***THE** landing of CYTA's submarine cable ALEXANDROS on the south coast*

The constant revolution

Telecoms companies face more rapid changes amid relentless industry advances

This week we present our special supplement on the telecommunications sector. Over several pages of analysis, we address the key issues currently facing global telecoms companies today.

Telecommunications is an industry that has been in constant revolution now for several decades. It started when we could connect to the other side of the world with slow, modem-based, noisy dial-ups that cost a fortune and could not cope with more than one or two images on a web page.

These developments create very intense demands on telecoms companies to stay nimble, keep abreast of rapidly-changing demands and make the right investments to keep ahead of the competition

Fast forward to 2017 and most of us are now carrying around 4G in our pockets. The revolution is by no means over, however. Mega players such as Google and Microsoft are now investing hundreds of millions, getting into areas traditionally dominated by telecoms companies, such as submarine cables.

These developments create very intense demands on telecoms companies to stay nimble, keep abreast of rapidly-changing demands and make the right investments to keep ahead of the competition.

With those challenges in mind, in our special supplement we give special focus on how Cyprus is already taking advantage of its geographical position to attract global players, but also how it can leverage that position even further going forward, to address rising competition and meet rapidly-rising demand for more secure and ever-faster connections.

We start by introducing the submarine cable networks owned and/or operated by CytaGlobal, the national and international wholesale market division of state-run Cyta, as well as Cyta's global satellite network.

We take a look at how Cyprus compares with other EU countries, using the European Commission's digital economy and society index (DESI). This measures digital connectivity, including prices, and we also ask what more can be done to raise Cyprus' scores.

In addition to Cyta, we talk to the other operators in Cyprus - Hellas Sat, Cablenet, MTN and PrimeTel - asking their opinions on what is needed to turn Cyprus into a hub for top-demand users such as data centres and commodity traders. We also ask them what is needed to improve price competitiveness and to attract more foreign investment.

We also describe the open access model, consider its pros and cons and ask if it can work as an option for international connections or fibre networks.

***GERMANY'S** first 4.5G mobile base station launched in July 2016*

Cyprus the regional hub

***Cyta's Chief** Commercial Officer Yiannis Koulias tells the Cyprus Weekly how the island acts as a regional hub for submarine cable system that span the globe*

***SUBMARINE** cable landing stations and satellite earth stations in Cyprus*

By **Frances Miller**

When we think of the state telecoms operator, Cyta, we tend to think of landlines and mobile phones. Yet hidden away under the sea, and in space, away from view, is another highly-valuable resource, namely the large international network of Cyta consisting of satellite and submarine systems and networks.

Cyta is the dominant telecommunications provider in Cyprus and its product portfolio covers the whole spectrum of electronic communications, ranging from fixed and mobile telephony to internet service provision and broadband applications.

"Cyta, through its strategic business unit Cytaglobal, is particularly active in the area of undersea cable systems, providing wholesale products and services on a global basis," explains Yiannis Koulias, Cyta's Chief Commercial Officer.

As Director of Cyta's National & International Wholesale Market Division, he has led Cytaglobal in developing and promoting Cyta's successful cable and satellite hub in the Eastern Mediterranean, contributing to establishing Cyprus as a regional telecommunications centre of excellence.

***YIANNIS** Koulias, Cyta's Chief Commercial Officer*

Through Cytaglobal, Cyta has invested tens of millions in several high-capacity, fibre-optic submarine cable systems and subsystems. To understand why this is an important resource, look up at a map of global submarine fibre-optic cables. You will see a cluster in the Eastern Mediterranean centred on Cyprus.

These cables run west from Cyprus to Greece, Italy, France, and as far as Portugal, UK, Belgium and Germany. Other cables run south to Abu Talat and Alexandria cable stations in Egypt, while on the east side, the cables link to Syria, Lebanon and Israel. Through Cyta's co-ownership of transatlantic cable systems and other regional systems, Cyprus is also linked to the rest of the world.

Cyprus, through Cyta, currently serves as a major regional telecommunications hub in the Eastern Mediterranean, with multiple cables linking Cyprus to neighbouring countries and other European destinations.

"Cyta's new undersea cable systems and subsystems to Israel, Egypt, Lebanon, Syria, Greece, Italy and France, complement existing facilities, enhancing the robustness of Cyta's international access through physical diversity and significant increase in bandwidth, thereby creating Eurasia business opportunities and a bridge between East and West," said Koulias.

The submarine network is therefore another example of how Cyprus uses its strategic geographical position, at the crossroads of three continents, to act as a regional hub between east and west, north and south. These submarine cable connections even allow Cyprus to act as a transit point between countries that do not have diplomatic relations, such as Syria, Lebanon and Israel.

The recent interconnection of Cyta's international networks with the extensive optical fibre networks in Greece, owned and operated by Cyta's wholly owned subsidiary Cyta Hellas, is another boost.

"It presents additional unique business opportunities, on a common Cyprus-Greece front, along the important axis extending from the Middle East to the Balkans and Central Europe," said Koulias.

"This interconnection of networks is a major development, which allows for a unified strategy to exploit all national and international networks of the Cyta Group for the benefit of our customers, assuming a leading role as a regional hub of great geopolitical importance," said Yiannis Koulias.

Cyta, through its strategic business unit Cytaglobal, is particularly active in the area of undersea cable systems, providing wholesale products and services on a global basis

Continuous investment needed

To keep the satellite and submarine cable systems up to date and responding to rapidly-evolving business and consumer needs, continuous investment is needed.

According to a recent article in the Financial Times, global demand for bandwidth is growing at 40% per year. Cloud-based technology is one key source, as well as "demand for greater capacity from financial services companies seeking the smallest possible delays in transaction times (known as latency)", it said.

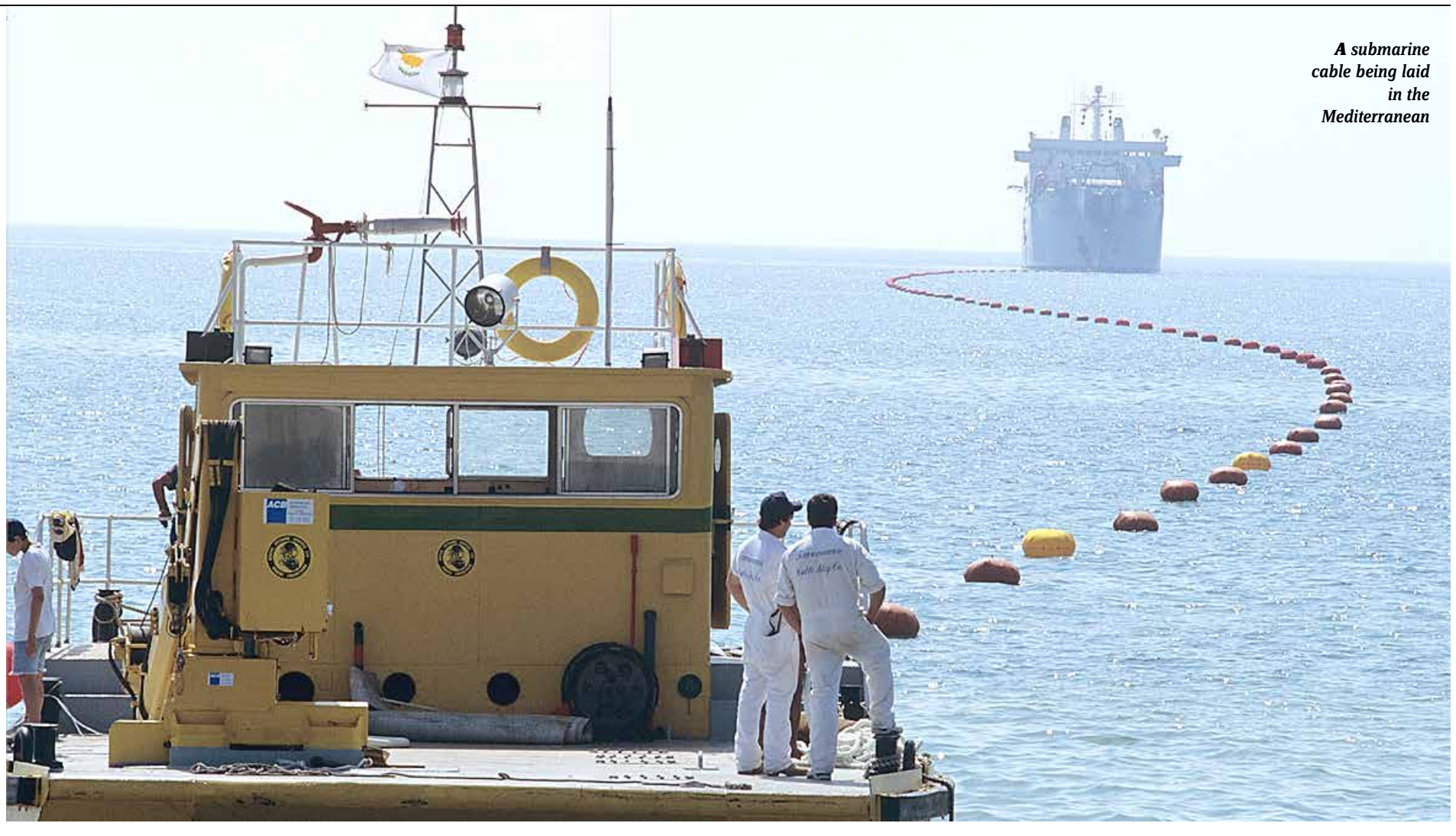
Moreover, big technology companies like Microsoft and Google are also getting involved. Google was one of the investors in the $300m Faster Cable system running from the US to Japan that launched in June 2016.

This means competition for established telecoms companies. They have not stood still, however, and have been responding by joining forces with other telecoms companies. For example, Vodafone announced in May 2016 the opening of the 8,100 km Bay of Bengal Gateway (BBG) submarine cable linking India, Singapore, Malaysia, Oman, UAE and Sri Lanka.

The investment was undertaken together with five other telecoms companies: Dialog Axiata of Sri Lanka, Etisalat of the United Arab Emirates, Omantel of the Sultanate of Oman, Reliance Jio Infocomm of India and Telekom Malaysia Berhad of Malaysia.

Cyta is continuously evaluating the connection of Cyprus to other planned fibre-optic networks the world over.

"By co-owning, buying or leasing capacity, we participate in many regional and global submarine cable systems, thus leveraging our strategic location and know-how to create synergies and partnerships, ensuring that Cyprus retains its position as an important telecommunications hub in the Eastern Mediterranean," said Koulias.



A submarine cable being laid in the Mediterranean

Cyprus' submarine cable networks

Cyta's international network is continuously expanding

Cyprus' submarine cable network is based on Synchronous Digital Hierarchy (SDH) cable systems as well as self-healing rings. SHD interconnections are faster and less expensive than the older Plesiochronous Digital Hierarchy (PDH) systems. Repeaterless systems have a number of benefits, including the fact that they do not require additional subsea equipment such as regenerator units or power-feed equipment. Self-healing rings allow systems to continue operating if one segment of the system fails.

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Cyta's international network is continuously expanding. The following cables land in Cyprus at three separate Cyta cable-landing stations: Ayia Napa in the east, Pentaskhinos and Yeroskipos in the west.

ARIEL: A private cable system consisting of a fibre pair between Cyprus and Israel providing connectivity to Israel and extending beyond to Western Europe through other existing networks.

CIOS: A repeaterless fibre-optic cable system connecting Cyprus directly with Israel.

CADMOS: A repeaterless fibre optic cable system connecting Cyprus directly with two separate landing stations in Lebanon.

UGARIT: A repeaterless fibre-optic cable system directly connecting Cyprus and Syria and via terrestrial extensions, with Jordan. UGARIT and CADMOS systems, together with the BERYTAR cable system (Beirut – Tartous) are fully integrated into a secure self-healing ring, interconnecting Cyprus with Lebanon and Syria.

***CYTA'S** network operation centre*

ALASIA (in progress): A new repeaterless fibre-optic cable to Syria that will connect with Cyta's existing ALEXANDROS cable (a subsystem via Telecom Egypt's TE-North (TEN) that connects to Egypt and France). It will also complement the existing UGARIT cable system to Syria.

EUROPA (planned): A planned new repeaterless fibre-optic cable to Lebanon that will connect with Cyta's existing ALEXANDROS cable subsystem. It will also complement the existing CADMOS cable system to Lebanon.

SEA ME WE 3: At 40,000 km it is one of the longest fibre-optical cable networks in the world, consisting of two fibre pairs. It links the Pacific Rim, South East Asia, the Middle East and Western Europe, through a multitude of landing stations in many countries.

LEV: A state-of-the-art cable system connecting Cyprus eastwards with Israel and westwards with Italy, and thereafter via the MED NAUTILUS cable system to Greece, Turkey and the rest of Europe.

MINERVA: An independent private cable subsystem, operated and managed by MED NAUTILUS for the sole use of Cyta and its customers, forms a direct self-healing ring between Cyprus and Italy, and through Telecom Italia Sparkle Pan-European networks, connecting to the rest of Europe, the US and beyond.

ALEXANDROS: A private cable subsystem wholly owned by Cyta, consisting of a fibre pair between Cyprus – Egypt and a fibre pair between Cyprus – France, implemented through Telecom Egypt's submarine cable system TE-North (TEN), connecting Egypt with France, and, through Pan-European networks, connecting to the rest of Europe and beyond.

'This interconnection of networks is a major development, which allows for a unified strategy to exploit all national and international networks of the Cyta Group for the benefit of our customers'

ATHENA and KIMONAS: Private cable subsystems wholly owned by Cyta, connecting Cyprus with Greece. The subsystems consist of two integrated rings; one ring interconnecting the islands of Cyprus, Crete and Sicily and the other ring interconnecting Crete with the Greek mainland, terminating in Athens.

POSEIDON: A subsea cable system developed by Cyta and Radius Oceanic Communications to serve the Mediterranean offshore oil and gas sector.

AAE-1 (in progress): Asia-Africa-Europe 1 (AAE-1) is a 25,000-km submarine cable from South East Asia to Europe across Egypt, connecting Hong Kong, Vietnam, Cambodia, Malaysia, Singapore, Thailand, India, Pakistan, Oman, UAE, Qatar, Yemen, Djibouti, Saudi Arabia, Egypt, Greece, Italy and France. Cyta has secured access to AAE-1 with the use of its ALEXANDROS fibre pair between Cyprus and Egypt.

A major satellite hub

Cyta operates more than 35 major satellite earth stations


***THE MAKARIOS** satellite teleport site*

In addition to its submarine cable network, Cyta has been active for years in satellite communications and provides links and associated support services to major international customers.

Cyta operates more than 35 major satellite earth stations to provide access to global satellite providers such as EUTELSAT, INTELSAT, SES, AVANTI and ASIASAT. Cyta has established three teleport sites, named MAKARIOS, ERMIS and PERA, that enhance the resilience and diversity of its operations. Cyta's services enjoy professional certifications and comply with all relevant international standards.

Today, one of the core products offered at Cyta's satellite teleports is gateway services to modern broadband satellites, bundled with global fibre connectivity

Cyta's business model is focused on building long-term relationships with its customers.

"The key to this philosophy is trying to understand the customers' needs and the capability to offer products at competitive prices with the expected quality of service," says Cyta's Chief Commercial Officer, Yiannis Koulias.

"The broad experience of the personnel, the continued care and support and the reliable infrastructure are the tools to facilitate these capabilities and enhance the value of Cyta's services to its customer base."

The services offered via Cyta's satellite teleports include a broad collection of products, ranging from satellite television on a permanent and occasional basis to broadband gateway services, satellite control and monitoring services, data and internet connectivity. The satellite teleports also offer very small aperture terminal (VSAT) services, hosting services to third parties and serve as a video head-end (master facility for receiving television signals) for Cytavision IP-TV in the Cyprus market.

Supporting the international market

With the rapid development of the fibre network, attention has shifted from international telephony to services supporting the international telecommunications market. Today, one of the core products offered at Cyta's satellite teleports is gateway services to modern broadband satellites, bundled with global fibre connectivity. This makes it possible to establish large gateways to High Throughput Satellites (HTS) that offer broadband services in selected regions around the globe.

Hosting services

Cyta offers dedicated secure areas with full facilities and regulated access for business partners to install and operate their own equipment. Full operational support is provided by Cyta and customers are offered the option for remote operations and monitoring.

VSAT links

VSAT links enable instant connectivity to remote regions around the globe and offer modern communications solutions. Cyta offers VSAT services and field support in association with specialised partners.

Support services

Cyta offers support services to satellite operators to ensure the health of the satellite fleet, enforce compliance of the customers to the terms of their leases, verify the quality of satellite transmissions and identify sources of unauthorised transmissions.

TV content collection

Cyta's teleport facilities also serve as satellite content collection nodes for its Internet Protocol television (IP-TV) Cytavision service and its wholesale customers. This includes reception of hundreds of TV channels from numerous satellites. All the content is actively monitored on a 24-hour basis.

TV turnaround services

IRIS, a wholly-owned subsidiary company of Cyta, provides TV turnaround services including satellite broadcasting on multiple satellites covering Europe, the Middle East and Asia. IRIS also offers occasional services for video turnaround of special events around the globe. The subsidiary company provides dedicated satellite links for broadcasting and distribution, as well as hybrid solutions, with a combination of fibre and satellite means.

Ideal location

"Cyprus provides an ideal geographical location with optimal conditions for satellite communications," said Koulias.

"Cyta has the necessary tools to bring together fibre and satellite products and offer integrated solutions. Cyta possesses a set of important capabilities that make it an attractive partner to the prospective customer."

These include extensive experience in the provision of international telecommunications products, a modern fibre network with international points-of-presence (POPs) and dedicated teleport facilities for satellite access.

"Cyta enjoys a solid reputation of providing reliable quality services to its customers," added Koulias.

Is open access the way?

Ways need to be found for the massive investment needed

If Cyprus is to keep pace with the rapid increase in demand for faster and faster telecommunications, one way it might do so is through cross-country open-access systems.

Open access has long been used in land-based telecoms systems as a way of increasing competition in the national market and encouraging established players to keep investing in more technology.

Now, telecoms players are beginning to use open access for submarine cables as well, such as the Africa Coast to Europe (ACE) submarine cable.

However, the concept has both its advantages and disadvantages.

The basic idea behind open access is that the owner of the infrastructure leases the use of that infrastructure to other companies.

In telecoms, that has traditionally seen telecom operators renting their landlines or internet connections to other telecoms operators, on a wholesale basis.

The pros and cons

Open access has both advantages and challenges. On the plus side, the OECD reports that the systems helped increase the number of unbundled broadband lines in the UK from 123,000 in 2005 to more than 8 million by 2012.

The European Commission reports that broadband prices in Europe dropped by 22.8% between 2012 and 2015 for the 30-1000 Mbps service.

Open access has also encouraged 'legacy companies' (typically the originally state-owned monopolies) to invest more, in order to keep one step ahead of the competition, according to the OECD.

Open access is not without its problems, however. As noted by the International Telecommunications Union (ITU), open access reduces market share. This can create disincentives to the dominant operator to invest in expensive new technology if they feel their return on it will be eaten by other operators.

The OECD recommends that regulators "balance the benefits of open-access policies against the incentives for different actors to invest in infrastructure and services".

Could it work for submarine cable systems?

With the right regulatory incentives, open access could provide a solution to the massive investment needed to keep up with global demand for cross-country high-speed connections. This might be pertinent in areas like foreign exchange trading (a big sector in Cyprus) where very high-speed international networks are a necessity.

But Cyprus might not be able to do it alone. It will need to find the right partners.

"We understand that business development in the new era is fuelled by alliances, which reinforce the constituent parties and create synergies and added value. Our expansion strategy is, therefore, based on such strategic alliances," said Yiannis Koulias, Cyta's Chief Commercial Officer.

***OPEN** access has pros and cons*

This allows Cyta to provide "total solutions", he said.

"We have the people, the products, the expertise and the experience that provide the key to success. We can plan and design global networks. We can build them. We can operate them for our customers. We can provide enhanced applications. We can do any one of these things, or we can do all of them, together," he says.

"Consulting through telecommunications, information technology and business knowledge, Cyta is pioneering a whole new way of managing bandwidth, networks and applications."

From East to West, we keep you in touch

We are based in Cyprus, at the crossroads of Europe, Asia and Africa. Through our state-of-the-art global network, we provide a wide range of international telecommunications products, services and integrated solutions, turning the country into a major telecommunications hub in the Eastern Mediterranean and an exceptional international electronic communications centre.

- Submarine cable capacity
- Satellite turnaround services and teleport facilities
- Dedicated fiber links to major international POPs
- Ethernet, MPLS-VPN connections and private leased lines
- Global internet connectivity
- Premium quality international wholesale telephony

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