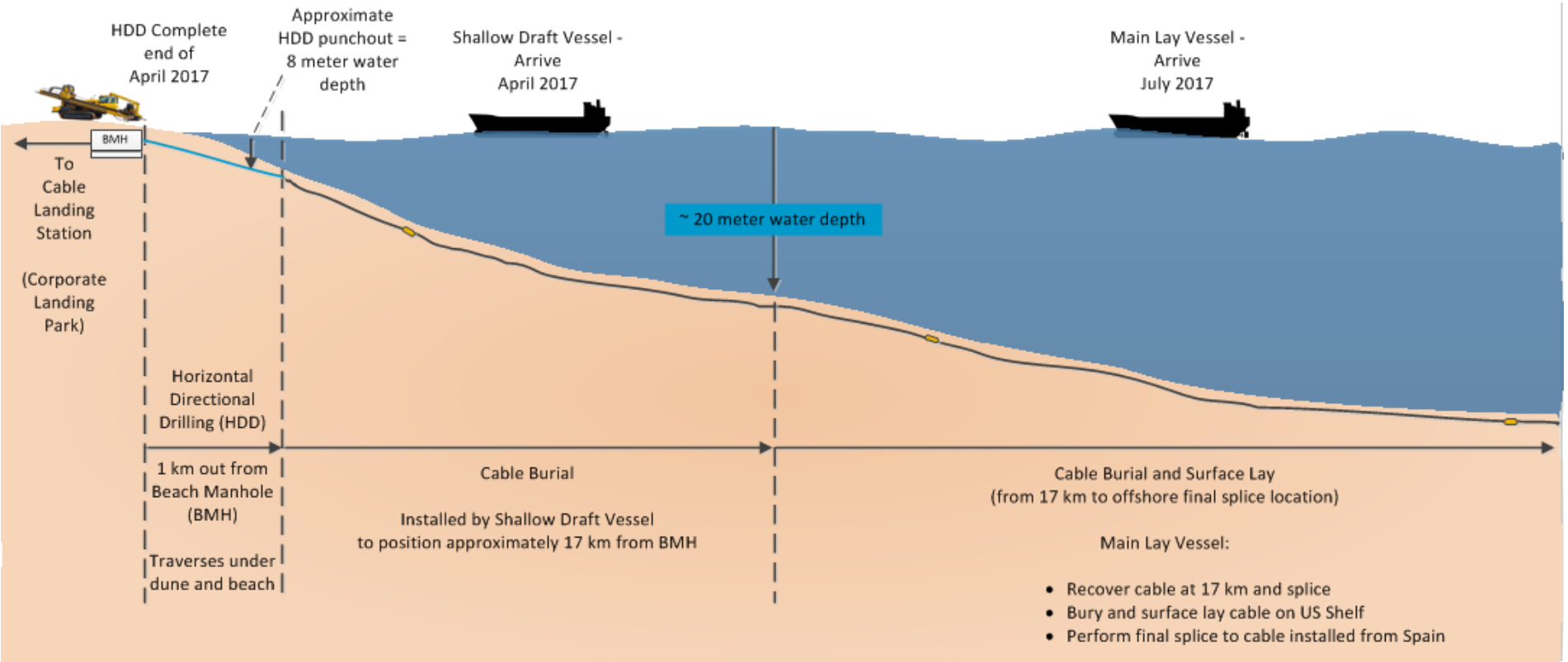


- Total of 6 Optical/Super Sites (Phase 0) and
- 54 Remote Locations (Phases 1 through 4)
- Construction Completion Dates:
  - Phase 0 – 06/24/2016
  - Phase 1 – 10/18/2016
  - Phase 2 – 04/07/2017
  - Phase 3 – 04/28/2017
  - Phase 4 – 06/15/2017
- NGN Go Live Date – Dec, 2017

Transoceanic Subsea Fiber Cables

MAREA Cable – From beach to manhole

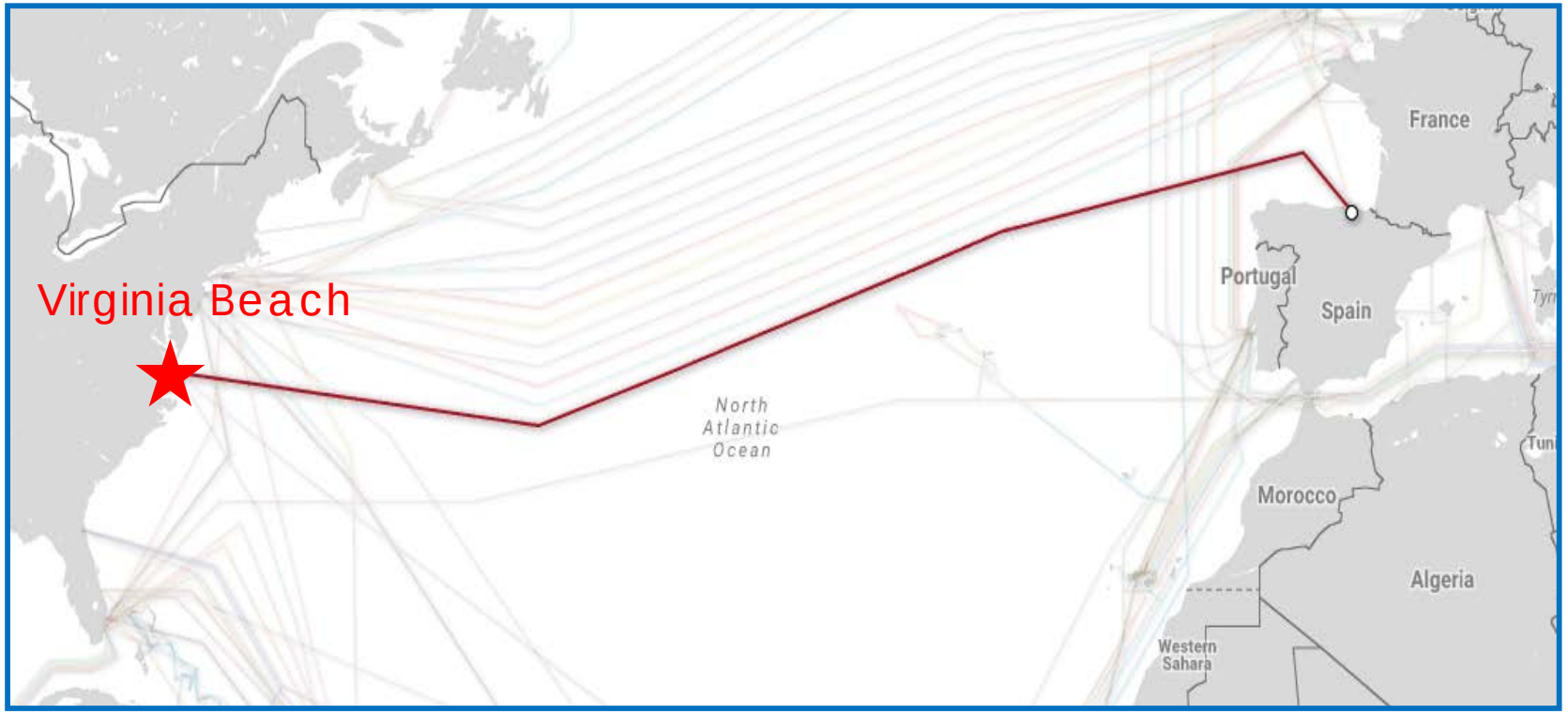
- **Oceanic** Infrastructure connection of subsea cable
  - Will connect sub-sea cable to off-shore duct duckbill flap (4 conduits for the MAREA/BRUSA beach manhole)
  - Clear in (ships check in port)
    - (shallow draft vessel) — April 7 – 14, 2017
    - (main lay vessel) — July 19 – Aug 15, 2017
  - Operational Period
    - (shallow draft vessel) — April 7 – 14, 2017
    - (main lay vessel) — July 19 – Aug 10, 2017



Transoceanic Subsea Fiber Cables

MAREA

Virginia Beach to Bilbao, Spain

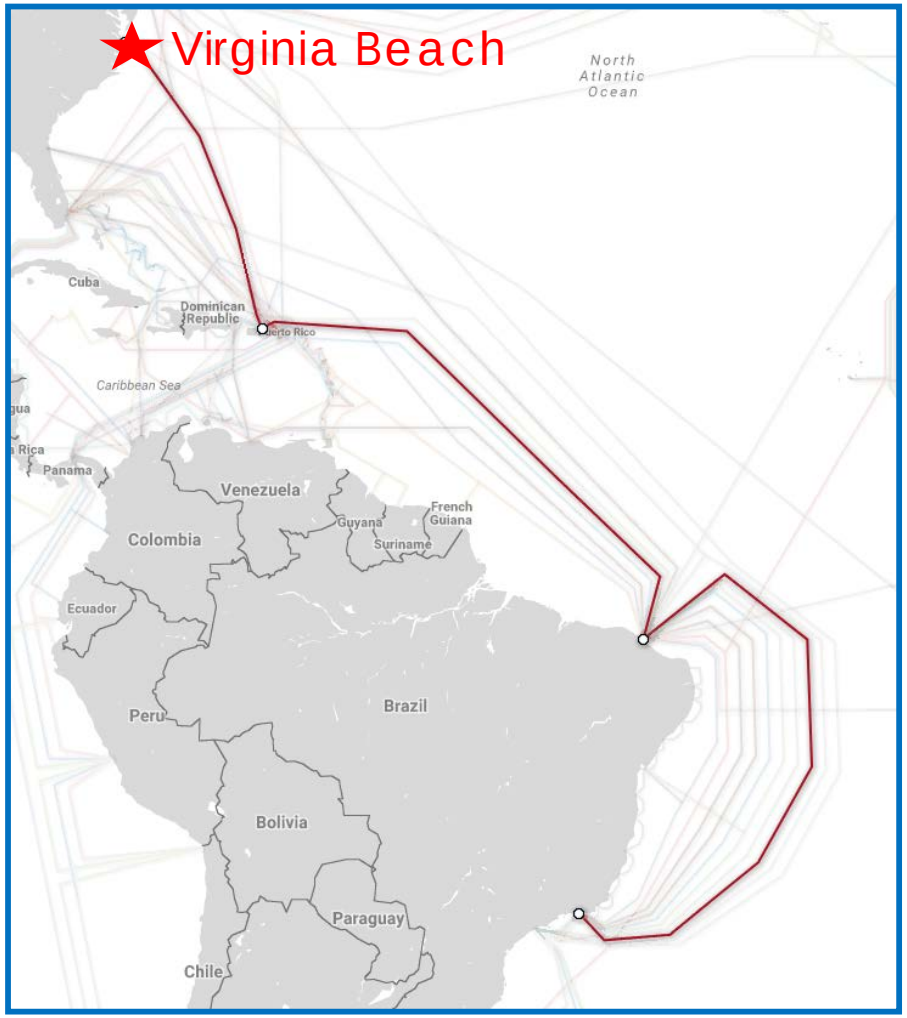


- Led by **Microsoft and Facebook, MAREA will be the highest-capacity subsea cable to ever cross the Atlantic**
- The new **6,600 km submarine cable system** will connect **Virginia Beach, Virginia to Bilbao, Spain**
- This new southern **route will provide greater diversity of connections & enhanced reliability** for customers
- Optimal connectivity to data centers on the East Coast
- Highest capacity cable to ever cross the Atlantic Ocean at 160 Tb/s

System Testing: **October 2017**
System Operational: **November/December 2017**

Transoceanic Subsea Fiber Cables

Virginia Beach to San Juan, Puerto Rico and Rio de Janeiro Brazil



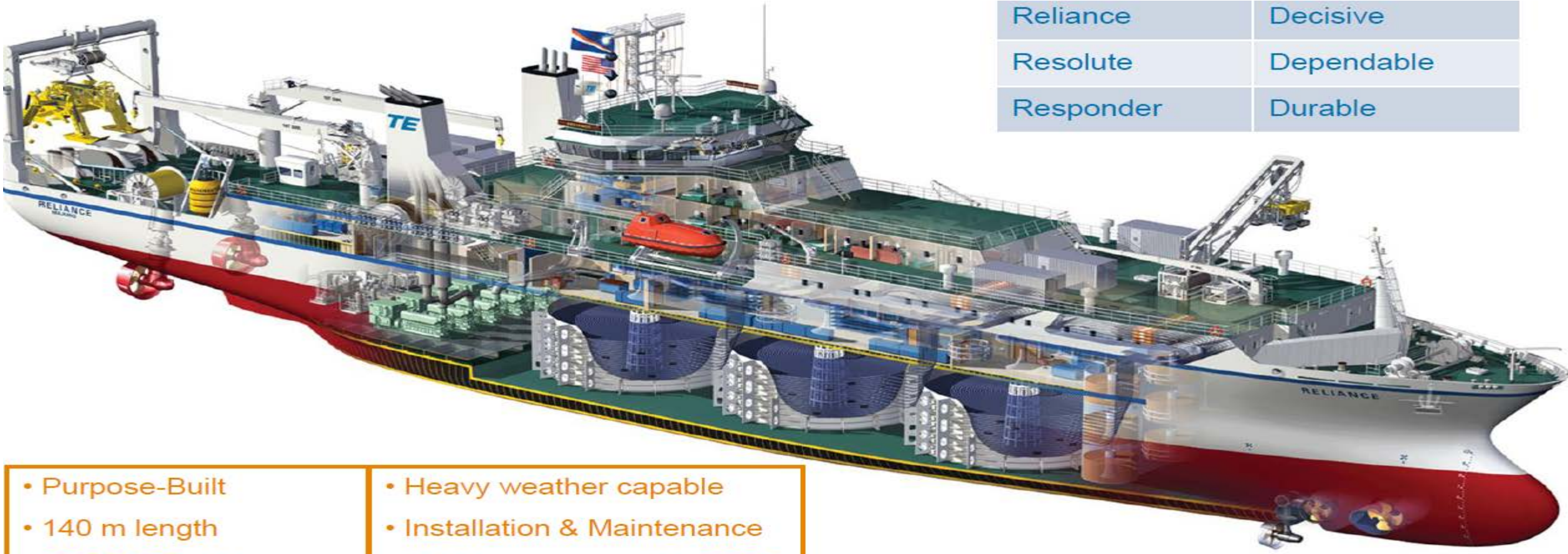
BRUSA Cable and Conduit Installation: **June 2018**
(dates per Telefonica)

BRUSA

- Led by Telxius Cable USA
- Nearly **11,000 km in length** linking **Rio de Janeiro** and **Fortaleza** (Brazil) with **San Juan** (Puerto Rico) and **Virginia Beach** (USA)
- Leading edge technology supporting **ultrafast transmission capacity**
- Increased end-to-end connectivity and the **availability of ultra high-speed broadband services**
- This new **infrastructure will address the exponential growth of data transmission** generated by its B2B customers, telecom operators, OTT players and end-consumers
- Will **improve communication reliability and deliver enhanced resilience by increasing the number of USA landing points**
- Will also provide the **lowest latency communication links between the two largest economies in the region, Brazil and USA**

Transoceanic Subsea Fiber Cables – Main Vessel

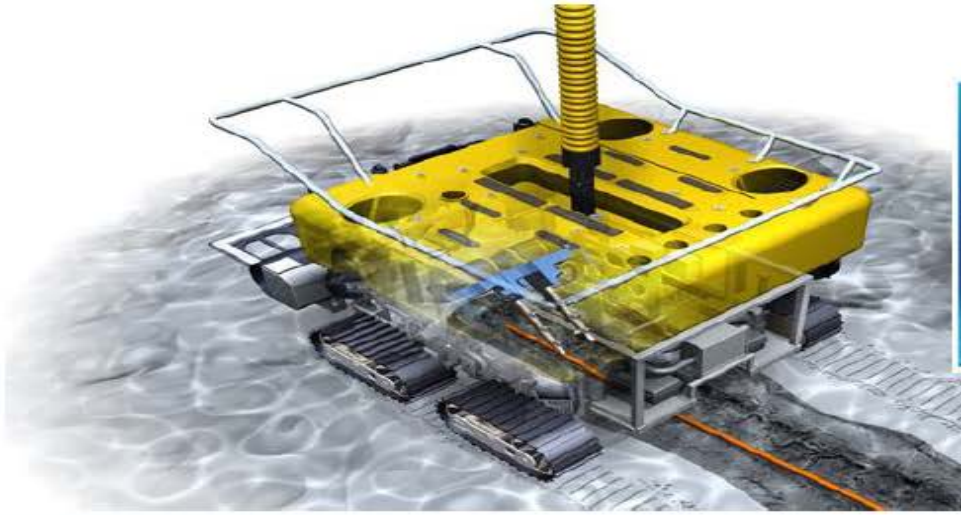
Reliance	Decisive
Resolute	Dependable
Responder	Durable



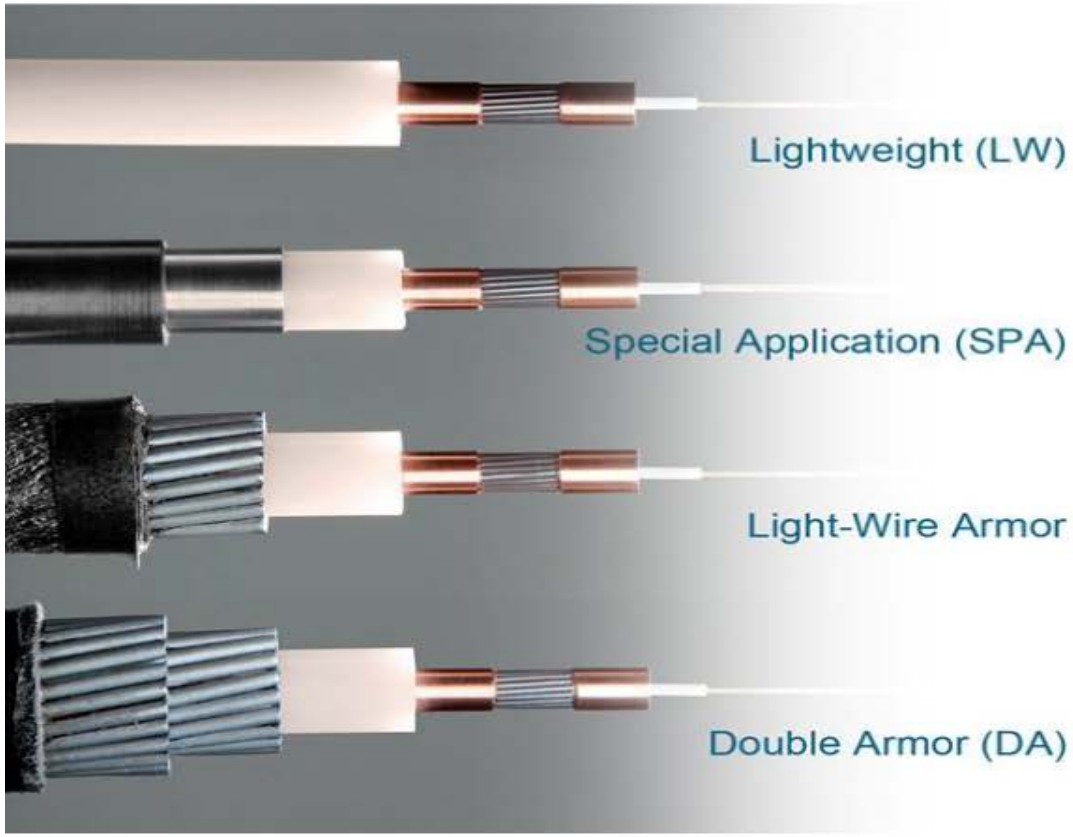
- Purpose-Built
- 140 m length
- 5,500 MT cable cap.
- 84 persons
- 60+ days endurance

- Heavy weather capable
- Installation & Maintenance
- Highly maneuverable (DP2)
- Plow & ROV equipped
- 60 MT A-Frame

Transoceanic Subsea Fiber Cables
Remotely Operated Vehicles (ROV)

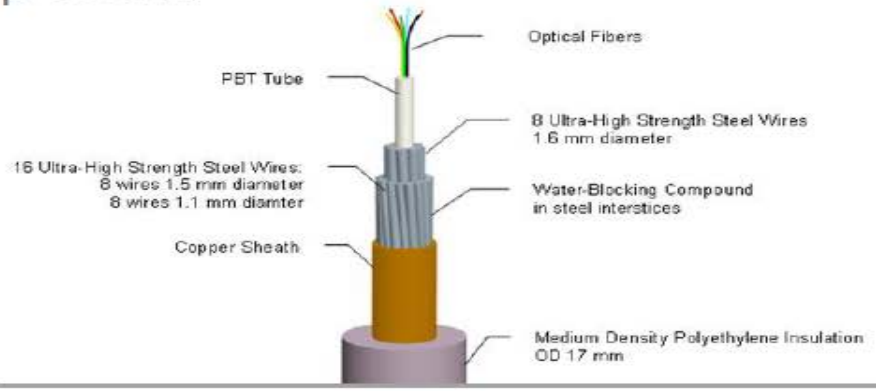


Transoceanic Subsea Fiber Cables

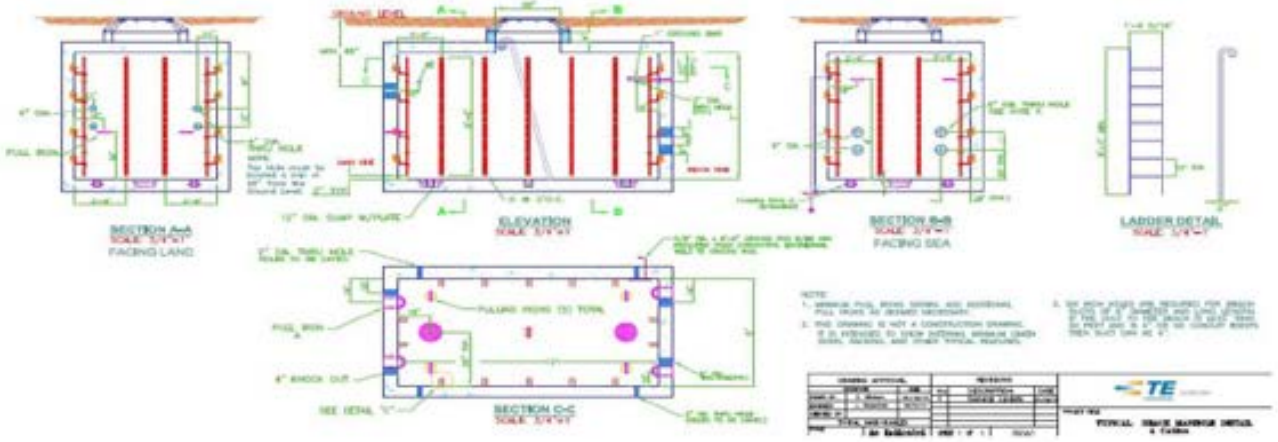


Undersea cables…

- protect optical fibers and an electrical conductor to carry telephone, internet & data communications traffic at ~2.5 TB/second;
- are built durable, yet flexible, to support system deployment, recovery, repair & re-deployment;
- are inert in the marine environment;
- offer various levels of protection from subsea conditions and external aggression, such as: rocky terrain, fishing activity, high risk of abrasion or crushing (e.g., anchoring), and the deep ocean.



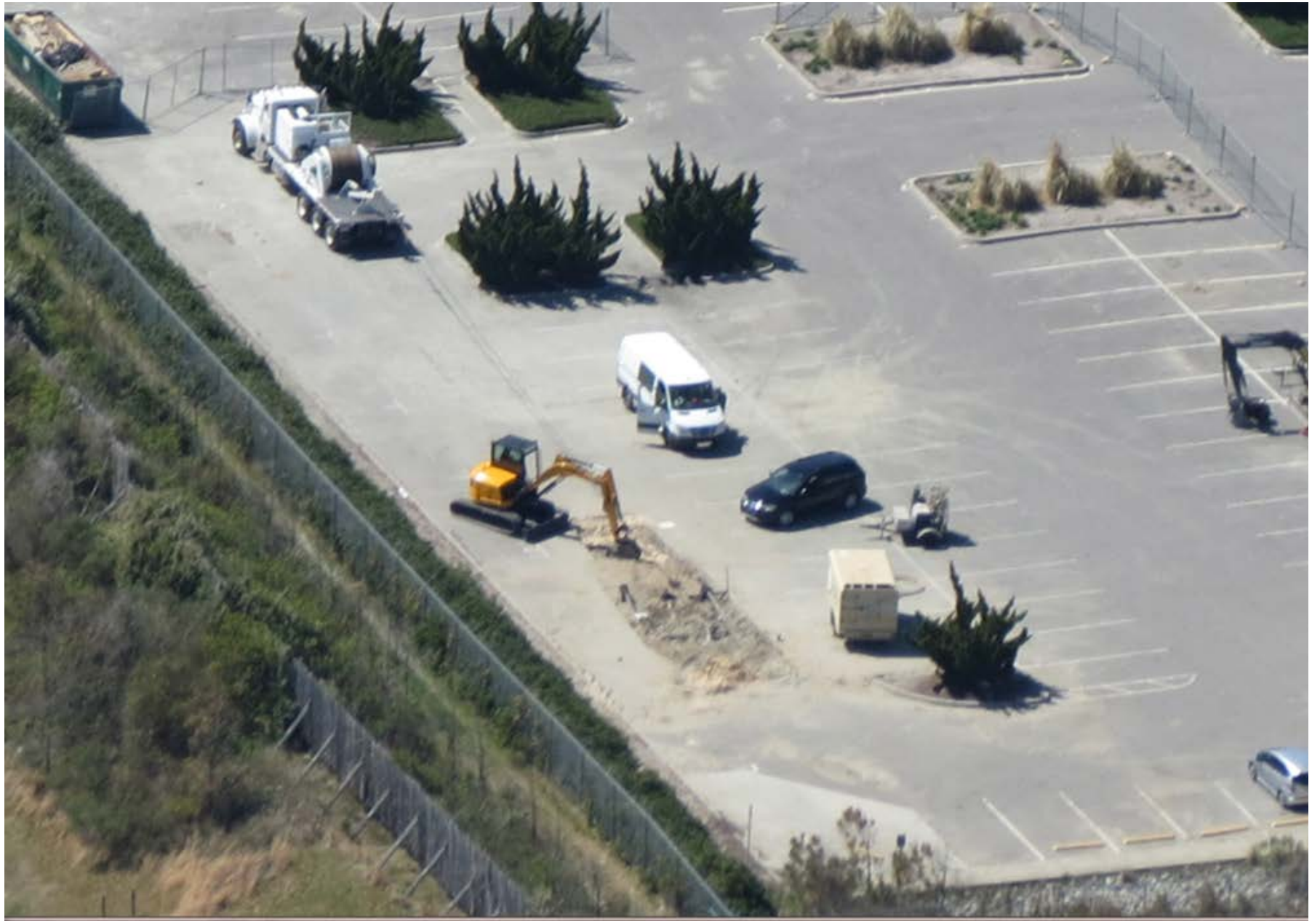
Transatlantic Subsea Fiber Cables



- **2 BMH's planned**
- **Typical BMH Design: 12' L x 6' W x 7' H**
- **Buried (below ground level) within the parking lot, with corresponding buried ocean ground bed anodes**
- **No Significant impact to the long-term functionality of the parking lot**

Transoceanic Subsea Fiber Cables – Shallow Water Vessel

Transoceanic Subsea Fiber Cables – Landing Point, Camp Pendleton



Transatlantic Subsea Fiber Cables