

Eurodefense, Portugal

Geostrategic position of Portugal in the global submarine cable network. Challenges and Opportunities

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“...We currently live in a changing world where the control of large maritime spaces has become a priority for States, especially when there is a concern for sovereignty over these spaces and we intend to monitor everything that can contribute to our sustainable development. In Portugal. The “new” SMART Cables technology will be a relevant contribution to this goal. In this opinion article we intend to raise some key questions and contribute to a debate that we believe to be useful and very necessary for the development and security in Portugal and in the world...”

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Introduction

Submarine cables are crucial to cyberspace’s cybersecurity, acting as the backbone of global internet connectivity and data access. These subsea cables carry vast amounts of data between continents, facilitating seamless communication and access to online services essential to our society. Protecting the security of these cables is imperative due to their vulnerability to physical and cyber threats, such as sabotage, espionage, and disruptions. Therefore, safeguarding submarine cables is vital for maintaining critical infrastructure, economic stability, and national security.

Modern submarine cables utilize fiber-optic technology capable of transmitting multiple terabits of data per second. Lasers on one end send data at extremely rapid rates through thin glass fibers to receptors at the cable's other end. These glass fibers are protected by layers of plastic and sometimes steel wire. Submarine cables consist of copper or optical fibers, encased in several protective layers of plastic, wire, or synthetic materials. These cables can stretch up to 11,000

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km in length and reach depths of 8,000 meters. Installing and operating these systems can take several years, with a lifespan of approximately 25 years.

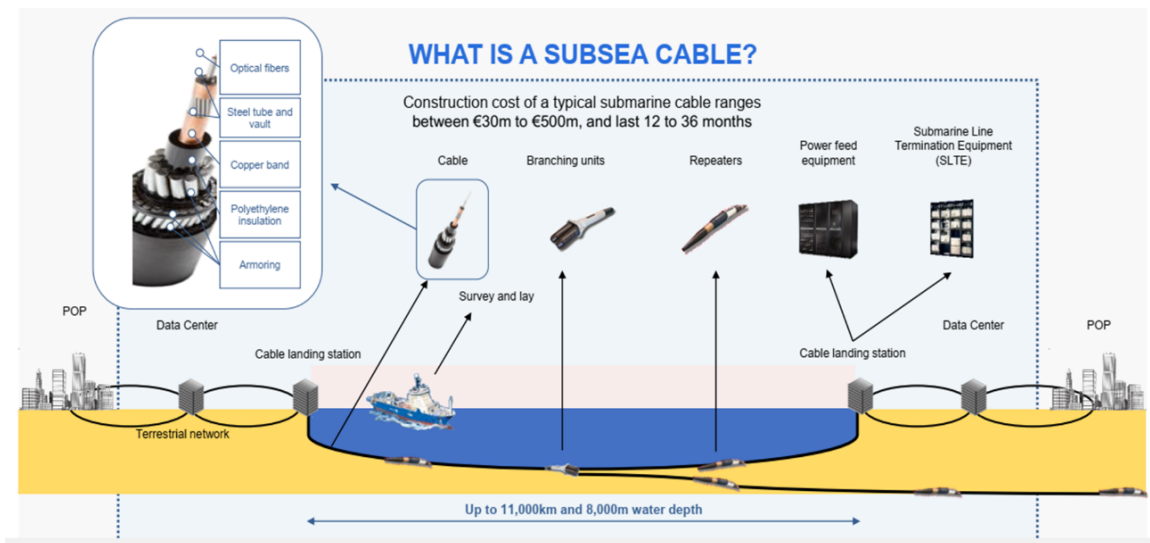


Figure 1 - Subsea Cable

(<https://www.csis.org/analysis/securing-asias-subsea-network-us-interests-and-strategic-options>)

The 2AFRICA² submarine cable, the world's largest, spans 45,000 km, encircling Africa and connecting 46 landing points across 33 countries, including the United Kingdom, India, and numerous countries in the Middle East and Africa. At 45,000 km in length, 2AFRICA is one of the world's most extensive subsea cable projects, interlinking Europe (eastward through Egypt), Asia (via Saudi Arabia), and Africa.

The system was scheduled to go live in 2023, offering a design capacity of up to 180 Tbps—surpassing the total combined capacity of all existing subsea cables serving Africa. 2AFRICA will provide essential internet capacity and reliability across extensive regions of Africa, meet the rapidly growing capacity demands in the Middle East, and support the expansion of 4G, 5G, and fixed broadband access for billions of people.

Past to the Present...and what about the future?

Specialists categorize the history of deep-sea communication into three periods: the Telegraph Era (1845-1929), the Telephone Era (1930-1985), and the Digital Age (1988-present). The first submarine Atlantic telegraph connected England to America, crossing the Atlantic and linking Lisbon (with Carcavelos as the first landing station in Portugal) and the Azores to the world. In the early days, Portugal emerged as a central hub for sea cable communication. After 1910, telegraph lines proliferated across the northern Atlantic Ocean, establishing that region as the focal point for cable communication, connecting America to Europe and Europe to the rest of the world.

More recently, in the digital age after 1990, we have witnessed the globalization of submarine cables. Global enterprises and communication companies have become more influential than states, with the liberal market driving the worldwide development of submarine cables. The internet, which we rely on for daily activities, depends on these subsea cables to deliver data to

² <https://www.2africacable.net/>

users promptly, whenever and wherever needed. Over the past decade, global interconnectivity has more than doubled, with key areas of sea cable development including the North Atlantic, connecting the US with Europe, the Pacific region in Asia, and the Middle East.

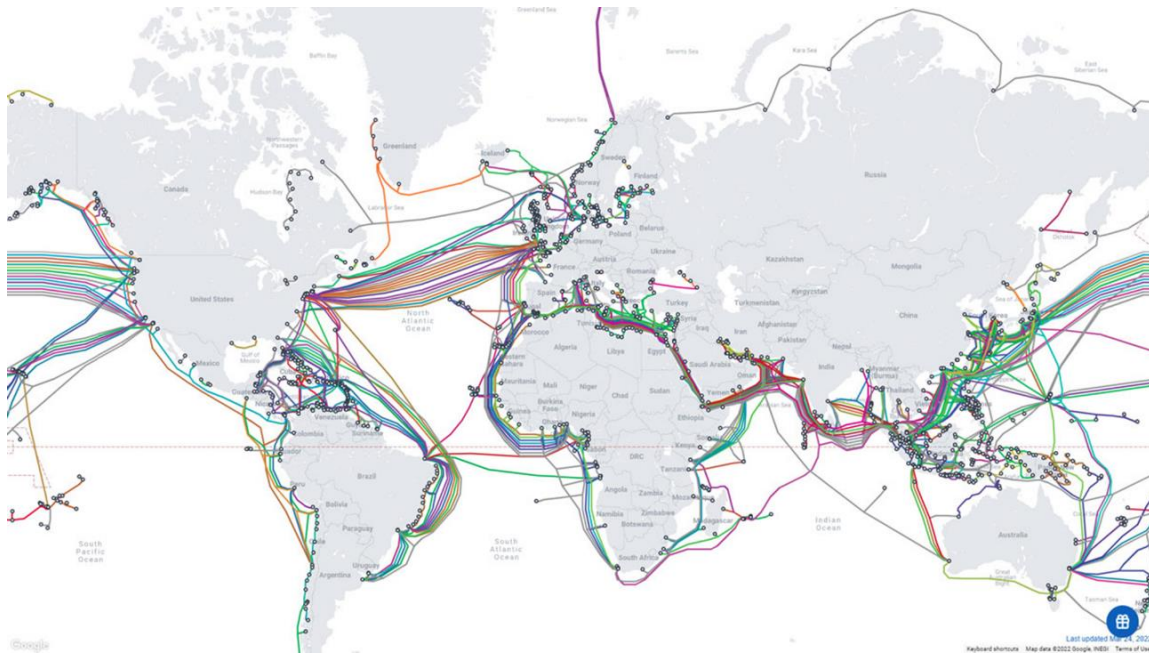


Figure 2 - Subsea Cables Map (www.telegeography.com)

Global internet traffic is forecasted to continue growing over the next few years, with an expected increase of at least 20-25%. However, there is a significant possibility of a data volume explosion if certain innovative technologies gain sudden popularity. For instance, artificial intelligence will demand a higher level of data, speed, and complexity within the digital ecosystem. Individual internet usage is also set to rise, further increasing our dependence on the internet.

We rely on the internet for accessing and providing information, entertainment, gaming, and, most importantly, communication. Europe currently leads in individual internet usage, while Africa is poised to experience the fastest growth rate. Asia and America are also in the race, with Europe continuing to serve as a strategic hub for communications, as it has in the past. This hub provides internet services to Asia, the Middle East, Africa, and Europe. Portugal, situated at the center of this hub, faces both significant opportunities and challenges.

With the continuous global increase in internet demand, the need for submarine cables is also rising significantly. In 2022, there were 530 active submarine cables worldwide. This number grew to 552 in 2023, and by early 2024, we have already reached 574 active cables globally.

As of early 2024, it is estimated that there are 1.4 million kilometers of submarine cables in service worldwide. Some cables are relatively short, such as the 131-kilometer CELTIX Connect cable between Ireland and the United Kingdom. In contrast, others are extremely long, like the 20,000-kilometer Asia America Gateway cable. While submarine cables are economically significant, data centers (represented by green dots in the picture below) are equally important. Portugal should aim to become a hub for data centers, capitalizing on the information economy rather than merely serving as a transit point for submarine cables.



Figure 3 - Subsea Cables and Datacenters Mapping (www.telegeography.com)

Geostrategic position of Portugal in the global submarine cable network

Portugal's geostrategic position in the global information network is significant, with about 25% of sea cables crossing its Exclusive Economic Zone (EEZ) and around 75% of submarine cables crossing the North Atlantic passing through its waters. Until 2023, Portugal was the only country in the world with direct sea cable connections to all continents. In the next 2-3 years, several important submarine cables will be installed in Portugal, including "NUVEM" (2026), "2AFRICA" (2024), and the "ATLANTIC CAM," which will establish new connections between the mainland and Madeira and the Azores using SMART Cables³.

Portugal's sea cable landing stations are currently concentrated in just four locations near Lisbon and around 100 kilometers south, which poses a significant vulnerability. Specialists suggest diversifying and establishing additional landing stations along the northern coast, equipped with power supply infrastructure and mega data centers. For example, Sines already has multiple HDD bore pipes at the beach to support future systems landing there. From a terrestrial perspective, Sines offers a robust network solution with diverse backhaul routes to Lisbon and Madrid, running over gas pipes and power lines. The opportunities and challenges in this area depend on the level of political engagement and strategic involvement of national and especially international partners.

³ <https://www.jornaldaeconomiadomar.com/contributions-of-smart-cables-technology-to-sustainable-development-in-portugal/>

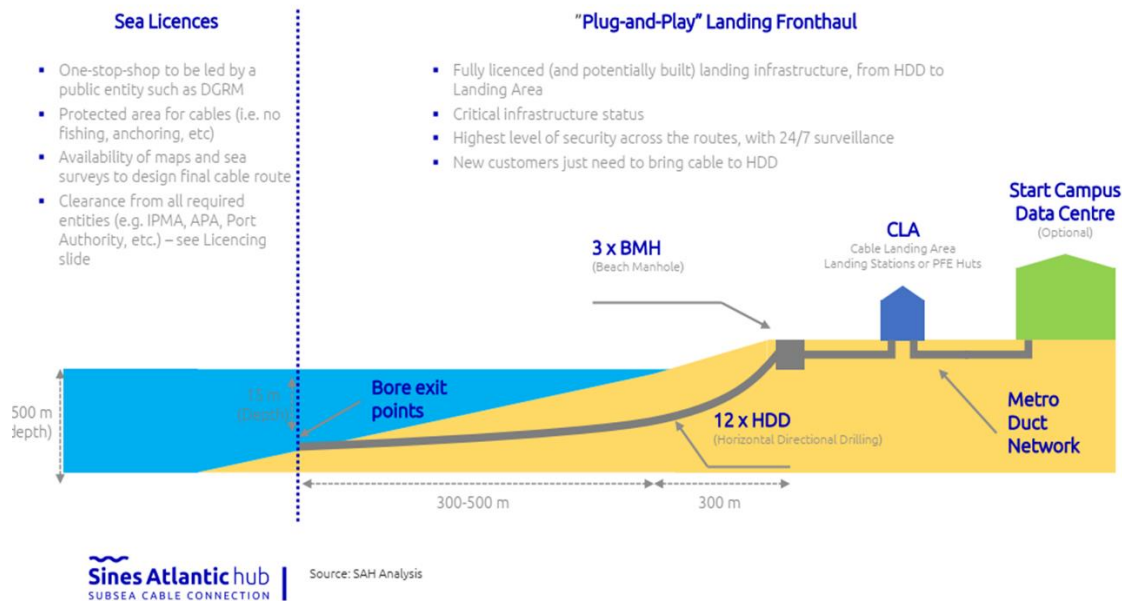


Figure 4 - Sines Subsea Cable Connection (<https://www.startcampus.pt/en>)

Conclusion

Portugal's geostrategic position is unique, offering North-South Atlantic interconnections with access to Africa and South America, East-West connections to North America, and links to Europe and the Mediterranean Basin, extending to the Middle East and Asia. Remarkably, Portugal is the only country in the world with direct underwater cables moored to all continents, except for Antarctica.

Portugal enjoys numerous advantages due to its geographic position, but more needs to be done in terms of national strategy to transform these advantages into economic opportunities. To achieve this, Portugal must focus on strategic cooperation between states and companies and lead the global dialogue on subsea cables. By doing so, it can become a strategic partner and one of the most influential countries in the world in the near future.

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