# OPPORTUNITIES AND RISKS WITH SENSOR DEPLOYMENTS ON TELECOM-MARINE DATA CABLES

Kent Bressie (Wiltshire & Grannis LLP)
kbressie@wiltshiregrannis.com

**Abstract:** Dual-purpose undersea cables that combine commercial telecommunications-transmission and marine data-gathering capabilities do not fit neatly within the jurisdictional categories established in international law. Under international law, undersea cables are permitted freedoms and protections accorded to no other marine activity. By contrast, marine data collection—including marine scientific research; surveys; and exploration and exploitation of living and non-living resources—is subject to varying levels of coastal-state jurisdiction and regulation. There is little international agreement or consistent state practice about the proper treatment of undersea cables that combine these activities. This paper will examine the legal opportunities and risks arising from dual-purpose telecom-marine data cables. It will consider the absence of any agreed international law about how to treat telecom-marine data cables and concerns that deployment of such cables could erode the unique freedoms accorded to undersea cables.

## 1. DEVELOPMENTS DRIVEN BY DEMAND FOR MARINE DATA AND TECHNOLOGICAL INNOVIATIONS

The commercial telecommunications and scientific applications of undersea cables have traditionally operated independently of each other. Undersea cables carry most of the world's voice, data, and Internet traffic.[1] Scientists also operate undersea cables to power, and transmit data from, marine observatories, in some cases using retired undersea cables previously used for commercial telecommunications.[2] Nevertheless, recent commercial developments and a joint initiative of UNESCO/Intergovernmental Oceanographic Commission, the World Meteorological Organization, and the International Telecommunication Union have focused on multipurpose undersea cables that would transport commercial telecommunications traffic while also gathering and transmitting real-time data regarding ocean temperature, salinity, and water pressure by using scientific sensors.[3] These initiatives seek to gather better climate-change data and improve natural-disaster—particularly tsunami—prediction while at the same time creating new revenue streams for cable owners and suppliers.

These initiatives are driven in large part by demand for better marine data. Existing data-gathering methods include cabled observatories, buoys (whether moored or drifting), remotely-operated vehicles, balloons, floats, and expendable bathythermographs; equipment on civilian and military ships and aircraft; and satellites. These methods and instruments all have significant limitations, and have prompted policymakers and scientists to seek more—and more reliable— data regarding ocean conditions and climate change.[4] They also seek new and better data regarding natural disasters, particularly in the wake of recent earthquakes and tsunamis in the Asia-Pacific region.[5]

Technological developments have made these initiatives possible. Suppliers of submarine cable systems have developed new technologies and systems to enable multi-use or hybrid submarine cable

 

systems combining commercial telecommunications and scientific functions.[6] Scientists have also developed methods for using existing and retired submarine cables for data collection. [7] Nevertheless, the legal-regulatory regime for submarine telecommunications cables equipped with marine data-gathering sensors—to which I will refer as telecom-marine data cables—remains unsettled.

## 2. SEPARATE LEGAL REGIMES FOR SUBMARINE TELECOMMUNICATIONS CABLES AND MARINE DATA-GATHERING

As with many technological and commercial innovations, commercial submarine telecommunications cables equipped with marine data-gathering sensors—to which I will refer as telecom-marine data cables—do not fit neatly within the jurisdictional categories established in international law. The United National Convention on the Law of the Sea [8] other treaties, and customary international law establish a sliding scale of jurisdictional rights for coastal states, with the rights generally declining as the distance from the coast increases: the territorial sea; the contiguous zone; the exclusive economic zone ("EEZ"); the continental shelf; the high seas; and the seabed and ocean floor, and subsoil thereof, beyond the limits of national jurisdiction. The international legal regimes for submarine cables and marine data collection treat submarine telecommunications cables and marine data collection as discrete activities, with defined legal rights and obligations.

Submarine cables are permitted freedoms and protections accorded to no other marine activity. International law recognizes unique freedoms for the installation and maintenance of submarine cables. Various international treaties dating back to 1884 guarantee unique freedoms to lay, maintain, and repair submarine cables—freedoms not granted for any other marine activities—and restrict the ability of coastal states to regulate them. Principles articulated in these treaties have since been recognized as customary international law.

By contrast, certain types of marine data collection are subject to varying levels of national jurisdiction and regulation, with marine scientific research subject to significant national jurisdiction and regulation. UNCLOS recognizes three separate categories of marine data collection: marine scientific research ("MSR"); surveys; and exploration and exploitation of living and non-living resources. To encourage the advancement of science and the peaceful dissemination of information, some states have distinguished a fourth category of marine data collection—operational oceanography—though the concept and its consequences remain hotly disputed.

UNCLOS grants the coastal state the right to regulate, authorize, and conduct MSR within its EEZ and on its continental shelf.[9] It requires the coastal state to grant consent to other states for the conduct of MSR in "normal circumstances," but the coastal state may withhold consent if the activities would involve natural resources exploration/exploitation, drilling, use of explosives, introduction of harmful substances, or construction, operation, or use of artificial islands, installations or structures.[10] The scope and meaning of the term MSR remains subject to significant dispute and varying national interpretations as UNCLOS does not define MSR, due to an unresolved dispute in the drafting of the treaty.[11] The result was a muddled set of consent requirements for an ill-defined set of activities.

UNCLOS also grants coastal states some jurisdiction over marine data collected during the exploration and exploitation of living and non-living resources, though the scope of the jurisdiction depends on whether the activities are conducted in the EEZ,[12] on the continental shelf,[13] in "the Area,"[14] or on the high seas.[15]

UNCLOS treats "surveys" and "hydrographic surveys" separately from "research" and MSR, suggesting that by definition surveys do not constitute MSR.[16] For a hydrographic survey, UNCLOS requires prior consent from a coastal state for the conduct of a survey in its territorial sea, from states bordering an international strait for the conduct of a survey while transiting such a strait, and from an archipelagic state for the conduct of a survey while transiting archipelagic sea lanes.[17] UNCLOS, however, is silent on the subject of submarine cable-related surveys (such as route surveys) and military surveys, though submarine cable operators have long asserted that UNCLOS's submarine cable-related rights and freedoms encompass their survey activities.

During the drafting of UNCLOS, a number of parties expressed concerns that the MSR provisions of the proposed convention would restrict marine meteorology.[18] In an effort to liberate such activities from the strictures imposed by UNCLOS on MSR, some commentators and governments have therefore analogized marine meteorology to other routine ocean-observation activities and recognized "operational oceanography" as distinct from MSR.[19] Operational oceanography is the "routine collection of ocean observations, such as temperature, pressure, current, salinity and wind, in all maritime zones. This data is [sic] used for the monitoring and forecasting of weather (meteorology), climate, and ocean state (e.g., surface currents and waves). The data is [sic] transmitted from sensor to shore in near real-time and is made available to the public in near real-time."[20] The fight over the guidelines for the Argo float program—a global array of more than 3,000 free-drifting floats used to measure ocean temperature, salinity, and velocity to a depth of 2,000 meters, with recorded data transmitted periodically via satellite—illustrates that coastal states continue to have profound disagreements about whether to recognize operational oceanography as a distinct category of activity that is not MSR.[21]

## 3. TELECOM-MARINE DATA CABLES ARE NOT MSR BY DEFINITION

UNCLOS and customary international law do not classify dual-purpose telecom-marine data cables definitively as MSR. Although some government representatives and commentators have asserted otherwise,[22] the text of UNCLOS itself does not support the conclusion that dual-purpose telecom-marine data cables are MSR by definition. To the contrary, In fact, since the earliest negotiations over UNCLOS, coastal states have disputed the scope and meaning of the term "marine scientific research." Customary international law also does not support the treatment of dual-purpose telecom-marine data cables as MSR. The position that such cables are MSR satisfies neither of the requirements of the classical definition of customary international law: general practice and acceptance of general practice as law.

## 4. LEGAL UNCERTAINTY PRESENTS RISKS AND OPPORTUNITIES FOR EXPERIMENTATION

In the absence of agreed treaty interpretations or customary international law governing dual-purpose telecom-marine data cables, there is likely to be variation and experimentation by coastal states and cable owners for the foreseeable future. To understand the opportunities and challenges for such cables, the submarine cable industry and scientists should consider that legal-regulatory circumstances create "easier cases" (deployments on the high seas and where coastal states recognize the concept of "operational oceanography") and harder cases (deployments within the exclusive economic zone and continental shelf-areas of certain coastal states with an expansive view of MSR and indeed marine jurisdiction generally).

The undersea cable industry and some governments are rightly concerned about guarding against erosion of the unique rights and freedoms accorded to submarine cables. Fundamentally, these parties are concerned both that the dual use telecom-marine data cables would encourage even more aggressive jurisdictional assertions over submarine cables, which, if widespread, could provide a basis for new treaty interpretations or customary international law. Such actions by coastal states could impose significant costs and delays on the installation and maintenance of submarine cables and—particularly in the maintenance context—threaten the reliability of communications transported by such cables.

In the near term, the deployment and operation of telecom-marine data cables is most likely to occur in circumstances such as the "easier cases," where the risks of MSR regulation and erosion of submarine-cable freedoms are least likely to occur. Continuing disagreements regarding coastal-state jurisdiction over marine data collection makes the prospect of international agreements and standards in this area very unlikely. Moreover, any attempt to impose on submarine cable operators a uniform global approach regarding scientific sensors—if such an approach were even possible—would likely doom the deployment of such cables. For the deployment of telecom-marine data cables to succeed, submarine cable operators and suppliers must determine whether they have sufficient legal-regulatory flexibility and a business case for such deployments.

## REFERENCES


[1] *See Submarine Cables and the Oceans – Connecting the World*, UNEP-WCMC Biodiversity Series No. 31 (UNEP-WCMC and ICPC, 2009) at 8 (noting that more than 95 percent of the world's telecommunications and Internet traffic is routed via submarine cable).

[2] *See id.* at 51-53 (describing underwater observatories); Yuichi Shirasaki et al., *Study on ocean observatories by re-use of retired optical submarine cable*, Oceans '04 MTS-IEEE Techno-Ocean 2004 Conference Proceedings (14 Mar. 2005), vol. 4 at 2170; "Old Phone Cables Open Seabed to Science," *The New York Times* (24 Aug. 1999).

[3] *Call to Action*, Workshop on Submarine Cables for Ocean/Climate Monitoring and Disaster Warning: Science, Engineering, Business and Law (Rome, 9 Sept. 2011), www.itu.int/dms_pub/itu-t/oth/4B/04/T4B040000080001MSWE.docx.

[4] *See, e.g.*, Georgeanne Purvinis et al., *Global Deep Ocean Sensor Network on Submarine Cables*, Oceans '08 MTS/IEEE Kobe Techno Ocean Conference

Proceedings (28 May 2008); Yuzhu Yu, *Using Submarine Communications Networks to Monitor Climate Change*, ITU Technology Watch Report (Nov. 2010) ("Yu") at 4; Peter Ryder, *A possible migration from marine scientific research to operational oceanography in the context of the United Nations Convention on the Law of the Sea* in BUILDING THE EUROPEAN CAPACITY IN OPERATIONAL OCEANOGRAPHY, PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON EUROGOOS (H. Dahlin et al. eds., Elsevier B.V., 2003), at 25 ("Ryder").

[5] *Id.*

[6] *See, e.g.*, Maurice E. Kordahi, *New Tools for Multilayered Undersea Telecommunication Networks*, SEA TECHNOLOGY MAGAZINE 51, No. 7 (2010) ("In the past, undersea cable networks focused on data transmission between land masses. As the need for better communications and data transfer evolves, however, networks are being envisioned that can go beyond single-purpose fiber and power management, incorporating layers of various individual networks supported by a single infrastructure. A cable that once transmitted only telecommunications data between continents could also relay data from various oil and gas platforms or from a scientific research institute's underwater observatory.").

[7] *See e.g.*, Yu at 3-4.

[8] United Nations Law of the Sea Convention, Dec. 10, 1982, 1833 U.N.T.S. 397 (entered into force on Nov. 16, 1994) ("UNCLOS").

[9] UNCLOS art. 246.

[10] UNCLOS art. 249.

[11] *The Law of the Sea: Marine Scientific Research - A revised guide to the implementation of the relevant provisions of the United Nations Convention on the Law of the Sea*, Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations (2010), at 4-6.

[12] UNCLOS art. 77(1).

[13] *Id.*, art. 77(4).

[14] *See id.*, Part XI.

[15] *See id.* Part VII, Section 2.

[16] *Id.*, arts. 19(2)(j) (referencing "the carrying out of research or survey activities" in relation to the right of innocent passage), 21(1)(g) (referencing "marine scientific research and hydrographic surveys" in relation to the state regulation of innocent passage).

[17] UNCLOS arts. 19(2)(j) and 21(1)(g) (territorial sea), 40 (international straits), and 54 (archipelagic sea lanes).

[18] *See, e.g.*, René Jean Dupuy and Daniel Vignes, A HANDBOOK ON THE NEW LAW OF THE SEA, (Kluwer Academic Publishers, 1993) at 221 ("Dupuy-Vignes") (noting "strong negative reactions to the provisions regarding marine scientific research among oceanographers"); Report of the Chairman of the Third Committee, *Official Records of the 134th Plenary of the Resumed Ninth Session of the Third United Nations Conference on the Law of the Sea*, vol. 14, U.N. DOC. A/CONF.62/L.61 at 134 (Aug. 25, 1980).

[19] *See, e.g.*, Ryder at 32.

[20] J. Ashley Roach, *Marine Data Collection: Methods and the Law* at 175-76, in FREEDOM OF THE SEAS, PASSAGE RIGHTS, AND THE 1982 LAW OF THE SEA CONVENTION (Myron H. Nordquist, Tommy T.B. Koh, and John Norton Moore eds., Martinus Nijhoff Publishers, 2009).

[21] *Guidelines for the Implementation of Resolution XX-6 of the IOC Assembly Regarding the Deployment of Profiling*

*Floats in the High Seas Within the Framework of the Argo Program*, IOC RES. EC-XLI.4, Annex II, Executive Council, 41st Sess. (29 July 2008), http://unesdoc.unesco.org/images/0017/001798/179861e.pdf ("Argo Guidelines").

[22] *See, e.g.*, Anastasia Strati**,** Ministry of Foreign Affairs, Greece, *The Law – Existing rules and new challenges*, ITU 2011 Green Standards Week Workshop on Submarine Cables for Ocean/Climate Monitoring and Disaster Warning: Science, Engineering, Business and Law (Rome, 9 Sept. 2011), www.itu.int/dms_pub/itu-t/oth/06/5B/T065B0000050041PPTE.ppt; Douglas Burnett, *Understanding the Differences Under UNCLOS Between Submarine Cables and Marine Scientific Research*, ITU 2011 Green Standards Week Workshop on Submarine Cables for Ocean/Climate Monitoring and Disaster Warning: Science, Engineering, Business and Law (9 Sept. 2011), available at www.itu.int/dms_pub/itu-t/oth/06/5B/T065B0000050043PPTE.ppt.

 