

**BEREC**

**Sept. 21 2023**

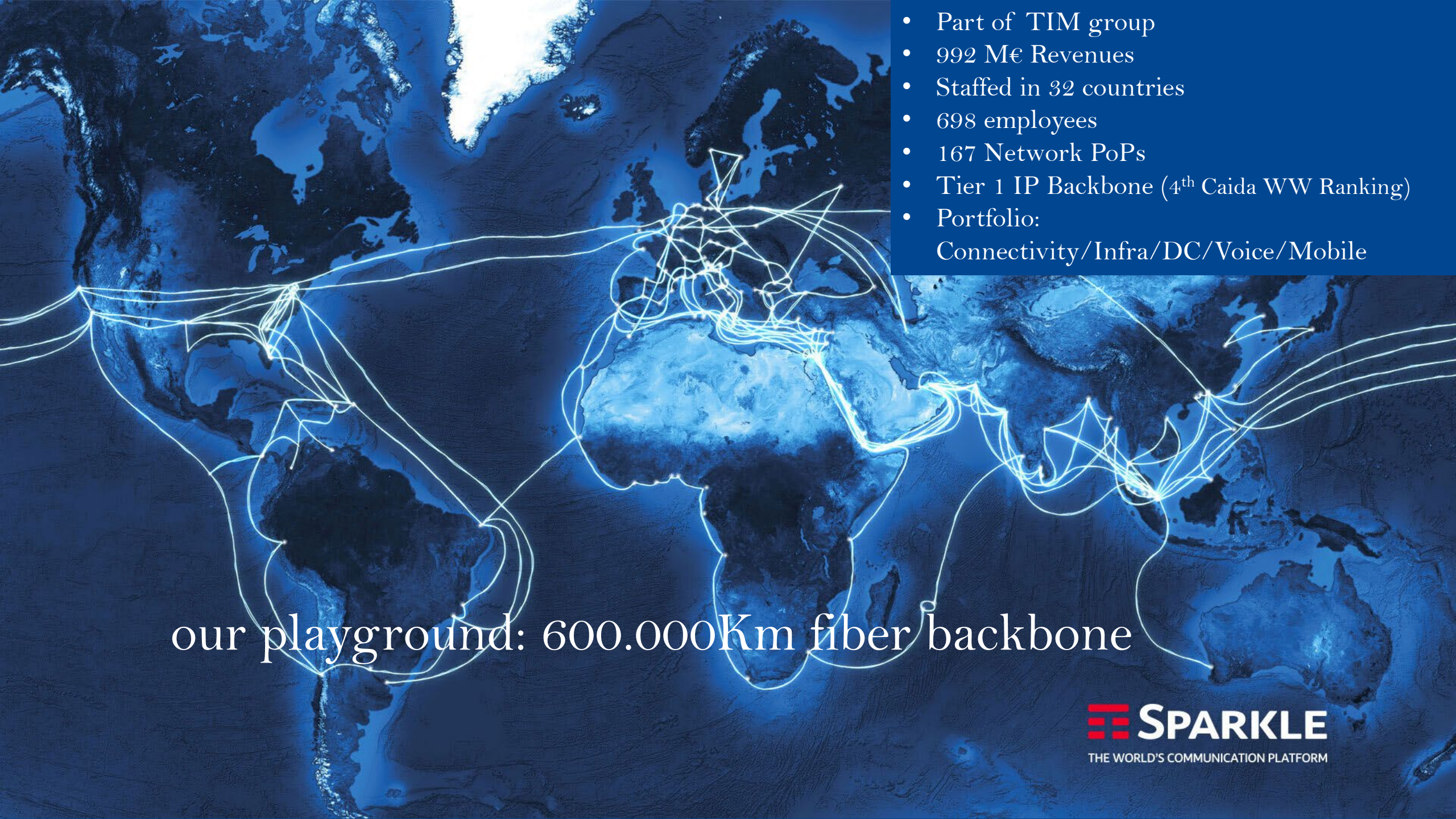
**Panel 3 | Presentations on the challenges faced in the operation of submarine cables, including in what concerns access to stations and to terrestrial backhaul and resilience, security and sustainability**

*Giuseppe Valentino – Telecom Italia Sparkle*

# Agenda

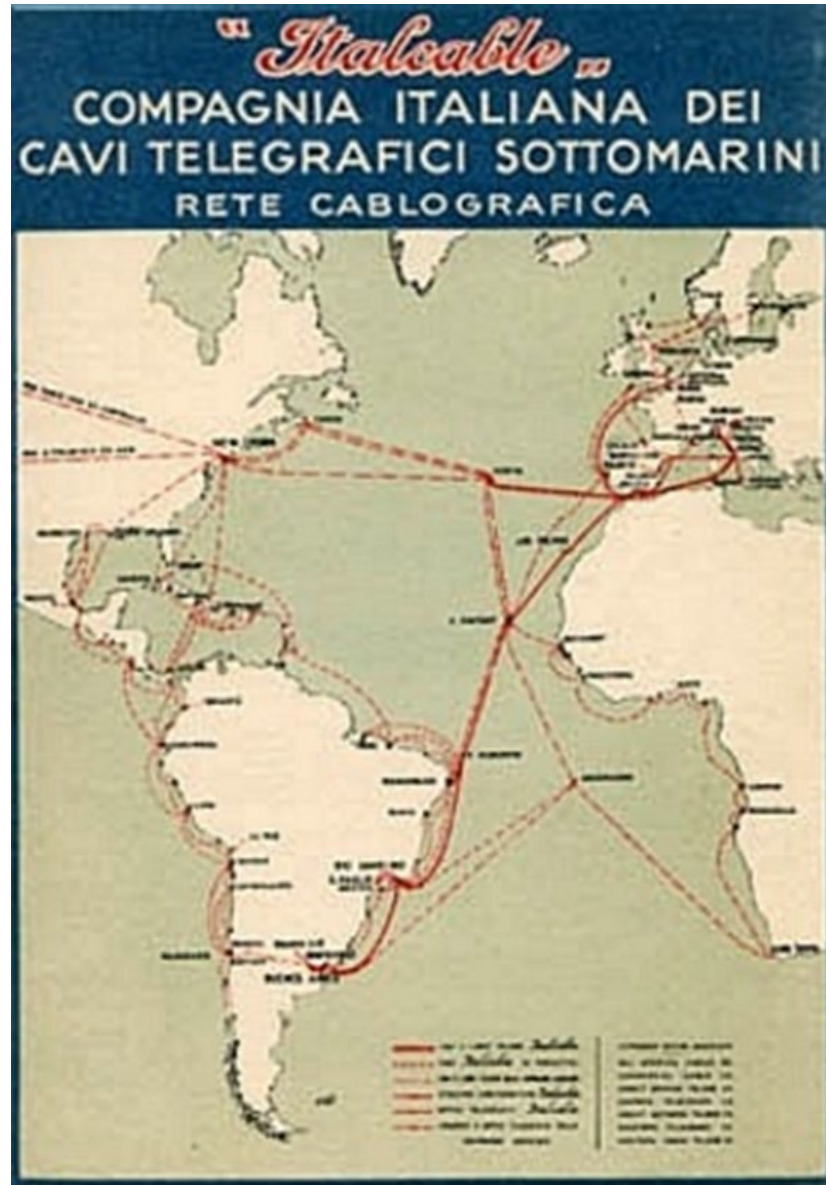
- Sparkle introduction
- Paradigm shift in submarine cables business model
- Highlights on operational challenges
  - Resiliency
  - Security
  - Sustainability
- Cable sensing, not only digital transmission....



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- A world map with a dark blue background, overlaid with a complex network of glowing white lines representing a fiber backbone. The lines are most dense in Europe and Asia, with several long lines stretching across the Atlantic and Pacific oceans. The map shows the continents in a lighter shade of blue.
- Part of TIM group
  - 992 M€ Revenues
  - Staffed in 32 countries
  - 698 employees
  - 167 Network PoPs
  - Tier 1 IP Backbone (4<sup>th</sup> Caida WW Ranking)
  - Portfolio:  
Connectivity/Infra/DC/Voice/Mobile

our playground: 600.000Km fiber backbone

# Sparkle heritage.....

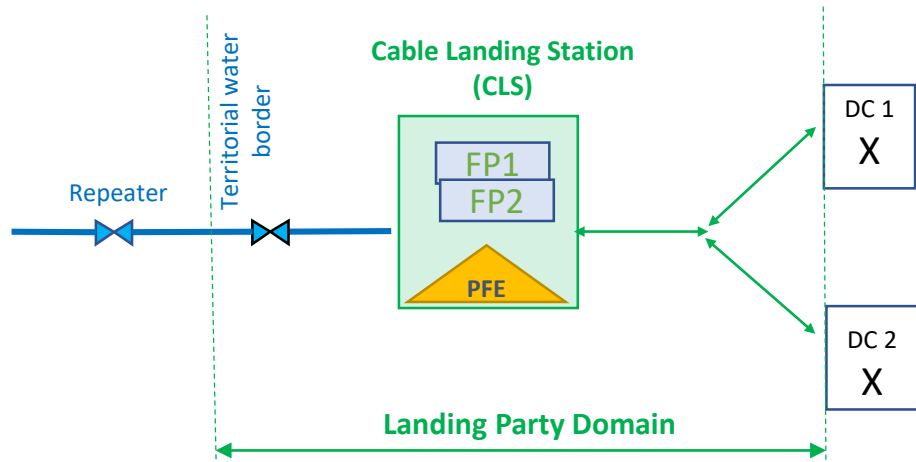


More than 100 years  
experience in submarine  
cable development and  
operations!

# Submarine cables business model: a paradigm shift

## Legacy Consortia Cable

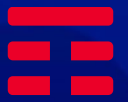
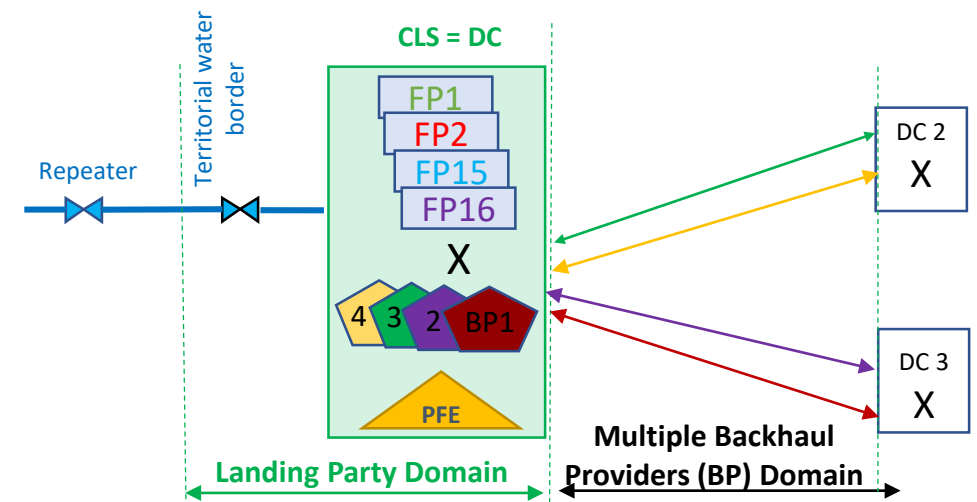
- Limited fiber pairs (2/3/4) shared by members, dedicated capacity
- CLS is typically a closed environment operated by the Landing Party (LP)
- Backhaul is typically provided by the LP only
- Interconnection (X) with other networks/cables in DC (far from CLS)
- Vendor lock in on wet plant and equipment





market - technology evolution

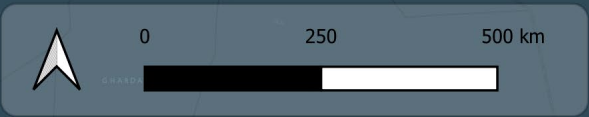
## New Open Cable

- High fiber count (16/20/24), SDM technology, dedicated fiber pairs per each tenant
- CLS is normally also an open/neutral DC, so an interconnection (X) ecosystem
- Backhaul is provided by multipole network providers
- LP operates the wet plant
- Backhaul Providers operate the backhauls
- Equipment disaggregation from wet plant





-  Blue segment
-  BlueMED segment
-  BlueMED optional segment
-  Shared branch
-  Private branch
-  Sparkle Landing Hub/DC
-  3rd Party Hub/DC



to Aqaba,  
Djibuti,  
Mumbai

# Resiliency

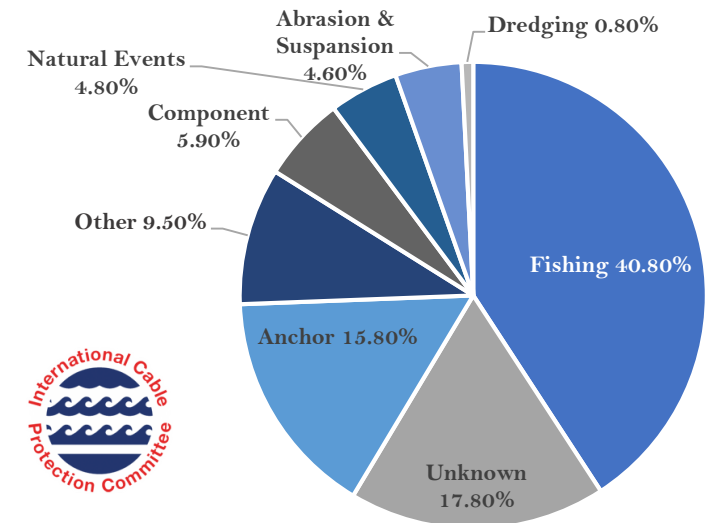
- Main fault causes related to maritime activities
  - **Fishing**, high incidence but impact restricted to individual cables
  - **Anchorage**, medium incidence but can impact several cables

## Risk Mitigation

Industry Best Practices

Regulations

Percentage of cable faults related to different causes



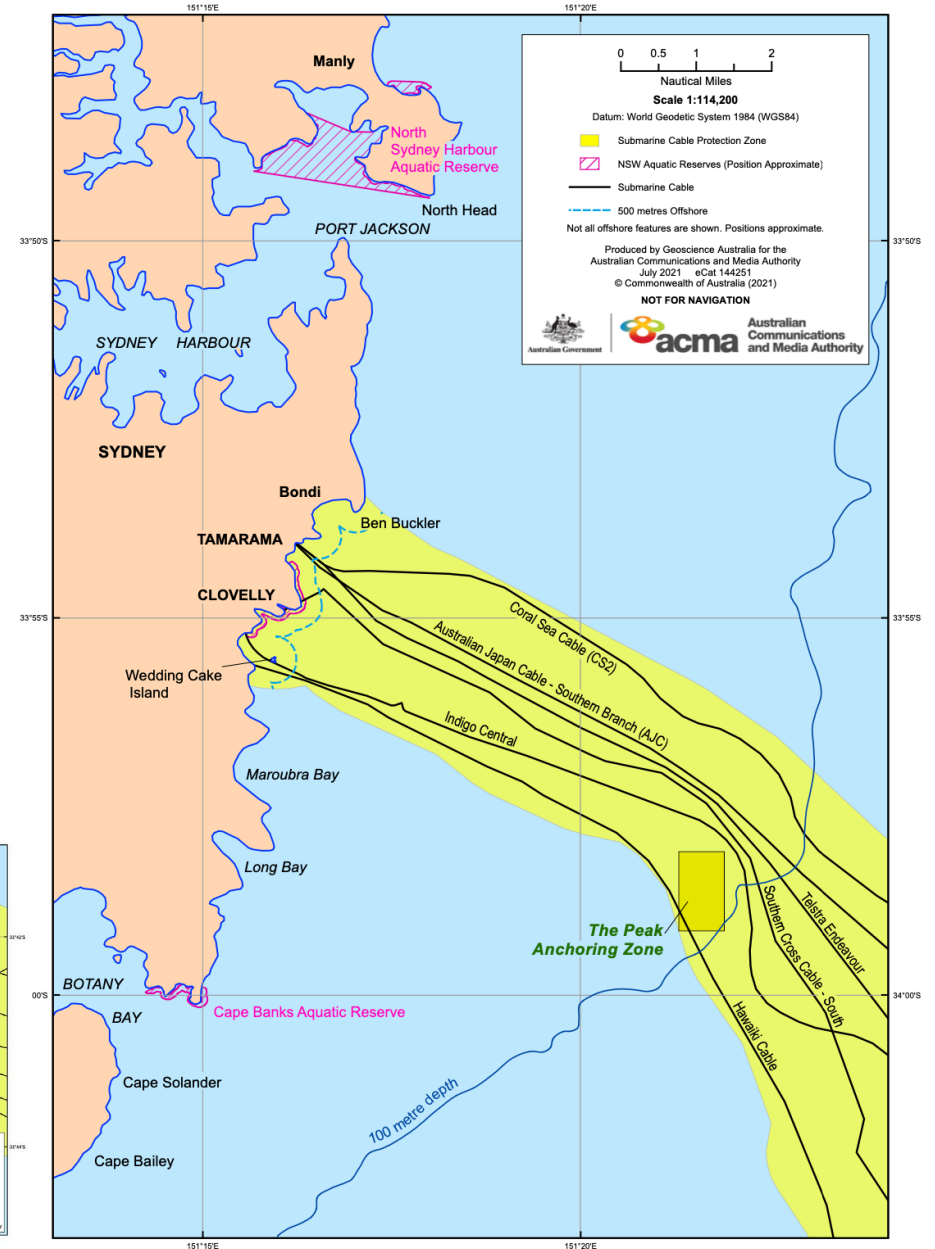
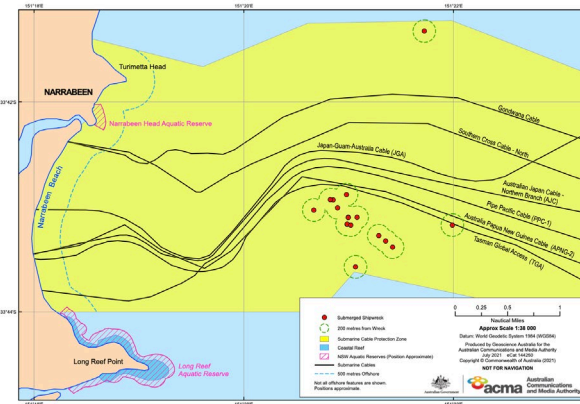
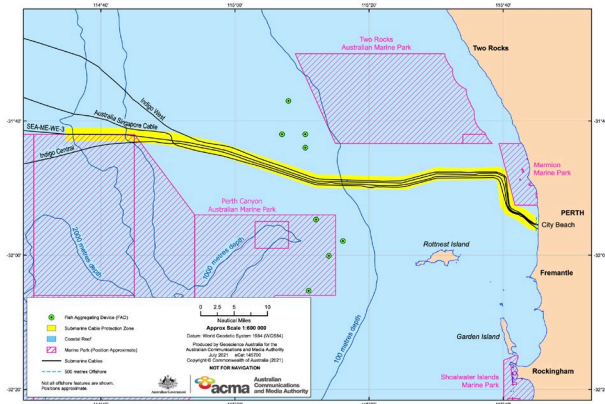
based on analysis of a global database kept since 1959 (Courtesy of Global Marine) - ICPC "Submarine Cable Protection and the Environment" March 2021

- The importance of proactive Regulation to reduce the risks
  - Promote the distribution and use of cable awareness charts to fishermen
  - Impose use of automated identification systems ("AIS") and vessel monitoring systems ("VMS")
  - Require that vessel operators carry appropriate insurance
  - Consider creation of Cable Protection Zones
  - Promote the establishment of fishing-cable committees that can compensate fishermen for snagged and lost gear in exchange for not risking cable damage through gear retrieval efforts (trawling fishing)

# Resiliency

## Cable Protection Zone - Example

- Australian Government has recognized the strategic importance of submarine cables
- Protection zones designated for both “Perth and Sydney Submarine Cables”
- Zones run to 2000m water depth
- High risk operations banned & low risk activities restricted
- Criminal penalties up to \$A330,000 &/or 10 years prison





# Resiliency

## Cable Repairs

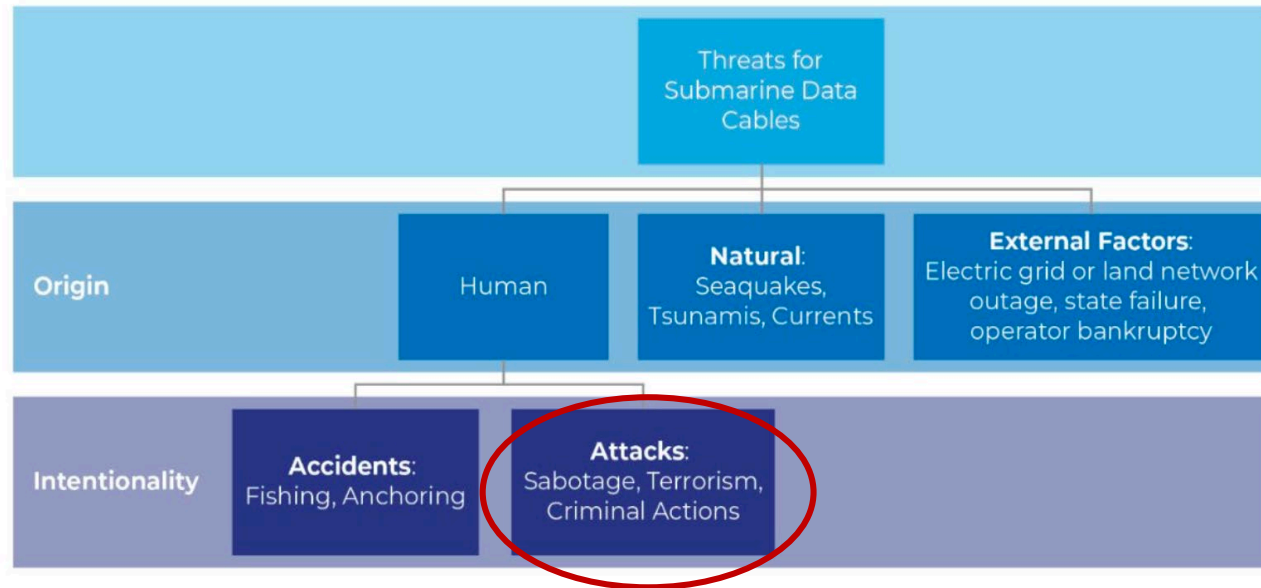
- Interference from Fishing activities
- Permits requirements, cabotage and crewing restrictions introduces a delay and increasing costs, that can be significant
- Any delay increases risk of multiple cable failure
- Multiple cable failure can cause major disruption to the telecommunications services in the region

**The creation of a specific regulatory framework for submarine cables can significantly reduce the impacts of an outage**



# Security

- In addition to accidental failure there are possible “attacks”



- Making the position of the cables publicly available to prevent accidents related to anchoring and dredging makes it equally easy for criminals to identify the assets for sabotage or tapping attempts or actions
- Recent events (i.e. NorthStream sabotage) raised the media and policy makers attention on the defence of critical infrastructure, including submarine fiber cables

# Sparkle: we take security very seriously

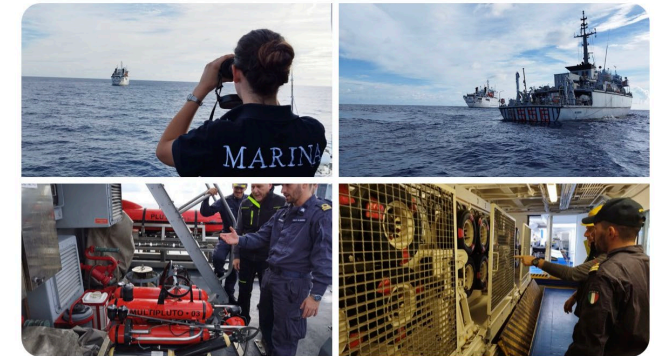


- NOC & SOC are redundant and distributed
- All network elements/assets protected through multiple cyber security platforms
- Sparkle is NOC/NA provider of key consortia systems
- MoU with Italian Navy
  - Assets monitoring
  - Hydrographic and ops support
  - R&D



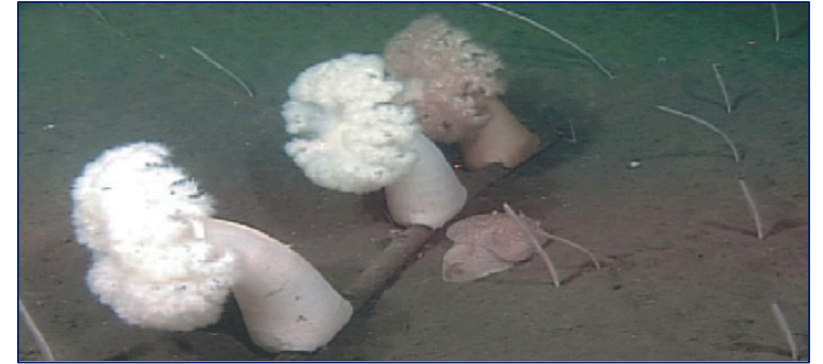
**Marina Militare**  
@ItalianNavy

Al via la collaborazione tra #naveAlghero e l'unità posacavi Antonio Meucci nell'ambito del Protocollo d'Intesa siglato tra la #MarinaMilitare e la società di telecomunicazioni @TISparkle per la protezione dei cavi di telecomunicazione sottomarini. News 🗉 [bit.ly/3WTBx17](https://bit.ly/3WTBx17)



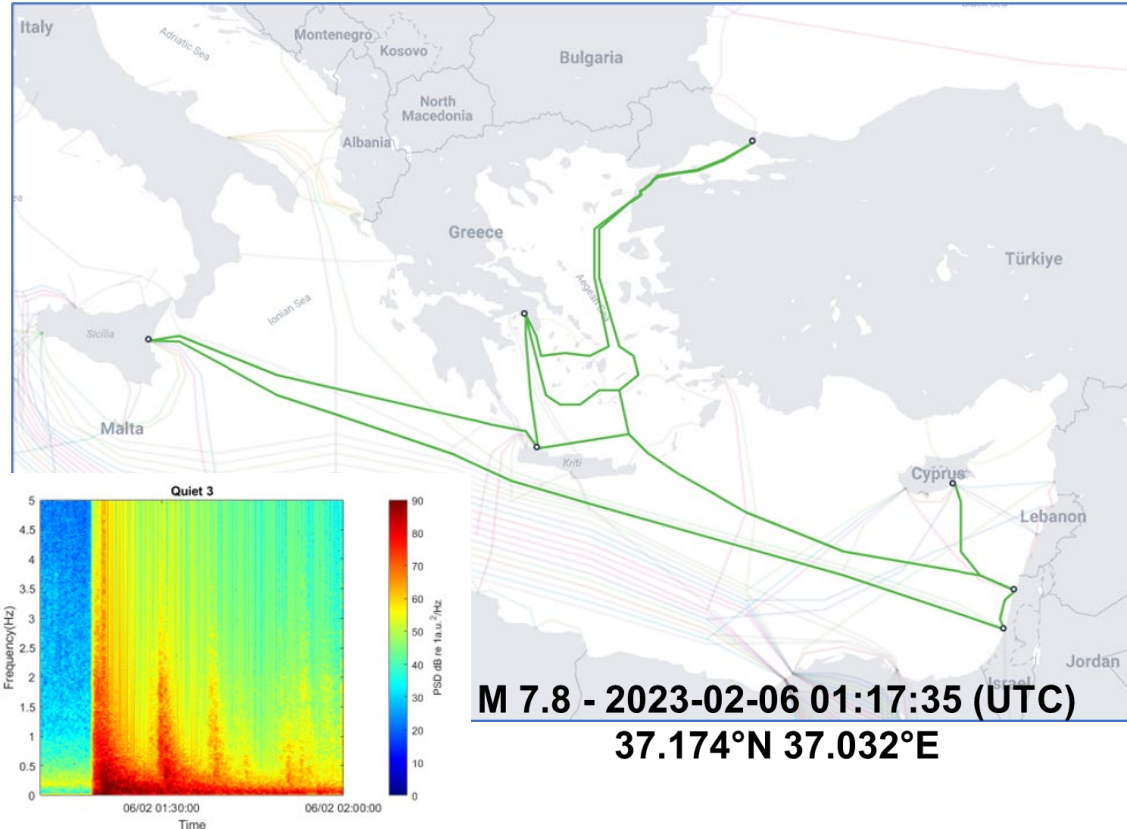
# Sustainability

- Properly installed fibre-optic cables have **neutral to benign effect on marine environment**.
- Their small diameter means **“footprint” is small**, especially when compared to submarine pipelines.
- Composed of **non-toxic materials stable in sea water**.
- Provide **substrates for marine organisms**.
- Seabed disturbed by burial, recover quickly.
- Cable protection zones can serve a dual purpose by acting also as marine sanctuaries to improve biodiversity & fish stocks.



ATOC/Pioneer cable with marine life on & close to cable - Monterey Bay Aquarium Research Institute

# Cable sensing, not only digital transmission....



First experiment on SOP (State of Polarization) on a ring topology system (MedNautilus), that improves the capability to identify the epicentre of the event



Istituto Nazionale di  
Geofisica e Vulcanologia

 SPARKLE

Combining fiber optic submarine cables and analytics will help identify seismic events and **monitor** and provide **alert** for **earthquakes** and **tsunami**