Indian Ocean networks: Cable-laying companies and the contingency of empires

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Construction of the Fibre-optic Link Around the Globe (FLAG) in 1996 heralded the ascendancy of submarine cables for inter-island and intercontinental telecommunications.[1] Other submarine fibre optic networks followed in the late 1990s, increasing the capacity for transmitting data across the Indian Ocean and around the world. After an 80-year hiatus brought about by innovations in radio then satellite technologies, submarine cables were back in fashion. Yet, the fantastic potential of fibre optic networks, combined with advances in computing, soon caused network over-capacity[2] and a technology investment bubble. As the dot.com bubble burst and share prices of major international network companies collapsed in 2000, several Asian companies established a foothold in the international market not just for operating submarine cable networks and data centres, but also for supplying the network technologies. The collapse enabled offshoots of formerly nationalized telecommunications organizations in postcolonial states on the Indian Ocean rim to buy some of the most ambitious international network operators for a fraction of their previous valuations: Reliance in India bought the FLAG network after its bankruptcy in 2002 and Singapore Technologies Telemedia purchased Global Crossing in 2003.[3]. As major financial institutions reeled from network investment losses, a China-based company, Huawei, entered the international market supplying network technologies to relatively small, regional projects.[4] By the second decade of this century, investor confidence in network investment had returned amid rising demand for transmission capacity in an environment where social media services were becoming ubiquitous and audio-visual communications the norm. The period since 2014 has been marked by substantial year-on-year increases in investment in the installation and maintenance of submarine cable networks, which now carry over 97% of the world's data traffic.[5]

So, who constructs the submarine networks traversing the Indian Ocean? Where do these companies come from, how do they see the world and what are the implications? In answering these questions, this chapter provides a history of submarine cable networks in the Indian Ocean region: from installation of subsea links between colonial telegraph systems in the 1860s-70s through to commercial and political dependence on fibre optic networks in the 2020s. Then, studies on contemporary submarine networks are reviewed before methods are described for identifying and researching the companies that laid international submarine networks in the Indian Ocean between 2010 and 2021. Findings are presented for each of the relevant cable-laying companies: Alcatel Submarine Networks (ASN), SubCom, Nippon Electric Company (NEC), and HMN Technologies. Finally, public representations by these companies are discussed to further understandings of the tensions between national agendas and competing globalizations being played out in and around the Indian Ocean.

From cables of empire to fibre-optic interdependence

Electronic messages were relayed across the Indian Ocean for the first time in 1871 from Suez via undersea cable to Bombay (Mumbai), overland to Madras (Chennai) then undersea again to Penang, Singapore and Batavia (Jakarta), or onward to Banyuwangi and Darwin, or to Saigon (Ho Chi Minh City) or Hong Kong.[6] These cables, rolled off the back of steamboats, were integral to the first world-wide, commercial, telegraph system. The system was overseen from London but dependent upon the operators, support staff and repair crews working at cable stations where the cables came ashore. These early submarine cables of the Eastern and Associated Companies were manufactured in factories on the River Thames using imported materials such as gutta percha rubber latex from the East Indies[7] for waterproofing and insulation. The locations of Britain's overseas colonies afforded it an advantage over other European colonial competitors, and there was little competition from the United States in submarine cables because of the disruption of the civil war.[8] By the end

of the 19th century, 24 of the 30 cable ships operating in the world were British, three were French and one Danish. British companies continued to lay cable in the Indian Ocean, including a long southern network between Africa and Australia via Mauritius and the Cocos Islands at the turn of the 20th century. The Eastern and Associated Companies dominated trans-Indian Ocean telecommunications until after World War I when Guglielmo Marconi's short-wave radio telegraph proved to be faster and cheaper than cable. Wireless communication was far more threatening to the Eastern and Associated Companies than the German Navy's failed attack on its submarine cable station at Cocos Islands during World War I. As the speed and economy of short-wave radio overtook telegraph networks in the 1920s, the British Government ensured the undersea cable operations of the Eastern and Associated Companies would survive by merging it with the Marconi Wireless Telephone Company under a new company, named Imperial and International Communications Ltd, within a seemingly private corporate structure controlled by the Government's Imperial Communications Committee. In the early 1930s, Imperial and International Communications was renamed Cable & Wireless.

A challenge to British dominance of international telecommunications emerged from Japan in the early 20th century as Japanese colonial territories and the telegraph networks to them expanded in East Asia.[9] After a cable ship and cable were purchased from Britain to lay a network linking Japan, Okinawa and Taiwan at the turn of the 20th century, Japan developed sovereign capacity for manufacturing, laying and operating submarine networks as its empire expanded in East Asia then into Southeast Asia. New networks were introduced until the 1940s, when Japanese production was disrupted and the Indian Ocean networks were cut off from Malaysia, Singapore and Indonesia during World War II.

Meanwhile, on the other side of the Pacific, the American Telephone & Telegraph (AT&T) company was dealing with the threat of radio by patenting new technology to

increase cable speed. After the war, redundant submarine telegraph cables were replaced by submarine coaxial cables for better quality international telephone calls.[10] As US empire grew through cold-war actions, international organizations and Intelsat satellite communications, AT&T became the world's largest telecommunications company until 1984 when the US monopoly was broken up.[11] AT&T laid submarine cables from its fleet of cable ships and developed the club system of national telecommunication companies that owned and maintained local lengths of submarine coaxial cable connected to AT&T-led networks with AT&T-operated cable stations.

As colonies became independent nations after World War II, cable stations were nationalised and local staff became managers, senior technicians and operators. Some of the formerly illustrious cable stations never reopened.[12] Others were rebuilt as secretive, insulated underground facilities for surveillance during the Cold War.[13] In the Indian Ocean region, surveillance facilities constructed for British intelligence services have been an enduring and, occasionally, embarrassing legacy of British empire.[14] The British Government built and operated a major international listening post in Perkar, Sri Lanka, in the 1950s that operated into the 1960s. Then, after working out of a US facility in Ethiopia, the British military began operating a joint surveillance facility with the US military from the 1970s at Diego Garcia in the Chagos Islands, 500 km south of the Maldives. More recently, the British Government shifted a substantial set of surveillance equipment from Hong Kong to Geraldton, Western Australia, before returning the Hong Kong territories to China in 1997.[15] While taking control of Hong Kong's substantial submarine cable infrastructure,[16] the Chinese state has sponsored the successful entry of Chinese communication system manufacturers into the global market for cable networks.[17] Chinese efforts to overtake US leadership in telecommunications infrastructure have been hampered in the Americas, Australia and other parts of the world, but have been reasonably successful in parts of

Southeast Asia and, on the other side of the Indian Ocean, in eastern Africa.[18] Huawei Technologies' successes in constructing networks and cloud infrastructures, for instance, have also led to accusations of surveillance, such as data transfers from the African Union building in Ethiopia to China.[19] The concentrated deployment of Chinese network and smart cities technologies in Kenya and on the horn of Africa, where China also has a naval base, have generated friction given the tendency of social imaginations to perceive submarine cable facilities as nodes of empire[20] particularly in the Indian Ocean region.[21] Studies suggest that a view of cable networks as a tool of empires also has a strong presence in the Chinese cybersphere, where network sovereignty is expected to be achieved by extending global interdependence while 'building an international "community of common destiny" meant to counter the US-led top-down model.'[22] The argument goes that global Chinese network sovereignty is necessary because the US has 'weaponized the tools of economic globalization for geopolitical purposes.'[23] So, despite the evidence that major wars can spell disaster for submarine cable businesses,[24] the spectre of building and disrupting networks for security purposes continues to haunt texts about submarine cable networks.

Discourses, theories, sources and methods

In reviewing recent literature on submarine cable networks, Bueger and Liebetrau identified three categories of academic discourse on the politics, governance and protection of submarine cables.[25] The categories included a security discourse about protecting networks from attack; a technical discourse on maintaining networks against everyday damage; and a legalistic discourse on improving regulatory systems. While most damage to submarine cables is caused by boat anchors, followed by fishing trawls then geological disruption,[26] there is a growing focus on geopolitical-economic conflict around network infrastructures between the great powers of the 21st century: the US and China.[27] Bueger and Liebetrau argue that submarine "cables are now a major new technological battleground of the world's global

powers and they should be treated as a key issue in security studies, geopolitics, and peace and conflict research."[28] Yet, the existence of this technological battleground – like the continuation of empires – depends upon the contingent reproduction of knowledge in and about communities that becomes entrenched overtime;[29] often mediated through international telecommunication networks but also through international networks of people working in and around telecommunication facilities.[30] The clash of empires battleground may recede as new subjectivities emerge through trans-scalar encounters[31] bought about by the 25,000-fold increase in data transmission capacity that has occurred in the last 25 years between FLAG's 8 Gps capacity[32] and the India-Asia-Express network's 200 Tps.[33] Of course, there is no guarantee that faster communications will bring peace. Indigenous communities were disrupted and empires entrenched through the acceleration and intensification of communication, commerce and violence enabled by the submarine cables laid in the 19th and 20th centuries.[34] Empire is defined here as "a system of influence or rule in which ethnic, cultural, or ecological boundaries are overlapped or ignored."[35] Every empire is unique, and people closest to an empire's seat of power may not recognize the ruling order as an empire.[36] An empire need not emerge through military conquest according to Harari: "empire is defined solely by its cultural diversity and flexible borders, rather than its origins, its form of government, its territorial extent, or its size of population."[37] British Empire, for instance, has been shown to persist – beyond popular recognition of its decline – through the construction and operation of telecommunication facilities in the Indian Ocean.[38] Also, British imperial practices have persisted in India's postcolonial telecommunications industry despite opportunities for their disruption in relations of network construction.[39] Therefore, maritime cable construction is a complex cultural space in which builders have tended to uphold professional transnationalism[40] while entrepreneurs have looked to government sponsorship and deployed nationalist discourse to garner support and subsidies for their international

maritime cable networks.[41] Yet, cable network entrepreneurs' desire for government support may be more about commercial opportunism than allowing their cables to "serve the expansionist aims of nation-states"[42] or unrecognized empires.

In a range of recent studies on submarine cables,[43] TeleGeography has been a common source of data. TeleGeography is a Washington-based, telecommunications-market-research company that provides an open-access map, linked to a database of commercial submarine cable networks.[44] The website for TeleGeography's Submarine Cable Map was sponsored by Huawei-subsidiary HMN Technologies during the initial phase of research for this study in 2021. TeleGeography's dynamic map[45] was used to investigate which companies had constructed international submarine cables in the Indian Ocean and littoral seas between January 2010 and December 2021. By reviewing the data for every international submarine cable network shown in the relevant area of the Submarine Cable Map, four companies were found to have laid international cables in this period: ASN, SubCom, NEC and HMN. The cable-laying activities of these companies in the Indian Ocean since the construction of FLAG in 1996 was then investigated to identify which organizations contracted these companies to lay cable in the region. The corporate genealogies of the cable-laying companies were researched by examination of scholarly and Internet sources. The information from these sources was compared with representations the companies made about themselves, their histories and their Indian Ocean activities in English through their own websites. Four corpora totalling 34 webpages was collected in February 2022 for textual analysis by close reading, comparison and corpus-supported discourse analysis.[46] The corpora contain the homepages, corporate history pages (if available) and a selection of news/press releases most relevant to this study from four corporate websites: https://web.asn.com; https://www.subcom.com; https://www.nec.com; and https://www.hmntechnologies.com. The corporate websites do not display adverse facts about

the corporations but analysing the internal and external relations of their texts enables critical understandings to be extended[47] about the most important communications infrastructure in the Indian Ocean.

Alcatel Submarine Networks (ASN)

ASN has installed most of the fibre optic submarine cables around the rim of the Indian Ocean. ASN cables land in South Africa, Madagascar, Mauritius and other islands off the coast of Africa. ASN cables come ashore in Tanzania, Kenya and Somalia. They land in the Gulf of Aden in Djibouti and Yemen, and at various sites of the Red Sea then pass through Egypt to the Mediterranean. In the northwest of the ocean, they come ashore at Oman, the Emirates, Kuwait, Iraq, Iran and Pakistan. In India, ASN cables land in Mumbai, Cochin, Trivandrum and Chennai. ASN cables dominate the Bay of Bengal, Andaman Sea and Strait of Malacca: landing in Bangladesh, Myanmar, Thailand, Malaysia and Singapore. ASN cables also dominate the submarine links and cable capacity between Jakarta and Perth, and links between ports and offshore gas fields in the northwest of Western Australia.

The origins of ASN go back to the start of the submarine cable era through the establishment of the Gutta Percha Company in London in 1845.[48] The use of gutta percha latex, from rubber trees in Southeast Asia, to waterproof and insulate copper cables was a key innovation that overcame the rapid short-circuiting that had hindered the nascent submarine cable industry. Gutta percha insulation enabled the companies, controlled by Scottish entrepreneur John Pender, to roll out (figuratively, off the back of boats) in the 1860s and 70s a commercial submarine telegraph system that connected all the world's continents with some degree of reliability.[49] This network, established through precursors of the Eastern and Associated Companies, was the first telecommunications network to span the globe. Supplying the Eastern group with cable, were two other forerunners of ASN: Siemens Brothers which was established in 1863, and the Telegraph Construction and Maintenance

Company (Telcon) in 1864. From factories on opposite banks of the Thames, these two companies supplied all the world's submarine cables for two decades before having to deal with international competition. In 1935, Siemens Brothers and Telcon formed Submarine Cables, which became Submarine Systems in 1970, Alcatel Submarine Networks in 1994, and then Alcatel-Lucent Submarine Networks for a time before settling on ASN, which is now headquartered in Paris and owned by Nokia.[50]

In the shadows of American hegemony and nationalization of telecommunications by emerging postcolonial states, British Empire legacies in Indian Ocean communications arguably persist through the commercial cable-laying activities of ASN. They also persist through missed opportunities in the development of alternative Indigenous technologies and in the continuation of colonial regulatory practices within postcolonial communication systems.[51] Also, the underwater-branching unit – with no apparent submarine cable connections – supplied by ASN at Diego Garcia[52] suggests its active involvement in persisting empire through the construction of British-controlled surveillance facilities in the Indian Ocean region since the 1950s,[53] and in the continued supply of amplifiers, repeaters, branching units and other submerged equipment from ASN's Greenwich facility, which manufactured the world's first trans-ocean cable.[54]

ASN's website is busier in appearance than the other cable-laying companies' websites. Packed with colourful, and sometimes multi-lingual content the webpages seem to reflect a cosmopolitan company that has wrapped the world in cable. The company's homepage indicates a current focus on laying cables in the waters off East Africa with the Africa-1 project and an intention to surround Africa in cable (and link it to Europe) for the upcoming Africa-2 project.[55] The cable map in ASN's media library indicates that ASN dominates cable submarine networks around Europe, South America, Africa and Oceania.[56] The map, the busiest of all those captured in this study, shows not just the cable systems and

underwater branching units supplied by ASN but also those supplied by others. The map reflects the company's ability to lead turn-key projects and also work in support roles on projects led by other cable-laying companies. The map suggests corporate transparency, capacity and agility in negotiating the complex and competitive world of cable laying. ASN represents the world as flat landscape – empty except for territory names, boundaries and cable landing nodes – and contoured seascape where sea lanes are crowded with cable.

SubCom

SubCom's maps suggest a flat world without territorial boundaries.[57] Each of the maps on its homepage shows an area of land and sea (indicated by different colours) containing a single thick digital pipeline made by SubCom to conveniently connect two or more coastal nodes. Where ASN's maps suggest international and environmental complexity, SubCom's suggest global singularity and environmental simplicity. SubCom cables are thick and efficient in an otherwise empty space. SubCom's homepage does not have a menu bar, just a direction for readers to scroll down past bold statements, statistics on its fibre-optic cable achievements, its capabilities, testimonials, recent projects and recent news. At the bottom of the page is a Contact Us section showing just an email address and a US phone number. It takes a business directory search to realize that SubCom is, apparently, headquartered at an industrial address in Eatontown, New Jersey,[58] just 4 miles from Fort Monmouth. This fort was home to the US Army Communications-Electronics Command (CECOM) until 2011.[59] The relationship between the base and US telecommunications companies goes back to 1916 (World War I) when the US Government asked executives at AT&T and other companies to recruit their staff for the Signal Enlisted Reserve Corps. This is how Fort Monmouth became known as "the home of heroes and scientists, the birthplace of innovation and technological revolution."[60]

SubCom was the first company to lay fibre optic cable across the Indian Ocean: the FLAG network became operational in 1997 linking the United Kingdom and Japan through cables laid in the Mediterranean Sea, Red Sea, Arabian Sea, Indian Ocean and in trenches cut across southern Thailand to join cable laid in the South China Sea.[61] FLAG marked the return of commercial dependence on undersea cables after the satellite era. However, unlike the first submarine cables to carry telegraphic signals across the Indian Ocean, the first fibre optic network across the ocean bypassed Singapore, Indonesia and Australia altogether. Singapore's exclusion from FLAG was attributed to the break-up of the New York headquartered AT&T corporation,[62] which had dominated the development and maintenance of submarine cable networks since World War II. FLAG was controlled by a former AT&T unit, renamed Nynex, and the cable laying and maintenance contract was won by AT&T Submarine Systems (AT&T SSI) and KDD Submarine Cable Systems of Japan.[63] Kokusai Denshin Denwa (KDD) was formed from the international arm of Nippon Telephone & Telegraph (NT&T) in 1953, reviving the Japanese capacity for submarine cable laying that began in 1896 when Japan used proceeds from its war with China to purchase a cable ship and 2,600 kilometres of cable from Britain.[64] After Japan's defeat in World War II, KDD became AT&T's junior local partner but, by the 1980s, its technological innovations were enabling Japanese corporate leadership in fibre optic networks with installation of a 300 km network between the islands of Honshu and Hokkaido in 1986 followed in the same year with AT&T's Submarine Systems' installation of the first commercial fibre optic cable across the English Channel.[65]

FLAG heralded the ascendancy of fibre optic networks in global communications, stimulating a boom in telecommunications investments that enabled AT&T Submarine Systems to be purchased in 1997 by Tyco for US$850 million.[66] The company was rebranded Tyco Electric Subsea Communications (TE SubCom) in 2010 and, subsequently, as

SubCom.[67] Submarine cables laid by SubCom cut diagonally across the Indian Ocean not far from Diego Garcia: SubCom's SAFE cables, completed in 2002, curve around South Africa then pass through Mauritius on route to Cochin, India, and Penang, Malaysia; completed 2022, SubCom's OAC cables stretch from Muscat in Oman to Perth in Australia with a future branch to the Cocos Islands.[68] SubCom also helped lay – with ASN and NEC – the AT&T-led consortium's 39,000 km SeaMeWe-3 cable network that became operational in 1999 stretching from South Korea and Australia in the east around the Indian Ocean and to Belgium in the west. This network included direct links to Singapore, Medan and Jakarta in Indonesia and to Perth in Australia; which had missed out on direct access to the FLAG network. SubCom laid cable in 2004 from Chennai to Singapore for Tata Communications – a former Indian state-owned telecommunications company – which at the time of writing claimed its "wholly-owned subsea fibre backbone and consortium cables' global network carries ~30% of the world's internet routes."[69] SubCom also laid Tata's cable from Mumbai to Egypt in 2009. More recently, SubCom has been commissioned to build Reliance Jio Infocomm's India-Asia-Express network across the Indian Ocean to Singapore in the east and its India-Europe Xpress through the Red Sea in the west to Italy. SubCom, evidently, has developed strong links with Indian companies that are among the world's largest owners of international submarine networks.[70]

Nippon Electric Company (NEC)

NEC has laid cable in the Indian Ocean in recent years, but most of its cables can be found in the South China Sea and East China Sea.[71] This geography of cable-laying reflects the company's partnership with KDD and AT&T and its engagement with national telecommunication providers in Taiwan and Southeast Asia since the 1950s – NEC restored relationships with telecommunications engineers and officials in these territories that were under Japanese dominion between 1895 and 1945. Daqing Yang has described how the

capacity to install and operate submarine cables was integral to the expansion of Japanese empire in the late 19th and early 20th centuries, and how the imperial expansion also supported the growth and invention of Japanese telecommunications companies until World War II.[72] Japan's early imperial expansion was followed by and supported by telegraph cable networks. In 1896, Japan used proceeds from its war with China to purchase a cable ship and 2,600 kilometres of cable from Britain. The ship and equipment were used to install a 1,608 km submarine telegraph link from Japan, via Okinawa, to its newest territory, Taiwan, in 1897. The remaining 1,000 kilometres of cable were used, subsequently, for telegraph links to Korea and Manchuria. Supported by Japan's imperial agenda and demand for communications from its expanding overseas colonies, Japanese engineers had laid by 1915 submarine telegraph cables to Pusan in Korea, to Fuzhou, Shanghai, Qindao and Dalian in China and to Bonin Island in the Pacific. During the imperial expansion, Japanese engineers made substantial inventions that increased the efficiency and effectiveness of submarine cables in carrying words, images and sound. This period of invention is celebrated in NEC's history on its corporate website. The company's historical timeline commences in 1899 with the "Foundation of the Nippon Electric Company" in a joint venture with the Western Electric Company of Illinois as "the first foreign-affiliated company after the revision of the treaties."[73] An estimated 54% of the capital invested in NEC came from Western Electric,[74] the production arm of AT&T.[75] In NEC's representation of its own history, the American connection is celebrated in the first image on the timeline of the history page of its website.[76] The image of 43 founders taken in 1909 shows at least one Caucasian person in the centre of the front row. Below this image, Western Electric's Japanese agent – Kunihiko Iwadare – is presented as an NEC legend who implemented "no borders in technology."[77] The timeline then marks challenges and NEC's achievements in inventing battery and switching technologies before the major achievement of developing Japan's world-leading

phototelegraphic equipment and transmitting "scenes of the Imperial Accession Ceremony of Emperor Hirohito."[78] The timeline then presents NEC's contributions to broadcast technologies and television production in the lead up to the 1940 Olympics in Tokyo. Technological achievement not celebrated in NEC's timeline includes the manufacture of submarine telegraph cable through its Sumitomo Electric Wire joint-venture subsidiary with Sumitomo after supplies from Europe were disrupted by World War 1.[79] The timeline could also have mentioned that Sumitomo Electric Wire's loaded submarine cable made telephony possible between Japan and Korea after AT&T introduced loaded cable to Japan in the mid-1920s. During World War II, NEC's name was changed to "Sumitomo Communication Industries" in 1943 then back to NEC in 1945.[80] NEC's history page does not mention Sumitomo's involvement in supplying cable for networks laid in the wake of Japanese imperial expansion nor does it mention World War II except for a 1952 entry, celebrating the Deming Prize for quality control, which reflects on lessons learnt from "non-scientific production during wartime." While NEC's history page celebrates many achievements in switches, computing, optical communication broadly and biometric recording, "cable" is only mentioned twice – in relation to completing construction of the "world's first South Atlantic Cable System" in 2018.[81] Nothing is said about laying cable networks in the Indian Ocean.

NEC's contributions to networks that span the Indian Ocean has been through partnerships: the 20,000-km SeaMeWe-5 led by ASN completed in 2016; and the 25,000-km Asia Africa Europe-1 with SubCom in 2017.[82] Japanese corporate involvement with earlier cable laying ventures across the Indian Ocean was done through Fujitsu. Later, with ASN on the SeaMeWe-4 network in 2005; and with ASN and SubCom on SeaMeWe-3 in 1999. When working alone, NEC has supplied smaller networks within the Indian Ocean particularly for local state-owned telecommunications companies. Its first individual contract was the 325 km Bharat Lanka Cable System between India and Sri Lanka in 2006, followed

by the 850 km Dhiraagu-SLT Submarine Cable Network from Sri Lanka to Maldives in 2007 when Japan's former national telecommunications company, NTT, still owned a stake in Sri Lanka's telecommunications company. These projects were followed by the 1,253 km Dhiraagu Cable Network in 2012 and the 2,300 km Chennai-Andaman & Nicobar Islands Cable in 2020. In 2022, NEC is expected to complete the 8,100-km MIST network.[83] With an estimated investment of US$400 million, MIST will link Mumbai and Chennai in India with Myanmar, Malaysia and Singapore through a network with 216 Tps.[84] MIST will be maintained and operated by Orient Link, headquartered in Singapore, but mostly owned by NTT and the Fund Corporation for the Overseas Development of Japan's ICT and Postal Services. Despite NEC's successes and Japanese investment within Indian Ocean networks, another competitor has emerged from East Asia. Huawei has entered the marked from China, a nation with heightened awareness of the strategic implications of Japanese corporations' submarine cable capacity in a context where the offshoots of AT&T – SubCom – and the Eastern and Associated Companies – ASN – remain the dominant players.[85]

HMN Technologies

Since the mid-1980s, China's political leadership has focussed on developing sovereign information and communication industries.[86] In the early 2000s, this focus became a conviction that China must develop its own cyberspace. Their policies have been successful in developing a robust Chinese cybersphere,[87] but also in developing telecommunications manufacturing capacity for import substitution and for "walking-out" investment into overseas telecommunication networks. [88] These policies provided support for Huawei Technologies to become an international supplier of inter-continental fibre-optic systems.[89] In 2008, Huawei Marine Network (HMN) was established through a joint venture between Huawei Technologies and Global Marine Systems. HMN began to win submarine contracts around the world,[90] starting with the 1,200-km Mataram-Kupang section of Indonesia's

Palapa Rings network.[91] HMN was selected by Indonesia's state-owned PT Telkom primarily because "its cutting-edge technology and huge capacity unrepeatered solutions… significantly reduced the cost."[92] The project was completed before an influential US intelligence committee in 2012 identified Chinese firms as a security risk, leading to the cancellation of an Atlantic Ocean cable contract with Huawei in 2013 which was then awarded to SubCom.[93] Huawei may have been hampered by allegations of spying but HMN has continued to win national and occasionally international submarine cable contracts,[94] reflecting the complex commercial and geopolitical negotiations in developing and maintaining submarine cables in the fibre-optic age. This is an age, according to Starosielski, in which competitors collaborate while maintaining security through encryption and digital authorization as well as through exclusive physical access to relatively small spaces within larger, shared, network facilities.[95] The situation for HMN reflects Schiller's prediction that there would be minor clashes within the "volatile political economy of networks" serving transnational capital for as long as the United States dominates global telecommunications networks.[96] In the meantime, China has embraced a cosmopolitan turn in reshaping global communications towards a "community of common destiny."[97] The reshaping program includes a state-led wave of investment supporting direct engagement with national telecommunication organizations that would over-time "break barriers against China-based techno-corporate forces."[98] Within this high-stakes geopolitical dance, Huawei Marine Networks has been renamed HMN Technologies. The 51% shareholding by Huawei Technologies and 30% by Global Marine Systems have been sold to China's leading manufacturer of fibre optic cable, Hengtong group.[99] When announcing the share transfers in 2020, HMN boasted that it had completed 108 projects and 65,000 km of submarine cable.

In and around the Indian Ocean, HMN has won projects from state or formerly state-owned national telecommunication companies to supply submarine networks that connect

islands with relatively small economies. After installing the Mataram-Kupang Cable System for Telkom Indonesia; HMN installed the 260 km Avassa cable links in Comoro Islands in 2016 for Comoros Telecom; and the 700-km Mauritius and Rodrigues Submarine Cable System in 2019 for Mauritius Telecom with PCCW.[100] Yet, HMN appears to have encountered limits in laying inter-island networks for state-owned companies. In Indonesia, for example, local company Mora Telematica Indonesia (Moratelindo) has replaced HMN in laying cable for the nationally more strategic sections of the Palapa Ring projects.[101] Moratelindo was contracted by the Indonesian Government to install, between 2016 and 2018, the substantial West Palapa Ring and the East Palapa Ring. At the time of writing, Moratelindo has laid 48,515 km of submarine and terrestrial fibre optic cables since its foundation in Jakarta in 2000. Meanwhile, the subsequent network in Comoros, the 400km GoFly-Lion3 network, was supplied in 2019 by ASN rather than HMN.[102]

Yet, HMN has enjoyed steady success laying cable for private operators of networks within and in between some Indian Ocean nations. HMN supplied the 1,253 km Nationwide Submarine Cable Ooredoo Maldives in 2017; the 1,500 km Gulf2Africa cable for Ethio Telecom and two privately-owned Somali telecommunication companies in 2017; the SEAX-1 system in 2018 linking Batam in Indonesia with Singapore and Peninsular Malaysia; and, the 863 km Maldives Sri Lanka Cable in 2021.[103] Most recently, HMN has started work on the 2,227 km Singapore-Myanmar cable for Campana group on the north-eastern rim of the Indian Ocean. On the north-western rim, HMN is laying cable for its own sister company, PEACE Cable International Network Co., which aims to be the "leading international submarine cable operator."[104] PEACE, referring to Pakistan and East Africa Connecting Europe, is a wholly-owned subsidiary of Hengtong Optic-Electric. The 15,000 km PEACE cable will link Pakistan with Djibouti and four landing stations in Somalia on the horn of Africa; then the cable runs to Kenya in the south to the west through the Red Sea, Egypt and

Mediterranean as far as France. On signing a final agreement in Singapore between PEACE and telecommunications operators, PCCW Global and Orange, the CEO of PEACE and Vice President of Hengtong Vice President, Wu Qianjun, said "PEACE will provide low-cost capacity for those fast-growing regions and enhance the routing diversity in Asia, Africa and Europe" (PEACE Cable 2019).[105] The success of PEACE, which is expected to become operational in 2022, signals a major shift towards Chinese operation of the undersea cable space once dominated by the British Eastern and Associated Companies. The Hengtong corporate model of controlling cable supply and network operation for PEACE marks a return to the John Pender style of ensuring control over cable networks when Eastern and Associated Companies operated in this region from the 1860s until becoming Cable & Wireless in the 20th century.[106] The geopolitical symbolism of PEACE is unlikely to have been lost on Hengtong or its partner, PCCW, which purchased Hong Kong Telecom from Cable & Wireless in 2000 – signalling a substantial step forward in Chinese operation, development and construction of international submarine networks.

PEACE and US globalism, don't mention the wars

The 160-year presence of submarine cable networks in the Indian Ocean, provides an opportunity for considering the potential of networks to bring people together through cosmopolitan subjectivities and to tear them apart through imperial competition. This chapter has shown that despite the rise of postcolonial states on the Indian Ocean rim, the major submarine cable companies contracted to work in this region have strong connections to an imperial past and present. Although owned by Nokia Networks and headquartered in France, ASN's history, clients, contracts and manufacturing facilities suggest a persisting relationship with the imperial presence of the British Eastern and Associated Companies in the Indian Ocean region. Meanwhile, SubCom's history, clients, contracts and manufacturing facilities reflect an enduring relationship with US empire. NEC reflects legacies of Japanese empire

and Japan's contemporary relationship with US power. Meanwhile, HMN embodies the imperial ambitions of the Chinese state in the name of achieving network sovereignty through wider global interdependence and investment in international telecommunication networks to counter US hegemony.

Overt connection to past, persisting, or emerging empires is problematic in today's telecommunications business, particularly in Indian Ocean communities that remember national independence struggles. These connections are downplayed in the corporate webpages collected for this study. For example, the websites of ASN and NEC provide extensive timelines of corporate history, going back to 1845 and 1899 respectively but say nothing or little about the wars that substantially disrupted these companies. ASN indicates that nothing happened to the company during either of the world wars: its timeline jumps from 1898 to 1925 and from 1935 to 1948 despite the impacts of wars on submarine cable networks and landing stations.[107] NEC's timeline does not address the wars directly, but it does include a brief reflection on problems with wartime manufacturing (as discussed above). HMN's "History" only starts in 2008[108] with its international foundational joint venture despite the many achievements of Huawei in China and overseas last century.[109] Instead, HMN publicises the 150-year history of its founding British joint-venture partner. Meanwhile, SubCom's website does not include a history page or timeline – a reader can only scroll down the homepage then click open a media release or click to view the heading of a few more releases made available in reverse chronology. SubCom's history is inferred vaguely on its homepage with statistics of work done "SINCE 1955," and the sentence: "From the very beginning, SubCom has been a leader in defining the undersea cable industry."[110] Crumbs of corporate history can be gleaned from media releases by SubCom or by SubCom's clients on the website. For example, a release describes who commissioned SubCom to construct the Djibouti Africa Regional Express 1 (DARE1) in 2019, and where

and when the companies were founded: Djibouti Telecom, headquartered in Djibouti, was founded in 1999; Somtel Somalia in 1997 and Telkom Kenya in 1999.[111] Yet the description of SubCom in the same release represents the company operating globally in the present having come from nowhere: "SubCom is the leading global partner for today's undersea data transport requirements." SubCom's history must be inferred by the statement in the media release that it has "deployed over 200 networks – enough to circle Earth more than 17 times" and that at least one of its staff (the press contact) is based in the US because of the "+1" telephone number.[112] Clicking on another SubCom release heading, a hyperlink opens a webpage hosted by LinkedIn stating that SubCom has new manufacturing facilities and business offices in "Newington, NH,"[113] which someone familiar with the US would understand to be in New Hampshire, on the northeast coast of North America. While SubCom's website seems to avoid placing the company or its history overtly in the US, the three other companies mention US connections in their histories or founding media release. For example, the third item on ASN's corporate history timeline, 1869, mentions Western Electric Manufacturing in Chicago – yet, the two prior entries on the timeline on the formation of Telcon in 1864 and the Gutta Percha Company in 1845 make no mention of their urban locations or even that they were in the United Kingdom.[114] Meanwhile, NEC lists Western Electric of Illinois in its very first entry of 1899. Even HMN boasts about its US connections "Huawei's global R&D centres are located in Silicon Valley and Dallas in USA" and its founding joint venture partner has "regional offices in the United States."[115] Historical representations on the public websites of cable-laying companies indicate that it is expedient to be multinational and a little bit American in origin, unless the company actually has a very strong relationship with US empire – in which case the relationship is unspoken. SubCom represents itself as global in a planetary sense, without an office or place of origin. At the top of its homepage, SubCom claims to deliver, maintain and operate "the best value undersea

networks on the planet." Whereas, HMN Technologies is "Connecting the world one ocean at a time." NEC is "Connecting Continents and Communities," and ASN relies on slides with press-release headers and images to suggest that ASN is doing a variety of interesting things in oceans around the world, particularly in the waters around Africa.

This chapter has demonstrated that a competition between globalization visions is being waged within and about network systems dominated by the US and its cable-laying company, SubCom. Within this context, the network sovereignty of nation states in the Indian Ocean region is being negotiated in a variety of ways ranging from corporate ownership of international networks and data centres by Indian, Singaporean and other companies headquartered in the region, to the more recent development of sovereign cable-laying capacity by Moratelindo within Indonesia. Yet, every operator of international fibre-optic submarine networks in this region relies on technology installed, during the period of this study, by one or more of the four cable-laying companies rooted in formidable empires originating outside the region.

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