VERSION 1.1

GOVERNMENT BEST PRACTICES FOR PROTECTING AND PROMOTING RESILIENCE OF SUBMARINE TELECOMMUNICATIONS CABLES

With these Best Practices, the International Cable Protection Committee ("ICPC") identifies recommended actions for governments to foster the development and protection of submarine telecommunications cables and to maintain continuity of communications even in the event of damage to a submarine cable. In implementing these Best Practices, a state should adapt them to address national and regional circumstances, including but not limited to: localised risks to submarine cables; localised activities of other marine industries; national laws, regulations, and governmental structures; and jurisdictional disputes with littoral states.

1. General principles

In adopting and implementing a submarine cable resilience plan, the state should be guided by the following principles:

- Focus on statistically-significant risks where government action could have the greatest impact on risk reduction;
- Promote commercial and regulatory environments that encourage multiple and diverse (both with domestic and foreign landings) submarine cable landings within the state's territory;
- Observe and implement treaty obligations (particularly under the United Nations Convention on the Law of the Sea ("UNCLOS")) and customary international law defining state jurisdiction over, and protection of, submarine cables;
- Promote transparent regulatory regimes that expedite cable deployment and repair according to well-established timeframes;
- Consult closely with industry to understand industry technology and operating parameters and to share data regarding risks;
- Complement existing industry best practices;
- Recognise that laws and government policies themselves can sometimes exacerbate risks of damage and reduce resilience; and
- Engage with other states on a global and regional basis, as other states' actions can greatly affect an individual state's own connectivity.

2. Fishing and anchoring risks

ICPC statistics indicate that each year, fishing and anchoring account for approximately 70 percent of global damage to submarine cables—far more than other human or natural causes. Commercial fishing-related damage is most often caused by bottom-tending fishing gear such as trawl nets and dredges, but it is also caused by long lines and fish aggregation devices anchored to the seabed and pot and trap fisheries using grapnels for gear retrieval. Anchor-related damage is most often caused by: improperly-stowed anchors, which release or fall overboard and can be

dragged for great lengths along the sea floor, damaging cables along the anchor's path; anchoring outside of approved anchorages and near installed submarine cables; anchors dragged by properly-anchored vessels, depending on sea conditions; and dropping of anchors in marine emergencies. Mooring lines of fish aggregating devices ("FADs"), especially in deep-water can cause abrasion to submarine cables during installation, and FAD anchors have caused damage to deployed cables.

The submarine cable industry uses a variety of mitigation measures to limit damage from fishing and anchoring, including: route selection and design to avoid areas of particular risk (for example, routing around designated anchorages); cable armouring; cable burial (from 0.5 meters to 3 meters) for cable installed at water depths less than 1500 meters, where seabed conditions permit; cable awareness and liaison programs designed to educate fishing fleets regarding the location of submarine cables, and actions to take if gear is snagged; and programs to compensate fishermen for snagged gear (so that they abandon snagged gear rather than damage cables in trying to free it). Coordination with FAD owners and with governments to obtain FAD positions so cables can be routed around them, and/or measures to relocate or recover FADs in coordination with the owners have proven beneficial. These industry self-help measures can be effective, but they are insufficient absent additional actions to be taken by governments.

ICPC statistics confirm that state adoption and implementation of effective cable protection measures directed at fishing and anchoring risks can greatly reduce the risk of damage to submarine cables. As best practices, ICPC recommends that states therefore adopt and implement the following measures:

- Prohibit fishing in close proximity to submarine cables—including deployment of drift nets, gill nets, fish aggregation devices, and vessel anchors—consistent with default and minimum separation distances discussed in part 3 below;
- Require use of designated anchorages and establish and prosecute legal offenses for anchoring outside of designated anchorages;
- Promote the distribution and use of cable awareness charts (prepared by submarine cable operators) to fishermen;
- Promote direct engagement between submarine cable operators, including 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;
- Require use of automated identification systems ("AIS") and vessel monitoring systems ("VMS") on vessels at all times and establish and prosecute legal offenses where vessel operators turn off or disable AIS or VMS;
- Require that vessel operators carry appropriate insurance;
- Require use of AIS or VMS by even the smallest of vessels; and
- Direct the coast guard to issue local notices to mariners regarding submarine cable protection and to communicate with vessels operating or drifting near submarine cables.
- Limit deployment of FADs proximate to installed and planned submarine cables.

- Establish a FAD registry, requiring FAD owners to identify and update FAD locations, and make such registry available to submarine cable operators during the route planning process for new cables.
- Require removal of ropes and ghost gear in the water column and consider removal requirements for end-of-life disposition of FADs.

3. Spatial separation

Spatial separation of submarine cables from other marine activities is one of the effective means of cable protection. It minimises the risk of damage from other marine activities and ensures that submarine cable operators have ready and unfettered access to their cables for installation and maintenance needs and to minimise outage time in connection with a repair. The oceans, however, are increasingly crowded spaces where ideal spatial separation might not be possible, and where marine industries make compromises regarding proximity while seeking to reduce risk through closer coordination and communication.

A default separation distance establishes a minimum separation distance between an existing submarine cable and another marine or coastal activity in the absence of any mutual agreement to allow the activity in closer proximity to the submarine cable. By contrast, a minimum separation distance establishes an absolute minimum separation distance between the submarine cable and the other marine or coastal activity. Consistent with ICPC recommendations, many countries—as diverse as China, Denmark, Indonesia, Russia, Singapore, and the United Kingdom—have established default or minimum separation distances to protect submarine cables.

Some states have established cable protection zones and corridors that prohibit specified activities posing risks to submarine cables—including fishing, anchoring, and dredging—within fixed geographic areas. Discretionary cable protection zones grant protections to submarine cables that choose to locate in them or that may be declared around them, as in the case of Australia. Mandatory cable protection zones (or cable corridors) require submarine cable operators to route their infrastructure in defined geographic areas (as in the case of New Zealand). States with cable protection zones enforce them with air and sea patrols and infringement penalties. Submarine cable operators generally disfavor mandatory cable protection zones and corridors because they (1) provide insufficient spatial separation from other submarine cables for installation and maintenance and (2) encourage geographic clustering of submarine cable routes and landings, which magnifies the risk that a single natural or man-made event could damage multiple cables.

As best practices to promote spatial separation, ICPC recommends that states:

- Adopt and enforce the following recommended separation distances between cable ships and other vessels in the exclusive economic zone ("EEZ," extending 200 nautical miles

seaward from the shore) and the territorial sea (extending 12 nautical miles seaward from the shore):
    - In shallow water with a depth of 75 meters or less: 500 meters; and
    - In greater depts of water: the greater of 500 meters or two times the depth of water;
- Implement on nautical charts the text box specified in International Hydrographic Organization ("IHO") Resolution 4/1967 (amended April 2017), as discussed in part 4 below;
- Ensure that any cable protection zones are adopted with consultation and support of cable operators; and
- Maintain flexibility with the number and size of cable protection zones.

4. Charting

Nautical charts (such as Admiralty charts) issued by government hydrographic offices consistent with IHO recommendations are graphical representations of ocean and adjacent coastal areas showing, among other things, water depths, seabed and coastline details, tidal information, and human-made features such as harbors, munitions dumps, offshore wind farms, and submarine cables. Nautical charts aid in navigation and alert users to the presence of other ocean activities. Nautical charts were previously issued periodically in paper form, but they are now generally maintained in electronic form and available on a computer screen or using a print-on-demand function.

Submarine cables are charted using data provided by operators and their contractors to hydrographic offices (such as the U.K. Hydrographic Office, the Indian Naval Hydrographic Office, the South African Navy Hydrographic Office, and the Hydrographic Department of the Maritime and Port Authority of Singapore). Historically, the IHO recommended charting only to a depth of 2,000 meters, in light of a focus on safety at sea. Some submarine cable operators still charted their cables at all depths. In 2018, however, the IHO revised its approach, due in part to a recognition that charting of submarine cables in areas proximate to deep seabed mining could reduce the risk of cable damage. The IHO and ICPC have established a pilot program to chart cables in areas proximate to contract areas of the International Seabed Authority.

As best practices for charting, ICPC recommends that states adopt and implement the following measures:

- Update nautical charts regularly and in near-real-time;
- Show all submarine cables on nautical charts, distinguishing between in-service and out-of-service cables;
- Show on nautical charts all other human activities that could pose risks to submarine cables, including but not limited to mining areas (including sand and gravel borrow areas), renewable energy facilities, traffic separation schemes, munitions dumps, and military test areas;

- Ensure that national and regional charting authorities implement amended IHO Resolution 4/1967, which requires that charting authorities include a text box in publications such as mariners' handbooks and notices to mariners:
    - Directing vessels to avoid anchoring, fishing, mining, dredging, or engaging in underwater operations near cables at a minimum distance of 0.25-nautical mile on either side of a cable, and
    - Recognising submarine cables as critical infrastructure, noting that damage to a submarine cable can constitute a national disaster.

5. Domestic cable protection laws; penalties for damage

The 1884 Convention on the Protection of Submarine Telegraph Cables requires state parties to establish offences for cable damage. Article 113 of the UNCLOS provides that every state shall adopt the laws and regulations establishing a punishable offence under national law for the breaking or injury by a ship flying its flag or by a person subject to its jurisdiction of a submarine cable beneath the high seas done wilfully or through culpable negligence.

Countries such as Australia and New Zealand have implemented these treaty obligations by establishing substantial penalties—particularly with respect to their cable protection zones—that are more likely to deter those who might damage submarine cables. Other countries such as Sweden impose strict liability, requiring that if the owner of a cable or pipeline causes damage to another cable or pipeline, the owner shall pay the cost of repairing the damage. By contrast, countries such as the United States adopted penalties to implement their 1884 Convention obligations but have not updated the penalty amounts for more than 130 years. Finally, many other states have failed to adopt any measures to punish cable damage, even when their treaty obligations require them to do so.

To implement their treaty obligations, to compensate cable owners for damage, and to deter future damage, particularly by commercial fishermen and vessel anchors, ICPC recommends that states:

- Adopt and enforce effective cable protection laws, consistent with the 1884 Convention and UNCLOS;
- Adopt and update penalties to ensure they are substantial enough to deter damage; and
- Ensure that coast guards and law enforcement agencies are sufficiently familiar with cable protection laws to enforce them, and that they cooperate with and assist cable operators in investigating cable damage claims (including preservation and sharing of evidentiary material).

6. Marine spatial planning and inter-industry coordination

Governmental bodies and other marine industries are often unfamiliar with the presence of, operational requirements for, vulnerabilities of, status as critical telecommunications

infrastructure of, and statutory and treaty protections that apply to, submarine cables. In some cases, marine spatial planning activities omit submarine cables entirely. This lack of familiarity with, or neglect of, submarine cables can greatly impair their protection and resilience.

As best practices, ICPC recommends that states undertake the following to protect cables and de-conflict cable routes:

- Include and consult with submarine cable operators as stakeholders in such processes;
- Identify submarine cables in their mapping resources and tools (not just on nautical charts);
- Identify and include submarine cable operators as critical stakeholders in marine spatial planning and policymaking;
- Adopt regulatory frameworks for other marine activities, such as oil and gas development and renewable energy installations, to require coordination with submarine cables at the earliest stage of planning and development of those other projects; and
- Ensure that planning and leasing documents for oil, gas, and renewables specifically reference submarine cable protection and coordination.

7. Single point of contact

Submarine cable development, installation, operation, and repair implicates the regulatory and policy responsibilities of numerous government agencies, including those ministries, departments, and agencies responsible for telecommunications, maritime and shipping, environment, customs, and national security, to name a few. The dispersion of responsibilities for submarine cables can impair government action with respect to submarine cables and also make it difficult for other industries to coordinate with submarine cables. Singapore has addressed this issue by designating its telecoms regulator, the IMDA, as the point of contact for submarine cables, even if other government bodies have ultimate responsibility for a particular issue.

As a best practice, ICPC recommends that states:

- Establish a single point of contact for submarine cables—and not just for permitting purposes, but also for any issues arising with respect to installation, repair, and protection.

8. Route and landing optimisation; geographic diversity

Submarine cable operators consider a variety of factors when choosing routes and landings, including:

- Economic need (for connections between data centers and points of presence, and on highly-trafficked routes);
- Economic opportunity (in the case of wholesale capacity sales);

- Seafloor topography (seeking flat and uninteresting seabed that avoids geographic features with steep gradients, seamounts, vents, or fracture zones);
- Geographic diversity (to minimise the impact of a single event causing damage to multiple cables);
- Proximity to other marine activities and infrastructure (which pose risks of damage);
- Access to terrestrial networks (to ensure secure, diverse, and low-cost connectivity between submarine and terrestrial networks);
- Environmental restrictions (such as marine protected areas); and
- Regulatory considerations (including length and expense of permitting).

They design routes to follow the shortest viable route between landing points exhibiting the lowest risk to the installed cable. They start with a great circle route (the shortest distance between two points on a globe), which provides the lowest latentcy for communications transmissions (the time taken for data to pass from point A to point B) and then adjust for technical, economic, and regulatory factors.

Submarine cable operators and their capacity customers increasingly seek to maximise geographic diversity of submarine cable routes and landings in order to enhance network resilience and reduce the risk of damage from a single event, whether an earthquake, a tsunami, a vessel anchor, fishing gear, or a terrorist attack. Their options may be limited by other factors, such as slow and expensive permitting, coastal landowners, and marine protected areas. Moreover, they operate in dynamic coastal and marine environments that are increasingly crowded and that lack a single landowner or a single regulator. Other activities and infrastructure are frequently authorised without regard to the potential to foreclose particular areas to future submarine cable development, increasing the potential for clustering of cables and landings, and the risks inherent in non-diverse infrastructure.

As best practices, ICPC recommends that states undertake the following to promote resilience of submarine cable networks:

- Adopt and implement regulatory frameworks to optimise routes and landings, including geographic diversity of routes and landings;
- Recognise that diversity can be impaired by government shore-end permitting, marine protected areas, and marine spatial planning (or lack thereof) that results in clustering of cables, magnifying risk that a single incident will damage multiple cables and impair connectivity; and
- Recognise that submarine cables cannot be hidden or armoured and buried to guard against all malicious and non-malicious sources of cable damage.

9. Permitting for installation and repair

As noted in part 8 above, permitting can greatly affect route and landing location decisions for submarine cable operators. In many cases, coastal states apply a “one-size-fits-all” permitting

regime that applies equally to polluting activities (such as oil and gas development) and environmentally-benign activities (like submarine cables), which can burden and delay the environmentally-benign activities.

Moreover, the permitting actions of one state can greatly affect the connectivity of other states. UNCLOS articles 2, 58, 79, and 87 authorises a coastal state to impose conditions and consent requirements for submarine cables entering its territorial sea, but not beyond it in the EEZ or on the continental shelf. UNCLOS articles 2 and 51 also allow archipelagic states to impose conditions for new submarine cables entering archipelagic waters.

As best practices, ICPC recommends that states ensure that permit requirements for installation and repair:

- Are consistent with UNCLOS in the EEZ and archipelagic waters and on the continental shelf—excessive jurisdictional assertions by one's neighbors can impair installation of new cables and repairs of existing ones;
- Reflect the best available science showing that submarine cables are neutral-to-benign in the marine environment;
- Are transparent;
- Establish clear timeframes that are as short as possible; and
- Promote diversity of routes and landings.

10. Cabotage and crewing restrictions

Cabotage is the transport of goods and passengers between domestic ports. For a variety of reasons, including protection of domestic industry and national security, a number of states have restricted cabotage to domestic vessels, with varying criteria including domestically-built, domestically-owned, domestically-flagged, and/or domestically-crewed vessels. Some states have expanded their cabotage restrictions to a broader range of economic activities in their territorial seas and EEZs, including submarine cable installation and repair. Application of cabotage laws to submarine cable installation and repair is inappropriate and undermines the resilience of submarine cable networks.

Cable ships are built specifically for cable-related operations and are crewed by highly trained and experienced merchant mariners, engineers, and cable operations staff. Most of the world's countries with submarine cable landings and transits lack locally-flagged and locally-crewed cable ships. Instead, most of the world's installation and repair services are provided by a few global and regional providers with the necessary expertise and economies of scale. Submarine cable operators often pool risks and resources to contract for cable ships in regional zone agreements. These zone arrangements cover vast multinational geographic areas, meaning that there are no discrete national maintenance markets.

Cabotage and crewing restrictions render installations and repairs more expensive and can result in performance and safety problems arising from the use of inappropriate vessels and inexperienced crew. They generally impair the operation and economies of scale of maintenance consortia. Cabotage and crewing restrictions can also greatly delay critical repairs, as a submarine cable operator must wait to qualify a foreign-flagged/crewed vessel through an exemption or waiver process. Cabotage and crewing restrictions can harm the connectivity of other neighboring countries.

Within the EEZ and on the continental shelf, cabotage and crewing restrictions are inconsistent with UNCLOS articles 79 and 87, which provide for the freedom to install, maintain, and repair submarine cables in those maritime zones. Within archipelagic waters, cabotage restrictions on repair of existing cables that merely transit the state are inconsistent with UNCLOS article 51. Although permissible within the territorial sea, cabotage and crewing restrictions are inadvisable.

As best practices, ICPC recommends that states:

- Refrain from defining submarine cable installation and repair as cabotage, as they do not involve the transport of goods or passengers between domestic ports;
- Refrain from applying cabotage or crewing restrictions on vessels engaged in installation or repair, whether in the territorial sea, archipelagic waters, or EEZ/continental shelf.

11. Port entry requirements

Based on installation or repair work within the territorial sea, archipelagic waters, or EEZ, some states require that a cable ship enter a domestic port for regulatory clearance purposes, even when crew members would not otherwise embark or disembark. Such requirements disrupt operations and delay installation and repair.

As best practices, ICPC recommends that states:

- Refrain from requiring port entry for cable ships conducting installations and repairs beyond the territorial sea; and
- For work within the territorial sea and archipelagic waters, establish annual pre-clearance procedures for cable ships and crews.

12. Customs duties, taxes, and fees

Some states view the entry of new submarine cables into their jurisdictions as an opportunity to extract revenue from the operator in the form of customs duties, taxes, and fees. Such charges increase the cost of capacity to users and in some cases can deter landings, thereby undermining government policies designed to foster new cable landings. Such charges can also serve as a source of disputes that delay installation and repair.

As noted in part 9 above, UNCLOS articles 2, 58, 79, and 87 authorises a coastal state to impose conditions for submarine cables entering its territorial sea, but not beyond it. UNCLOS articles 2 and 51 also allow archipelagic states to impose conditions for new submarine cables entering archipelagic waters. Some states, however, have sought to impose customs duties, taxes, and fees for activities and infrastructure in the EEZ and on the continental shelf, in contravention of UNCLOS.

As best practices, ICPC recommends that states:

- Refrain from imposing customs duties, taxes, and fees on installation activities beyond the limits of the territorial sea, and on cable ships merely transiting an EEZ;
- Reduce or eliminate customs duties on submarine cable equipment imported into a state's territory, in order to foster submarine cable deployment and facilitate quick access to spare plant for repair; and
- Refrain from imposing importation requirements and customs duties on cable ships conducting installation or repair.

13. Maritime boundary claims and disputes

Competing maritime boundary claims and boundary disputes can impede installation and even foreclose certain routes. Such disputes can also greatly delay repairs due to duplicative and time-consuming permit requirements. In some cases, boundary disputes pose a danger to the cable ship and its crew due to the threat of military action.

As best practices, ICPC recommends that states:

- Facilitate installation and repair without prejudice to any maritime boundary claim; and
- Recognise that submarine cable operators seek to remain neutral in boundary disputes and seek to conduct their activities without prejudice to such disputes.

14. Critical infrastructure designation

Critical infrastructure is generally understood to include assets that are essential for the functioning of society and the economy, and damage or destruction of which would harm national and economic security, public health, and public safety. Governments use critical infrastructure designations to highlight asset criticality and to identify and mitigate vulnerabilities and threats through specific laws and policies.

As best practices, ICPC recommends that states:

- Designate submarine cables as critical infrastructure;
- Gather and assess data regarding vulnerabilities of, and threats to, submarine cables; and
- Develop and implement policies to reduce those vulnerabilities and threats.

15. Sharing of risk and incident data

Sharing of risk and incident data between operators and governments and among operators is useful for identifying patterns of activity, gaps in existing cable protection efforts, areas for improving resilience, and identification of malicious acts by state and non-state actors.

As a best practice, ICPC recommends that states:

- Consistent with competition laws, establish mechanisms for exchanging incident data and threat information.

16. Impact of other high-seas regulatory activities

Regulatory activities of other states, bodies, and institutions far beyond a state's maritime boundaries can impair submarine cable installation, repair, and resilience. Such activities include uncoordinated deep seabed mining and environmental regulation on the high seas under the proposed treaty to conserve and promote sustainable use of biodiversity beyond national jurisdiction ("BBNJ").

Deep seabed mining poses risks of: damage to existing submarine cables, increasing the risk of a communications blackout for certain countries, and route foreclosure for new submarine cables, rendering them less resilient. Some mining contractors have argued either that cable owners proceed at their own risk or that mining contractors have a right to exclude submarine cables from their contract areas, which cover vast areas of the seabed. UNCLOS does not establish any specific coordination mechanisms, including instead only mutual "due regard" and "reasonable regard" obligations. The Exploration Regulations adopted by International Seabed Authority ("ISA") do not address submarine cables at all. Based on a joint proposal by the ICPC and France, with support from numerous other developing and developed states, the Draft Exploitation Regulations now contain provisions to ensure early coordination between mining and submarine cables, to protect existing submarine cables, and to permit future submarine cables. Although the ISA's jurisdiction, and the potential for mining, extends globally throughout the Area (the seabed and subsoil of the high seas), the greatest number of mining contract areas current exist in the Indian and Pacific Oceans.

The proposed BBNJ treaty to promote conservation and sustainable use of BBNJ could impair submarine cable protection and resilience. Specifically, the treaty could require environmental impact assessments ("EIAs") for cables in high seas areas, restrict cable transits and repairs in new marine protected areas on the high seas, and create a new international regulatory body to oversee such activities. Many of the proposals under consideration by the treaty conference would impose significant costs and delays on new builds and repairs and result in cable routes that are less efficient and resilient.

As best practices, ICPC recommends that states:

- Seek to ensure that the ISA Exploitation Regulations protect existing submarine cables and avoid foreclosing routes for future cables;
- Support amendment of the ISA Exploration Regulations to protect existing submarine cables and avoid foreclosing routes for future cables; and
- Seek to ensure that the BBNJ treaty accounts for the socio economic importance of submarine cables, recognise the benign environmental impact of submarine cables and their co-existence in existing MPAs in areas of jurisdiction, and recognises submarine cables as a sustainable use of the oceans.