A robust submarine cable dataset at your fingertips

The key to working in harmony with our ever-changing subsea environment

Words: Gail Clark, OceanIQ Managing Director

Our reliance on the intricate network of subsea cables continues to grow globally. There is a significant boom in offshore renewable energy generation, satisfying the increasing demands of the world whilst also plugging the gap in capacity lost as more traditional generation methods come to end of life. And it's extraordinary to contemplate the phenomenal demand for data, which today penetrates every corner of the globe. Both surges in connectivity rely almost entirely on vital cable infrastructure on the sea floor as it circumnavigates the globe between countries and continents.

Offshore wind farms are a regular feature around the British coastline. According to a recent submarine power cable report from ESCA (European Subsea Cables Association) there are currently 18 operational wind farms around the coast of the UK, with a total of 1,075 turbines. With a further five under construction, eight with planning permission and a potential 30 more in development. It's a market that according to the GWEC (Global Wind Energy Council) will see a further 235 GW of new offshore wind capacity being added to the global portfolio within a decade, and now sees this sustainable energy source expanding beyond its foothold in Europe, and gaining traction in both America and Asia.

If you combine this with the seemingly insatiable universal demand for data which has seen a 19% increase in the world's population accessing the internet over the last five years alone, according to Statista, the scale of this submarine cable network only just becomes comprehendible.

These mind-blowing statistics emphasise the importance of the millions of kilometres of submarine cable that makes such interconnectivity possible. Mapping and interpreting this complex submarine cable network is a highly specialist activity which depends upon an abundance of high quality data.

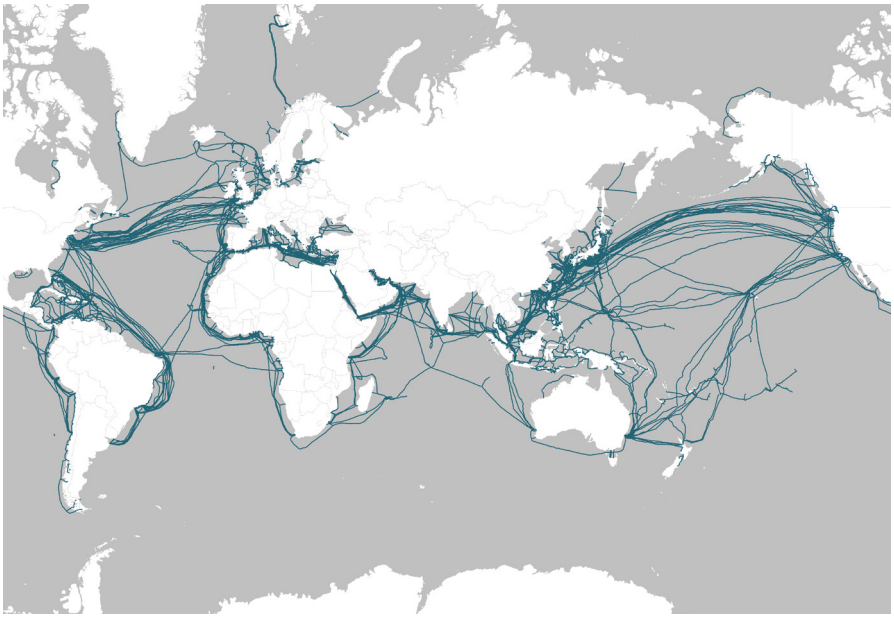
Multiple layers of cable route information

Planning, installing, and maintaining subsea cables has been taking place for well over a century. But the task hasn't become simpler. We're having to share the seabed like never before, with an ever-increasing number of assets on the seafloor and specifically the growth of offshore renewables having an impact on existing and new cable infrastructure. There is currently over 33,000 km of in service power cable and over 1.5 million km of in service fibre optic cable installed subsea, and that doesn't factor in all of the redundant infrastructure which still remains in situ.

To build a full picture of what's below the surface, and therefore protect valuable cable assets from risk as much as possible, there are many layers of data and knowledge that need to be applied to an environment. These include in service cables, including telegraph, coaxial, fibre optic, inter array, export and interconnectors; detailed as-laid cable routes; out-of-service cable data; cable maintenance zones; and cable fault analysis.

Comprehensive cable data is critical to feed into detailed route development, effective crossing strategies and successful cable protection approaches for future systems. Understanding the most common cause of faults in a specific area is essential when considering cable types and developing cable burial strategies.

The considerations and constraints can be examined in detailed Desktop Studies or FEED (Front End Engineering Design) Studies, and will generally include the following: geohazards, including geological faults, slope instability, mobile bed-forms, pock marks, and the type and consistency of the seabed; anthropogenic factors, including the activities of other marine stakeholders/users, such as fishing, maritime traffic, and risks from anchors, military activities, aggregate extraction, recreational activities, other cables and



oceaniq.co.uk/submarinecablemap is a free to access resource for anyone across the globe

pipelines, and existing offshore energy projects; environmental factors of marine protected areas and their associated restrictions; archaeological marine protected sites and unexploded ordinance and the avoidance and/or removal of munitions found near cable routes. Specific cable protection assessments, landing point assessments, geotechnical studies and charting services all feed into the route engineering of a cable system no matter what the project or where in the world.

It's ideal to select a route that allows for the cable to be repaired at all points of its length, with adequate separation from other cables or seabed assets. This means enough space to enable the repair without compromising neighbouring cables, as well as completing reburial if necessary. This kind of detailed planning simply isn't possible without access to data that allows a full picture of the seabed environment to be constructed. This utopia however, is becoming far less of a reality, as the intricate network of subsea cables that navigates the globe is increasing at a phenomenal scale. Pre-planning is not just essential, it ultimately has the ability to limit delays during costly installation operations.

Reducing risk whilst saving time and cost

Following the increase in seabed usage from industries such as telecoms, renewable energy, oil & gas and resource mining, data can help prevent risks to both the installation of the cable and its ongoing security, as well as inform the process of acquiring permits during the planning phase of a project.

Cable faults and failures are a key issue for the industry and one that can cost tens of millions of dollars in project delays, extended time on site for chartered vessels, replacements of sections of cable as well as latter repair campaigns, not to mention the cost of any downtime on service interruption and loss of power transfer in the case of interconnector and export cables.

The planning and installation phase isn't always to blame, the root cause could also stem right back to the design and manufacturing phase of the asset itself, it could be down to the operation of the cable, or even due to the shifting landscape of the seabed including because of natural disasters. Whatever the cause though, proper planning and the considerations that go into that need to be brought under the microscope to ensure that cables can become a reliable component of a subsea system, overall saving project time and any extra costs.

Another key factor to consider is ensuring 24/7 access to your own cable data sets, holding cable crossing information centrally and managing the ongoing and accurate upkeep of the data – a small oversight that could cost heavily in delays.

Accessing highly important data

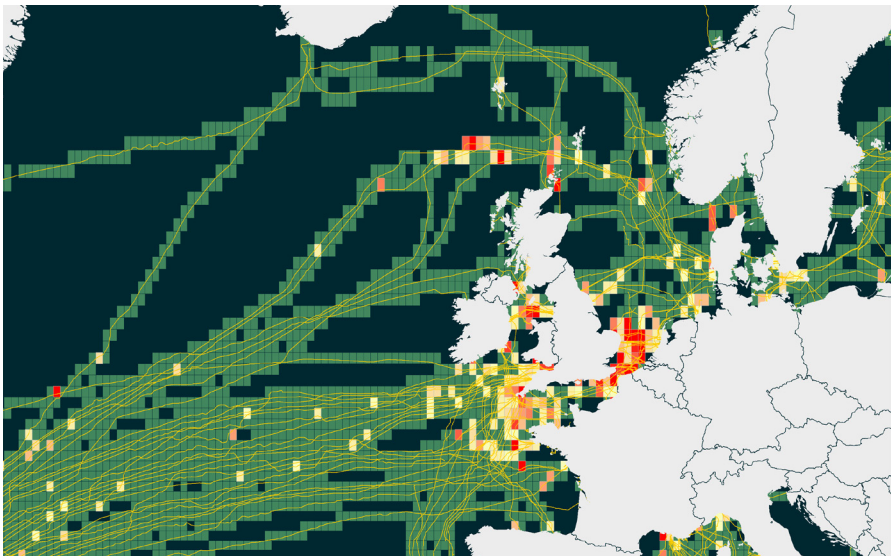
In September, OceanIQ launched its online submarine cable map, with what is believed to be the most accurate data set available freely online. This generalised data goes way beyond other more illustrative offerings and shares some of the knowledge built by the OceanIQ team over many, many years.

With a company history dating back to the formation of the submarine cable industry, the submarine cable map comprises a fascinating data set. This free to access resource for anyone across the globe means that data and insights are much more accessible and can be shared more widely with interested parties.

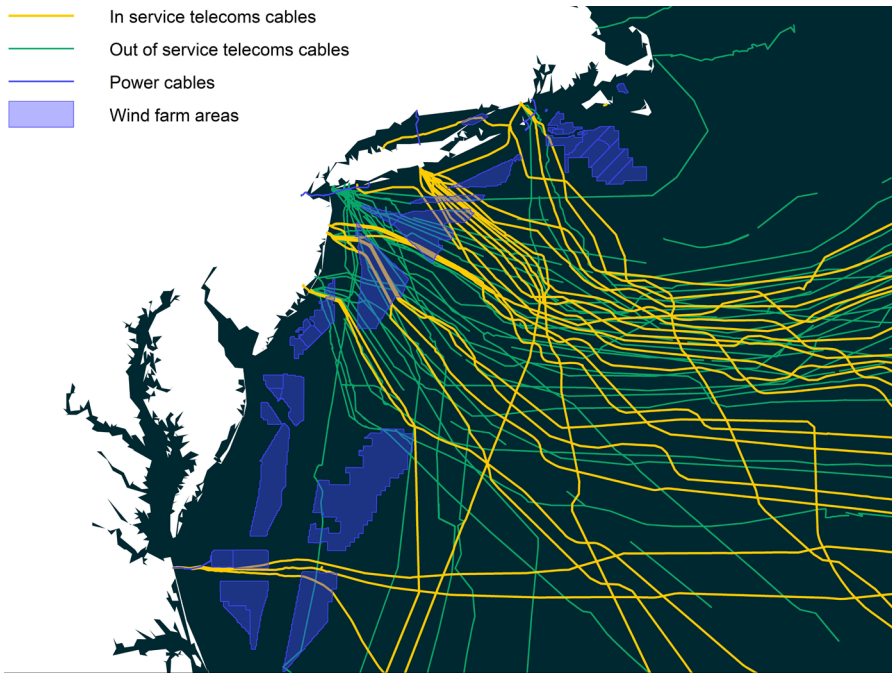
Customised data access

OceanIQ has also evolved their trademarked GeoCable data product too, introducing GeoCableLight, a secure web-based platform that enables a wider group of individuals to have view-access to the entire accurate data set; making this industry-leading data set accessible beyond the traditional GIS and route engineering users. GeoCableLight is accessible on the move too, on mobile and on tablets, which yet again changes how this data can be digested.

This of course does not eliminate the requirement for access to the full GeoCable



OceanIQ's cable fault rate heatmaps use over 4,300 historical faults to easily identify areas of high risk enabling effective project planning



The USA Eastern Seaboard: the sea floor is becoming increasingly congested with cables and other assets including wind farms

data set, this service has now been renamed GeoCablePro and remains the fully flexible professional choice, which has been trusted by enterprises, governments, or multi-national bodies needing highly accurate data on cable locations and wanting to undertake complex analysis and data planning themselves.

Both GeoCablePro and GeoCableLight are subscription-based, with information that is regularly updated – giving users the added peace of mind that their investment as subscribers will always give them up-to-date data and information.

The data is entirely customisable with worldwide coverage, or narrowed down to specific regions of interest, and with varying levels of user access. The software enables full zoom control, views based on various map types, coordinate key-in and readout, cable route planning, RPL (Route Position List) import and export, GIS analysis and cable fault heat maps.

Intelligent route planning software

GeoCable® GIS Software offers route planning functionality with RPL generation in a comprehensive software package for effectively managing and analysing project requirements.

The software allows route planning with RPL generation, full coordinate and distance measurement control, allowing you to plan routes effectively, integration with electronic navigation charts from the UK Hydrographic Office and the ability to integrate with other formats (ESRI Shape File, KML, KMZ, and WMS/WFS servers).

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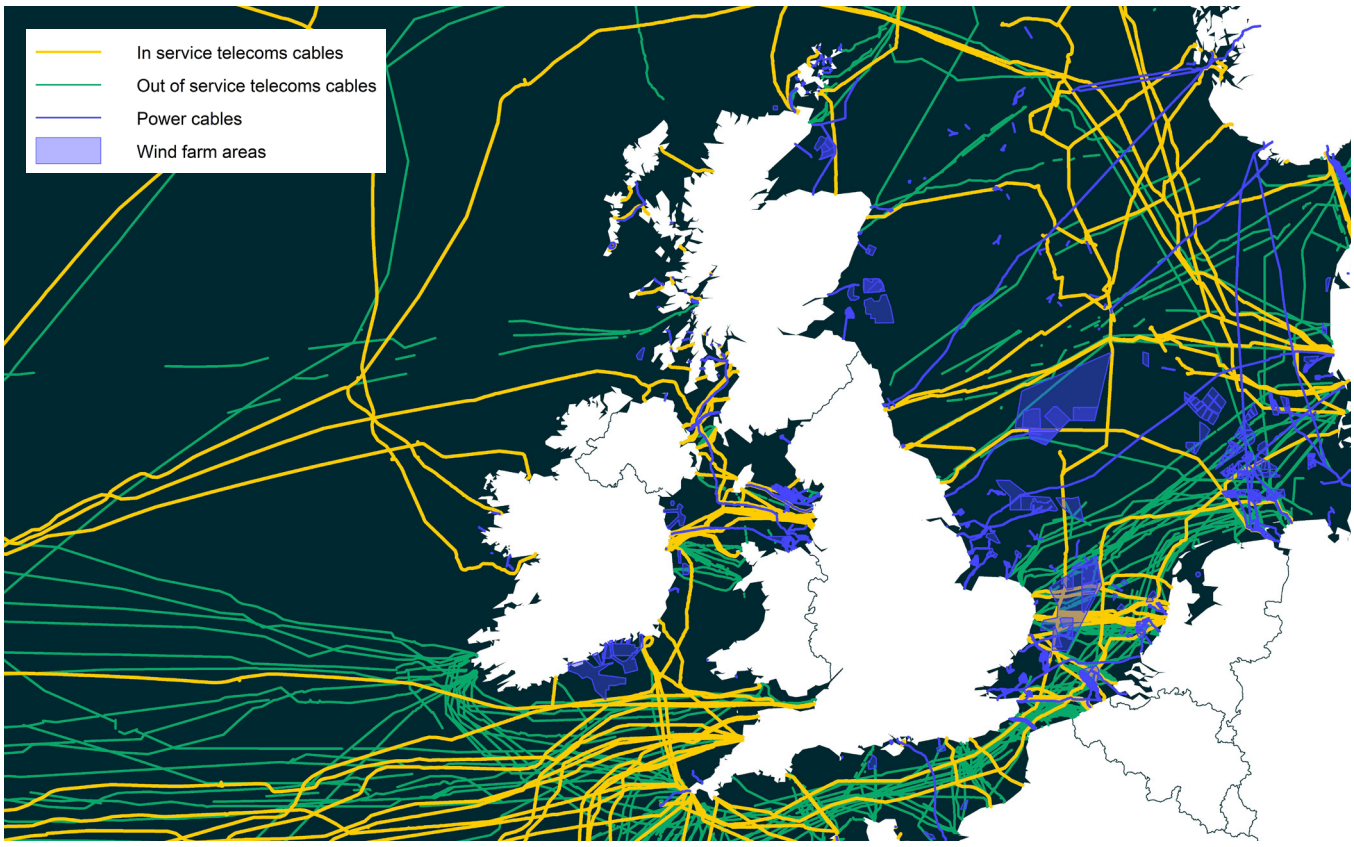

The North Sea: the waters around the UK and Europe can be difficult to navigate safely