

STRENGTHENING GLOBAL CONNECTIVITY & RELIABILITY - DIFFERENTIATING THE SOUTH ATLANTIC EXPRESS SUBMARINE CABLE (SAEX) ON THE BASIS OF THE ROGUCCI RECOMMENDATIONS

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Abstract: ROGUCCI (2010) identifies weaknesses in the reliability, resilience and security of the global undersea telecoms infrastructure underpinning the world economy. SAEx and a number of other initiatives attempt to address some of these concerns. What differentiates these initiatives from existing cables includes: (a) geographic diversity; (b) low latency; and (c) independence of the southern hemisphere network from northern routes. SAEx in particular will provide a robust solution as the first direct link from South Africa to South America across the relatively peaceful South Atlantic, positioning South Africa as a global hub – connecting East to West and supporting and enhancing global resilience.

1. INTRODUCTION: ROGUCCI

Submarine cables carry virtually 100 percent of the world's transoceanic internet traffic, 99 percent of intercontinental digital traffic, and close to 97 percent of transoceanic telecommunications traffic. The industry is therefore a critical lynchpin, essential for supporting the global economy, its security, and society at large.

In 2010 this reality motivated the commissioning of the ROGUCCI study, i.e. the Report on the *Reliability of Global Undersea Communications Cable Infrastructure*. In particular, ROGUCCI highlighted both the criticality and the vulnerabilities of the undersea cable network, vis-à-vis the global economy, particularly when looking at the requirements of the world's financial community.

Twelve recommendations, condensed hereunder, emanated from the study:

Rec. 1. Rudimentary geographic diversity for global infrastructure;

Rec. 2. Governments prioritization for timely cable repairs;

Rec. 3. Public-private cooperation to ensure preparedness for hostile maritime crises;

Rec. 4. Establish formal means for information sharing and improve the protection and rapid restoration of subsea cables;

Rec. 5. Establish new international governance for global subsea cable infrastructure;

Rec. 6. International ICT infrastructure standards for the financial sector;

Rec. 7. Measurements for stakeholder due diligence to ensure performance reliability;

Rec. 8. Improved cable protection agreements, standards, policies and regulations;

Rec. 9. Government inter-agency coordination of policies and practices for subsea cable infrastructure;

Rec. 10. Education and Awareness of GUCCI critical role;

- Rec. 11. Network Operators must develop mechanisms for handling overload demand ;
- Rec. 12. Experts should prepare for and recognize GUCCI catastrophic loss.

2. ACCENTUATING CURRENT NETWORK LIMITATIONS

The need for geographic diversity to avoid areas of inherent network vulnerability is elevated in the Report to primary position. This clearly underscores its significance to the industry. Recent damage caused to three cables in the Red Sea (EASSy/EIG and SMW3), taken together with the difficulties experienced particularly in respect of areas of geopolitical uncertainty, most notably in the Middle-East, highlight this matter.

ROGUCCI also draws attention to three of the world’s worst subsea cable network choke points, ‘Suez Canal – Red Sea – Manbad Strait’ passage, the Straits of Malacca, and the Straits of Luzon. An easterly routing to the USA from India would need to contend with these latter two areas of acute network vulnerability.

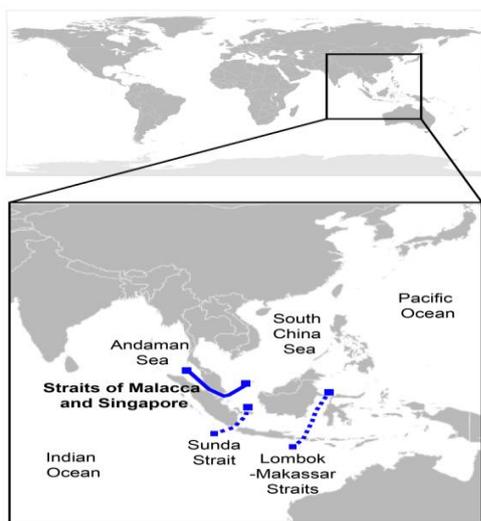


Fig.1: Map of the Straits (source: International Risk Governance Council, Geneva, 2011)



Strait of Singapore: ships waiting to clear the strait. (Flickr, by owaief89)

Considered within the context of traffic from India to New York the drawbacks that are associated with each of the two main options that carriers can follow are graphically illustrated by Terabit in the following diagram which illustrates network choke points affecting Asian traffic, discussed in their 2012 Undersea Cable Report.

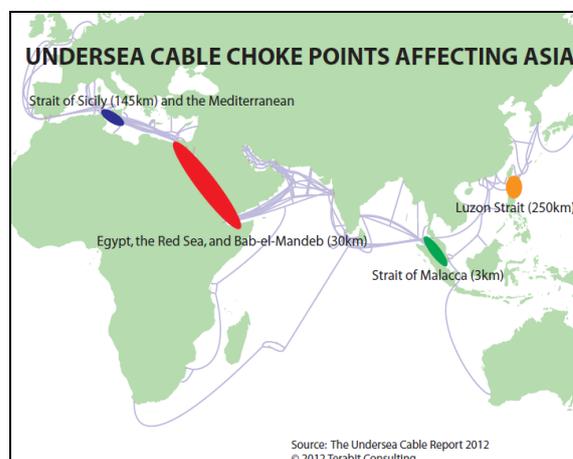


Fig.2: Undersea Cable Choke Points Affecting Asia

The existing cable systems that serve South Africa have a north-south focus and therefore also fail to address adequately the need for geographic diversity. A major physical disaster along either the west or east coasts of Africa could arguably impact on communications delivery of existing cables in the affected region, leaving no alternatives.

This is a failure directly corrected by the proposed South Atlantic Express (SAEx) submarine cable system which will also provide the most direct access to the USA through interconnections via partner systems in Fortaleza.

3. DIVERSITY IS KEY

As noted above, ROGUCCI underscores the vulnerability of the world economy (particularly the financial sector) to disruptions in cable networks. Thus geographic diversity is viewed as key to minimising network weaknesses and geopolitical uncertainty.

At the 2011 Capacity Middle East Conference, the OTE presentation noted that 90% of cable faults in the Mediterranean are local, essentially caused by fishing activity, anchor damage or equipment failures, with the impact of the faults being overcome by carriers having restoration paths available over multiple cables.

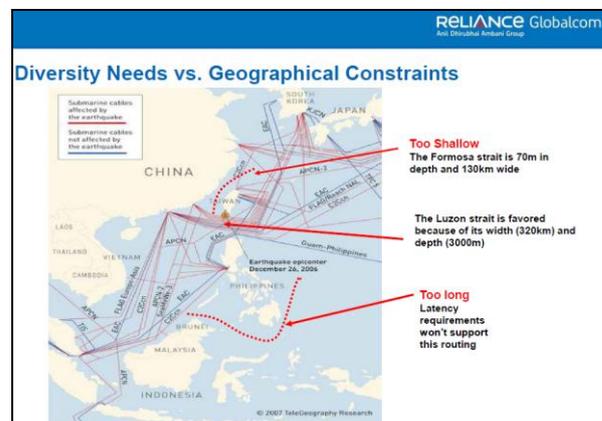


The remaining 10% of faults were characterised as regional - most likely caused by landslides due to earthquakes. Further, since most of the cables use the same corridor (Sicily Straits), regional faults therefore affect a large number of them making traffic restoration impossible

without route diversity, including the use of redundant routes.

Whilst a number of terrestrial systems in the Middle East have either been implemented or are proposed, these do not address the concerns over geopolitical stability. Terrestrial routes are considered less secure than subsea systems and are typically more prone to outages, often due to human intervention, whether deliberate or unintentional. This underscores one of the fundamental reasons reinforcing the arguments for a westerly routing of Indian and Asian traffic to the West via SAEx.

Looking at the option of an easterly routing Reliance voiced similar concerns to OTE. The concentration of cables in the straits of Singapore and Luzon imply the same type of risks as highlighted in the Mediterranean, including the risk of outages due to earthquake activity.



An easterly routing therefore gives rise to the following major concerns:

- The existence of two out of three of the world's major submarine cable network choke points (the straits of Luzon and the straits of Malacca);
- Inadequate cable separation and shipping activity in the Singapore straits;
- Earthquake activity around Taiwan - in December 2006 six major

cables were affected and in March 2012, two major cables were affected;

- Earthquake activity around Japan - in March 2011 four major cables were affected;

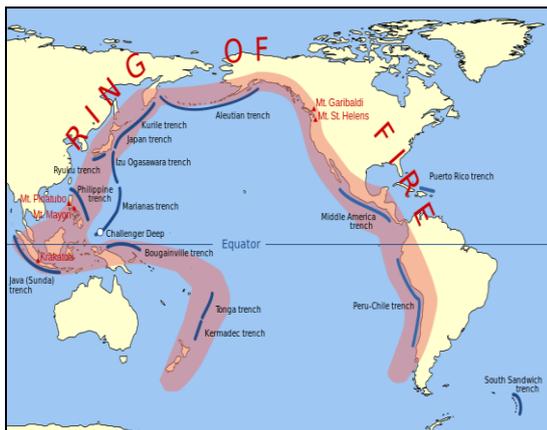


Fig.3: The Pacific Ring of Fire Source: Wikipedia

- The length of the overall traffic path increases latency;
- A high percentage of terrestrial cable arising from the need to cross the USA increases concerns over reliability;
- Permitting issues delaying repairs in the disputed waters around mainland China and Taiwan; and
- Cable density in the Luzon straits.

ROGUCCI's primary recommendation on 'diversity' seeks to improve the reliability of the global undersea cable system by addressing unwanted points of concentration through the use of geographically diverse routes. It describes as ideal, 'a mesh network with geographic diversity that wraps a highly interconnected web around the planet' (p.102). Creating such a diverse 'mesh network' would not only be critical for global stability (governments, private sector and society would benefit hugely), but would facilitate for example, the achievement of Recommendation 6, by

improving economic stability in the financial services sector. Thus, says ROGUCCI: If this strategy is implemented correctly, the new routes would be 'of a distance similar to or shorter than existing routes', preserving the low latency required by 'time-sensitive users, such as the financial services sector' (p.103).

The successful implementation of this primary recommendation would be visible in three key performance indicators:

- ✓ **Geographic diversity** in choices of undersea cable routes would allow for avoidance of choke points;
- ✓ **Latency-competitive routes** would therefore be provided as alternatives to choke points and be of similar or shorter distance to avoid unacceptable payload latency; and
- ✓ **Improved availability of global communications infrastructure** as calculated from appropriate models.

SAEx, amongst others currently under consideration, would help achieve each one of these KPIs.

4. SOUTH ATLANTIC ROUTING - A DIFFERENTIATOR

Africa is currently served by undersea cables that follow a north-south routing, connecting Europe, the Middle East and the Indian sub-continent to Africa. These cables include EASSy and SEACOM on Africa's east coast and SAT3/WASC over the length of its west coast. In addition there are the Main One and Glo1 systems which serve mainly West Africa (Ghana and Nigeria); TEAMS cable on the east coast, which connects Kenya to the UAE; the SAFE system connecting South Africa to Mauritius, Reunion, India and Malaysia. Finally, the West African Cable System

- Offers a diverse routing for traffic going West or East. In this context the routing of the SAEx cable has been specifically chosen to avoid the issues associated with existing routings through the Mediterranean and across the Pacific and as such its use will greatly add to the overall integrity of the global cable network;
- Provides the region with opportunities for additional diverse routing to Europe enhancing the integrity of communications and revenue assurance;
- Conforms to a growing aspiration to promote regional autonomy in the development of the region's telecommunications, political, economic and social fabric;
- Establishes South Africa very firmly as a regional telecommunications hub;
- Provides a system that is scalable, technologically developed and both operationally and economically viable;
- Supports future economic development – satisfying the communication needs of growing industries and the financial sector;
- Offers significant geographical diversity by closing a high-capacity ring around the Atlantic Ocean;
- Completes the South Atlantic network; and
- Facilitates direct connectivity between BRICS nations, allowing e-Government initiatives to develop, with South Africa at its centre.

5. LOWEST LATENCY

The desire to minimise latency has been brought into focus by a number of planned systems. In the north Atlantic Hibernia Express and Emerald have both been

planned to minimise latency between the locations served, and systems such as Polarnet and Arctic Fibre.

From a South African perspective traffic to the USA is currently routed via Europe which allows use of low cost capacity in the northern Atlantic but which significantly adds to the overall length of the traffic path and hence imposes a latency penalty. SAEx will be well placed to compete directly on the basis of latency between South Africa and the east coast USA, and could if required extend its geographic reach in that market by using carefully selected cables for extension capacity.

6. CONCLUSION

The South Atlantic systems that are under consideration provide South Africa with the degree of geographical route diversity highlighted as critical in the findings of the ROGUCCI Report and through connections with various other systems for a number of other countries.

This better positions South Africa as a regional telecommunications hub, increasing its importance in the global network, and brings with it a range of potential economic benefits that are associated with ICT development.

The SAEx system as one of these planned systems will provide direct access from South Africa to South America and by simple interconnect with a partner system at Fortaleza, direct onward access to the USA, or to other destinations in South America. The system will deploy advanced technologies that will allow a full range of service offerings.

The combination of these factors will enhance the importance of South Africa as a communications hub and in doing so

provide an element of ICT development that holds the prospect for increased inward investment into the country.

7. REFERENCES

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