



Here There and Everywhere

Around the World
Submarine Cable Session
0900-1000



A Tribute to our Friends and Colleagues

- Mike Rieger
- Fabrizio Civitarese



Global Lead Presenters

- Eric Handa - APT - Middle East and Asia/Indian Ocean
- Takahisa Ohta - NEC - Pacific and Oceania
- Paul Gabla - ASN - Europe & Africa
- Wayne Nielsen - WFN - Atlantic and Arctic
- Erick Contag -- LATAM and Antarctica

Legal, Regulatory and ICPC

Geopolitics, ICPC, Security and Legal Developments

- Kent Bressie - HWG
- Host - Tony Mosley Ocean Specialists Inc.

Here There and Everywhere

- Regional Projects
- Regional Challenges
- Technological Developments
- Permitting, Environmental and Sustainability
- Industry Boom or Steady State (risk appetite)



Asia and Indian Ocean

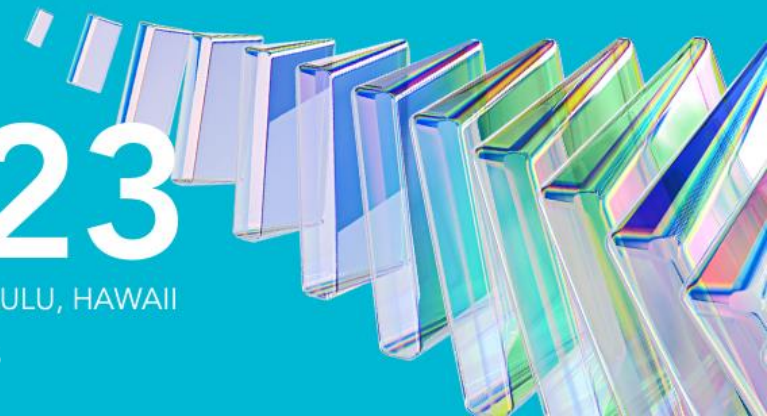
Eric Handa
CEO, APTelecom

SE Asia and Indian Ocean: Regional Projects

- 2Africa Pearls
- Africa-1
- Blue Raman
- Europe Middle-East India Connect 1 (EMIC-1)
- India Asia Xpress (IAX)
- India Europe Xpress (IEX)
- Oman Australia Cable (OAC)
- Pakistan East Africa Connecting Europe (PEACE)
- Singapore India Gateway (SING)
- Southeast Asia-Middle East-Western Europe 6 (SEA-ME-WE 6)
- Trans Europe Asia System (TEAS)

SE Asia and Indian Ocean: Regional Challenges

- The Indian Ocean Region is Huge
 - More than 10,000 kilometers from the Horn of Africa to Australia
 - Region has 38 countries or dependencies and approximately 2.7 billion people
 - Large and rapidly-growing bandwidth market fueling demand for new cables
- Regulations and Permitting
 - Regulatory regimes vary greatly from country to country
 - Some markets only just now opening to competition (ex: Bangladesh)
- Repair and Maintenance
 - Shortage of cable ships and depots
 - Long “mean time to repair” (MTTR)
- Natural Hazards
 - Active geological region (earthquakes, tsunamis)
 - Sea level rise is a threat to many islands (ex. Maldives)



SE Asia and Indian Ocean: Technological Development

- Space Division Multiplexing (SDM)
 - Overcomes current bandwidth limitations
 - Delivers record-breaking capacities
 - High fiber counts: 12 fiber pairs and up
 - Enhanced Branching Units (eBUs) provide flexible electrical power
- High-Bandwidth Applications Are Coming
 - Already tremendous bandwidth demand in the region
 - Demand will only increase with new technologies, such as 5G, 6G, IoT, Metaverse, etc.
 - Huge market potential in the region for Cloud gaming, VR, XR

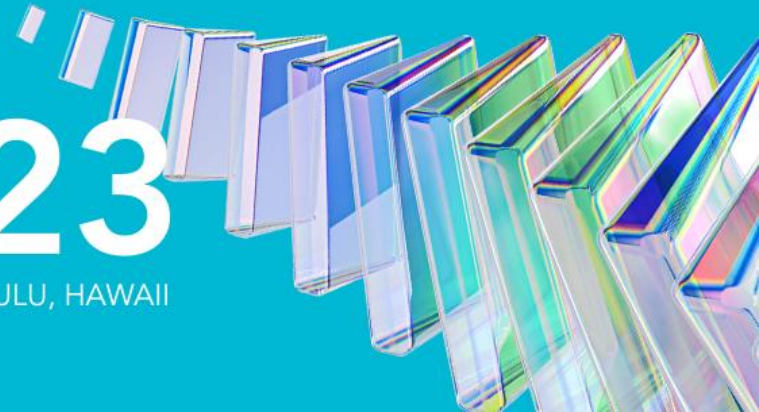


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SE Asia and Indian Ocean: Permitting, Environmental, Sustainability

- Permitting Issues
 - As can be expected from a region so large, regulatory regimes vary greatly
 - Competition is still limited in some markets
 - Environmental permitting can be a lengthy process
- Environmental and Sustainability Issues
 - Wide range of environmental concerns
 - Sea level rise
 - Beach erosion
 - Coral reef damage
 - Tsunamis and earthquakes
 - Cables for Environmental Monitoring
 - Distributed Acoustic Sensing (DAS) comes to the Indian Ocean
 - FLY-LION3 consortium and IPGP using DAS for tsunami warning for Comoros and Mayotte
 - Scientific Monitoring and Reliable Telecommunications (SMART)
 - SMART technology will soon be deployed in other regions

SE Asia and Indian Ocean: Industry Boom or Steady State?

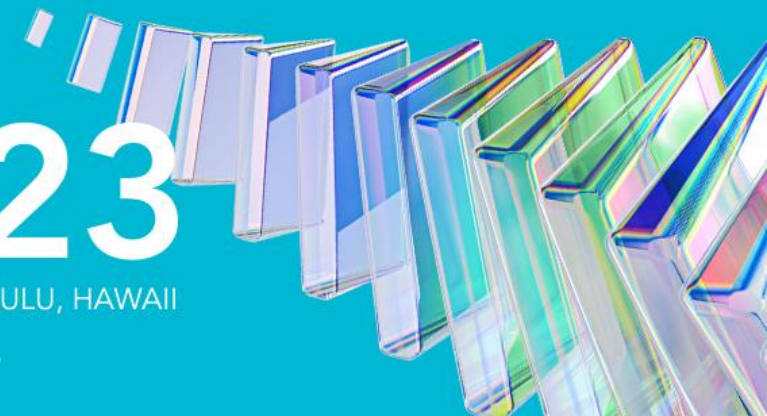
- Current Status

- High demand for both intraregional cables and cables connecting the region to Europe and the Pacific
- 11 cable systems either under development, under construction, or have recently entered service, totaling over 110,000 route-kilometers of cable
- OTTs moving into the region: 2Africa Pearls and Blue Raman

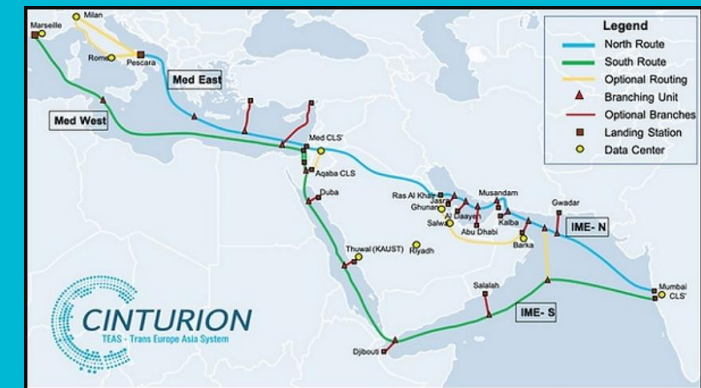
- Future Trends

- Bandwidth demand will continue to skyrocket
- Need for more diversity/resiliency, especially considering threats to cables in the region
- More competition as countries liberalize their markets

- Boom or Steady State? – Definitely a BOOM!



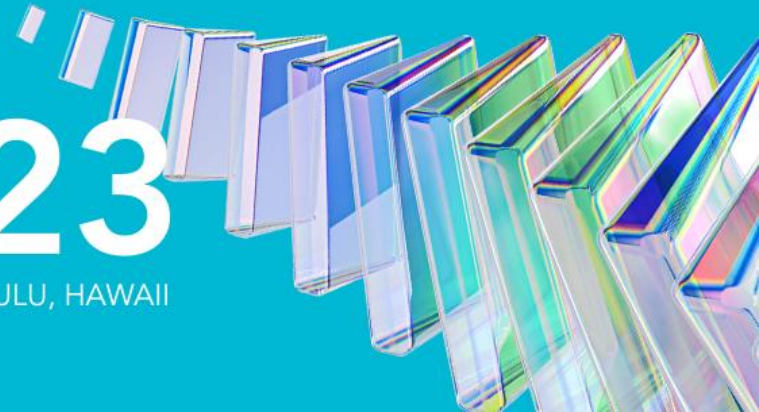
SE Asia and Indian Ocean Project Maps



Pacific and Oceania Projects

- Here,
There and
Everywhere...

Takahisa Ohta NEC



Pacific and Oceania Projects

- Being Built

- BtoBE [aka CAP-1]
- HKA
- Topaz
- Echo
- Bifrost
- Palau Cable 2
- JUNO

- Planned

- Hawaiki Nui
- ACC-1
- East Micronesia Cable
- JAWS

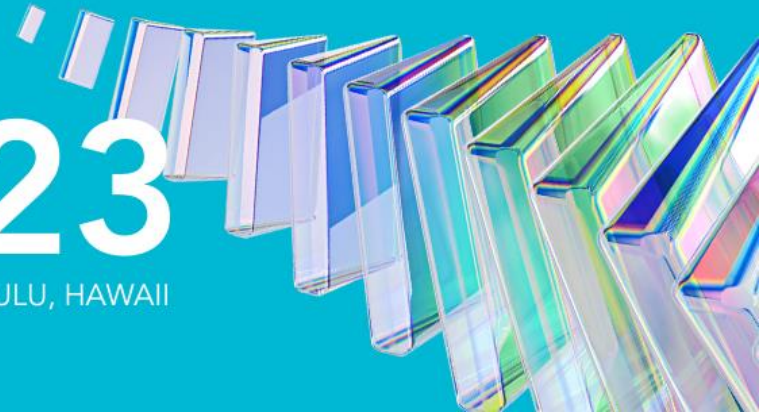


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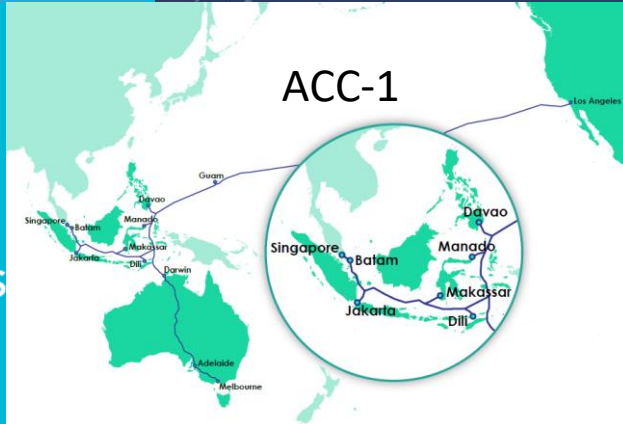
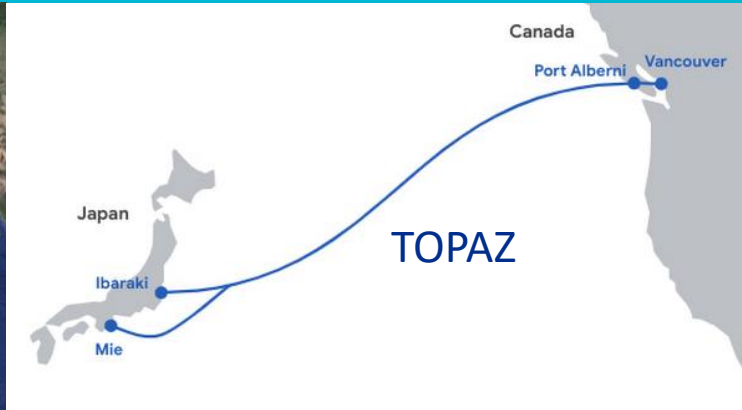
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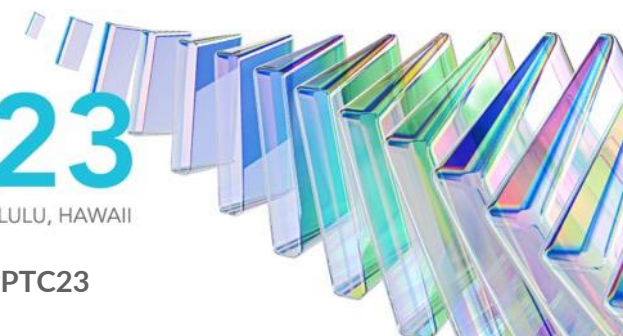
Pacific and Oceania Projects

(Images Sources: NEC, Google, ASN, BW Digital, Inligo Networks)



Here There and Everywhere

- Regional Projects
 - Strong Capacity Demand (North East Asia/Japan, Australia, U.S.)
 - Connectivity Demand (Islands Countries)
- Regional Challenges
 - Geopolitical Tensions / License Issues
- Technological Developments
 - 20FP in Trans-Pacific Cable (350Tbps)
- Permitting, Environmental and Sustainability
 - Geopolitical Tensions / License Issues
 - Undersea Observation Networks For Earthquakes and Tsunami
- Industry Boom or Steady State (risk appetite)
 - Private Equities / Investment Funds / Japanese Trading Companies Focusing on Telecom/Digital Infrastructure
 - Soaring Costs of Cable System Construction (Raw Materials, Fuel, Inflation ...)
 - Impact From Global Economic Trend/Outlook...?



Europe, Africa

Here,
There and
Everywhere...

Paul Gabla



ALCATEL
SUBMARINE
NETWORKS



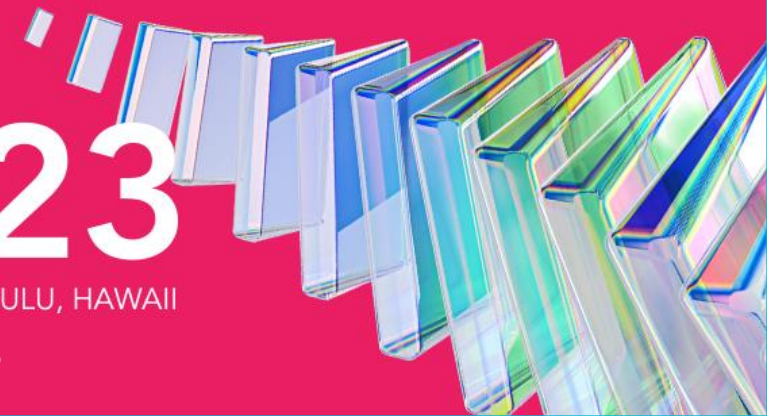
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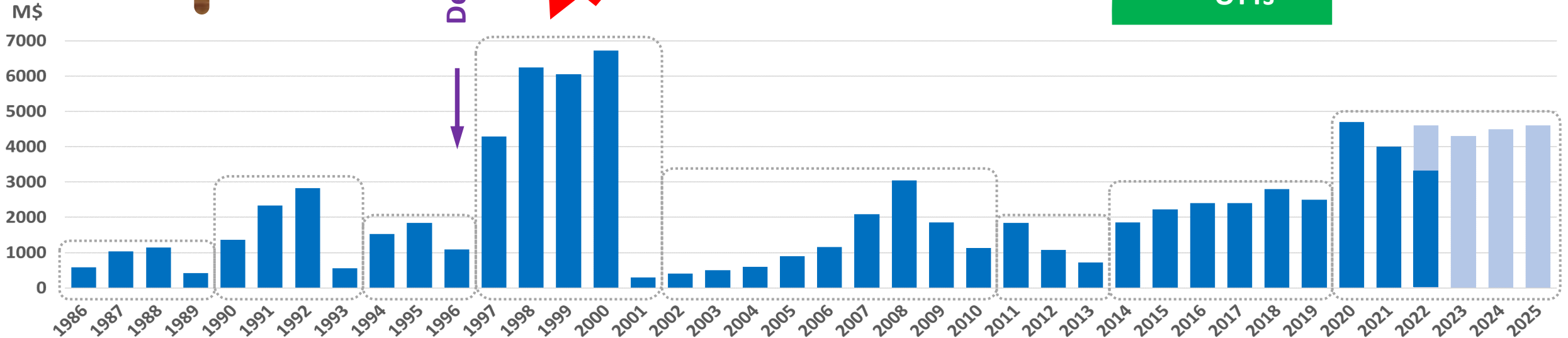
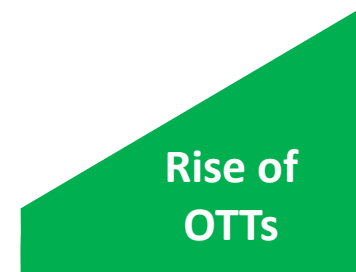


State of the Industry

Everywhere...



Deregulation

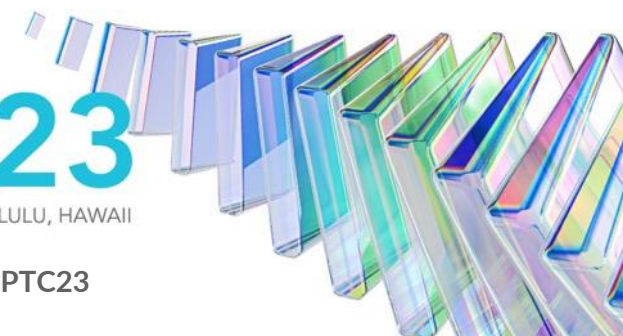


- Telecom carriers

- Telecom carriers
- Carriers' carriers

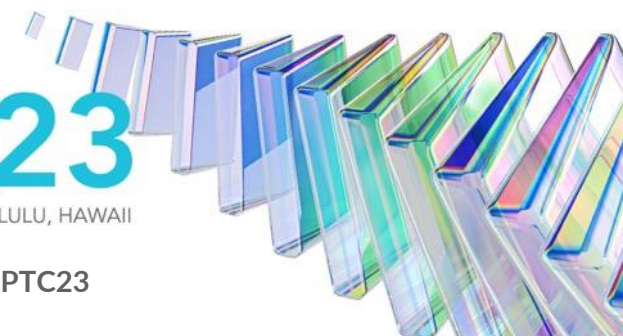
- Telecom carriers

- OTTs
- Telecom carriers
- Private entrepreneurs

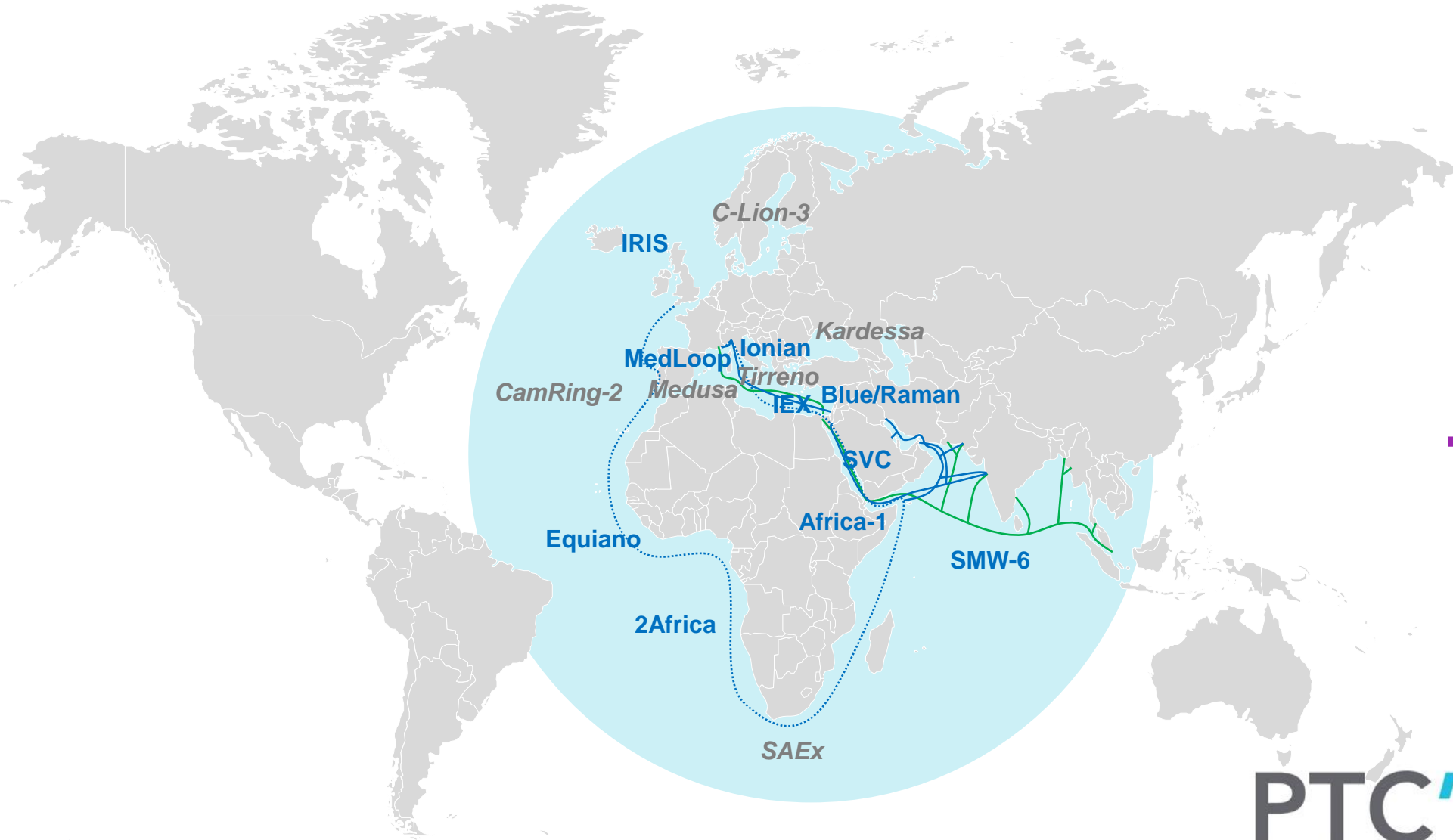


Europe & Africa Regional Challenges Here...

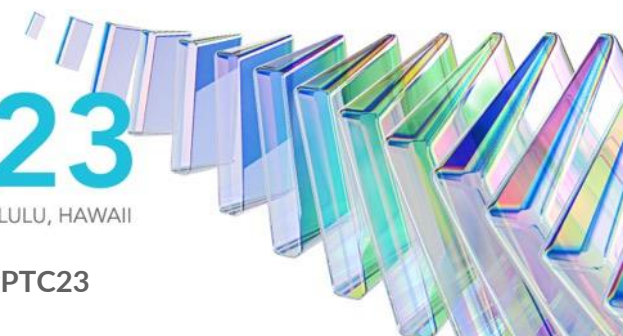
- High-capacity Internet pipes to US
- South to North connectivity (Africa to Europe)
- Middle-East: crossroads between Europe and Asia
- Regional meshing & sub-regional networks
- Bringing Africa into the digital fold
- Indian Ocean to Med crossing alternatives
- Permitting increasingly lengthy / difficult process



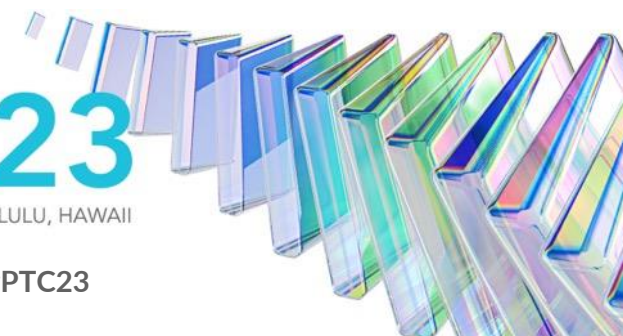
Europe & Africa - Ongoing and Upcoming Projects



Here and There...



Under construction (long-haul systems)

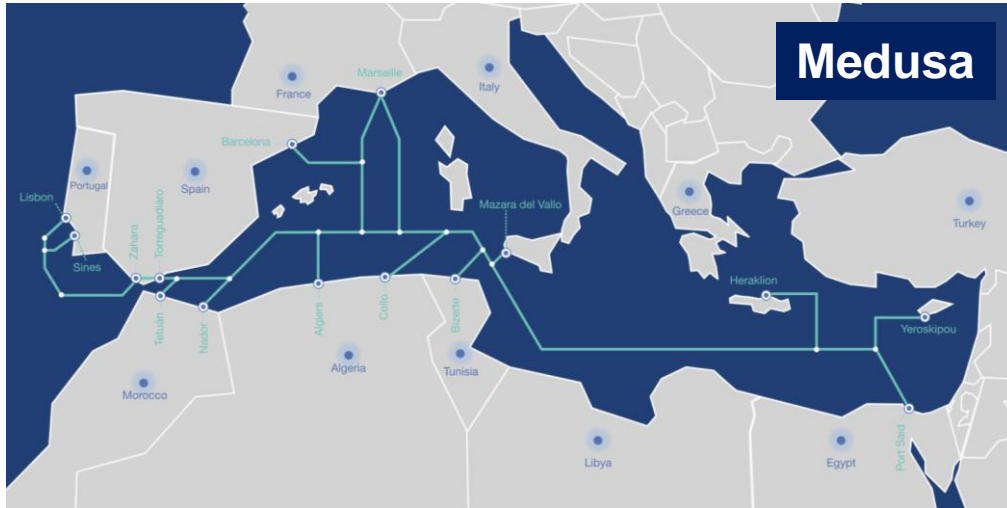


Under construction (short-haul systems)

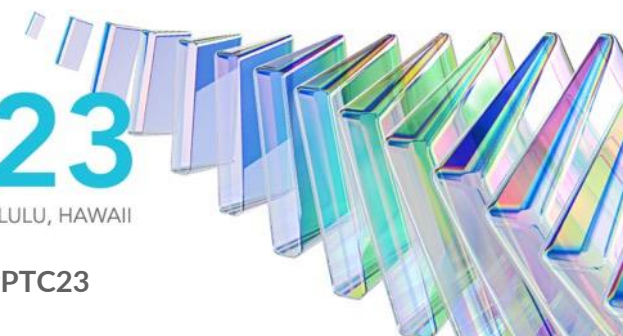


+ a few others...

Under development / procurement



And many more...



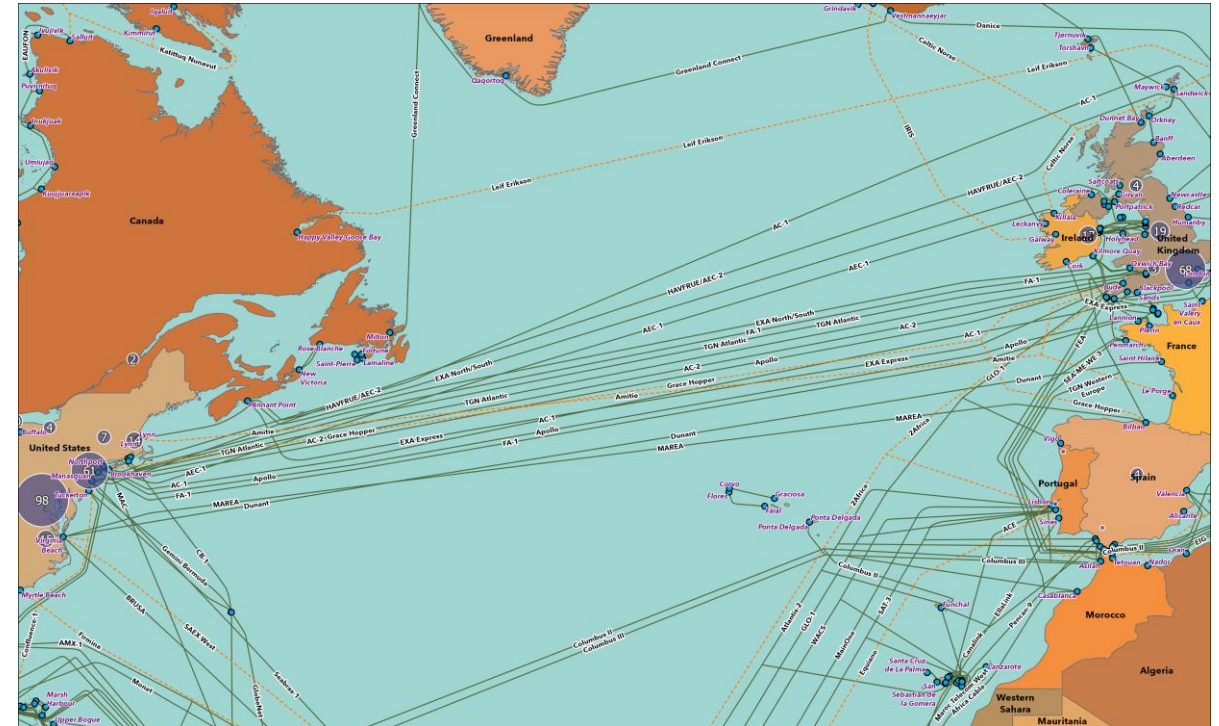


Atlantic and Arctic Region

Wayne Nielsen
WFN Strategies

Atlantic - System Growth

- 19 total systems in service
- 53% of systems >13 years old
- 2003-2015
 - No new systems
- 2015-2022
 - Steady growth since (~1 per year)
 - 8 total systems added
- 2023-2026
 - 4 systems planned (Amitie, Grace Hopper, Leif Erikson, and SAEx West)
 - Some systems moving away from NY-London route



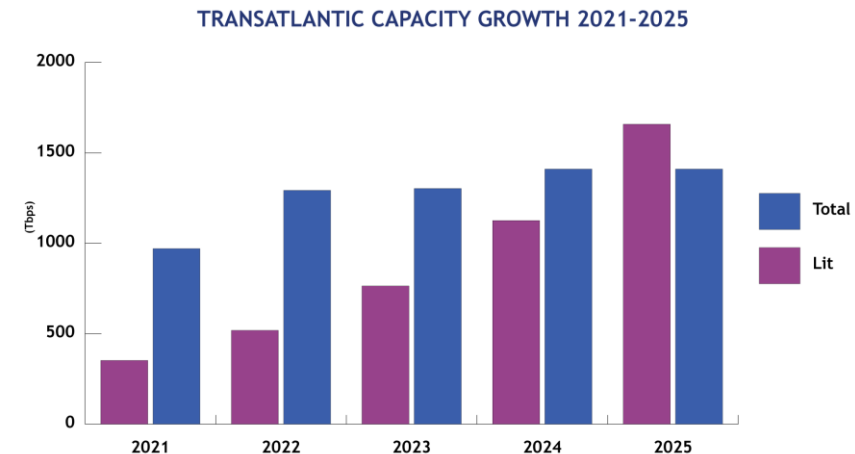
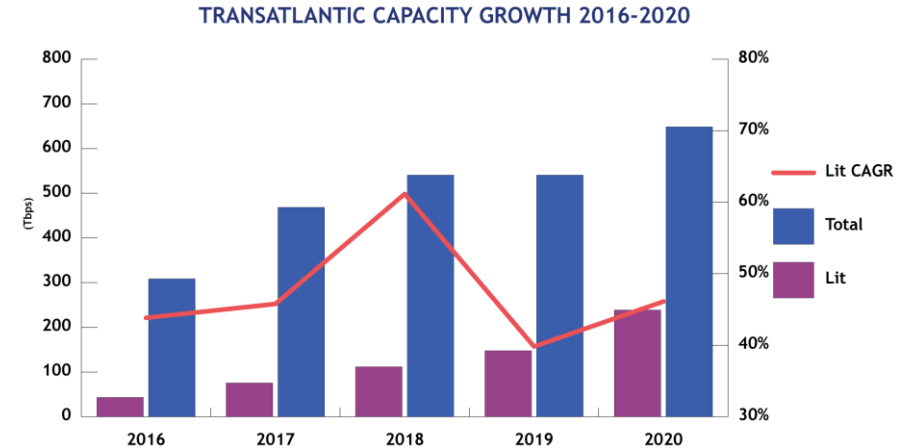
Atlantic - Capacity

• 2016-2020

- Most competitive global route
- Cloud service driven growth
- Available Capacity CAGR Grew at 16%
- Lit Capacity CAGR Grew at 41%
- Lit Capacity grew 2x pace of Available

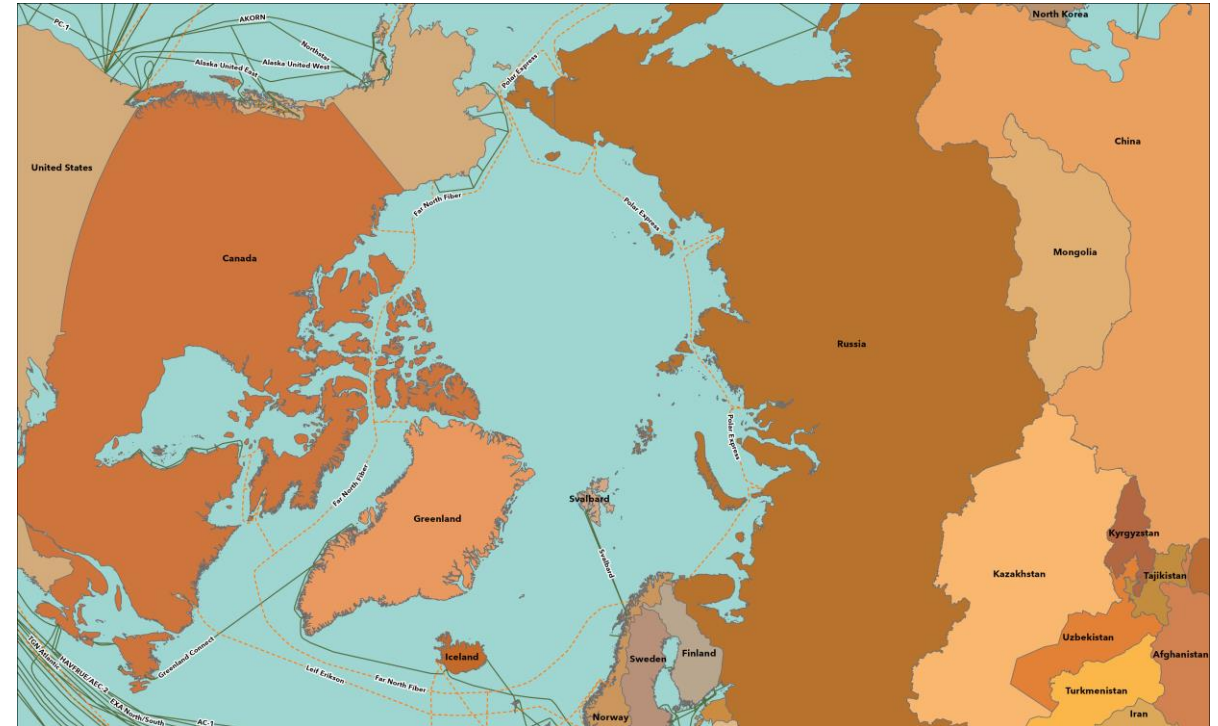
• 2021-2025

- Projected Total Capacity CAGR growth of 8%
- Projected Lit Capacity CAGR growth of 36%
- Demand outpacing capacity buildout (based on publicized projects)



Arctic - Regional Snapshot

- 2 Arctic systems RFS since 2017 (Quintillion & EAUFON)
- 3 Arctic systems planned through 2026 (Far North, Nunavut and Polar Express)
- Arctic routes minimize latency between Europe and Asia
- Avoid bottlenecks such as Suez Canal



Arctic - Difficulties

- Unproven, risky route
- O&M difficulties
- Higher risk & higher reward



Closing Thoughts

- Bandwidth demand continues to skyrocket
- Potential impact of Big Tech struggles on new system builds
- US to Europe Atlantic routes more critical than ever
- Certain Arctic routes imperiled due to political concerns with Russia
- Other Arctic routes have potential(?)
- New unannounced systems anticipated in short term



Latin America & Antarctica

Erick W. Contag
SubOptic

Latin America Today

The region's economy will grow more **slowly** in 2023

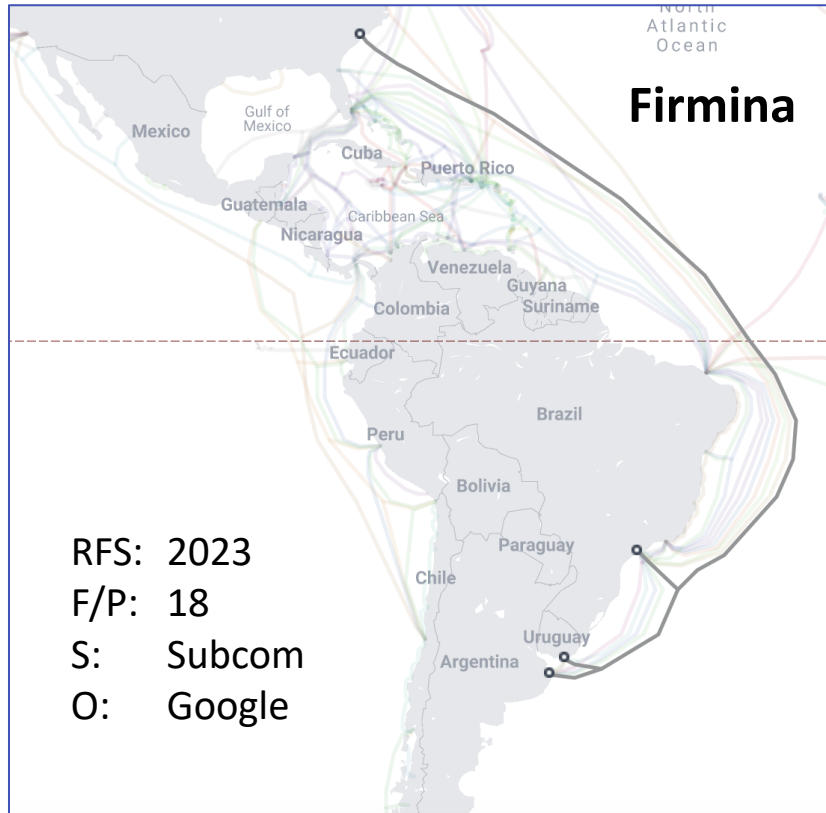
- recession risks are increasing; estimated GDP grow by only 1.5%

Geo-politics at center stage*:

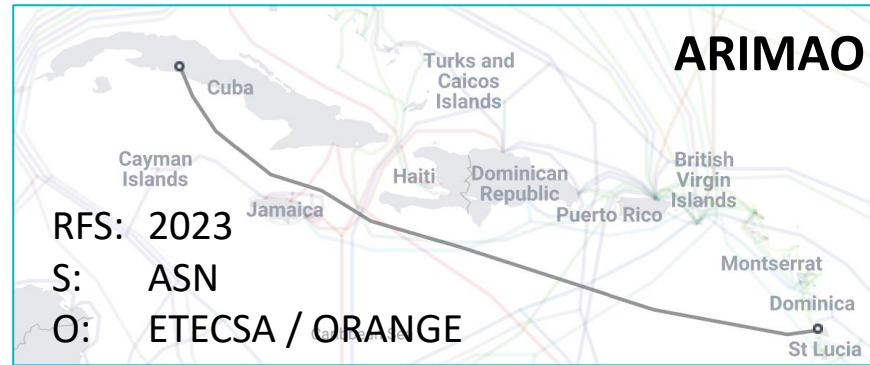
1. The resurgence of the political left will lead to higher tax burdens and expanded state-led development.
2. Left-wing administrations are appointing centrist finance and economy ministers, who are gaining increased influence that provides greater economic, financial, and political stability.
3. Efforts by multiple Latin American governments to prioritize investments in the renewable energy sector will face challenges.
4. Within the process of geopolitically driven restructuring of global supply chains, Latin America presents investment opportunities.

* Source: S&P 2023 Projections

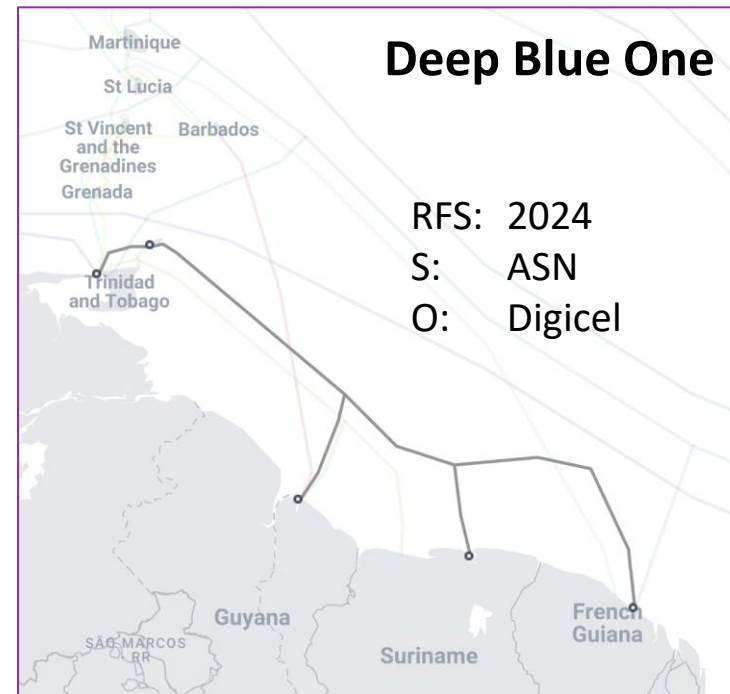
LatAm: Activity in Region - RFS '23-'24



US – Brazil – Uruguay - Argentina

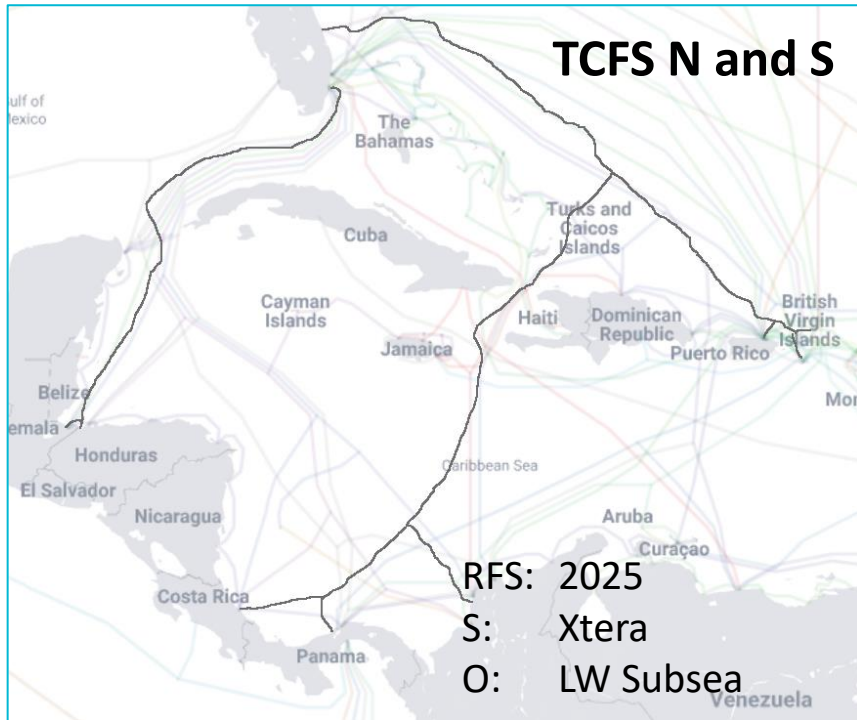


Cuba- Martinique

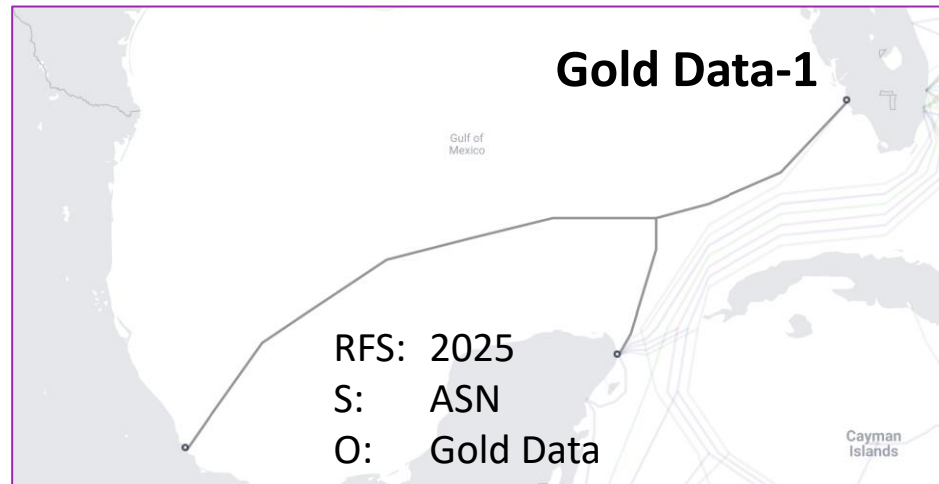


French Guyana - Suriname – Guyana –
Trinidad & Tobago – (Martinique)

LatAm: Activity in Region - RFS '25



Panama – Colombia – Costa Rica –
Puerto Rico – VI – USA
Honduras – Guatemala – USA



Mexico - USA



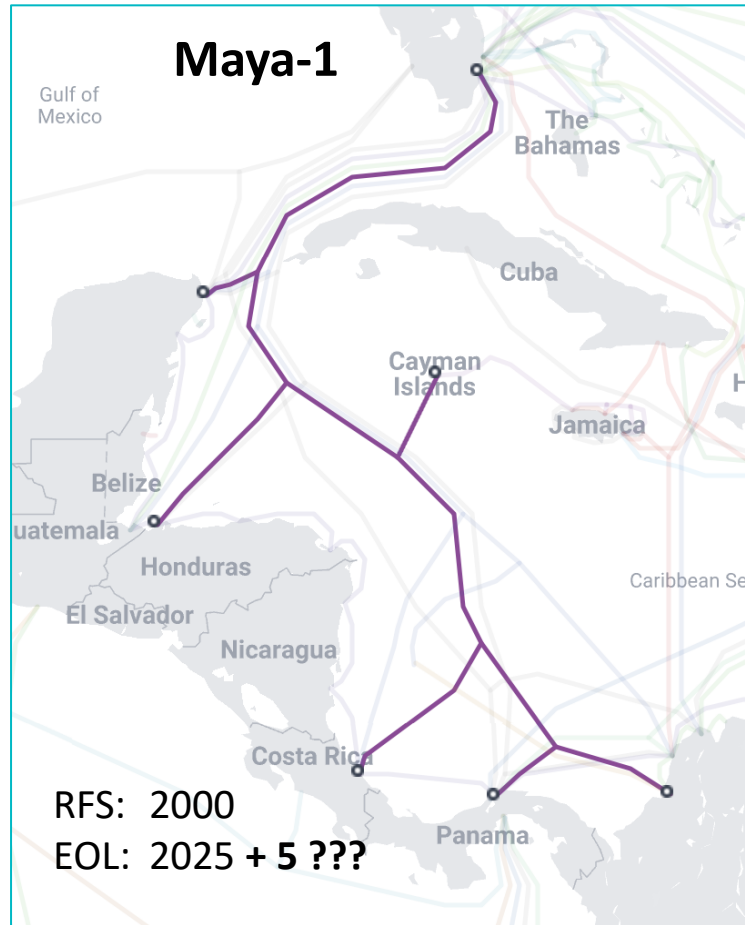
Ecuador – Panama
Colombia – USA

- TCFS N&S will provide low latency connectivity to Panama and Central America
- TCFS is planned to land on Florida’s East Coast
- CSN-1 will provide diversity to Maya-1, with possible future BU extensions to Central America
- Gold Data-1 will provide direct US connectivity to Mexico’s data center alley in Queretaro
- CSN-1 and Gold Data-1 are planned to land on Florida’s West Coast

LatAm: On the Drawing Board / Under Discussion



Guatemala– USA



EOL Systems starting decommissioning:

- Americas II
- Others within the next 5 years

Projects in the Works:

- CELIA (“Americas II” replacement)
- AMX-1 BU Extensions
- Other BU extensions on Seaborn, Malbec, etc.
- Ocean Networks
- Aurora

The Humboldt Cable Project: LatAm – Asia Gateway



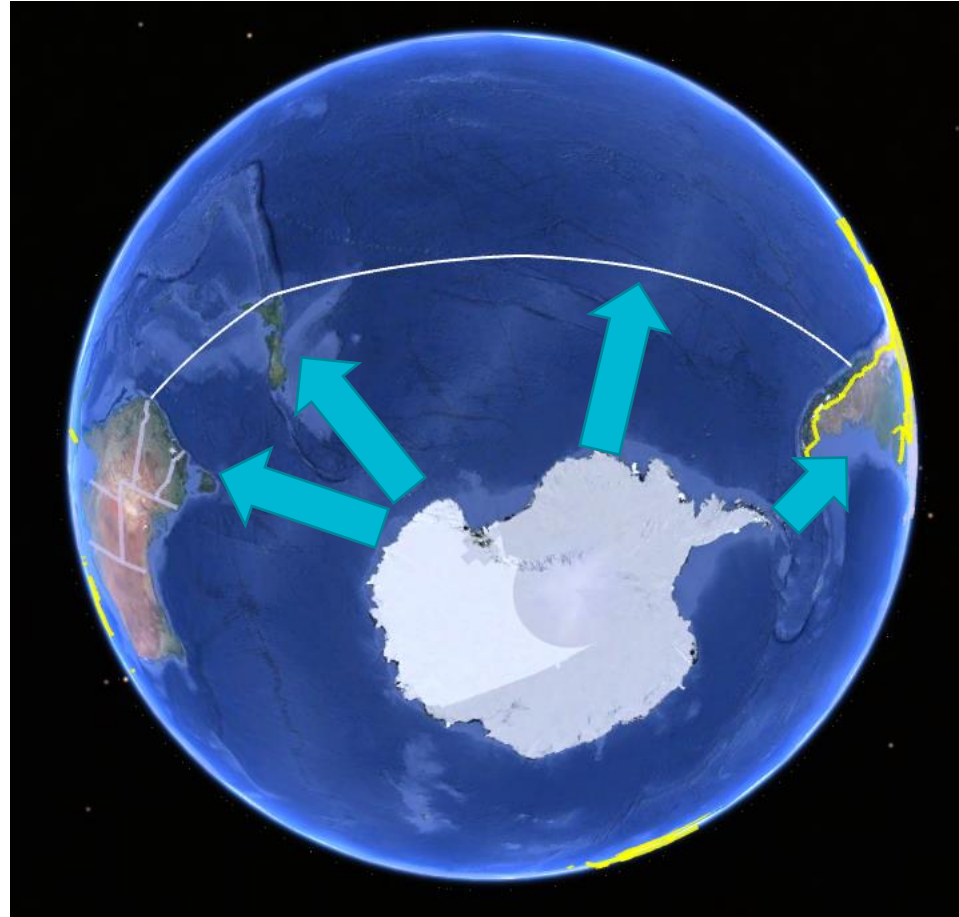
- Chilean Government sponsored cable, now supported by Argentina and Brazil
- Promoted by Desarrollo País
 - CAF sponsored feasibility study in 2019
- Development Partnership with H2/Hawaiki
- **BUs to New Zealand, Antarctica, Easter Island, etc.**
- Biz Model: PPP
- RFS: 2026 est.

The Chilean government left no doubt that it sees this 14,800-kilometer link to Australia first and foremost as a gateway to Asia

Antarctica - The last unconnected continent



Antarctica – NZ - AU
Chile - Argentina



Possible Routes from:

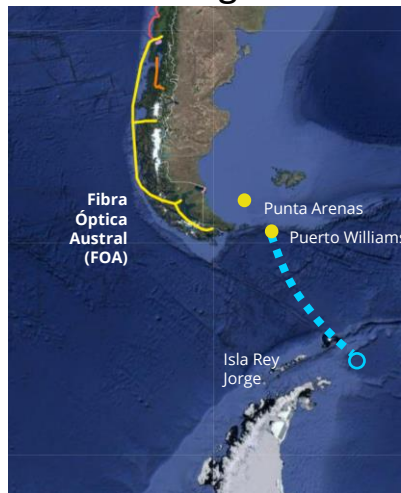
- Argentina, Australia, Chile, New Zealand
- BU on Humboldt Cable System

Opportunity / Need:

- Antarctica is home to dozens of research stations hosting thousands of researchers, who generate **terabytes of data a day**.

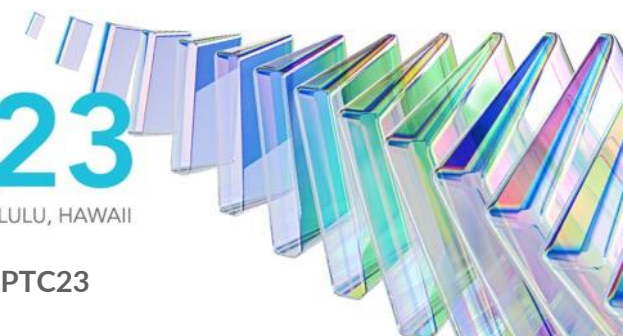
Projects:

- Chile and Argentina have both announced feasibility studies for 2023
- US' NFS has funded a study for a cable to New Zealand
- Chile's Humboldt Cable
- Datagrid is building a 50MW hyperscale facility on New Zealand



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Regional Opportunities & Challenges

Drivers:

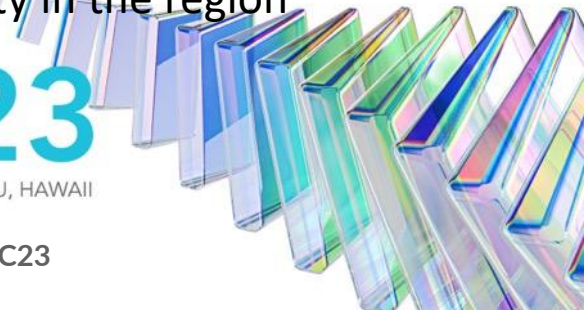
- Route diversity / Landing Point Diversity / Address pent-up Demand
- Replacement of legacy systems is coming up faster than you think

Technology solves problems of resource exhaustion

- SDM (# of fiber pairs / system) / Capacity per FP
- Distance between SLTEs (CLS-CLS vs DC-DC or POP-POP)

Opportunity and Challenges:

- **Geopolitical and regulatory challenges persist.**
- Is current and projected Int'l demand enough to justify new-builds? **Is capital available?**
 - Continued investment is needed across the industry to cope with the compounding effect of demand growth.
- The digital divide still exists—more efforts are needed to improve network access and reliability in the region
- Wil Antarctica become the next frontier?



Legal, Regulatory and ICPC

- Kent Bressie - HWG
- Geopolitics, ICPC, Security and Legal Developments

Around the World in Submarine Cable Law and Regulation

Kent Bressie

HWG LLP

International Cable Protection Committee

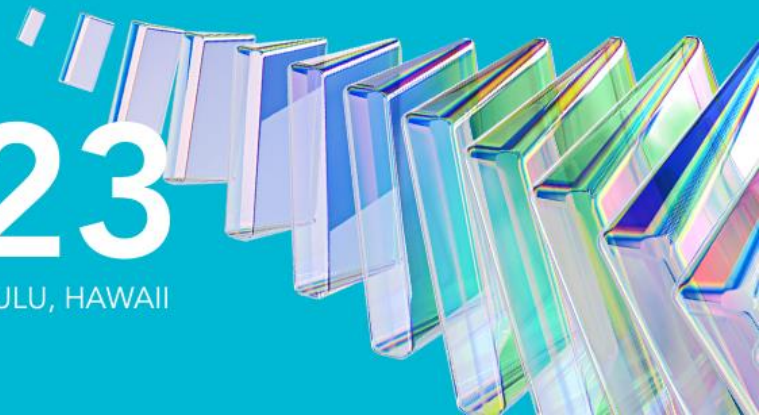


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Agenda

- Marine environment: BBNJ treaty and U.S. marine protected areas
- ISA and deep seabed mining
- Offshore wind
- Cabotage and protectionism
- Security and resilience
- USA: FCC and Team Telecom
- ICPC developments and 2023 Plenary

Biodiversity beyond national jurisdiction (“BBNJ”) treaty



- Lacking consensus, the fifth session of the Intergovernmental Conference (“IGC-5”) negotiating the BBNJ treaty was suspended in August 2022.
 - ICPC continues to represent submarine cable interests in the negotiations, with some ICPC proposals adopted.
- Substantial disagreements remain on issues relating to environmental impact assessments (“EIAs”) and marine genetic resources
 - IGC-5 will resume in late February 2023.

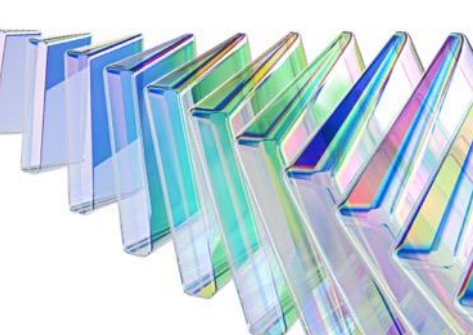
BBNJ key issues for cables

- **EIAs:** will be conducted by states (not BBNJ Conference of Parties or Scientific and Technical Body); threshold and treatment of activities with minor or transitory effects are not yet agreed; ICPC proposal re emergencies has not been adopted
- **Area-based management tools (including marine protected areas):** cables were recognized as human activities to be addressed in proposals; BBNJ Conference of Parties will have authority only where other global, regional, or sectoral bodies lack it
- **Institutional issues:** submarine cables industry is treated as a stakeholder and lacks institutional standing in some cases, as it is not a state or an intergovernmental organization

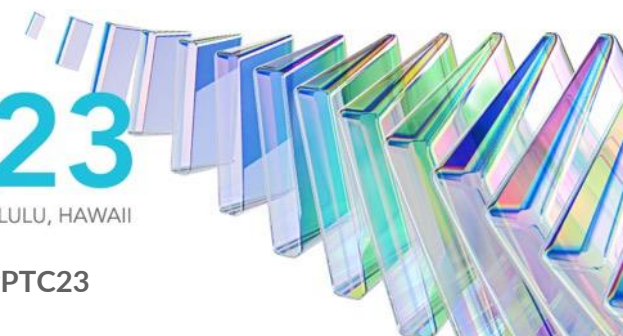
BBNJ: U.S. intervention on August 17, 2022

After noting importance of cables and the range of human activities they support (echoing ICPC's *COVID-19 Call to Action*), the United States stated:

“Submarine cables are also unique in terms of human activities in ABNJ, as they involve long-term fixed infrastructure resting on the seabed, but also require timely maintenance and, at times, urgent repair. We think it is critical that the instrument . . . take into account installation, operation, and timely repair of existing submarine cables, as well as publicly-announced plans for submarine cables, and include cable operators as relevant stakeholders at both the proposal and implementation phases.”

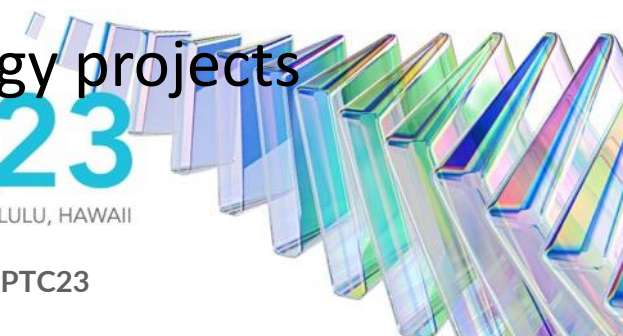


U.S. marine protected areas: generally

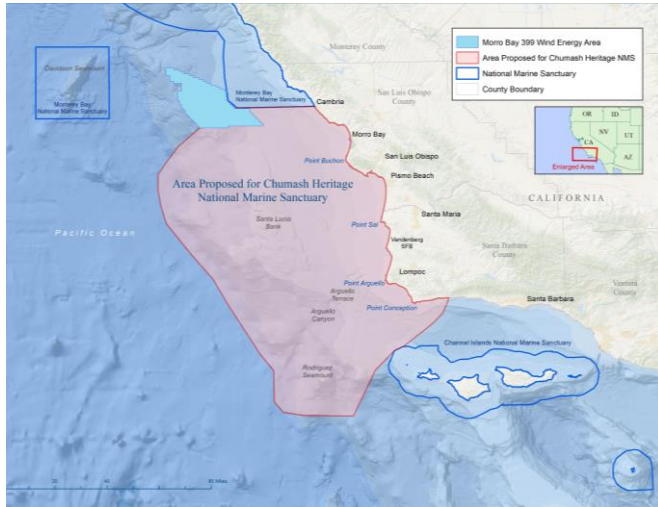
- Although cables exist in many marine protected areas around the world, recent experiences with the United States suggest that future of cables on the high seas under BBNJ treaty could be more challenging
- **National Marine Sanctuaries Act:** National Oceanic and Atmospheric Administration (“NOAA”) designates and manages national marine sanctuaries
 - Authorized and prohibited activities vary by NMS
 - Sanctuary managers have great discretion
- **Antiquities Act:** President has asserted authority to create marine national monuments (“MNM”) that are typically managed by NOAA and the U.S. Fish and Wildlife Service (“FWS”) 
 - FWS takes stricter approach than NOAA
 - Authorized and prohibited activities vary by MNM

U.S. marine protected areas: problems

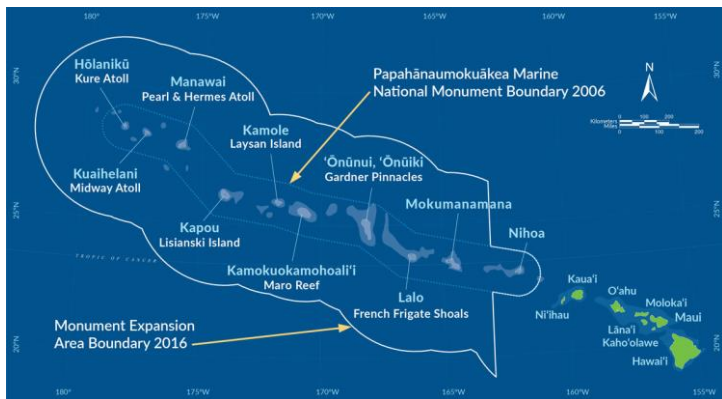
- Misplaced regulation
 - Failure of interagency process to promote and protect cables
 - NOAA bias against commercial activities
 - Overbroad and speculative designations
 - Failure of NOAA and FWS to account for best available science re cables
 - Jurisdictional creep: restrictions on submarine cables inconsistent with articles 58 and 79 of the U.N. Convention on the Law of the Sea (“UNCLOS”)
- Adverse impacts
 - Route foreclosure and reduced resilience
 - Increased spatial conflicts with offshore wind and MHK energy projects
 - Stranded landing station assets



U.S. marine protected areas: current activity

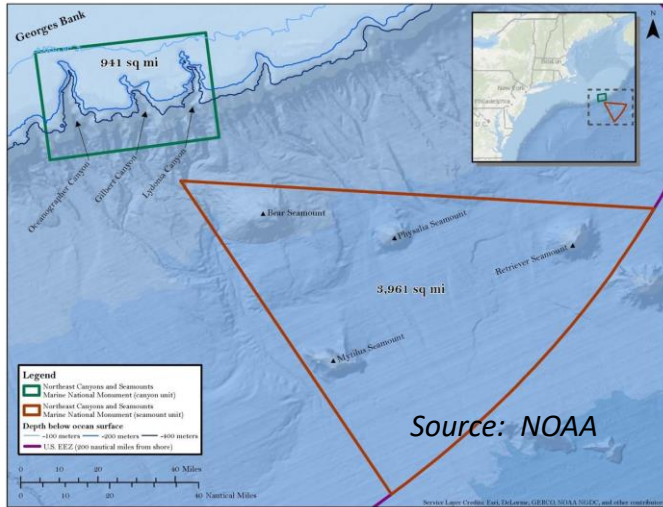


- **Proposed Chumash Heritage NMS:** overlaps with existing and planned cables; proposed area contiguous with other NMSs and wind energy areas; designation expected in 2023; NASCA has advocated for cable freedoms and more targeted NMS designation

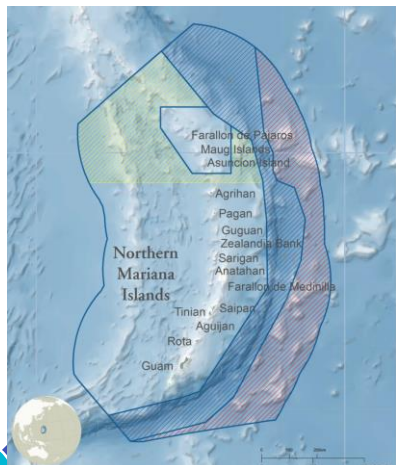


- **Papahānaumokuākea MNM and proposed NMS:** designated in 2006 and expanded in 2016; prohibits structures and materials on seabed; NOAA will designate portions as NMS in near future

U.S. marine protected areas: current activity



- **Northeast Canyons and Seamounts MNM and proposed NMS:** designated in 2016; modified in 2021 to prohibit commercial fishing within boundaries; prohibits structures and materials on seabed, except for submarine cables and scientific instruments; NOAA will soon designate portions as NMS; NASCA has advocated for cable freedoms

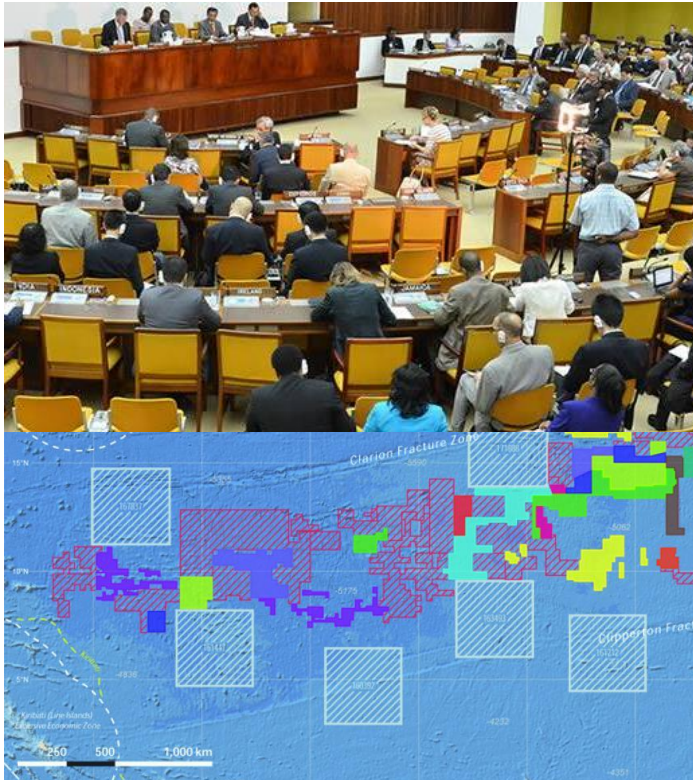


- **Mariana Trench MNM and proposed NMS:** designated in 2009; designation does not prohibit structures and materials on seabed; NMS nomination may or may not lapse

Offshore wind

- Climate change continues to drive significant investment in and deployment of offshore wind farms, increasing risks of damage and route foreclosure.
- Advocacy largely handled through regional cable protection committees, such as ESCA and NASCA, rather than ICPC.
- **USA:** numerous Bureau of Ocean Energy Management proceedings to identify and develop offshore wind facilities, but without sufficient early-stage coordination with cables; combined with NMSs, these areas can pose significant route foreclosure problems
- **Europe:** one-size-fits-all permitting and mitigation increasingly conflates telecom and power cables

International Seabed Authority (“ISA”) and deep seabed mining



- Uncoordinated mining on the seabed of the high seas poses risks of cable damage and route foreclosure.
- ICPC delegations have long participated ISA sessions, recently focused on finalizing the Exploitation Regulations to govern the extraction phase.
- In 2021, the Republic of Nauru notified the ISA Council of the intention of Nauru Ocean Resources Inc. (“NORI”) to seek approval of a plan of work for exploitation in the Area, triggering a provision in the UNCLOS 1994 Implementing Agreement requiring the ISA to consider NORI’s application regardless of whether the Exploitation Regulations are finalized.
- ICPC’s proposals for robust regulations addressing cable protection and route flexibility have the support of numerous countries.

Cabotage and protectionism

- Treating cable installation and repair as cabotage—transport of goods and passengers between domestic points reserved for domestically-qualified vessels—is but one example of increasing protectionism, along with crewing and foreign ownership restrictions.
- **India:** consultation by Telecommunications Regulatory Authority of India seeks view on India's licensing and regulatory framework, including benefits of Indian-flagged cable ships
- **United States:** In 2022, U.S. Customs and Border Protection again attempted to revoke key rulings exempting cable installation and repair from Jones Act restrictions, but NASCA succeeded in preserving the rulings.

Security and resilience

- Governments, NATO, and the OECD continue to worry about submarine cable security in the wake of attacks on the Nord Stream pipelines in the Baltic Sea.
- Western government continue to focus on China and Russia as threats.
- Governments focus their security efforts variously on supply chains, foreign ownership, and access by foreign-person employees and contractors. The United Kingdom has proposed a new surveillance ship.
- Many governments fail to focus on three approaches that could strengthen resilience and continuity of communications:
 - Two-way sharing of risk and threat information
 - Enhanced diversity of routes and landings, as security and environmental policies concentrate infrastructure and traffic
 - Wholistic approach to cable damage: all breaks disrupt traffic
- Governments have shown increasing interest in fiber sensing as a security tool but avoid discussing encryption, given it can thwart surveillance.



USA: Team Telecom

- Team Telecom continues to treat submarine cable operators as adversaries in national security reviews, with no two-way information exchanges about risks and threats
- In routine cases, reviews are generally shorter, but the process remains very unpredictable, making project and transaction planning difficult.
- The “standard” questionnaire only grows longer with each review, with no limits on the kinds of information Team Telecom may request
- Compliance has become much more burdensome, with personal identifying information disclosures employees and vendors in advance of physical and logical access

USA: FCC

- Promises of transparency and predictability in Team Telecom reviews remain largely unfulfilled
 - Referral criteria not followed
 - No controls over scope creep by Team Telecom
 - Slower application processing delays start of Team Telecom reviews
- Proposal to replace FCC International Bureau with a Space Bureau and a small Office of International Communications entirely neglected submarine cables.
- Unlike with satellites, FCC has not sought to improve licensing of cables, update its antiquated rules, or reduce regulatory burdens (including circuit capacity reporting, outage reporting, and high regulatory fees)
- FCC is also pursuing aggressive enforcement actions for rule violations involving foreign ownership disclosures, with the Justice Department's former Team Telecom lead now heading the FCC Enforcement Bureau

Select ICPC activities beyond BBNJ, ISA, and security/resilience

- **Research:** engagement with scientific community to develop peer-reviewed scientific research demonstrating that cables are environmentally benign
- **Fish aggregation devices:** ICPC established a new working group in 2021 developed an annex to ICPC's Best Practices for Governments, and has had productive discussions with key governments, particularly Indonesia
- **Charting:** ICPC continues to work with the International Hydrographic Organization and national charting authorities to improve charting
- **Rhodes Academy for Oceans Law and Policy:** engagement with judges, academics, and regulators on law of the sea to enhance understanding of cables
- **Advocacy of ICPC principles to assist members:** Fortaleza desalination plant
- **Compensation claims for cable damage:** new ICPC Recommendation No. 19, *Preparatory Actions for Civil Claims Development for Cable Damage*

2023 ICPC Plenary

18th - 20th April 2023 Madrid, Spain

Submarine Cable Resilience - Back to Basics



- First in-person plenary since 2019 offers an action-packed agenda and the opportunity to connect with other members, government officials, researchers, and other industries on key cable protection and resilience issues

For further information

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