As New Subsea Networks Are Routed to Emerging Markets, Modular Cable Landing Stations Are Essential to Bringing Them Online

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As the Internet continues to expand at a rate of more 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 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.

As the business demands of mature and emerging markets dictate, so follow the routes of new or expanding subsea cable networks. A report by Global Industry Analysts found that the most lucrative investment potential appears to be smaller markets that are currently linked through a single, exclusive fiber-optic submarine cable. 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

However, therein is the primary quandary facing cable owner-operators: How to keep pace with demand when relying on traditional stick-built Cable Landing Stations. This is an especially formidable challenge as new or expanding subsea cable systems are developed to bring connectivity to emerging markets throughout Africa, the Asia-Pacific, and South America.

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. As cable laying vessels lay their precious freight along the seabed according to the route mapped by the cable operator, the timely deployment of the Cable Landing Stations (CLS) at either endpoint of the system is mission-critical. If the newly laid cable reaches the endpoints and the CLS aren't ready to receive it, not only will the delay cause costly overruns, but the system will take longer to bring online, meaning lost revenue. This 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.

Stick. Build. Broke.

Delivering Tidal Waves of Data

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.

The robust durability and physical resiliency of MCLS are especially critical where new subsea cable projects will bring connectivity to underserved regions with specific hazards, both natural and man-made. The Asia-Pacific is vulnerable to earthquakes and typhoons. Countries in South America regularly face extreme rainfall and floods. And some countries in Africa, while making impressive strides in economic growth, still suffer from political instability that can make infrastructure more at risk for sabotage.

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. These hardened facilities are essential in environmentally harsh or remote environments.

But along with the pace of new cable builds, rigid construction timelines, and the often challenging geographic location of system endpoints, there is another reason why traditional stick-built CLS are impractical if not invalid options for submarine network owner-operators. Namely, the unpredictability, and difficulty of accurately forecasting, capacity demand in light of the mainstreaming of consumer and industrial Internet of Things (IoT) applications, artificial intelligence (AI), blockchain, and other next-generation technologies accompanying the Fourth Industrial Revolution.

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. 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, or where an absence of existing data centers near cable landing points prevents subsea network owner-operators from directly connecting their systems in Point of Presence to Point of Presence (PoP-to-PoP) configurations.

Lastly, these unpredictable tidal waves of data 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.