WHERE DO WE GO FROM HERE?

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Abstract: The submarine fiber industry has gone through many recent upheavals and disruptions that have dramatically changed the market landscape. Keeping track of new trends to provide a better view of where the markets are heading is essential to long term industry health – which is only possible through a centralized and impartial database.
Our company's Submarine Cable Database is purpose-built by our company's database administration team, which is powered by SQL and retained on a Microsoft Azure platform. Data is collected from the public domain and personal interviews, and is the most accurate, comprehensive, and centralized source of information in the industry. At present, our Submarine Cable Database is chronicling the work of some 18 financiers, 477 cable owners, 22 system suppliers, 12 upgraders, 15 system surveyors and 25 system installers. In addition, it manages data for some 360+ projects, across 7 regions and 840+ landing points.
This tool allows for a comprehensive analysis of the submarine fiber industry as it is and can help predict where it will be heading in the future.
This paper will discuss a market outlook for the submarine fiber industry with analysis of the information contained within our Submarine Cable Database.

1. INTRODUCTION

The submarine fiber industry has seen something of return to form the last two years with 15 cable systems and over 90,000 kilometers of cable added in 2017 and 8 cable systems and 45,000 kilometers in 2018. The last time more than 90,000 kilometers of cable were added to the global network was 2009, and from 2011 to 2016 no more than 40,000 kilometers were added each year.
System capacity has also risen alongside an overall increase in systems added, resulting in a nearly exponential increase in global capacity. Since 2014, the average capacity of a submarine fiber system has risen steadily from 25 terabits per second (Tbps) to 60 Tbps. Additionally, more new systems are making use of 6, 8, or even 12 fiber pairs, providing an even higher capacity ceiling.
Much of this growth has been spurred on by the changing dynamic in system ownership observed since 2016 – when Over-the-Top (OTT) providers began to move from capacity purchasers to cable developers. Companies such as Facebook, Google, Microsoft and Amazon have been building new cables at a rapid pace to meet their infrastructure needs. This trend shows no signs of slowing down, with a significant portion of new system builds for the next several years being driven by these companies.
Dynamics throughout the industry are changing rapidly, leaving us to wonder: Where do we go from here?

2. SYSTEM AND CAPACITY GROWTH OVERVIEW

2.1 CURRENT SYSTEMS

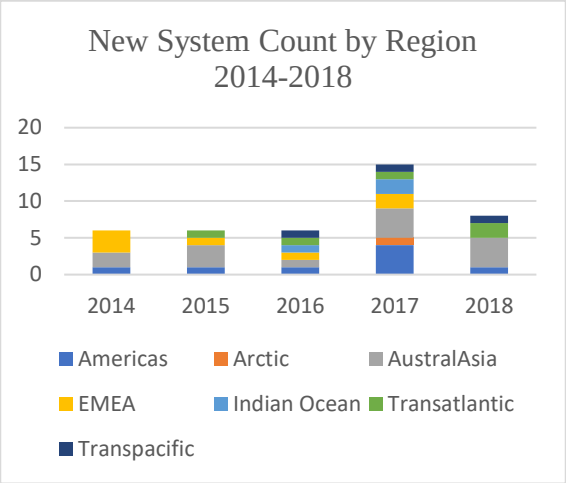

Figure 1: New System Count by Region, 2014-2018

Prior to 2017, anemic growth in new system development was observed due to economic uncertainty and the prevalence of system upgrades. With a greater demand in new markets and route diversity, system implementation experienced a boom in 2017. However, 2018 saw a severe reduction in new system activity with only 8 new systems entering service. In all, 23 new systems were added to the global network in 2017 and 2018 – nearly 30 percent more than 2014-2016. (Figure 1)

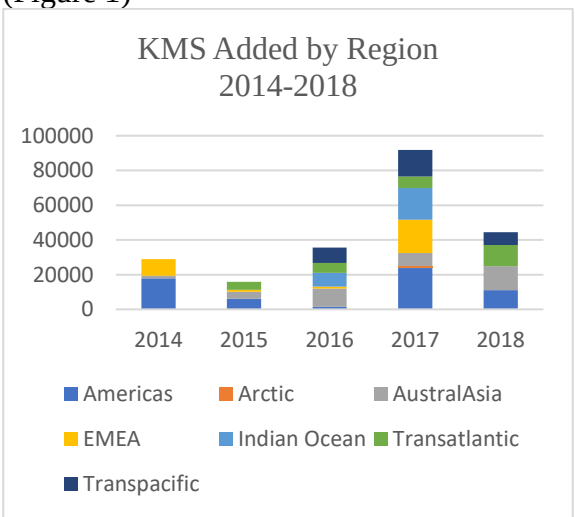

Figure 2: KMS Added by Region, 2014-2018

The period 2014-2016 saw an average of under 30,000 kilometers added annually, with 2015 adding only 15,800 kilometers. As a further positive sign for the industry at large, 2017 added over 90,000 kilometers of cable. However, 2018 saw an addition of only 45,000 kilometers — a much closer number to recent years. (Figure 2) While 2017 seemingly shook the industry out of a downturn — largely helped by the new trend of OTT providers wanting more direct control over their own infrastructure — the data from 2018 may suggest this was an outlier.

2.2 FUTURE SYSTEMS

Between brand new routes, desire for increased redundancy and the need to replace aging cables with modern systems there is a potential uptick in new system activity for the next two to three years. As people and businesses around the world continue to integrate the internet and other telecommunications services into their daily lives, these factors should result in 2019 and 2020 observing upwards of 19 and 23 new systems, respectively. (Figure 3) While 2021 shows a marked decrease, it is still some ways off. Further, OTT backed systems tend to be publicly announced 2 years from completion – which is outside the traditional 3 to 5-year time frame. Expect new OTT driven systems for 2021 to be announced throughout 2019 as a result.

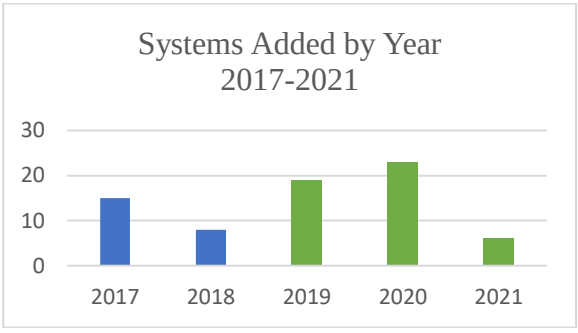

Figure 3: Systems Added by Year, 2017-2021

The next two years are projected to add over 70,000 and 160,000 kilometers of additional cable — a potential indicator of continued healthy growth.

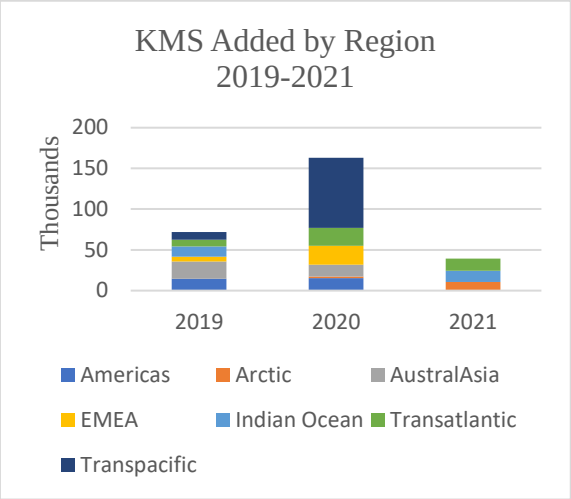

Figure 4: KMS Added by Region, 2019-2021

While 2019 should be another above average year, 2020 has the potential to be another breakout year in the same vein as 2017. Over half of all planned kilometers for 2020 are in the Transpacific region and many of these planned cables may end up competing directly against each other which potentially limits the amount of new cable that the region can support. Even if they do not end up competing from a business standpoint — over half of the seven planned systems are OTT backed and will largely be used for internal infrastructure purposes — that much cable needing to be produced and installed in a single year will severely tax industry suppliers and installers. It is very likely that several systems planned for 2020 will slip to 2021 or later. (Figure 4)

Historically, based on data collected through the Submarine Cable Database and SubTel Forum Newsfeed, only 52 percent of all announced systems end up achieving the Contract in Force (CIF) milestone. Once CIF is achieved, however, it is nearly guaranteed that a system will enter service. While OTT backed systems tend to be exempt from this rule – as they generally only announce once they are already CIF – expect the projected cable kilometers for 2019 and 2020 to fall as other non-OTT systems fail to become CIF.

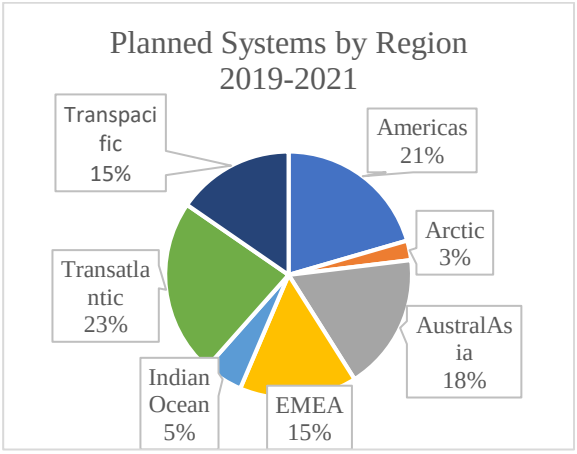

Figure 5: Planned Systems by Region, 2019-2021

Going against recent trends, significant amount of system growth through 2021 will take place in the Transatlantic region. This growth is spurred on by the infrastructure demands of OTTs and the desire for routes in the South Atlantic and from Europe to Virginia Beach to provide direct access to Ashburn, Virginia datacenters. These new routes will provide both traffic diversity and connect growing markets in South America and Africa directly.

Growth in the Pacific Ocean has started to slow down, with only 18 percent of future systems taking place in the AustralAsia region and 15 percent in the Transpacific. Growth along Transpacific routes has been spurred by a significant interest in lower latency and increased capacity between Asia, Australia and the United States — with four out of the seven planned systems for the region backed or wholly owned by OTT providers. Growth in AustralAsia has started to show signs of slowing down, with a near 50 percent reduction in planned systems as compared to the region's peak in 2016. This region will continue to trend downwards, as nearly all Pacific Island nations have now been connected. (Figure 5)

The Europe, Middle East and Africa (EMEA) and Indian Ocean Pan-East Asian regions maintain muted growth as compared to historical trends, largely due to sustained

political and economic instability in the Middle East and the saturation of African telecommunications markets. Growth in the Americas region stems from replacing older systems in the Caribbean and increased demand for connectivity between the United States and South America.

2.3 CAPACITY GROWTH

The world continues to consume ever increasing amounts of data, with bandwidth demand projected to almost double every two years for the foreseeable future. This demand — largely driven by a continued shift towards cloud services and the explosion of mobile device usage — provides numerous opportunities for the submarine fiber industry to build new cable systems. While OTT service providers had shakier earnings reports at the end of 2018, they are still expected to grow at a rapid pace. As these companies are the largest driving force behind bandwidth consumption, their continued growth indicates that bandwidth demand won't be tapering off any time soon.

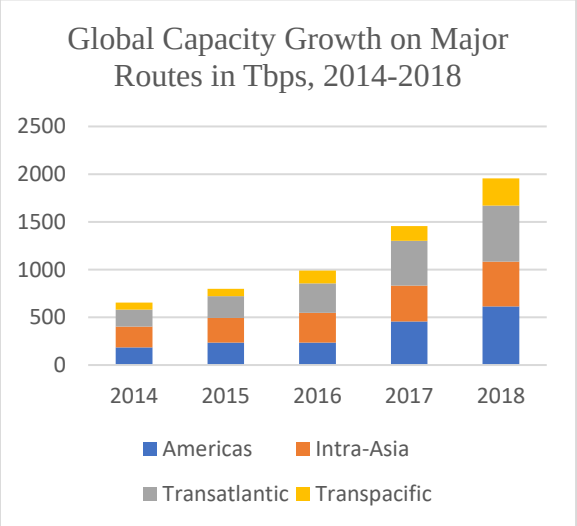

Figure 6: Global Capacity Growth on Major Routes in Tbps, 2014-2018

Over the last five years, the submarine fiber industry has added an average of 32 percent capacity annually on major submarine cable routes, including upgrades and new system builds (Figure 6). This is the same rate as a year ago – indicating relatively static growth. Further, while 2017 added 47 percent capacity, 2018 only experienced a 34.5 percent increase in total capacity along major routes. With global demand increasing at 40 percent Compound Annual Growth Rate (CAGR) this infrastructure growth rate will not be sustainable long term and will potentially cause demand to exceed supply. So far, the industry has been able to keep up — but it will have to increase activity to stay ahead of demand.

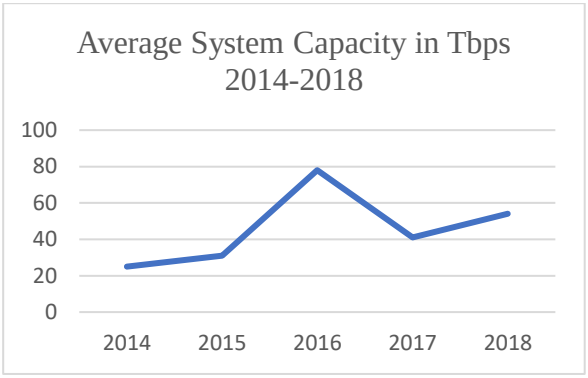

Figure 7: Average System Capacity in Tbps, 2014-2018

One sign of evidence the submarine fiber industry is up to the task of meeting global capacity demands is that the average new system capacity over the last five years has skyrocketed. Averaging at just over 25 Tbps in 2014, new systems now average at 54 Tbps. (Figure 7) With future systems being able to take advantage of higher wavelength capacities and potentially more fiber pairs, this average should continue to increase at a steady rate. New technologies and transmission techniques will play a key factor in the industry's ability to keep up with capacity demand growth.

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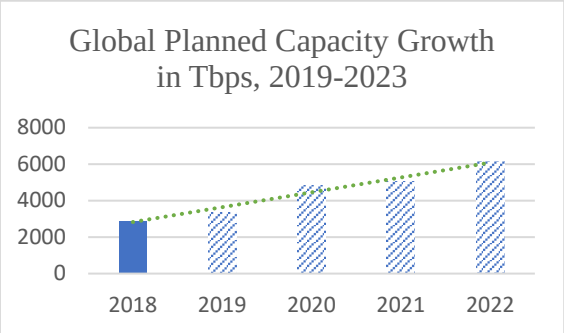

Figure 8: Global Planned Capacity Growth in Tbps, 2019-2023

Based on reported data and future capacity estimates, global capacity is estimated to increase up to 112 percent by the end of 2022. (Figure 8) Multiple systems slated for the next two years will have design capacities of more than 100 terabits per second, with many others boasting bandwidth between 30 and 70 terabits per second. Looking ahead even further, 2020 already shows another strong increase in global capacity even with only a handful of systems announced so far. Nearly all the systems currently planned are being designed with 100G technology in mind — with several in 2019 utilizing 150G and 200G technology — so expect to see an even more drastic increase as new wavelength technology begins to see widespread commercial use.

3. SYSTEM SUPPLIERS

3.1 CURRENT SYSTEMS

Based on each supplier's reported activity by region for the period 2014-2018, companies are keeping in line with overall global economic trends, with heavy focus on the developing Americas, Transatlantic and Transpacific. SubCom was the busiest supplier over this 5-year period, while Alcatel Submarine Networks (ASN) was active in every region of the world except the Transatlantic and Transpacific. Most of the smaller to mid-size companies almost exclusively focus on their "home" regions — such as NEC being the most active in the Transpacific and AustralAsia regions. Huawei Marine, however, bucks the trend by being the most active in the EMEA region, specifically Africa.

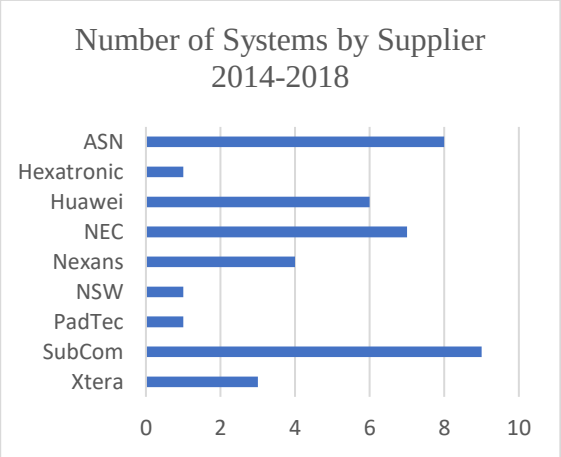

Figure 9: Number of Systems by Supplier, 2014-2018

According to announced information on the amount of cable each company has supplied over the last 5 years, SubCom takes the lead — with almost 80,000 kilometers of cable produced. NEC produced the next most at 57,000 kilometers, with ASN rounding out the 3 busiest companies at 39,000 kilometers produced. These 3 companies have been very dominant in recent years, being some of the few companies that can produce cable at a high enough volume to meet demand for large systems. So, while some companies had a relatively high amount of activity, they were not always supplying large systems. Certain companies seem to be winding down their production, or even pulling out of the submarine fiber market entirely. (Figure 9) (Figure 10)

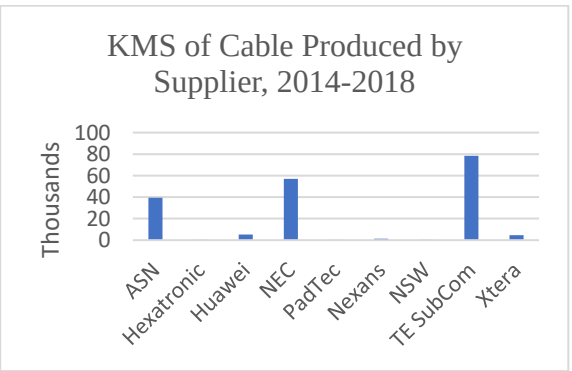

Figure 10: KMS of Cable Produced by Supplier, 2014-2018

Over the last couple of years, there has been a renewed interest in Transpacific routes and routes connecting Asia and South America directly to Europe. This will involve vast systems, requiring thousands of kilometers of cable. Moving forward, the industry will have to rely on only three companies to tackle large projects.

3.2 FUTURE SYSTEMS

Regional plans will differ slightly compared to recent years. The AustralAsia region is no longer driving the bulk of new system demand as the Pacific island nations are nearly all connected. In contrast, there is renewed focus on crossing the Atlantic — albeit taking slightly different routes than the historically dominant London to New York. As more owners and service providers look to circumvent the tumultuous Middle East, expect activity there to persist in its decline. The Oil & Gas industry will maintain demand off the coasts of Africa and Australia if oil prices cooperate and expect emerging markets in South America to increase activity in the Americas and south Transatlantic regions as well.

OTTs are becoming increasingly responsible for new system demand — especially for the Americas, Transatlantic and Transpacific regions. These companies, specifically Facebook, Google, Microsoft and Amazon, are consuming bandwidth at an increasingly rapid pace. While this trend has remained strong through 2018, there are signs that a sharp drop off in demand from these OTT providers may come after 2019. However, there is an increasing possibility that other OTT providers will begin building their own infrastructure to compete with the larger companies. This could provide a much-needed boost to the submarine fiber market after 2019. Unfortunately, as of the time of this writing such a boost has not yet been observed.

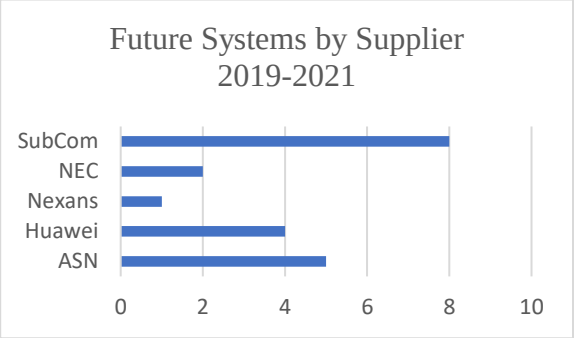

Figure 11: Future Systems by Supplier, 2019-2021

Overall, SubCom will continue to be a strong leader in the supply industry. They have been the most active and can supply the largest volume of cable and equipment. Looking forward, Huawei may be ramping up efforts again, while NEC will fade a bit with no major projects currently on the docket. However, with more and more systems announced every year, there will always be room for a savvy supplier to take on a promising opportunity. (Figure 11)

4. SYSTEM INSTALLERS

4.1 CURRENT SYSTEMS

Based on announced systems installed for the period 2014-2018, ASN is shown to be the busiest overall by a significant margin. SubCom is the next busiest with Huawei Marine, NTT, NEC and S.B. Submarine Systems not far behind with the rest of the companies being about equal in system activity. This compares well with regional capability, as those who can serve the most regions tend to be the busiest. However, the number of cable ships owned clearly does not correspond to the amount of system installations performed per company. (Figure 12)

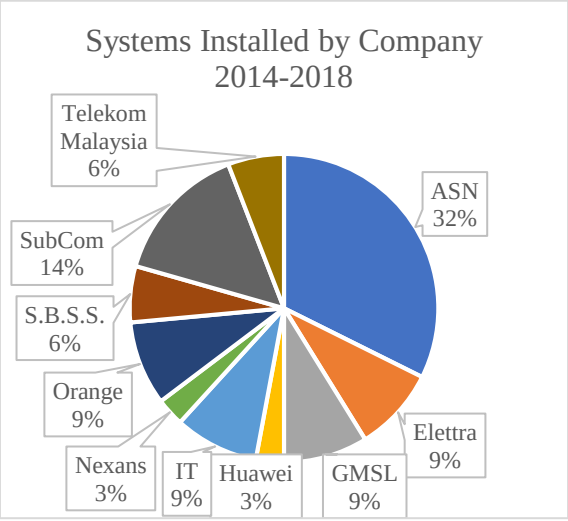

Figure 12: Systems Installed by Company, 2014-2018

The amount of cable installed by region for the period 2014-2018 shows the Americas region as the busiest by far. Except for the Arctic region, all regions around the world saw a healthy amount of new cable added — owing largely to the industry success of 2017. The Americas have benefitted from emerging markets in South America, the continued desire for more bandwidth and redundancy on the United States to Brazil route — especially when driven by demand from OTT providers — and the fact that it is one of the largest regions in the world. The Indian Ocean Pan-East Asian region has benefitted from multiple large systems put into place within the last year.

The EMEA region has experienced a downward trend in recent years, as economic and political instability in the region have caused prospective cable owners to seek alternative routes — though it maintains a moderate level of growth. The Transpacific and Transatlantic regions slightly overtake the EMEA region due to renewed interest for new routes and improving route diversity, while AustralAsia continues with more moderate growth compared to years past. Lastly, a new system was installed in the Arctic region for the first time in 2017. (Figure 13)

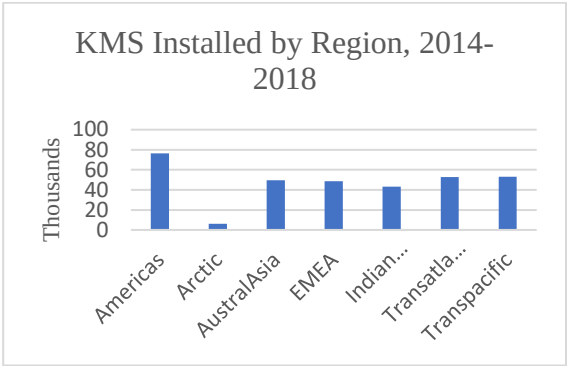

Figure 13: KMS Installed by Region, 2014-2018

4.2 FUTURE SYSTEMS

Projections for the next 2 years indicate a new trend differing from that of the previous 5 years. The Transatlantic and Transpacific regions are expected to see the most activity, as several large systems are set to be installed throughout both regions to connect major economic and data center hubs in the United States, Europe and Asia. The Americas region will see moderate growth, as OTT providers complete their infrastructure builds to the Caribbean and South America. By contrast, the EMEA and Indian Ocean Pan-East Asian regions are expected to see reduced activity compared to years past in part due to economic uncertainty in Europe and sustained political instability in the Middle East and surrounding areas. The AustralAsia region is expected to see a marked decrease in activity as the region gets closer to being fully connected. There are early plans for new Arctic systems, but they are the mostly uncertain — owing to the technical challenges and expenses incurred from dealing with ice. (Figure 14)

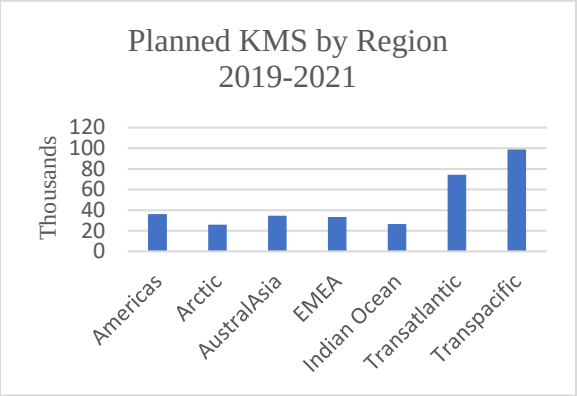

Figure 14: Planned KMS by Region, 2019-2021

5. THE OTT IMPACT

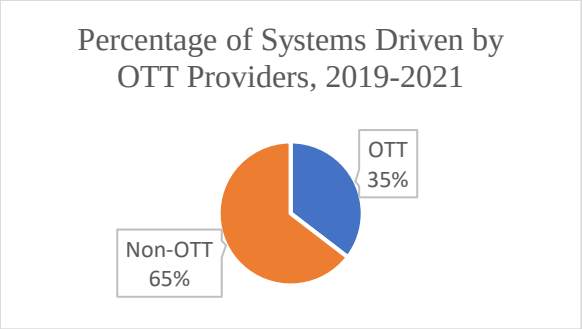

Figure 15: Percentage of Systems Driven by OTT Providers, 2019-2021

Of all systems planned for 2019-2021, OTT driven systems account for 35 percent. (Figure 15) This is a significant portion of system activity held in the hands of just 4 companies. While some of these systems are not wholly owned by OTT providers these companies are a large part of why they are being developed in the first place. As systems driven by OTT providers have a much greater chance of being implemented – due to the high financing threshold of these companies – expect this percentage to increase as new cables are announced and other projects die off. Without these kinds of backers, future systems will have a much harder time proving their business case and securing funding.

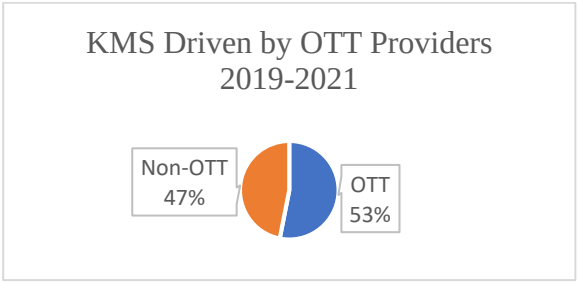

Figure 16: KMS Driven by OTT Providers, 2019-2021

While only 35 percent of new systems for 2019-2021 are driven by OTT providers, more than 50 percent of planned kilometers are attributed to them. This indicates that the infrastructure and network requirements for these companies are resulting in large, transoceanic systems. On average, planned systems driven by OTT providers will be at least 7,000 kilometers in length.

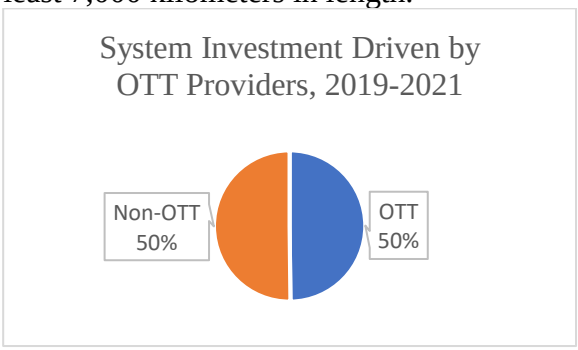

Figure 17: System Investment Driven by OTT Providers, 2019-2021

Of the nearly $7 billion investment for planned systems over the next several years, fully half of that amount is tied up in OTT backed systems. Again, while these companies are not sole owners on every cable system they are a part of, this still represents a significant dollar value that would very likely not exist without their involvement.

While only 52 percent of announced cable systems end up entering service, OTT backed systems have thus far proven largely immune to this trend as they generally do not announce a system until it is already CIF. It is therefore probable that up to half of non-OTT driven systems will not achieve the CIF

milestone and further highlight the dominance of the OTT providers on the submarine fiber industry.

6. CONCLUSION

While 2017 was a breakout year – and one of the best since the industry crash of the early 2000s – 2018 was a return to more normal output. This potentially casts some doubt on just how high a level of activity the submarine fiber industry can reliably sustain. Additionally, while numerous OTT backed systems are slated for 2019 and 2020 a large drop off is observed after 2021. As the typical submarine cable system needs a two to three-year development timeline, having so few systems announced for 2021 gives potential cause for concern.

Still, there are numerous positive signs that may point towards continued opportunity for growth. The OTT providers continue to grow and expand, demanding ever more bandwidth and will undoubtedly continue to build submarine cable systems over the long term. Furthermore, OTT providers have tended to wait on publicly announcing a system until after it is already CIF and the manufacturing process has begun. This development milestone is typically reached about 18-24 months from cable system completion. This means it is possible more OTT driven systems for 2021 will be announced throughout this year and 2020.

As systems continue to age out on established routes like New York to London – where 77% of currently in-service systems are older than 15 years – there will be several new opportunities to replace this aging infrastructure with modern cable systems. Additionally, the advent of new and disruptive technologies could prove attractive enough to build new systems on routes with cables less than 10 years old.

However, despite many encouraging data points the fact remains that the bulk of activity in the submarine fiber industry has slowly shifted towards a very small handful of companies. While it is not a bad thing that OTT providers are driving so much new activity – they are the ones driving data consumption around the world, after all – it is perhaps a bit alarming to be so single-threaded. While the OTTs show few signs of going away, the potential that they may stop, or even simply slow down new system builds must be considered.

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