SEACOM: Continuing Its Commitment to East Africa Development

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Abstract: In 2009, SEACOM became the first international undersea cable system to interconnect Kenya, Tanzania, Mozambique and South Africa with each other and the world's fiber backbone. Within minutes of SEACOM commencing service, users in East Africa experienced internet speeds an order of magnitude faster than before. The cost structure of international bandwidth was dramatically reduced for SEACOM's customers (carriers, ISPs, and education institutions) in Africa, and many of their customers benefitted quickly. Long-awaited anticipation of the better access SEACOM had promised became reality for many East African internet subscribers, including universities which SEACOM had promised to uniquely support.

SEACOM indeed had many challenges to conquer to realize its vision, starting with obtaining project financing amid investors' vivid memories of the past telecom collapse and innate cautiousness surrounding African investments. Next, the sheer magnitude of SEACOM's construction, spanning three continents, posed major permitting and project management challenges in a greenfield environment. Accompanying the undersea construction challenges, backhaul was also a challenge and it remains a future opportunity for SEACOM, as it connects more and more inland cities and countries. Last, but far from least, it was critical for SEACOM to create a proper operations system to assure quality of service for its customers.

With SEACOM's entry into service in July 2009, many users experienced, for the first time, internet access at speeds approaching a level most of us take for granted. As more pan-African cables come into service on the heels of SEACOM, the competition is intensifying for SEACOM. SEACOM is committed to continuing to extend its reach to serve Africa more broadly. This paper will highlight key unique aspects of the SEACOM and its impact on the market in the greenfield environment, both retrospectively and prospectively, as it faces competition in 2010.

1. INTRODUCTION

SEACOM, as the first international fiber optic cable along the east coast of Africa, has been an enabler of lower costs and improved access for African businesses and consumers at large. Other submarine cables have either followed, or will soon follow, SEACOM; these will bring further competition, improved services, potentially lower end-user pricing, and broader reach to Africa at large. Financing, development, and construction of SEACOM in a greenfield environment was a huge undertaking, and similarly has had a significant impact on East Africa. SEACOM continues to expand and enhance its services to the African community at large. This paper will summarize SEACOM's: (a) key project development, including its challenges, risks, solutions; (b) impact on its customers to date, and (c) plans moving forward.

Figure 1: SEACOM Route Map

2. SEACOM PROJECT DEVELOPMENT

SEACOM was conceived by private entrepreneurs in mid-2006 to fill a fundamental void in critical African infrastructure and commenced service in July 2009. At that time, approximately 12,000 cable kilometres and seven landings had been installed and tested. The project was led by an experienced infrastructure project developer in Africa. As with many private undersea projects, SEACOM focused on:

- Keeping costs low, to allow competitive end-user pricing;
- Meeting the promised, critical mid-2009 RFPA;
- Providing customer-needed access, including open-access at each landing, PoP-PoP connections, and access to the global network at competitive access points (in Europe)
- Providing adaptable service offerings compatible with local African service providers' needs;
- Completing construction consistent with international standards.

Financing: Project financing SEACOM was a major challenge. The uncertainties of both the local demand for international communications capacity over time and future international cables, coupled with the financial community's general residual uneasiness about submarine cable projects from the 2001 telecom collapse, all created concerns regarding the business plan. Two keys to demonstrating the robustness of SEACOM's business plan were: (a) presales by anchor tenants, and (b) business case profitability, even in the face of potential capacity price reduction due to new cable competition over time. Demand growth, given the untapped potential of East Africa, was not a major concern- so long as access to the cable was available. Despite these challenges, SEACOM secured a set of equity investors, who collectively funded a major portion of SEACOM. Thus, only a small percentage of the project development budget required debt financing. By finding the right set of limited partners to finance, support, and supply the project, SEACOM was able to move forward with construction quickly, after financing closed at YE2007.

Competitive Connectivity: Equally important to SEACOM's success was its ability to differentiate its offering from pending new competition, most significant- by providing one-stop-shop, cost-effective connectivity all the way to Europe. SEACOM minimized its connectivity cost by purchasing (rather than building) portions of its network and also by selling fiber pairs on portions of its new construction. SEACOM's co-build arrangement with another carrier, who purchased its own fiber pairs on SEACOM in the north, was a win-win arrangement providing cost-effective capacity to each. (The use of an undersea optical-add-drop-multiplex also enabled independent capacity and cost sharing.) Similarly, SEACOM's Egypt-to-Europe fiber pair purchase provided a low-cost solution to bridge SEACOM's Red Sea cable landing to France. From there, SEACOM purchased wavelengths in the very competitive European backhaul market to London, where most of its customers wish to terminate. Through these agreements, SEACOM has been able to offer East

African customers cost-effective connectivity all the way to London (and other European destinations). In essence, an Africa-Europe satellite connection can now be readily replaced by SEACOM's much-more affordable, higher-bandwidth, better-quality Africa-London fiber connection.

Landing Partners & Open Access: Landing site issues (e.g. landing party agreements, licenses/permits, backhaul arrangements, and POPs) were just as critical to SEACOM's development plans as they are to any other private cable project. Via its local affiliates in landing countries or through cooperation with strategically-picked local operators, along with the support of local advocates, SEACOM was able to secure landing rights, licenses and backhaul as needed. Obtaining these licenses was not always straightforward; in some countries, it required extensive work with local governments. Every landing party agreement provided for open-access, allowing new users the ability to access SEACOM's international capabilities without constraints of any local operator. However, given the limited number of providers in several of the landing countries, despite SEACOM's best efforts, African backhaul options still today remain few. In addition, they are an expensive portion of SEACOM's end-end capacity purchase price. In two cases, microwave radio to the cable station remains essential to complement other backhaul solution. Over time, as new terrestrial networks become reality, SEACOM expects the backhaul options, performance, and cost to further improve.

3. CONSTRUCTION & RISK MANAGEMENT

SEACOM construction was planned as an 18-month, turnkey program, but like many similar projects, it routinely faced challenges within territorial boundaries (mostly permits), which threatened the mid-2009 planned RFPA.

Local Construction Risk: One key element of SEACOM's plan for minimizing the risk of local construction delay was to contract for the supply inclusive of prefabricated cable stations, designed and constructed by people with knowledge and experience with cable stations [1]. SEACOM directly undertook the local civil work, using their own experienced African-construction team to manage the foundations required for the modular stations; it was important for SEACOM to have people managing the civil works who had familiarity with local practices and people. This sharing of responsibility, leveraging each party's expertise, proved to be the best approach for SEACOM.

Figure 2: SEACOM Mombasa Modular Cable Station

Permitting: To manage the hundreds of permits required for this project, a permit plan at the start of construction was critical, along with regular permit coordination meetings to manage this program. This proactive permit risk management allowed SEACOM and its contractors to mitigate most of SEACOM's permit-approval delays (e.g., EIA approvals [2]; ROW finalization; property purchase closures). In this greenfield environment, approval processes for the spectrum of permissions required for an undersea project were not always well defined. This lack of procedure clarity sometimes enabled permissions to be secured in very manageable timeframe, while at other times, it made securing approval inordinately complex and time-consuming. Despite these challenges, not

one Sub-Saharan approval held up RFPA. In part, this was because of the importance of the project to the region and the public support it received. Nonetheless, as with any other project, a sizable lobbying effort was required to secure all the requisite approvals..

SEACOM's greatest construction challenge and surprise, which affected many cables in the region, was permitting delay in the Mideast region. While innumerable cables have transited the Mideast in past decades, in 2009, the region became a bottleneck in two areas: (a) the Red Sea; and (b) Egypt. Both are continuing to be worked as of the writing of this paper, and are hoped to be fully remedied by the time of the SubOptic 2010 conference. In the meantime, SEACOM is providing connectivity to Europe through its interconnection at Mumbai, India to SMW4. SEACOM's new construction thru the Red Sea and Egypt is not, as of the writing of this paper, yet complete.

The permitting lessons here are not new: (a) plan and include contingency; (b) use local, experienced personnel; (c) the program, budget, supply contract, and supplier all must support the flexibility that will inevitably be required, and (d) contract terms must clearly establish force majeure remedy responsibilities and liabilities. As it relates to the Red Sea and Egypt challenges, despite the industry's desire otherwise, there remains no proven competitive, alternate solution.

Pirates: The escalation of piracy near the Gulf of Aden was also a major construction challenge and surprise, causing delays to SEACOM's Indian Ocean marine installation. For weeks, the cable ship waited for a security escort before laying towards the Horn of Africa thru the increasingly hazardous seas. In fact, it was these delays that resulted in a one-month slip of the planned RFPA. Had piracy been a known problem when the project was contracted, appropriate plans for security could have been managed without creating a delay. It is unfortunate to say that the pirates are so well established in the region now, that the risk they pose in terms of delays and cost (marine insurance & security protection) are now being factored into any new submarine cable plan in this region.

Risk Mitigation: Each of the problems encountered during the course of construction obviously had their own solution; often the solution involved adjusting scope of work, responsibilities, or program. Sometimes, deploying interim solutions was required. What proved critical to solving most of these problems was cooperation between all of the parties involved. It was equally critical that the associated contracts had mechanisms which anticipated the potential of change, obliged cooperation to support changes, and defined the approach to commercially manage such change, especially in the case of a force majeure event.

4. SERVING SEACOM's CUSTOMERS

In parallel with the project construction, SEACOM focused on preparing for service with its customers, including: (a) capacity-offer development and presales, and (b) operations facilities, tools, and personnel development.

Presales were a challenge made easier by SEACOM's substantial price per Mb and performance advantages relative to alternate satellite solutions. These cost and performance advantages did not, however, assure easy sales. Potential customer's: (a) pre-existing long-term commitments to satellite leases, (b) purchase practices tuned to satellite leases, (c) lack of confidence in the potential growth of their own business resulting from greater bandwidth and lower capacity costs, (d) lack of familiarity with submarine cables and capacity purchase contract terms in general, and (e) confidence/risk of SEACOM completion were all barriers that needed to overcome. In essence, successful sales required SEACOM to familiarize its customers with new products and purchase

practices, translating what our industry considers to be standard, into terms that those more familiar with satellite communications could readily adapt.

On the operations side, a significant amount of development resources and talent were invested in preparing SEACOM-specific procedures, tools, and communication systems for SEACOM's service environment. At the same time, local talent was recruited and trained to provision, operate, and maintain the SEACOM network from South Africa to London. Separately, the SEACOM team also negotiated and secured wet maintenance contracts to assure that if the SEACOM cable was ever cut, a ship would be ready to repair it promptly.

When SEACOM went live on July 23, 2009, SEACOM had sold and provisioned over tens of Gb/s of capacity from East Africa to Europe. Sales contracts spanned the gamut of: point-to-point STM-1's; multipoint STM-4's and STM-16's, and even wavelengths. Some of SEACOM's larger customers purchased station to station, but most sales were city-to-city. Customers included large and small ISPs, mobile and fixed-line incumbent operators, and university research networks. Many customers purchased capacity in bulk (with volume discounts) and provisioned only a portion at RFPA, but have incrementally activated more capacity than anticipated, as demand by their customers has grown at unprecedented and unanticipated rates. The internet chatter over the positive impact of SEACOM has had on the East African communications market continues unabated today. Despite some continuing challenges in reaching end-users, the undersea plant has performed flawlessly, and SEACOM's customers continue to rely on this new network.

Many of SEACOM's capacity purchasers initially passed on SEACOM's price-per-Mb savings to their customers as increased bandwidth, rather than price-reductions. As a result, some operators have reported that thruput to their users has seen dramatic increase. In Kenya, for example, within weeks of SEACOM service, one ISPs demand increased by more than 200%. Industry reports suggest that with SEACOM, the supply of international bandwidth has now increased by 700% in Kenya and South Africa; 850% in Mozambique; 1000% in Tanzania. The trend of providing greater capacity to the end-user for the same price continues, but more and more local providers are now also passing on savings they obtain from SEACOM to their own customers. In some countries, prices have declined by approximately 50% since SEACOM commenced service. Some of SEACOM's carrier-clients are reporting both a substantial increase is profitability and an increased in customer satisfaction as a result of SEACOM. SEACOM is attracting more and more new customers who find it a necessity to compete with SEACOM's existing customers.

New local businesses and community service initiatives have commenced which otherwise might not have been possible without the prices and access SEACOM provides. Entrepreneurs with business concepts relying on inexpensive international bandwidth have launched new ISPS and are now building new call-centers. New cable TV companies have been launched in East Africa, complementing pre-existing, dominant satellite-TV. In Kenya, the government and KDN have launched an initiative to build "digital villages", which bring computer and telecommunications facilities to remote areas of Kenya.

SEACOM customers also include universities. As part of its social responsibility commitment to East Africa, SEACOM sold large amounts of capacity at a substantial discount to TENET, a university research network. Students and researchers throughout East Africa have seen the benefits from remote learning and networking otherwise not possible.

5. SEACOM MOVING FORWARD

Today, SEACOM serves over 30 customers, with SDH services to South Africa, Mozambique, Tanzania, Kenya, Djibouti and India (and soon also Egypt). Many tens of Gb/s of capacity have been sold on SEACOM to date.

Moving forward, SEACOM will see increasing competition. Specific plans for what this means to SEACOM continue to be formulated, but focus is extended reach, improved access and potential new services. Most of the reach is focused on inland Africa, including Rwanda, Uganda. Ethiopia, Burundi, Botswana and Zimbabwe. However, undersea extensions are also anticipated in the Red Sea and potentially also in the Indian Ocean. Most important, SEACOM is working with local providers to provide more options and diversity in access to customers. Backhaul and local access in East Africa are now the biggest barrier (in terms of cost, performance and reach) to more fully realizing SEACOM's vision of serving as many East African users as possible.

Increasing competition in the African market will also influence the shape of SEACOM in the future. SEACOM led the East African international fiber capacity market with very competitive prices relative to satellite alternatives (discounts approaching 90%). EASSy and TEAMS, as SEACOM's principle competitors, impacted SEACOM sales opportunities even before they reach(ed) RFPA. The commitment of both of the other project's shareholders to their own networks led to some degree of market segmentation, and willingness by some operators to remain on satellite until these later cables reach(ed) RFPA. Consumer desire for the bandwidth (and/or prices) enabled by SEACOM to other service providers, however, has encouraged some EASSy and TEAMS investors to purchase on multiple cables. Over time, as more cables are in place, and route diversity becomes increasingly important, SEACOM anticipates there is likely to be even more blending of the market segments, and cooperation amongst cables in a variety of ways, including mutual restoration, wet maintenance services, backhaul, etc. Therefore, SEACOM anticipates the increasing competition should further enhance the opportunity for African customers and each project's future success.

What this means in terms of pricing and services remains to be determined. As with most private cable operators, SEACOM has been forced to examine the possibility of offering IP services to their end customers, who are moving more and more to IP platforms. When, and if, this will happen- and what associated impact it might have on pricing, all are still being considered. If SEACOM should commence these new services, as it did for initial service, SEACOM will work with an experienced team to make sure its entrée into this new market builds on lessons others have learned.

6. SUMMARY of LESSONS LEARNED and CONCLUSIONS

SEACOM's project development experience, in the broadest sense, generally mirrored other private project developments, but had its own unique aspects given the green field environment. Takeaways from the experience reiterate the importance of:

- An experienced project team, with a balance of project development, local and industry knowledge;
- Formal program/risk management & backup plans, especially for permitting;
- A flexible project team and construction contract, with clear force majeure terms governing responsibilities and mutual commitments to support project changes;
- Support for new customers in understanding what the cable system offers, in their language (or standards).

Undersea project developments face many of the same challenges, no matter whether they're in a green field environment, or in an established market. Sometimes, even in regions very experienced with deployment of new submarine cables, there is an unexpected difficulty- and this can have the most significant impact on a program. Thus, no matter where the project is located, the lessons learned above are, as always, critical. What may be unique to successful deployment of a cable in a green field environment is the extra effort required to educate local entities and customers about the project, including its impact and potential value to the local economy, in order to gain their support of the project.

In the end, project development challenges in a greenfield environment are much the same as anywhere else, but sometimes (not consistently) exaggerated. The most unique aspect of a greenfield project, compared to one in a developed region, is its impact, when done, on the local community. To quote one internet user in east Africa on a chat with his IP manager about SEACOM, "I download a Windows upgrade recently in a few minutes, it used to take hours before. Did you change the company service provider?".

7. REFERENCES

[1] Prefabricated Modular Cable Stations: Risk Mitigation through Industrialized Construction, A. Marks (Kullman Buildings Corporation), SubOptic 2010

[2] Equator Principles Compliance for Undersea Cable Systems, Daetwyler (Environ UK) and Pohling (David Ross Group), SubOptic 2010

