STICK. BUILD. BROKE.

Why Modular Cable Landing Stations Are Essential To The Successful Growth of the Subsea Cable Industry

XSITE MODULAR

EXECUTIVE SUMMARY

Along with a number of other current and near-future trends impacting the subsea industry, the pace of new cable builds, the often challenging geographic location of system endpoints, and the ever-present need for scalable capacity are increasingly making traditional stick-built **Cable Landing Stations (CLS)** and data centers to be impractical if not invalid options for submarine network owner-operators.

As this white paper will examine, **Modular Cable Landing Stations (MCLS)** and **Data Centers** can be deployed in more accelerated timelines, possess the highest levels of structural resiliency, and deliver a higher degree of flexible and scalable infrastructure than traditional design-build methods.

Especially as new or expanding subsea cable systems are developed to bring connectivity to emerging markets throughout Africa, the Asia-Pacific, and South America, only **MCLS** and hybrid **MCLS/data centers** will be able to keep pace with rising demand.

As Business Tracks Globally, So Does Subsea Cable

Spurred by rapid advances in information and communications technology (ICT), the pace of globalization has accelerated over the past 25 years, leading to an increased interconnectedness of national economies and the integration of global markets. Moreover, as Internet users now number roughly 4.4 billion people, or 57 percent, of the world's population of approximately 7.71 billion, for the first time in history emerging economies are involved in more than half of global trade flows.

As the Internet continues to expand at a rate of more than 1 million new users each day, the volume of data moving across global borders is also surging, facilitated by the growth of undersea cable networks running along coastlines and traversing waters between continents. Currently, there are approximately 378 submarine cables in service around the world, although the total number of cables is constantly in flux as new cables enter service and older cables are decommissioned. Much of the existing subsea infrastructure that was put into service between 2000 and 2001 is nearing end-of-life and will soon face retirement.

In 2019 alone, several new submarine cables have already been announced, deployed, activated for service. Among these, are the Havfrue system, the first transatlantic cable to link Scandinavia to North America since the aging TAT-14 cable entered service in 2001; the INDIGO-West cable, one of only two high-capacity cables linking Australia's west coast to Indonesia and Singapore, and the first subsea cable to directly link Perth to Sydney; and the Pacific Light Cable Network (PLCN), whose main span will link Hong Kong to the United States and feature a branch to Taiwan and two branches to the Philippines.

Additionally, there is the Chennai-Andaman & Nicobar (A&N) Islands cable. The first subsea cable connected to the A&N Islands, it will originate in Chennai, India, before crossing the Bay of Bengal to Port Blair and seven other island landing points. And then there is Arctic Connect, the new cable that will link Europe to Japan and China across the Arctic Ocean. A trans-Arctic submarine cable will significantly reduce the distance between Asia and Europe, which is especially important to financial institutions that want the lowest possible latency on transactions between London and Tokyo.

As the business demands of mature and emerging markets dictate, so follow the routes of new or expanding subsea cable networks. For this reason, the Cable Landing Station is critical infrastructure in the end-to-end service path of new and updated systems. But as we shall learn, not all CLS are created equal.

The Primary Quandary of Stick-Built CLS

The aforementioned subsea cable projects have been planned and deployed in response to an increase in intercontinental bandwidth demand that is currently tracking at a 40 percent compound annual growth rate (CAGR) in both established and emerging markets. However, therein is the primary quandary facing cable owner-operators: Keeping pace with demand when relying on traditional stick-built Cable Landing Stations.

The price tag for today's subsea projects ranges anywhere from $100 to $500 million, varying with the length of the cable. As cable laying vessels lay their precious freight onto the seabed according to the route mapped by the cable operator, the timely deployment of the Cable Landing Stations at either endpoint of the system is critical. In this way, subsea cable builds are not unlike a track-and-field relay race in which a runner finishing one leg is required to pass the baton forward to the next runner while both are running in a marked exchange zone. If the newly laid cable reaches the endpoints and the Cable Landing Stations aren't ready, not only will the delay can cause cost overruns, but the system will take longer to bring online, meaning lost revenue – a baton that isn't so much dropped, but lost indefinitely.

Building CLS through the use of traditional "stick-build" construction, whereby various components are transported to a site and then put together into a final product at great time, cost and labor, is ill-suited to rigid cable construction timelines. Additionally, companies and workforces native to many of the regions tasked to construct stick-built CLS will all too frequently lack experience in the design-build of these highly specialized buildings. Moreover, if weather, logistical delay or other factors compromise the CLS construction timeline, inexperienced crews working with traditional stick-built structures will be ill-prepared to respond to the contingencies.

To accelerate cable project timelines and provide cost certainty from the earliest concept phases through completion, the use of modular design-build methods solves for these and other challenges. Modular Cable Landing Stations (MCLS), built in a controlled environment by experienced labor that integrates design flexibility to meet a project's specific technical requirements, can significantly reduce deployment timelines. MCLS offer the advantages of a Containerized Cable Landing Station (CCLS) solution but possess higher quality and durability than either traditional site-built Cable Landing Stations or containers.

Providing Resiliency Against Natural and Man-Made Threats

According to a recent Global Industry Analysts report, new subsea cable routes serving the United States and Europe are experiencing the greatest levels of investment due to increasing broadband consumption. That said, developing markets such as Africa, the Asia-Pacific and South America are also seeing new subsea investments. Asia, which has the most Internet users of all continents, is home to 49 percent of the world's Internet users. The Global Industry Analysts report found that the most lucrative investment potential appears to be smaller markets that are currently linked through a single, exclusive fiber-optic submarine cable.

Emerging countries in Africa and Southeast Asia, in particular, are projected to see the strongest growth in new subsea cables driven by increased broadband investments, rapid growth in Internet and mobile phone usage, and an escalating demand for reliable and affordable connectivity. The majority of new subsea cable projects will focus on underserved regions or in markets in need of cable technology upgrades.

Regardless of where they are located, all Cable Landing Stations, because they are coastal installations, must be able to withstand extreme weather and other adverse events. The Asia-Pacific is vulnerable to earthquakes and typhoons. Countries in South America regularly face extreme rainfall and floods. And while many countries in Africa have made impressive progress in economic growth, democratization and regional cooperation, political instability remains in many nations. As a result, Cable Landing Stations are sometimes more vulnerable to sabotage in less developed countries in Africa where physical security and cyber defenses tend to be the weakest.

MCLS are permanent steel and concrete buildings designed to a 50-year lifespan and able withstand the most extreme climates, natural disasters, failure scenarios or security threats. This is especially critical in environmentally harsh or remote environments, whether an MCLS is commissioned for service in Algeria where temperatures can reach 120 °F, or at landing points near the Bering Strait.

Take for example October 2018, when Category 5 Super Typhoon Yutu struck the Pacific Islands with maximum gusts of up to 190 miles per hour. A hardened MCLS not only remained standing, but continued operations throughout the duration of the event. According to Research and Markets, the APAC subsea cable market is expected to increase at a CAGR of 9.8 percent from last year through 2027. In light of this projected growth, not only will MCLS and hybrid MCLS/data centers be necessary to keep pace with rising demand in this region of the world, but given the common environmental threats, the robust physical resiliency of these structures will become equally critical for new cable networks to maintain uptime.

Preparing for the Fourth Industrial Revolution

The Fourth Industrial Revolution describes the global transformation that will accompany the mainstream adoption of consumer and industrial Internet of Things (IoT) applications, artificial intelligence (AI), quantum computing, blockchain, robotics, and other next-generation technologies. Worldwide, Cisco projects IP traffic will increase three-fold reaching an annual run rate of 3.3 zettabytes by 2021, up from an annual run rate of 1.2 zettabytes in 2016, in part due to greater adoption of IoT-based devices and machine-to-machine (M2M) connections.

To serve the transoceanic and regional subsea networks carrying this explosive amount of global data to its ultimate endpoints will require more MCLS, and as well as modular edge and micro data centers, to support many Fourth Industrial Revolution technologies. Once again, traditional stick-built CLS will fail to keep pace with demand, especially in markets that are poised to experience exponential growth in data traffic.

The Asia-Pacific and the Middle East and Africa are expected to witness the greatest increases in data traffic, with the former reaching 107.7 exabytes per month at a 26 percent CAGR, and the latter increasing at a 42 percent CAGR to reach 15.5 exabytes per month by 2021. Especially as new or expanding subsea cable systems are built to support the increase in data traffic in these emerging and undeserved markets, MCLS or a hybrid MCLS/data centers will be required to secure much needed connectivity. This is particularly the case where an absence of existing data centers near cable landing points prevents owner-operators from directly connecting their networks in Point of Presence to Point of Presence (PoP-to-PoP) configurations.

Moreover, the unpredictability, and difficulty of accurately forecasting, capacity demand will require high levels of scalability and flexibility in space, power and cooling, as well as remote monitoring capabilities, all of which MCLS and hybrid MCLS/data centers can readily deliver.

About XSite Modular

XSite Modular is a design-builder of Modular Cable Landing Stations (MCLS) constructed in the United States and shipped all over the world. XSite's MCLS include the following: PLCN for BCDA, CSPS for SIDCC, Crosslake Fibre, ECLink, CFX-1, SEACOM, Matrix, ARCOS, Fibralink, TGN Pacific G6, Seabras-1, Hawaiian Telcom Makaha CLS (SEA-US), Hawaiki, Atisa, and SPM. Our permanent, structural steel and concrete buildings are non-combustible and built to withstand the harshest environments including heavy wind and seismic loads. XSite buildings have the benefits of a Containerized Cable Landing Station (CCLS) solution with higher quality and durability than traditional site-built stations.

XSite's stations are built in a controlled environment with experienced labor forces while our process provides design flexibility to meet our clients' requirements, both technically and aesthetically. We are able to provide large column free spaces with gracious ceiling heights for ease of equipment installation. Our design-build process dramatically reduces project schedules and provides cost certainty from the earliest concept phases through completion.

XSite's MCLS are easily customized for clients' specific telecom DC power requirements and space/program needs. Our transformational modular approach allows us to dramatically reduce risk for our clients by providing a turnkey landing station to deliver time-sensitive, critical infrastructure to often challenging locations. We have worked on six of the seven continents in both urban and remote locations. XSite also provides ILA and PFE shelters, modular edge and micro data centers, and all types of terrestrial telecommunications buildings, ILA, and PFE shelters.

To learn more about XSite Modular, visit www.xsitemodular.com.

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