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SOUTHERN ASIAN WIRELESS COMMUNICATIONS



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Sepura is a global leader in the design, development and supply of digital radio solutions, providing comprehensive support for critical communications users in public safety, transport, manufacturing, utilities, airports and other sectors.

Based in the UK in the Cambridge technology hub, Sepura is a trusted partner for Professional Mobile Radio public safety and commercial users across the globe. Since it was founded in 2002 Sepura has brought together radio infrastructure, terminals and data applications to create compelling solutions that enable its customers in over 100 countries address the demanding operational challenges that they face every day.

The company has a long history of being first to market with product innovation and has recently launched its first LTE product to complement its proven range of TETRA devices, which are trusted by organisations around the world to support their communication needs.

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3i Infotech wins WiFi monetisation deal from RailTel

3i Infotech has won a five-year WiFi monetisation deal from RailTel Corporation of India, a central government PSU (public sector undertaking), which owns a pan-Indian optical fibre cable network of over 60,000km along Indian Railways railway track.

Reaching the next 200 million customers, it will roll out what RailTel calls its Super App, which will provide the right platform for digital advertisers and marketers to massmarket regional and hyper-local advertisements and content.

The Super App will provide access to Indian Railways services/ information, value-added services – such as infotainment, e-commerce, education, and premium content services – and free high-speed internet access to its users.

The revenue streams proposed under the project include both the Super App and a captive WiFi network, through which the partnering companies hope to unlock advertising revenue.

The project has been won by a consortium led by 3i Infotech, which is also the lead bidder. The project will cover more than 6,108 railway stations across every state, city, town, and district of India where free public WiFi networks have already been made available by RailTel.

Under the terms of the contract, the

3i Infotech-led consortium will have a revenue-sharing agreement along with minimum revenue assurance to RailTel.

"This project is a strategic fit towards expanding our edge computing capabilities," said Thompson P Gnanam, managing director & global CEO, 3i Infotech. "With this win, we will aim to further expand our business in the telecom, media and entertainment verticals as we foray into media technology."



Globalstar to build ground station at Thaicom teleport

Thailand's National Broadcasting and Telecommunications Commission has granted Globalstar a green light to operate a ground station, enabling it to deliver nationwide mobile services. The ground station is located at Thaicom's teleport centre in Pathum Thani province, north of Bangkok.

Globalstar VP of regulatory affairs L Barbee Ponder said

that the station joins 27 others in 17 countries and makes it the first company in Thailand to have authorisation to deliver services via a constellation of low Earth orbit (LEO) satellites. The offering includes emergency SOS communications serving hundreds of millions of people globally.

Thaicom CEO Patompob Suwansiri said the partnership is "a strategic move in expanding our portfolio of cooperation with a leading global LEO operator, which will complement our existing satellite services." He added that their shared experience will deliver advanced satellite services for the digital era and "lay the foundation for a long-term relationship and sustainable growth in the satellite industry in this region."

Indian Railways adopts IoT

Indian Railways is collaborating with Indian Space Research Organization (ISRO) for live tracking of trains under the Real Time Train Information System project.

The Rs250 crore project envisages installation of Internet of Things (IoT) devices in 8,700 locomotives to track position on a real time basis, according to Centre For Railways Information System (CRIS); the Railways software arm.

"Doing away with the manual system completely, the locos would be equipped with the traffic devices for live tracking of trains and for this Centre for Railway Information System (CRIS) has collaborated with ISRO under Real Time Train Information System (RTIS) project," said CRIS MD, DK Singh.

Devices have been installed on 4,000 locomotives to date, with another 4,700 set for installation in the next 15 months.

Data analytics may provide valuable insights that can help in optimizing various operations of the Indian Railways. It can be used to improve maintenance, enhance the efficiency of the train schedules, and reduce operational costs. By analysing data, Indian Railways can predict the demand for trains, and plan to provide adequate resources. This, in turn, can help in reducing congestion and minimizing delays.

Data analytics can also play a vital role in enhancing customer experience by providing better services and help in providing an integrated transportation system. By analysing data, Indian Railways can identify the busiest routes, and can plan better intermodal transportation to ensure efficient and seamless transportation services.



Telkom Malaysia and ZTE to collaborate on 50Gbps optical network research

Telekom Malaysia's TM R&D has signed an MoU with ZTE that will see the companies collaborate on optical network research, bringing the first 50Gbps bandwidth experience to Malaysia.

The MoU was signed by Dr Sharlene Thiagarajah, Chief Executive Officer, TM R&D and Steven Ge, Chief Executive Officer, ZTE Malaysia.

Under the agreement, TM R&D and ZTE will jointly explore the capabilities of next-generation passive optical network (PON) access technology, 50GPON, to support various application scenarios. In addition, both entities will look into use cases that can deliver ultra-broadband access to the government, enterprise and consumers, as well as support the requirements of innovative services such as 5G, Cloud Virtual Reality (VR), industrial intelligent manufacturing for high bandwidth, low latency & jitter, and clock synchronisation, all of which will enhance the user experience in Malaysia.

"TM R&D is committed to conducting research on future technologies and innovating new value-added smarter eco-systems that will improve the quality of user experience, and ultimately bring a positive impact on their lives. This fits well into the TM Group's transformation towards becoming a human-centred TechCo," said Sharlene Thiagarajah, CEO, TM R&D.

"With Gigabit home broadband services widely used in Malaysia at present, and the basic fixed network is in the time window of evolution from GPON to 10G PON, this partnership could not have come at a better time," said Steven Ge, CEO, ZTE Malaysia.

Globe's submarine cable due for completion in April

Globe Telecom's \$150 million Philippine Domestic Submarine Cable Network (PDSCN) is on track for completion in April.

This construction, the longest of its kind in the country, will further boost digitalization throughout the countryside as part of a fresh round of cable landings set for this year.

For the project, Globe partnered with Eastern Communications and InfiniVAN Inc. to provide equitable and reliable connectivity across



the country, including previously unserved and underserved areas in the Philippines. PDSCN, which has a total cable distance of 2,500km, will soon kick off landing cables in nine remaining segments that cover 13 sites.

The project launched in Subic Bay, Zambales, in July 2022 and has already completed 15 segments across the country, including key cities and tourist destinations.

"As the Philippines continues to build a digital economy, Globe is steadfast in its efforts to bring fast and reliable connectivity to all. We are committed to supporting the government's initiatives towards innovation, e-governance and greater digital adoption among Filipinos through our investments in PDSCN and other network infrastructure," said Globe Group president and CEO, Ernest Cu.

The PDSCN project is part of Globe's network expansion, which aligns with its commitment to improving infrastructure and foster innovation towards development under the United Nations Sustainable Development Goals.

As the PDSCN project nears completion, Globe is shifting its focus towards capital efficiency and optimization, with plans to reduce its capital expenditures budget to \$1.3 billion in 2023 and \$1 billion in 2024 from approximately \$1.9 billion in 2022. This move aims to optimize spending in the next few years by maximizing the utilization of fibre assets and taking advantage of arrangements with tower companies to boost tower construction.

MEASAT extends broadband services

MEASAT has selected Hughes' Jupiter System ground platform to enable broadband services on the MEASAT-3d high throughput satellite (HTS).

MEASAT-3d will leverage the Jupiter System gateway and terminals to extend its CONNECTme NOW satellite broadband services throughout Malaysia.

"The Hughes Jupiter System will help us turn our ambitions for MEASAT-3d into reality, serving more than two million unconnected citizens across Malaysia within the next three years," said Yau Chyong Lim, COO, MEASAT.

Launched on June 22, 2022, MEASAT-3d increased the company's broadband capacity ten-fold from 3Gbps to 30Gbps. Now powered by the Jupiter ground system, the new satellite delivers broadband service with download speeds of up to 100Mbps.

"MEASAT's choice of the Jupiter System to enable service on the MEASAT-3d HTS underscores their commitment to delivering greater connectivity across Malaysia," said Ramesh Ramaswamy, executive vice president and general manager, international division, EchoStar.

"We value the partnership and the trust MEASAT has placed in Hughes in helping to bridge the digital divide," added Ramaswamy.



The USTDA and AirJaldi Networks have forged a partnership focusing on digital connectivity in India.

USTDA, the US Trade and Development Agency, has awarded a grant to AirJaldi Networks for a feasibility study to help expand broadband connectivity to more than 30 million people in rural and periurban communities across India.

USTDA links US businesses to export opportunities by funding project preparation and partnershipbuilding activities that develop sustainable infrastructure and foster economic growth in partner countries. AirJaldi is a leading innovator and implementer of technically and economically viable internet connectivity solutions for rural areas.

To conduct the study AirJaldi selected Vernonburg Group, which will evaluate the technical and economic viability of expanding AirJaldi's broadband network into new rural and peri-urban areas, as well as modelling sustainable business cases and scenarios for delivering affordable connectivity and value-added digital services for customers in these markets.

In addition, it will identify and prioritize infrastructure investments for AirJaldi to expand broadband connectivity across 16 Indian states, design network architecture, evaluate technology options and provide a financing plan. The study will also assess other critical areas that will be necessary for the project's implementation.



83.4 million financial spam text messages blocked in 2022

Globe Telecom blocked 83.4 million bank-related spam messages in 2022 in a move that was streamlined by partnering with all major banks and online retailers in the Philippines. The company also spent US\$20 million to upgrade its spam and scam SMS detection and blocking system. The system also filters out nefarious messages not only in SMS messages but also in



messenger apps.

"Our customers are our top priority so we do our best to ensure that they are protected from scammers and fraudsters. We will continue to invest in cybersecurity systems and work tirelessly to provide them with a safe and enjoyable online experience as we also take part in the full implementation of the SIM Registration Act." said Globe chief information security officer Anton Bonifacio. "With our relentless proactive blocking efforts and implementation of the new law, we are taking great strides in our campaign to end text fraud."

The Philippines enacted its SIM card registration law on 27 December 2022 to safeguard consumers from rising digital security risks such as text and call scams, as well misinformation.

Multinet chooses IP Infusion for nationwide IP upgrade

Multinet has selected IP Infusion's OcNOS® networking operating system in its nationwide IP upgrade to 3.2Tbps. This project, based on solutions developed by Telecom Infra Project (TIP), is the largest Open Optical and Packet Transport (OOPT) project to date.

Multinet will be upgrading its transport network that spans the entire country covering more than 120 cities, across more than 14,000km, and supporting more than 150 million people in the region. Multinet's expansive upgrade incorporates Cassini, TIP's disaggregated coherent switch and open packet transponder built by Edgecore Networks, and IP Infusion's OcNOS, the industry's first full-featured network OS for white box disaggregated network solutions that provides the scalable transition from traditional networks to open networks. Greatly expanding capacity, this long-haul network infrastructure deployment upgrades the network to 3.2Tbps capacity using TIP Open Optical solutions which have been designed to provide better connectivity around the world. Multinet's long-haul network infrastructure deployment includes additional TIP Open Optical ecosystem partners SmartOptics along with local system integrator partner in Pakistan, STARCOM Technologies (Pvt) Limited.

"IP Infusion's OcNOS was the clear choice to future-proof our network," said Adnan Zaidi, COO of Multinet. "IP Infusion's highly rated disaggregated architecture, open and complete transparency on all network element requirements, competitive pricing and simplified licensing are integral to advancing connectivity solutions across Pakistan. Being the world's first Open Optical Framework deployment of this scale, I am proud to bring this venture home. The network upgrade will be of national significance as this will not only serve the exponential growth in the capacity demand but will also expand network access to new urban, semi urban and rural areas."

Dialog completes South Asia's first mmWave 5G test

Dialog has successfully tested mmWave 5G for the first time in South Asia. Conducted through its fully owned subsidiary, Dialog Broadband Networks, the trials achieved 5G download speeds greater than 4Gbps on non-standalone (NSA) mode using mmWave, attaining significantly higher throughputs than current standards.

mmWave solutions work in highfrequency ranges and provide ultra-capacity over short distances, allowing for wider bandwidth, as well as faster uplinks and downlinks, enabling users to leverage all the benefits of 5G. Deployment of mmWave technology will enhance fixed broadband performance levels and enable low-latency industry applications, including industrial automation, healthcare, intelligent transport systems, and virtual reality.

"With 5G mmWave gaining momentum around the world as a game-changer for consumers and businesses alike, we are pleased to be the first operator in South Asia to demonstrate enhanced network capabilities with this range, keeping true to our brand ethos of delivering 'The Future. Today.' With this successful trial, we have opened a new chapter in Sri Lanka's ICT landscape, and we look forward to the endless opportunities and innovative applications our 5G network will usher in, powered by the best-in-class technologies such as mmWave," said Supun Weerasinghe, director, Dialog Broadband Networks (Pvt) Ltd.

XL Axiata increases base station presence by 42%

XL Axiata has increased its base station presence by 1,100 sites (42% year-on-year), with coverage now reaching 75% of the location with its latest deployment on the island province of Kalimantan in Borneo.

The base stations were rolled out across all five provinces of Kalimantan. XL Axiata's 4G network now reaches 1,800 villages and 466 sub-districts in 55 cities/regions. Data traffic on the island increased by 29% year-on-year, the operator claimed, showcasing pent-up demand. Its network in Kalimantan is supported by more than 9,800 base stations including 5,800 which are LTE sites, and inter-regional fibre-optic cables.

"Apart from the business aspect, our vision in expanding data networks to various regions of Kalimantan is to support accelerated development," said XL Axiata acting regional group head of Kalimantan, Horas Lubis. "We want to contribute to the local government's efforts to advance the Kalimantan region, including preparing for the construction of network infrastructure in the National Capital Region. Quality data network infrastructure, including the availability of a fast internet connection, will enable the implementation of digitization in various fields which will ultimately support accelerated development in Kalimantan."

XL Axiata is focused on growth in the more remote locations that border the Malaysian portion of Borneo, namely the provinces of West Kalimantan, North Kalimantan and East Kalimantan. Currently, the company is finishing re-farming 3G spectrum to 4G, having completed this process for 90% of base stations in Kalimantan.

WorldLink gains huge investments for ISP

WorldLink Communications has received a series B investment of NRs 1.08 billion from British International Investment (BII), the UK government's development finance institution and impact investor, and NRs 900 million from Dolma Impact Fund II (DIF II).

Dolma is the largest private equity fund manager focused on Nepal, with over US\$100 million currently under management. The sector focus of the Dolma Impact Fund reflects areas of both high commercial growth and strong developmental impact.

This combined investment is described as one of the largest in the internet sector in the country to date. In October 2019, BII invested NRs 1.35 billion in WorldLink. Total foreign investment in the company has reached NRs 3.33 billion.

WorldLink Communications will use the investment to speed up its internet expansion activities across the country, focusing on rural areas. The capital provided by BII and DIF II will enable WorldLink to provide reliable internet service to more small and medium enterprises and households, supporting the development of enterprises and connecting them with the international market.



FunP Innovation to bring smart retail to Indonesia

FunP Innovation Group has secured US\$3.12 million in additional investments to fuel a smart retail and cloud drive into the Indonesian market.

The company received the support of Ennoconn Corporation, a global leader in integrated cloud management services, industrial internet of things (IIoT) and embedded technology, in the funding round.

FunP Innovation Group (BVI) controls cacaFly, a leading digital

advertising sales consulting agency, and Tenmax.io, an advertising technology development. Both have spearheaded earlier initiatives in Indonesia, including a joint venture to form a data-driven digital marketing agency for Indonesia, a partnership with Google Cloud to launch a Cloud Al+ Solution Centre in Taiwan and a partnership to develop a one-stop digital advertising solution.

FunP has said that it will use the extra funding to deliver smart retail and cloud

services solutions for the Indonesian market and other Asia Pacific countries, under its cacaFly business unit and in a partnership with Ennoconn.

"Ennoconn's capabilities in AloT, together with our own in cloud computing and marketing technology, equals the opportunity to develop pioneering retail solutions for Indonesia and beyond," said Brian Yang, FunP group co-founder and chief strategy officer.



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Telkom Indonesia appoints NEC Corporation and ADVA for time synchronisation

NEC Corporation and ADVA will jointly deploy time synchronization solutions for Telkom Indonesia, the largest fixed network operator in Indonesia, to help prepare its transport network to deliver time-sensitive 5G services across the country.

To meet the anticipated demands of mobile operators and partners using Telkom Indonesia's services, the company is enhancing the timing accuracy of its transport network.

NEC and ADVA will deliver solutions that support the precision time protocol telecom profile for phase/time synchronization with full timing support from the network (PTP G.8275.1/2), recommended by the International Telecommunication Union (ITU) for the adoption of 5G networks. The network will further enable superior customer experiences even in dense urban areas like Jakarta and other central cities. Time synchronization will also enable a flexible architecture that will accommodate the unique requirements for each region.

"Working in close partnership with NEC, we're helping ensure that Telkom Indonesia can make the leap to highly reliable and accurate 5G timing. Our PTP grandmaster clock technology will provide vital backup to GNSS-based synchronization. delivering stable and precise timing from the core to an increasing number of edge locations," said Gil Biran, GM of Oscilloquartz, ADVA. "NEC's team shares our drive to exceed expectations and empower customers to succeed. Together, we're bringing the levels of reliability and stability that Telkom Indonesia's 5G network needs for the high-bandwidth, ultra-low latency services of tomorrow."

NEC has been a trusted partner to Telkom Indonesia for over 30 years, supplying carrier-grade services with end-to-end project management ranging from consultancy, design and implementation to operational support, leveraging its nation-wide service coverage across numerous islands. Based on extensive



knowledge of the operator's network and its experience deploying time synchronization solutions globally as part of 5G xHaul Transformation Services, NEC is leading the system integration of the total project.

"NEC is honoured to extend our partnership with Telkom Indonesia," said Hideyuki Ogata, GM, service provider solutions department, NEC Corporation. "Capitalizing on our global alliance partnership with ADVA and its industry-leading technology, we are confident this project will lead to another step in developing replicable industry best practices and bringing to life inspiring new customer experiences with 5G networks."

NavTech to transfer LiFi tech to Indian Institute of Technology-Delhi

Nav Wireless Technologies Pvt Ltd (NavTech) has signed an agreement with the Indian Institute of Technology-Delhi through its technology transfer body - Foundation for Innovation and Technology Transfer – to transfer the developed LiFi technology to the Ahmedabad based company.

"NavTech is the pioneer and leading technology company in India working on optical wireless communications – LiFi | FSO technologies and developed products. We are glad to join hands with one of India's premier technology institutions for further development of LiFi technology," said Hardik Soni from NavTech.

IIT-D with support of NavTech will design an indigenous LiFi network based on visible lights. This solution will be energy efficient as the same transceivers will be used both for illumination and communication. The development of LiFi networks on visible light is rare. The developed solution will aim to deliver high bit rates to mobile users – a challenging task due to the highly directional light beams.

India to gain cloud gaming anywhere, anytime

JioGames has partnered with Gamestream to launch a 10-year strategic partnership that will provide 1.4 billion Indians with unlimited access to cloud gaming anywhere, anytime. Described as India's own cloud gaming platform, JioGamesCloud will enable consolelike gaming easily accessible across devices.

The partnership combines Gamestream's technological and cloud gaming expertise with Reliance Jio's digital reach. It will see



JioGames emerge as a leading cloud gaming player in India at a time when the country is poised to play a major part in the global video game market.

Gamestream says it will enrich JioGamesCloud's comprehensive library with over 100 licences for families and casual gamers alike, with additional games added each month.

JioGamesCloud is currently live in its public beta. It is currently available free of cost for a limited period of time across Jio set-top box, Android smartphones and select web browsers. Described as a one-stop hub that brings multiple stakeholders from the world of gaming together gamers, game publishers, spectators, and gaming communities - JioGames is present across multiple devices like smartphones and feature phones, and in home gaming via settop boxes. It offers cloud gaming, livestreaming, esports opportunities and solutions and enables gaming powered by cloud technology.

"We are glad to partner with NavTech for the development of indigenous LiFi network, targeting the demands of future 6G technology. We envision a health-safe indoor system with high throughput, low latency, and high security. As 6G research has picked up globally, our LiFi network can build upon our country's ecosystem with its inherent energy efficiency and can satisfy some of its use cases. Our system will address three goals: scalable, intelligent, and affordable," said Abhishek Dixit, department of electrical engineering, IIT-Delhi.



30 million SIM registrations in days

Operators in the Philippines have signed more than 30 million SIM cards in days since the introduction of the SIM card registration law to combat hackers and fraudulent activity.

The Department of Information and Technology (DICT) detailed the figure is 17.76% of 168.9 million subscribers nationwide.

PLDT subsidiary Smart Communications reported 15.4 million customers registered their SIM cards, some 22.76% of its subscriber base. Globe Telecom recorded 12.2 million SIM cards which accounts for 13.89% of its 87.8 million customer base. Meanwhile, DITO Telecommunity reported 2.3 million registered SIM cards, 17.79% of its 13.1 million subscribers.

"We are seeing good progress in terms of the registered subscribers, and we look forward to how this will translate to a safer and more secure digital communications in the coming days," said DICT secretary Ivan John Uy.

DICT is also collaborating with the National Telecommunications Commission to register SIM cards in 15 remote regions.

The Philippines ratified its SIM

registration law in February with support from operators due to large scale fraud from scam text messages and phone calls, which prompted operators to beef up security systems.



Globe Telecom hits infrastructure targets

Globe Telecom has hit infrastructure deployment targets as it continues its build-out to meet consumer demand for connectivity, which has gathered pace since the pandemic.

Globe built 1,702 new cell sites, upgraded over 13,600 mobile sites to LTE and installed 2,267 new 5G sites nationwide in 2022. The company said it fast outstripped its 2021 build which totalled 1,407 sites.

"We are proud to have made huge investments in our network infrastructure to provide our customers with the best possible experience. Our goal is to always deliver network reliability and consistency to our subscribers," said Globe Telecom head of network planning and engineering Joel Agustin.

The company spent PHP101.4 billion on capex which was 9% up for 2021, marking this as the highest investment ever in Globe's infrastructure.

Globe implemented multi-beam, multiband lens antenna technology for its deployment, crediting the new technology for significantly enhancing its capacity and coverage of 4G and 5G networks. It will be deployed in more locations due to positive pilot results.

Marlink adds Starlink to EPS smart hybrid network

Marlink is adding Starlink LEO connectivity to Eastern Pacific Shipping's (EPS) existing smart hybrid network as the Singapore-based ship manager looks to enhance business operations and seafarer wellbeing services across its fleet.

The Starlink service will initially be trialled onboard selected vessels, integrated into the smart blend of networks fully managed by Marlink, which already serves most of the EPS fleet with VSAT connectivity and multiple L-band backup alternatives.

A Marlink customer since 2016, EPS has progressively adopted digital solutions to support the efficiency and safety of its operations. This includes a strong focus on digitalisation, sustainability, covering all aspects of environmental protection and programs to enhance crew welfare.

"Marlink is the right partner to help EPS evaluate and potentially adopt new services that can enhance our operational and seafarer wellbeing strategies," said Max Wong, head of IT, Eastern Pacific Shipping. "These trials will provide us with insights into how high throughput and low latency data transfer capabilities will affect business use cases on our vessels. We are optimistic that a successful trial will enable us to accelerate technology adoption, allowing us to do more with less."

EPS is currently undergoing unprecedented growth with an expanding orderbook increasing the fleet size to 21m DWT under management. To manage this exponential growth in a fast-changing environment, EPS is shifting its culture from managing ships to leading people. Supporting this culture shift is the EPS Life at Sea Programme – a robust initiative designed to improve the long term mental and physical wellbeing of its 6,000 strong workforce.

"The focus on new LEO services as a component of the Marlink smart hybrid network is increasing rapidly as shipowners focus on new ways to deliver crew welfare and smart connectivity services," said Tore Morten Olsen, president, maritime, Marlink. "Our partnership with Eastern Pacific creates the opportunity to understand and evaluate what Starlink can bring to the table alongside our established hybrid network offering."

Kacific chooses ST Engineering iDirect for ground infrastructure

Kacific Broadband Satellites Group and ST Engineering iDirect have reaffirmed their long-term technology partnership through deep cooperation on the ground systems infrastructure for Kacific's fleet of satellites.

ST Engineering iDirect, whose Dialog hub platform was instrumental to Kacific1's highly successful program, will provide a comprehensive next-generation ground infrastructure including systems integration, as part of this strategic partnership.

Kacific is working to expand its capabilities and coverage, adding capacity many times over with services throughout southeast Asia and the Pacific. As a first step, its next-generation satellite aims to address the soaring demand for satellite connectivity in its existing southeast Asian markets, and extend its reach further into southeast Asia, central and western Asia, and eastern Africa. The International Data Corporation (IDC) suggests that satellite bandwidth sold across the Asia-Pacific would reach 335.6Gbps by 2026, with an estimated 1 billion unconnected people in Kacific's areas of interest, representing a total addressable market of US\$8 billion.

The upcoming Kacific nextgeneration satellites are planned to be reconfigurable, with flexible bandwidth allocation and high spectral efficiency. ST Engineering iDirect will match the space segment with a new generation of fully scalable, distributed ground systems that leverage standardsbased, automated resource and service orchestration to enable dynamic allocation of satellite resources. lts next-generation ground system will enable extremely flexible services that align with new applications and changing customer demands and facilitate the delivery of ultra-high-throughput services that can meet the demands of the most challenging applications, from community access to business networks.

Kacific will take advantage of the latest advancements in virtualization and cloudification for unprecedented scale and ease of operations. With a fully digitalized ground network, the Kacific satellites will accelerate new services and capabilities to market and meet the growing demand across the region.

These new innovations, combined with ST Engineering iDirect's nextgeneration Network Management System (NMS), will allow Kacific to streamline the management and operations of a complex large-scale network, optimizing costs, performance, and quality of the service delivery to ensure exceptional customer experience.

Nokia to supply BNG to Netplus Broadband

Nokia has entered into a partnership with Netplus Broadband to supply its multi-access gateway broadband network gateway (BNG) application for access management, hosted on the FP5-based 7750 SR, and the 7250 IXR, which provides highdensity aggregation, to scale Netplus' broadband services throughout northern India.

The 7750 SR is based on Nokia's industry leading FP5 silicon, which helps enable world-class broadband services with highly scalable subscriber management, granular bandwidth management and per-subscriber policy control, as well as deterministic performance and a 75% reduction in power consumption over FP4 silicon.

In addition, Netplus will also deploy Nokia's 7750 SR Extended Services Appliance (ESA) to scale support of Carrier Grade Network Address Translation (CGNAT), helping it solve the challenges faced by increasing demand for connected endpoints.

Netplus will be partnering with Nokia's IP Networks services team to support the deployment of the Nokia products and applications to deliver the new, quad-play residential broadband services to its subscriber base of one million plus across the state of Punjab.

"Our partnership with Nokia will help us achieve our goals of a worldclass broadband experience for our customers and last-mile broadband expansion with the benefit of added capacity," said Arshdeep Singh Mundi, executive director at Netplus. The expanded coverage will leverage Nokia's state of the art broadband access infrastructure and help Netplus cater to our customers' increasing demand, helping drive the Digital India vision."

"We're pleased to partner with Netplus to supply our industry-leading IP products. Our Multi-Access Gateway BNG, hosted on our 7750 SR platform, and 7250 IXR offers a scalable and high-capacity infrastructure to enable ISPs like Netplus to build a foundation for rapid broadband access growth across India," said Vach Kompella, vice president, IP Networks Division at Nokia.

Talking critical

Securing critical infrastructures against cyber quantum attacks

With the world facing growing challenges including the war in Europe and a global energy crisis, it is essential that the mission and business critical communications networks used by the public safety, critical infrastructure, and utilities sectors (including transportation, electricity, natural gas and water plants) are secured against third-party attacks, to protect communications and sensitive data.

With more than 120 countries using dedicated TETRA (Terrestrial Trunked Radio) networks for these critical services, work has been undertaken to ensure the ETSI TETRA technology standard remains robust in the face of evolving threats. Demand for TETRA technology will continue to increase at a CAGR of 4.7% in the 2021-2026 forecast period, according to Omdia.

To adapt to technology innovations and potential cybersecurity attacks, including from quantum computers, the ETSI technical committee TCCE has completed work on new algorithms designed to secure TETRA networks for at least the next 20 years. These new specifications have been developed in close collaboration with quantum safe cryptography experts from ETSI. This work was carried out with the support of TCCA, the global representative organisation responsible for the enhancement of the TETRA standard.

TETRA is widely used by public safety agencies around the world as, in addition to secure and resilient network communications, it also offers direct peer-to-peer critical communications without the need for a supporting network in situations such as natural disasters and emergencies.

Professional users generally need features to enable them to work effectively. These include secure encrypted networks, calls, and two-way radio messaging, assured coverage and call quality, the ability to send voice, data and images, direct mode operation as mentioned, which allows rapid communications between groups of workers (such as an emergency service response team at a major incident), and managed

Brian Murgatroyd, chair of ETSI's TCCE committee

fall-back for additional resilience. TETRA has characteristics in common with the mobile networks with which we are all familiar but offers the additional features which are required to meet these needs.

By far the largest market for TETRA is that of public safety, where the trend is for the deployment of nationwide networks shared by all public safety organisations for reasons of economics, autonomy of operation for routine communications and the ability to fully interoperate with other services during emergency situations and disasters. TETRA networks are also operational worldwide in many vertical markets including transportation, utilities, oil and gas, mining, government, and the military, commercial and industry, and are deployed for major events such as the Olympic Games.

Communication security is an essential prerequisite for the success of mission critical operations. The protection against eavesdropping and manipulation of voice and data as well as the exclusion of third-party use are therefore indispensable requirements for mission critical communication systems. This is particularly true against the background of increasing cybercrime. TETRA's security features, developed by mission critical communication experts, are modular and complement each other to meet the security requirements of mission critical applications. They are an integral part of the standard and thus guarantee security even when using devices and infrastructure from different manufacturers.

The TETRA standard supports powerful mutual authentication of a device on the one hand and the network on the other. This makes it possible for a TETRA system to control the access to it and for a device to check if a network can be trusted. In addition, applications enable authentication down to the user level. If a device is lost or stolen it is fundamental in a mission critical environment to exclude this device from using the network. TETRA supports different options for secure disabling over the air. The disabling can be either temporary, which leaves the possibility to enable again or permanent, which is irreversible.

As all air interfaces are vulnerable to eavesdropping, TETRA provides

air interface encryption where user and signalling information is encrypted

over the path between mobile devices and infrastructure, both for individual and group communications. The air interface encryption mechanism is available for voice and data and direct mode operation. The use of several encryption algorithms, both standard and proprietary, is also supported, and in addition, a user organisation may easily add an end-to-end encryption system to its own requirements. This flexibility is essential and unique in TETRA, which can be implemented in many forms for different user groups.

TETRA networks can operate either completely standalone, i.e., disconnected from the network, or integrated into the user organisation's communication and IT environment, which enables the use of the protection mechanism of the organisation against cyberattacks and other threats.

The work carried out by ETSI is vital to keep the TETRA cryptography updated with the latest cybersecurity algorithms. This is critical to the variety of sensitive organisations and applications served by TETRA systems. Maintaining TETRA's outstanding and unrivalled level of security is essential, especially in a continuously evolving and challenging context where new cyber threats are coming not only from isolated cybercrime actors, but from organised hostile countries.

These new air interface encryption algorithms will support TETRA into the foreseeable future. They are designed to withstand brute force attack beyond the year 2040 even if quantum computing becomes a viable means of attack, with new over-the-air key management algorithms and authentication keys to further strengthen the security of the standard.

TETRA is essential to the organisations using it. Its use is tightly integrated in the operational procedures and when organisations want to evolve to critical broadband services those operational procedures will also need to evolve.

Simply switching TETRA off and switching critical broadband on in one go will not be possible, so TETRA and broadband will co-exist for quite some time.



Enabling Smart Communications with TETRA+LTE Solutions

Today, mission critical communications rely on dedicated Land Mobile Radio (LMR) networks to provide a high grade of service for availability, reliability, and security. This is vital to supporting users in public safety, emergency response and critical national infrastructure where there is a significant risk to both the individual, the environment, and any members of the public nearby.

Worldwide, many of these networks are based upon the TETRA standard, providing narrowband voice and data services to its users, with a high standard of service and exacting requirements for availability, reliability, and security.

Mission critical users have traditionally relied on voice services but are evolving their operations to encompass many more data services and applications, many of which can be carried over TETRA. There is, however, an increasing need for the use of data services such as video, access to online tools or databases and the ability to upload or download large data items.

These tasks have a much higher bandwidth requirement than narrowband systems can deliver, and require broadband data services, such as LTE, to satisfy this demand.

However, these new platforms do not yet offer equivalent performance for mission critical voice, with many standards yet to be confirmed,



Mission critical users, such as airports or oil refineries are increasingly looking to incorporate data solutions into their critical communications solutions.



Public Safety users such as police and ambulance users will benefit from additional access to data from broadband solutions in the future.

and the technology lacks crucial mission critical voice such as priority or group calls, direct mode operation and end-to-end encryption. There are also concerns over coverage, especially in rural areas.

To answer these needs, and to support organisations transitioning to future LTE solutions, a hybrid device that supports TETRA for mission critical voice, and LTE for access to data provides a solution that is available today.

The SCU3 dual-mode solution is the most recent addition to the portfolio of Sepura, a proven leader in mission critical solutions with over 3 million TETRA devices sold around the world.

Cheng Soi Koh, Business Development Manager for Sepura in Asia outlined why the dual mode device is attracting such interest: "We are seeing across the world a shift to users investigating and testing the opportunities presented by LTE, which has been talked about for some time but is now moving toward reality. "Sepura has spent a lot of time with users around the world, understanding their needs and challenges to ensure that their solution answers these needs. LTE solutions can answer mission critical users operational needs by providing access to critical data in the field. Sepura are perfectly placed to respond to this need with the SCU3.

With Sepura's experience delivering trusted critical communications solutions, the SCU3 dual mode device has been designed for use in vehicles and/or fixed office locations and supports TETRA for mission critical voice and data through 4G/5G or WifFi connectivity.

Built on the market leading Android operating system, the device provides compatibility with a wide range of applications which have been designed to run on existing Android smartphones and tablets, meaning organisations can enable the use of tools such as mapping, database query, connection to third party devices, location reporting and



The SCU3 provides access to broadband features, increasing the flexibility of an organisation's communications solution.

other crucial tools.

Sepura has a proven history of providing mission critical devices to users around the world, in a variety of harsh environments. The SCU3 is the latest evolution of this; a fit for purpose mission critical device, designed for exactly the type of public safety use that Sepura has decades of experience in and now with the advantage of adding broadband data to our solutions.

In combination with the Sepura Accessory Hub, the SCU3 can be connected to a wide range of Sepura and third party accessories, providing flexibility for vehicle and fixed installations, including a Vehicle Control Unit which gives the user complete control, with ergonomic buttons designed to enable safe, error free use in vehicles that may be moving at speed. The option to reuse existing Sepura accessories means the cost of ownership is minimised and training requirements are significantly lowered.

Mission critical users are always looking for ways to extend their capability, and the Sepura hybrid solution enables them to do exactly this; adding broadband data to support their operations, while benefitting from the proven quality, coverage and robustness of TETRA voice communications.

Sepura is a leading provider of mission critical solutions to critical communications users and the SCU3 is the next step forward in supporting our customers around the world. With increasing demand from the market to integrate data into their operations, the SCU3 complements the TETRA solutions used and trusted by Sepura's customers and provides a transition solution to future LTE networks.

Steve Barber, CEO, Sepura



BTRC lifts 'inappropriate' SIM card sale ban on Grameenphone

The Bangladesh Telecommunication Regulatory Commission (BTRC) has lifted its ban on Grameenphone, which was forbidden from selling new SIM cards since June 2022 for poor quality of service.

Grameenphone CEO Yasir Azman confirmed the lifting of the ban after decreeing that the operator had improved its service. Azman initially called the ban "inappropriate" in regard to improving the quality-of-service issues for operators. Grameenphone was the only operator to be issued with such a ban.

Grameenphone has reportedly lost millions of subscribers since the sales ban. As of November 2022, Grameenphone had a customer base of 80.34 million, down from 84.08 million in June.

The BTRC reportedly allowed Grameenphone to sell 1.3 million old unused SIM cards in November 2022 after petitioning various branches of government, but this was backtracked on in October 2022.

Media outlets have reported that the ban stems from a political disagreement between Prime Minister Sheikh Hasina Wazed, and Grameen Bank founder Muhammad Yunus, which has a stake in the operator through subsidiary Grameen Telecom (Telenor has

Airtel reports double-digit gains in Q3

Bharti Airtel recorded a consistent performance across its portfolio in fiscal Q3 2023, which ended on 31 December 2022, with doubledigit gains in its domestic, Africa, mobile and enterprise businesses.

Net profit rose 91% year-on-year to INR15.9 billion, aided by an exceptional gain of INR5.1 billion and revenue grew 19.9% to INR358 billion. Mobile service revenue in India rose 21% to INR193.5 billion, with ARPU up 19% to INR193. The company added 4.4 million mobile subscribers for a total of 332.2 million. Its LTE user base increased 10.8% to 216.7 million, accounting for 65% of its total. Average data usage per customer increased 11% to 20.8GB.

Capex increased 120% to INR63.8 billion, with the operator launching 5G service in more than 20 cities at end-2022. In its earnings statement, MD Gopal Vittal said that its 5G rollout is on track to cover all towns and key rural areas by March 2024. Enterprise revenue increased 16% to INR47.8 billion; home service sales 30% to INR10.3 billion; and TV services 30% to INR7.4 billion.

the majority stake).

"We look forward to receiving continued support and cooperation from the authorities as connectivity plays a pivotal role in the digitalisation and economic growth of the country," said Azman.



AIS achieves 7.3% net profit increase in challenging conditions

AlS' bottom-line in the fourth quarter of 2022 was impacted by continued price competition, particularly in the low-cost unlimited data segment, but the company expects its mobile business to grow in 2023 as uptake of 5G service gains momentum.

AlS has predicted that mobile service revenue will increase by 3-5% this year.

Mobile service revenue in Q4 2022 was flat at THB29.5 billion, with post-paid ARPU down 3.8% to THB455 and prepaid 10% to THB123. Device sales decreased by 15% to THB11.5 billion.

Its 5G user base rose threefold to 6.8 million at end-2022, with the operator claiming coverage reached 85% of the population. Post-paid subscribers increased 9% to 12.6 million and prepaid 2.6% to 33.5 million.

AIS stated despite a challenging cost environment across its operations net profit increased 7.3% to THB7.4 billion, aided by foreign exchange gains of THB572 million.

Total revenue fell 3.3% to THB48.7 billion. Its broadband business and other services revenue each increased by 13% to THB2.6 billion and THB1.7 billion, respectively.

Capex for 2023 is estimated at THB27 billion to THB30 billion, a similar level to 2022.

Starhub optimistic for future

StarHub hit the top band of a revised revenue guidance for 2022 and forecast continued gains this year, driven by mobile, entertainment, and regional ICT services.

In a statement, CEO Nikhil Eapen explained the company made initial investments and nonrecurring provisions which impacted its bottomline in the short term, but are "necessary for us to accelerate growth" in the mid- to long-term.

The operator expects service revenue in 2023 to increase by $8{\cdot}10\%$.

In the first half of 2022, net profit fell 34.6% year-on-year to SGD53.2 million due to higher non-operating expenses stemming from impairment losses on legacy network assets and heightened investments in transformation initiatives. Revenue increased 18.7% to SGD1.3 billion, boosted by acquisitions: without these, the figure was up 9.7%.

Mobile revenue increased 11.1% to SGD296.1

million on subscriber gains and a 10.3% rise in post-paid ARPU to SGD32. Post-paid subscribers rose 5.5% to 1.6 million and prepaid 26.3% to 591,000. Average data usage rose to 14.4GB from 12.7GB. Excluding revenue from acquisitions involving MyRepublic Broadband and JOS, broadband sales increased 2.9% to SGD101.3 million and enterprise 9% to SGD101.3 million. Paid-TV turnover rose 27.1% to SGD119.9 million.



India's smartphone shipments nosedive 27% yoy

India's smartphone market suffered a doubledigit drop in shipments in the fourth quarter 27% year-on-year to 32.4 million units. Total of 2022 as consumer spending weakened, the shipments in the nation during 2022 fell 6% to second consecutive quarter of year-on-year 151.6 million units. declines, as per data from Canalys.

Analyst Sanyam Chaurasia noted the domestic market has started to feel the impact of a global economic slowdown towards the end of 2022, adding economic indicators suggest a sluggish performance in the short term. Canalys, however, expects moderate growth for the full year, "fuelled by a replacement cycle driven by 5G devices," said Chaurasia

Shipments in the final quarter of 2022 fell



Tata **Communications** reports further growth

Tata Communications reports that, for the quarter ended 31st December 2022, growth continued amidst uncertain global market conditions.

Consolidated revenue stood at INR 4,528 crore, up 8.2% year-on-year (YoY). Sequentially, growth in revenue followed upsides in the data business. Consolidated EBITDA was flat at INR 1,077 crore. Consolidated PAT stood at INR 394 crore from INR 395 crore in the third quarter of FY22. Committed CAPEX for this guarter stood at INR 391 crore compared to INR 400 crore in the third quarter of FY22.

Data business revenues grew by 11.1% YoY to INR 3,593 crore and strong momentum in the digital platforms and services segment continued. EBITDA stood at INR 948 crore, backed by consistent delivery in core connectivity and digital platforms and services. The core connectivity portfolio reported growth of 6% YoY in revenue; digital platforms and services delivered robust growth of 17.2% YoY.

"We are pleased to deliver another strong quarter with broad based growth in our Data business across India and international markets. Our expanding portfolio of digital fabric capabilities is enabling us to drive deeper customer engagements improving our funnel and order book," said A.S Lakshminarayanan, MD and CEO, Tata Communications.

"This was another quarter of a growth momentum in our Data Portfolio, reflective of our investments in our people and innovative solutions, in line with our customer's evolving digital needs. Our focus on financial prudence has allowed us to drive inorganic expansion of our global footprint," said Kabir Ahmed Shakir, CFO, Tata Communications.

further delays The merger between India's state-run telecoms carriers Mahanagar Telephone Nigam Limited (MTNL) and Bharat Sanchar Nigam Limited

merger faces

India's MTNL-BSNL

(BSNL) faces another hurdle. The government needs to delist MTNL from the stock exchanges for the merger to proceed to the planned completion at the end of next year.

The legal complexities are being explored and consulting firm Deloitte has been appointed to advise.

This merger has been on hold for more than ten years. The most recent delay was reportedly due to MTNL's debts, which are close to 300 billion rupees.

However, the delisting could be a long process and must involve discussions with markets regulator the Securities and Exchange Board of India (SEBI) as well as a detailed report on the legal issues and how to move

forward with the delisting process.

Both companies have benefited from massive government investment in revival packages over recent years, but improvement in both companies' fortunes has also been tied to voluntary retirement schemes, debt restructuring by raising of bonds, sovereign guarantee allotment administrative of

spectrum for 4G services through capital infusion, monetization of core and non-core assets and, of course, a merger between BSNL and MTNL.

Ooredoo Group reports 4% revenue rise for 2022

Ooredoo Group reported a 4% revenue increase in its 2022 full financial year, from QAR21.9 billion to QAR22.7 billion, as the company saw gains across most of its units.

Net profit for the group in the full year grew by 27% from QAR2.2billion to QAR2.8 billion, although net profit in 2021 was affected by a QAR2.3 billion impairment loss in its exit process from Myanmar, and a QAR1 billion gain from tower sales in Indonesia.

Its customer base stood at 56 million driven by growth across most of its markets which offset the decline from losses seen from Ooredoo Myanmar. Capex for the group was QAR2.7 billion. "Driven by our digital transformation strategy,

opportunities and are confidently poised for further success. Our ability to remain agile and adapt to the rapidly evolving nature of the markets in which we operate positions us well for continued growth and strong returns," said Ooredoo Group managing director Aziz Aluthman Fakhroo.

we are effectively capitalizing on market

The company also wrapped up a merger between Indosat Ooredoo and 3 Indonesia to form Indosat Ooredoo Hutchison (IOH).

In December, Ooredoo Maldives received the Gold 100 award, a prestigious recognition given to the leading 100 business entities in the Maldives.

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Profit and revenue gains for Globe

Globe Telecom recorded profit and revenue gains up from PHP23.7 billion, a 46% surge. in 2022 but will bring down capex and operating expenses in 2023

The operator stated that capex at the end of its 2022 financial year peaked at PHP101.4 billion, a 9% year-on-year rise. Total operating expenses stood at PHP78.9 billion, a rise of 2% from a year ago. The operator noted 2022 was a "challenging year with several macroeconomic and external factors" forcing almost all operating expenses to increase

Mobile service revenue which accounts for 68% of consolidated service revenues, was up 3% to PHP107.5 billion, boosted by a 25% surge in mobile traffic data. Data services grew 8% while declines were seen in voice (13%) and SMS (5%) revenue. Net income reached PP34.6 billion

Globe Telecom predict a contraction in subscriber numbers due to the government's SIM registration mandate, as non-active SIM cards are churned out of the network. But it does not expect the top line to be affected and will result in improved ARPU and active subscriber numbers.

"Despite 2022 being a challenging year marked by inflationary pressures, high-interest rates and weakened consumer confidence." said Globe Telecom CEO Ernest Cu. "Globe once again showed resilience. We are happy that the Globe Group closed the year with strong top-line and EBITDA growth. We also achieved momentous milestones in 2022 where we closed the country's largest-ever tower sale and leaseback agreement."

Continued recovery for Singtel

mobile businesses in Singapore and Australia in its fiscal third quarter (ending 31 December 2022), however, one-off gains from an asset sale a year earlier hit its bottom-line.

CEO Yuen Kuan Moon noted that it was "a challenging quarter but we had distinct positives in the form of the strong roaming recovery" across its consumer and enterprise businesses and a return to customer net adds in Australia. Looking ahead, Yuen said the company is "keeping a tight rein" on business

Singtel has reported a continued recovery in its costs in the current inflationary environment, while balancing the need to invest in growth and innovation.

> Mobile service revenue in Singapore increased 14.3% year-on-year to SGD327 million, with blended ARPU rising 12.5% to SGD27, prepaid subscribers up 5% to 1.4 million and post-paid subscribers 2.2% higher at 2.9 million. Average data usage per customer grew 17.5% to 10GB.

> Singtel noted service revenue gains were partially offset by lower pay-TV and mobile equipment sales.

Globe sells 578 more towers to Phil-Tower for PHP8.6 billion

Globe Telecom received PHP8.6 billion from towers from Globe. Phil-Tower Consortium after transferring 578 out of 1.350 towers to the company.

The tower assets are based on the islands of Visayas and Mindanao, composed of 92% ground-based and 8% rooftop towers.

This latest sale brings Globe up to 2,988 tower transfers out of 7,059 from all deals it previously struck with tower companies, which equates to 42% and raising in total PHP39 billion.

Globe's CFO Rizza Maniego-Eala, said that the cash injection provides "needed financial flexibility," particularly against the backdrop of high inflation and interest rates.

"We believe these partnerships with towercos will help us become more efficient in deploying capital and allow us to reach our goal of bringing down capex spending to US\$1 billion by 2024," said Maniego-Eala.

Phil-Tower president Devid Gunami said the company is eager to take the remaining 772

"We are taking advantage of the arrangements we made with the towercos to accelerate our tower builds and ensure fast and reliable connectivity as we roll out core products and services and diversify into new ventures," said Globe CEO Ernest Cu

"Globe and PhilTower will remain committed to supporting the government's initiatives towards establishing a world-class digital infrastructure nationwide," added Cu.



Mitratel forecasts above average growth for 2023

Dayamitra Telekomunikasi (Mitratel) has forecast growth above the industry average in 2023, after registering double-digit rises in net profit and revenue in 2022 aided by tower acquisitions.

In its earnings release, president director Theodorus Ardi Hartokos said Mitratel has room to expand due to a decreasing debt-to-equity ratio. "We believe the company's performance in 2023 will continue to grow with a focus on asset monetisation and cost efficiency."

Mitratel predicts double-digit revenue growth compared with a 4% rise for the broader industry.

Net profit in 2022 grew 29.3% year-on-year to IDR1.8 trillion and revenue 12.5% to IDR7.7 trillion, driven by 17.4% growth in its tower leasing business to IDR6.34 trillion. Mitratel added 7,212 new towers, 6,000 from Telkomsel and 9,412 tenants in 2022.

The company's debt fell to IDR15.3 trillion from IDR18.1 trillion in 2021.



Dialog Axiata reports loss for 2022

Dialog Axiata dropped to a loss in its full financial 2022 year due to one-off costs and rising operating expenses, despite growing revenue across its segments, namely mobile, fixed line, digital pay TV, international, digital platforms, and tele-infrastructure.

Revenue stood at LKR178.1 billion for its full 2022 financial year, up 26% year-on-year. Income from its broadband network grew 78% to LKR22.2 billion and international revenue doubled. The pay-TV segment also increased sales by 14% to LKR3.5 million. EBITDA took a 12% hit to LKR51.6 billion.

Net loss was recorded at LKR8.3 billion, overshadowing profit of only LKR4.6 billion. This was due to one-off provisions and impairments costing LKR12.1 billion and increased depreciation costs from high capex.

Dialog Axiata spent LKR52 billion on capex which, up 64% year-on-year.

The company expanded its network with over 450 new sites and upgraded over 2,100 sites, while also deploying alternate energy solutions such as solar and Li-on batteries to improve network availability.

PLDT agrees to acquire Sky Cable

PLDT has agreed to acquire 100% of Sky Cable for a total consideration of some PHP6.8 billion, marking the operator's third attempt to take control of a rival's broadband business.

PLDT's board approved the tieup after reaching a deal with Sky Cable's three major shareholders: Sky Vision, ABS-CBN, and Lopez. The transaction covers 1.38 billion common shares.

PLDT's proposed acquisition of Sky Cable's broadband and related assets is subject to standard regulatory approvals and requires the company to shutdown pay-TV and cable business operations.

Sky Cable's customer base comprised more than 300,000 cable users and nearly 350,000 broadband subscribers at end-June 2022. In its third quarter 2022 earnings, PLDT had 3.2 million fixed-line broadband subscribers.

PTCL gains green light for Telenor Pakistan offer

PTCL's board have granted approval for the company to make an offer for Telenor Pakistan.

The offer will consist of between \$800 million and \$1.2 billion, potentially creating the secondlargest operator in the country by number of connections.

PTCL's parent company e& has committed to guaranteeing loans needed to complete the deal and sought government approval to fund the deal in US dollars held offshore due to a liquidity crunch affecting the currency in Pakistan.

Telenor Pakistan closed 2022 G with 49.6 million connections, while PTCL's mobile unit Ufone G had 23.7 million. G

Talking satellite

Satellite & space: a 360 degree view via essential industry training

In my last Talking Satellite column for this publication I briefly referenced the satellite and space industry training offered by GVF and its training resource development partners. In this column I offer some additional perspectives and analysis on the increasing importance of training for a high-growth, high investment, sector in constant need of a reliable supply of human talent.

GVF technical training

GVF Training - a partnership of GVF and SatProf - has a near two decades long history. In serving the technical training needs of some 27,000-plus students to date it is recognised as the established global standard for satellite communications skills training and certifications. The GVF Training portfolio is based on realistic, online, interactive simulations of key skills, covering operation, installation and maintenance of VSAT, marine, and mobile/SNG satellite terminals, in addition to general and specialised satcom theory. The training programme was launched with the objective of building a global force of gualified VSAT installation technicians available in local areas to support expansion of VSAT networks and is additionally focused on imparting interference prevention skills, thereby contributing to combatting unintentional satellite interference.

The GVF training and certification programme has a representative based in India. Riaz Lamak – president of Mahdi Bagh Computers Private Limited, a satcom ground service company based in Pune – is international programme lead at GVF responsible for network validationbenchmarking, onsite capacity building, and humanitarian assistance and disaster response (HADR) communication initiatives. Lamak leverages GVF training resources to contribute to facilitation of performance quality assurance of satellite-based communication solutions.

A sample of the available courses is listed at https://gvftraining.org/

GVF500	Introduction to
	Satellite Communications
GVF505	RF and DC Theory for
	Satellite Systems
GVF506	Theory of Satellite TV System
GVF510 Ed2	Core Skills for

Martin Jarrold, vice president internation programme development, GVF

VSAT ProfessionalsGVF520Satcom FundamentalsGVF521Practical Technique for
VSAT ProfessionalsGVF522Spectrum Analyser TheoryGVF530Core Skills for Mobile Satellite
Terminal OperatorsGVF531Access Procedure SkillsGVF532Core Up-linking Skills

SBQ

The latest training initiative from GVF and SatProf, working with partner organisation Space & Satellite Professionals International (SSPI), is the SBQ Certification, the product of their combined 80-years of experience in space and satellite. Development of the SBQ (Space Business Qualified) Certification arose from the partners' recognition that the satellite industry is undergoing a uniquely fast ramp-up in human resource recruitment, fuelled by rapid innovation which is in turn powered by high levels of investment, rising pressure on available RF spectrum and the falling cost of access to space. The requirements of accelerated growth in the industry's employment needs, and changes in employment patterns, are the challenges that the Space Business Qualified Certification programme has been designed to meet.

Online and self-paced, SBQ enables students to master the fundamentals of the business of space, filling a critical gap in online training for people in the space and satellite industry, many of whom are new to the industry or looking to deepen their knowledge to increase their productivity and advance their career. Students successfully completing all five SBQ Fundamentals courses - Fundamentals of Orbits & Getting into Space (SBQ401), Spacecraft Fundamentals (SBQ402), Space Communications Fundamentals (SBQ403), Space Business - Markets (SBQ404), and Space Business - Finance, Legal & Regulatory (SBQ405) - and a comprehensive exam will receive an SBQ Fundamentals Certification, valid for three years and renewable.

The course series provides a broad introduction to all business aspects of key space industry sectors, including launch, spacecraft, communications, broadcast, earth observation, navigation, and exploration. This content is on the concept and business level rather than depending on in-depth knowledge of mathematics, physics or engineering, because the aim is to equip students for success in the business of space and satellite.

Traditionally, requisite skills and knowledge of the industry are acquired via on-the-job experience and/or in graduate programmes. Whilst still of value, these routes are slow and costly, whereas SBQ saves time and money with teaching through interactive tutorials, videos, illustrations, and

testing to validate understanding a n d reinforce learning, increasing the effectiveness of people working in every discipline, and enhancing their ability to secure promotion. SBQ offers a 360-degree view of the space and satellite industry and the wide range of activities needed to successfully operate in a space-based business:

- People entering the industry will quickly gain a comprehensive understanding to accelerate their success, whether in finding a job or taking on new assignments.
- Long-time employees moving into new fields will fill gaps in their knowledge and be better able to apply experience to challenges in greater responsibilities.
- Employers will more effectively onboard new personnel and improve employee retention.
- Students specialising in a particular engineering, science, legal or regulatory disciplines will gain a broader grasp of the industry.

Satellite is a complex business at the intersection of technology, communications, surveillance, government, and commercial markets and SBQ puts it all into perspective:

- For engineering and technical staff, SBQ prepares them for transition to sales engineering or management positions.
- For people in sales, marketing, and business development, SBQ gives new staff an understanding of industry capabilities, regulatory constraints and emerging opportunities.
- For finance, insurance, and legal staff, SBQ offers context on business models, customer needs, technologies, and regulatory matters.
- For employees in procurement, logistics and regulatory compliance, SBQ provides the background needed to turn an engineer's request for purchase of a particular component into a disciplined procurement process.
- For staff on the management track, SBQ provides a view of the industry that enhances their ability to evaluate opportunities, identify potential partnerships, determine strategy, and execute plans.
- For new graduates, SBQ is a convenient, low-cost programme – and a valuable credential – that eases entry into the space and satellite industry.

5G, IoT, and the move beyond connectivity



Martin Morgan, head of digital marketing, Qvantel

n Southeast Asia, 5G is starting to be rolled out and several operators have even launched 5G standalone (SA) networks. For most existing users, 5G is just like a faster 4G – which is good, but only when 5G SA starts to be rolled out will communications service providers (CSPs) have an opportunity to take a much stronger position when selling IoT services and partnering with companies who provide IoT products.

At present, CSPs provide the connectivity that connects many IoT devices, but when those devices start to be connected by 5G SA, this will present an entirely new ball game for CSPs. They can now go beyond selling connectivity to selling experiences and assurance. 5G SA enables network slicing, which means the CSP can manage the quality of service on the network and monetise accordingly. This ability to offer differing levels of speed and latency for different partners puts the CSPs in a much stronger position in the 5G value chain, and thus enables them to take a more confident approach in entering new markets.

5G is about more than connectivity. A report by ABI Research forecast a very lucrative future for 5G-based business applications in Asia Pacific. 5G private networks are being linked to revenue growth from \$732 million in 2022 to \$13 billion by 2028. In anyone's books, this represents a significant opportunity. Also, 5G network slicing will be a key differentiator and the monetisation impact will be significant. Indeed, AIB forecasts slicing-based revenues to be \$12 billion by 2028.

AIB Research is not alone in forecasting the lucrative impact that 5G-based business applications will have on CSPs. In 2022, Nokia ran a CSP survey (5G Insights: The Path to 5G Monetisation) which asked where new 5G revenues were going to come from. A massive 60% of CSPs expect most new 5G revenues to come from new B2B2X services. This highlights the need for CSPs to get very good at partnering and make it as easy as possible, through a partner portal, for partner companies to create offers that provide 5G connectivity to the IoT devices that they provide. This can include eSIM allocation and management, enabling partners to activate (and pay for) and manage eSIMs in their IoT devices.

CSPs are also starting to look at 5G and IoT to help them set up new businesses and enter new vertical markets. In the study by Nokia. CSPs listed the top five growth verticals that CSPs see the most potential in as smart cities, industry 4.0, telehealth, connected vehicles and entertainment. CSPs are setting up companies to offer digital healthcare whereby they can provide access to a network of medical professionals for video consultations but also provide diagnostic and monitoring devices connected by 5G. Smart cities are another major growth area for CSPs, who are working with cities to provide IoT-based solutions for city planning, traffic management and air quality management. The potential for IoT and 5G to

combine to provide a wide range of connected devices and use cases that can open new revenue streams and make a positive impact on societies is huge.

5G will open new opportunities, but it will also drive change in how CSPs operate and run their business. A good example of this is how CSPs work with partners. With 5G SA, the value chain will be fluid. In some cases, CSPs will be the main point of contact for the customer and in others, they will be providing connectivity to a third-party service provider (e.g., a gaming provider or a healthcare provider), who will have a direct relationship with the end-user

city, real-time patient diagnosis from a connected ambulance and precision robotics in a manufacturing plant. These are critical services and cannot be left to chance. Best-effort connectivity isn't an option here; only guaranteed network performance in terms of speed and latency will suffice. As such, CSPs can put a higher price on service level agreement (SLA)-backed connectivity for such services.

could be described as mission

critical. These include driverless

vehicles, traffic lights in a smart

Going beyond delivering specific slices to support services, there will be cases where slicing is required

"5G will open new opportunities, but it will also drive change in how CSPs operate and run their business. A good example of this is how CSPs work with partners."

customer. The latter will become increasingly popular as CSPs start to offer CaaS (connectivity as a service) where they can provide 5G connectivity to a wide range of companies (from broadcasters to event organisers) who need dedicated 5G connectivity for devices for a limited amount of time. This could be a sports club using drones to provide a 5G 4K broadcast of a football match. With SA 5G and network slicing, the CSPs can charge a premium for high quality of service and low latency and offer wholesale service level agreements as part of the offer.

Many 5G SA use cases are being trialled that involve IoT and

to support events. An example could be an eSports tournament where the gaming company organising the event needs two 5G slices: one for 'VIP' gamers and one for 'basic' gamers. Each is configured for different levels of latency, throughput, capacity, device volumes, locations and so on, according to the SLAs and customer experience index (CEI) parameters agreed on with the CSP.

With 5G we will see more development of IoT applications. This will open new opportunities for CSPs to go beyond selling connectivity, which will speed up the 5G return on investment and open new doors for CSPs to innovate.

FEATURE: CRITICAL COMMUNICATIONS



Acting fast when disaster strikes

The immediate aftermath in the wake of a disaster is a critical time for saving lives and infrastructure, neither of which is possible without effective wireless communications. Amy Saunders consults those in the know for their opinions on critical communications

lobal natural disaster rates are on the rise, with increasing numbers of earthquakes, hurricanes, tsunamis, floods, droughts, and fires recorded decade on decade.

Such disasters leave a trail of death and destruction in their wake; the highest death toll by natural disaster since 1980 came in at 220,000 lives lost during the 2004 Boxing Day tsunami in southeast Asia. The 2010 Pakistan and 2018 Kerala floods, 2015 Nepal earthquake, and recent Turkey-Syria earthquakes are examples of these catastrophic events that have resulted in significant loss of life and extensive

damage to infrastructure.

The link between natural disasters and global warming has been established. Droughts and deforestation increase the risk of landslides after storms; fracking has been linked with increased earthquake activity; and rising global temperatures are increasing droughts and wildfires. Since 2015, seven of the nine hottest temperatures on record were measured, making it a pretty sound conclusion that we can expect natural disasters to continue to increase in frequency and severity as the years go by – unless we get a handle on the climate crisis...

Countries and governments today must ensure that their disaster response plans are up to date and more fine-tuned than ever before.

When disaster strikes...

In the immediate aftermath of a disaster, reestablishing communications is essential to coordinate rescue and relief operations. Many types of disaster disable or destroy terrestrial communications infrastructure like cell towers and fibre, leaving first responders relying on alternative technologies.

Christian Patouraux, founder and CEO of

Kacific Broadband Satellites Group, experienced one of the region's most deadly tsunamis in recent times: the 2004 Indian Ocean Tsunami. He was on a small island where the death rate hit 50%. After the impact, all communication ceased. People were severely wounded and needed emergency evacuation.

"In Southern Asia, disasters like earthquakes and floods usually destroy or uproot mobile towers and fibre lines, and locals or victims are not able to reach out to emergency services. Also, communications between rescue parties and government departments are hindered," says Christian Patouraux, CEO, Kacific Broadband Satellites. "When split-second decisions can lead to saving lives, it is essential to have access to reliable communications infrastructure to make agile decisions and share this information with key personnel leading the rescues."

The availability of wireless connectivity is vital for effective coordination in any disaster response, says Kevin Graham, CEO, TCCA. "Immediate assessment of wireless coverage from existing terrestrial narrowband and mobile cellular networks, if available, in the disaster zone or hotspots is essential for local public protection and disaster (PPDR) first response agencies, essential service organisations, aid organisations and local and international agencies who may also engage to support local resources. Establishing the state of links back to existing agency incident control and command centres and ongoing monitoring of availability of the end-to-end connectivity with terrestrial networks dictates the prioritisation for deployment of additional equipment and network support personnel."

With this in mind, "initially a direct mode of operation (DMO) mission critical communications network needs to be set up, allowing a portable/ temporary base station to provide the capability to support rescue efforts," asserts Koh Cheng Soi, business development manager – Asia, Sepura. "The DMO will enable any subscribers to quickly communicate vital information to team members during the initial rescue effort, particularly in the immediate aftermath when it is still possible to save lives. Having equipment charged and ready to go, including having trained staff on hand, is key for the quick deployment of the communications network."

Dispatching personnel and equipment must be as fast as possible when disaster strikes, reports Winter Leng, ICT specialist and senior technical manager, Hytera. "The first step is to evaluate the situation, categorise the incidents, and develop a response plan to coordinate resources promptly and effectively. The most urgent issue is to grasp the first three days after the occurrence, commonly known as the 'golden 72 hours,' to take search and rescue measures and save lives. Meanwhile, real-time situational awareness is imperative to make informed decisions and share critical information among agencies."

Where coverage is unavailable or has been affected during the disaster, direct mode and local repeater facilities in handheld and vehicle mounted narrowband radios (TETRA/P25/ DMR and analogue), satcoms, high frequency transceivers, and even citizen band radios are relied upon for initial localised communications between individual agency personnel. Graham. "Deployment of portable/ savs vehicle mounted narrowband base stations or cell sites and mobile incident command centres, which may also incorporate satellite backhaul facilities, become the next priority to establish larger coverage, greater capacity, and improved situational awareness for first responder organisations."

Indeed, re-establishing communications in the wake of a disaster is no easy task. The unpredictable and frequent nature of disasters in southern Asia make it difficult to prepare for what's next.

"The region is exposed to natural disasters with some countries having low lying areas with limited coastal defences and others located on known disaster fault lines," says Subodh Vardhan, vice president & managing director South & South East Asia at Motorola Solutions. "From a technology standpoint, this further emphasises the need for robust and reliable communication. The availability of spectrum also differs across countries, so technologies that enable instant, interoperable and seamless communication are very important."

"Disparity wireless communications of infrastructure, low levels of network resiliency and lack of interagency interoperability across the ecosystems are a huge barrier to effective disaster response coordination and recovery," asserts Graham. "The major challenge is encouraging governments to move towards and fund international open standards-based communications infrastructure that supports critical agency and critical industry user functionality, and to ensure terrestrial networks are complemented with adequate satellite-based capability and devices for redundancy and/or for temporary network coverage of the disaster area. This may also necessitate improvements to legal and regulatory policy to enable such capability to be supported."

A large-scale disaster requires the cooperation of multiple agencies and disciplines. "However, the use of different communication technologies by emergency responders and agencies can hinder interoperability, making effective coordination the biggest challenge," says Leng.

Koh Cheng Soi agrees: "the devices need to be appropriate for the requirements of the operation – to be recovering from a serious episode such as a tsunami, earthquake, or major fire, users need devices capable of working in dirty, hot or wet environments with no impact on performance."

It can be challenging to connect to vulnerable populations in high-risk areas, however, "regulatory policies can be revised to simplify the requirements for disaster preparedness service providers, making it easier for new companies to enter the market and offer affordable services," observes Patouraux. "Some of the biggest challenges we see today are in educating and convincing the relevant parties of the need for disaster preparedness – preparing and having essential equipment to enable communications."

The occurrence of large-scale disasters has demonstrated, often through its failure, that the communications network is among the most essential components of critical infrastructure, states Leng. "Although Tetra network is typically hardened, it is still prone to disruption from power outages, building collapse and transmission failure in the event of infrastructure damage caused by large-scale disasters," explains Leng. Network congestion due to overuse by the panicked public, limited radio spectrum availability and interference, and road disruptions, also make it difficult to reach affected areas.

Leng outlines how search and rescue may need to be carried out in less-populated remote areas and challenging environments, such as caves, mountains, and oceans, which often have poor cellular coverage, especially in southern Asia, one of the most digitally divided regions. In addition, cellular networks, which are not primarily designed for the use of PPDR, can be more readily impaired by power interruptions or the destruction of infrastructure.

"The digitalisation of two-way radio has been ongoing for decades, with the development of digital technologies collectively known as 'gold' open standard professional/private mobile radio (PMR)," explains Leng. "However, about 90% of radios in southern Asia are obsolete analogues. Accelerating the transition to digital radio will overcome challenges and benefit responders with expanded capabilities, including optimal spectrum utilisation, decreased radio interference, better voice quality, wider-range coverage, and more extended battery life with higher power efficiency."

There is no one-size-fits-all solution to overcome these challenges in disaster response; a comprehensive approach with advanced technologies, rigorous planning, and collaboration among all stakeholders is necessary.

Technologies on the frontline

With few exceptions, southern Asian countries are well behind other nations who have more resilient multiagency interoperable mission critical narrowband networks, "and are moving towards, or have already established mission critical cellular broad capability (towards 3GPP MCX standards compliance)," reports Graham.

Southern Asian countries which have allocated radio spectrum and invested in national government multi agency, interoperable, open standards-based, high availability, and redundant digital narrowband network infrastructure, such as TETRA, coupled with rapid deployable assets (TETRA, cellular, satellite and HF) are clearly the best prepared for disasters (e.g., Singapore, Malaysia), continues Graham. "Others have digital or analogue narrowband networks with limited, or no, interagency sharing and interoperability, comparatively lower geographic coverage/ capacity, and availability/redundancy."

In technology terms, Leng believes that voicefirst is crucial, and Vardhan agrees: "the demand

FEATURE: CRITICAL COMMUNICATIONS

for voice communication for effective disaster management isn't going away. The TETRA and APCO P25 radio standards have long been the most proven global standards for providing resilient and dependable communication for emergency services," says Vardhan. "In fact, land mobile radio (LMR) continues to benefit from continued investment and innovation including the development of HF radios that provide longdistance communications without the need for infrastructure."

Indeed, narrowband is still the de facto choice to provide the necessary mission critical voice for swift command and coordination. "TETRA radios remain the most used devices among the public safety agencies globally for its versatile and easy deployment and robust design," says Koh Cheng Soi.

Throughout history, LMR has provided the most resilient and reliable form of communication because "even if LMR infrastructure is damaged, LMR handsets can operate via DMO for pointto-point communications on the ground without the need for communications infrastructure," says Vardhan. "This is especially important for enhancing situational awareness and safety among first responders who need to share realtime updates about how events are unfolding."

"With so many disasters nowadays requiring a multi-agency response, it's also important to have equipment such as donor radios programmed and ready to go into the hands of first responders as soon as they arrive on scene," says Vardhan.

However, in some emergencies the best and most effective devices for first responders to use are the ones they already carry. That may be a radio handset, but it may also be a smartphone or tablet. "This need has driven the development of broadband push-to-talk services as well as the integration between conventional radio and satellite services to provide continuous coverage in rural and remote areas that may not be serviced by other networks," explains Vardhan. "A growing number of public safety agencies are investing in converged mobile devices that bring together reliable voice communication and access to vital data applications within the one handset."

Leng agrees: "technological convergence is affecting mission-critical communication; a multi-mode rugged device that combines a range of wireless technologies is another field to be put on the prioritised development list, avoiding carrying multiple devices by first responders. The smart device can seamlessly attach and handoff across different networks and even fall back to DMO mode, roaming between two MNO networks without disrupting end users' attention."

While voice is inarguably essential for first responder operations, the importance of data for disaster response programmes is growing.

"When time is of the essence, a picture is worth more than a thousand words. The growing use of advanced multiple-hops MESH technologies with the ability to add or remove nodes without impact on the overall system is vital," says Leng. "It can provide flexible and robust connectivity through manpack, vehicle-mounted and aerial approaches, which is exceptionally suitable for establishing high-performing data networks in remote and hard-to-reach areas."

But the information collected from sensors is of little value unless it can be efficiently transmitted, processed, and conveyed to the end user through decision-making platforms.

"The continuing emergence of advanced, Alenabled video and software tools are helping to further strengthen the links between responders in the field and their colleagues in the control room," asserts Vardhan. "The 'visualisation' of information in the aftermath of a major event such as an earthquake is vitally important. For example, drones and robots can be sent in ahead of human responders to broadcast realtime images, video streams and other situational updates back to the control room. This helps to increase awareness of what dangers may lie ahead before placing responders at risk."

Other new and emerging technologies include intelligent video analytics solutions, AI, citizen engagement tools and software that can filter, analyse, and present actionable data from the masses of information generated during an emergency. "Giving responders the most relevant and precise information they need during a crisis helps them to make better and faster decisions and ultimately leads to a safer and more efficient response." says Vardhan.

Planning for the worst

Natural disasters are increasing in size and frequency, with recorded events worldwide and in southern Asia surging nearly fivefold in the past 50 years, resulting in extensive damage and significant loss of life.

From a big picture perspective, governments, public-private sectors. and international organizations can accelerate the development practical solutions by "investing of in developing and implementing satellite internetbased communications solutions for disaster management even in the most remote and disaster-stricken areas; encouraging publicprivate partnerships for disaster management, investment in including research and development, and collaborating on developing and implementing comprehensive disaster risk reduction policies and strategies; and providing technical and financial support for disaster management initiatives and projects, particularly in developing countries," says Patouraux.

The recent devastating earthquake in Turkey and the new extreme events demonstrate the need to re-examine and rethink our missioncritical communication networks and related systems, says Leng. Indeed, in the wake of a disaster, the impact of rapid response and recovery of communications networks cannot be underestimated, making all the difference between life and death. In enhancing response times, Graham believes that the establishment of harmonised and open standards-based multimode multiagency wireless communications infrastructure within Asian nations is key.

"A well-known term associated with disaster

response is the 'Golden Hour' - the brief but critical window of time after disaster strikes where the actions of responders can make all the difference in saving lives and property," says Vardhan. "Success during the Golden Hour during a major crisis requires a continuous cycle of strategic and operational planning to establish the right priorities, planning, equipment, and training needs. The future of emergency management will be defined by technology that enables agencies to seamlessly communicate with each other while integrating new data sources to create an even clearer, common picture as disaster unfolds."

We must "improve and align national disaster preparedness and response plans incorporating all critical agencies and critical infrastructure organisations leveraging advancements in the telecommunication ecosystem," says Graham. Radio spectrum harmonisation, the allocation and coordination across government and telecoms carriers with cross border coordination to support rapid deployables, temporary coverage establishment and mutual aid user devices, all have their role to play.

Further, "the alignment of legal and regulatory policy including radio spectrum and border control for temporary import/export in the case of mutual aid communications equipment would all enhance the speed of effectiveness for disaster response," reports Graham.

While mission-critical voice communication remains essential to first responders, "the incorporation of real-time video (CCTV, satellite, airborne, carry-on cameras, etc.) and critical sensor data (environmental, biometric), combined with other data services (weather, social media, etc.), is playing an increasingly vital role in modernising public safety communication," asserts Leng. "By monitoring the situation in real-time and delivering critical information to incident leaders and first responders, they can quickly assess the situation and take appropriate action to minimise damage and protect lives."

A systematic methodology and emerging technologies to connect, collect and compute data and create new applications (four 'C') intelligently, accurately, and timely, are required, says Leng. "This is commonly known as cyber-physical system (CPS). Of the key pillars of the 4C model, robust, reliable, and trustworthy connectivity is the essential precondition for the other three."

Currently, the deployment of LTE and MCXcentric next-gen mission-critical communications is underway. "However, with the advent of the 'hybrid network' era, modernising missioncritical communications involves more than just digitising radio systems or broadband-isation. Instead, it can be considered as integrating a range of technologies, including analogue and digital radio, LTE/5G/MESH, IoT sensors, control room, and cloud, to enhance situational awareness and decision-making and ultimately improve efficiency, effectiveness, and safety. While this transformation journey may be long, it promises significant benefits and can be the difference between success and failure. life and death," concludes Leng.

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Advancing national interests

Broadband availability has a huge impact on the development of a nation; however, access varies widely across southern Asian countries. Amy Saunders asks those in the know to expand on the reasons why

outheast Asia is home to a vibrant digital economy - expected to expand from US\$194 million in 2022 to US\$330 million by 2025 (Statista) - with more than 400 million internet users, and a high average internet penetration rate of around 70%.

Much of southern Asia benefits from broadband-speed connectivity via either fixed or mobile. Singapore is world-leading for average fixed broadband speeds of 225.71Mbps as of December 2022, combined with an impressive 79.58Mbps for mobile, and an internet penetration rate of 92%. In contrast, Cambodia, Bhutan, Pakistan, and Sri Lanka languish at the bottom of the table for speeds.

Expanding broadband

Typified by a wide variety of natural landscapes and island topology, one of the primary roadblocks on the way to regionwide broadband availability is infrastructure.

"Poor road conditions or non-available land routes create a barrier of entry for the service provider, and the lack of sufficient and reliable power supply compounds this issue. The investments required to improve this are very high – and economic challenges, especially post-COVID, impair the extent that the government can help," says Ganendra Selvaraj, chief commercial officer, MEASAT.

Hagai Offeck, senior director of presales engineering, Parallel Wireless, concurs: "the absence of basic foundations - power sources and roads allowing access with building materials for the construction of sites - makes the deployment of broadband solutions both challenging and expensive."

Building a cellular site in a rural area is extremely expensive with "the network design, laying the roads, building the towers in deserted areas, providing the necessary power source (solar/generator), added to challenging transmission and the operational burden and costs," asserts Offeck.

Another barrier is that the population in today's remaining unconnected areas typically live in low density environments with houses and communities sparsely distributed. "In these non-service areas there is usually a low count of inhabitants, and the citizens in those areas are usually quite poor; in the best scenario, they own legacy handsets for voice and texting," says Offeck. "The ROI for any such an investment is low to non-existent which deter potential investors, and the governments in those areas are usually too poor to allocate the needed budgets."

Selvaraj notes that economies of scale should be considered: "unlike urban locations which have the benefit of higher ARPU users and denser population distribution that provide better return of investment, rural communities typically have lower spending power, and due to the sparse population distribution, requires a distributed network."

Satellite networks are ideal for these areas, says Selvaraj, "but having multiple service providers may not be ideal as scale cannot be achieved and costs will remain high. Consolidating the network within one or a small number of providers who work closely with the government can help make this more cost effective. In Malaysia, private service providers like MEASAT are collaborating with the government to support the national goal of having full internet coverage in populated areas, even in areas without terrestrial connections."

Change from the top down is necessary to continue to drive the rollout of broadband across the entirety of southern Asia. To achieve this, regulators and policy makers must make the right decisions to increase coverage, improve quality, and drive affordability.

"Universal Service Obligation projects which specifically focus on building out infrastructure in areas which lack commercial value, and government support in terms of direct subsidy, especially for lower income groups, will help accelerate broadband rollout targets," says Selvaraj.

Offeck asserts that policies that can address the barriers include international funding; laws to enforce complete deployments in rural areas; allowing sharing between operators on non-profitable investments which will provide coverage to rural areas; initiating RFI/ RFPs with some regulation/ governmental benefits to gather information and proposals from investors; and the removal of governmental boundaries like spectrum pricing, taxes and regulatory charges, and subsidising handsets.

"By changing regulations and enforcing deployments, allowing the operators to share non-profitable investments in these rural areas, private investors will be encouraged to invest in these projects," states Offeck.

Moving on up

Advancement in connectivity rates and technologies are on a one-way march – onwards and upwards.

"I am confident that we will see an improvement in both the quality of service and overall coverage. The extent and speed of growth will depend on the coordinated efforts of the government and local private sector providers," says Selvaraj.

Asia Pacific nations are already dominated by 4G when it comes to mobile connectivity. With the demand for higher speeds and lower latency born of the increased remote workforce, 5G adoption rates are expected to accelerate; by 2025, the GSMA estimates more than 400 million 5G connections in the region, accounting for 14% of mobile connections.

Offeck, too, believes that "in five years, at least 40% of southern Asia's traffic will require wide broadband availability due to the adoption of 5G technology by most users."

One area of concern for southern Asia is the gender gap. Highlighted by the GSMA, the mobile internet gender gap grew from 36% in 2020 to 41% in 2022, due to increased mobile internet adoption by men, but stalling rates among women.

Further innovation is required to raise internet usage rates among women for the creation of a more inclusive and wealthy digital society for the benefit of each individual and the region as a whole.

	Mobile / Mbps	Fixed broadband / Mbps
Indonesia	17.57	25.45
Malaysia	43.46	90.89
India	25.29	49.14
Singapore	79.58	225.71
Vietnam	42.07	82.22
Thailand	37.71	198.98
Cambodia	20.01	20.13
Philippines	25.12	87.13
Myanmar	25.48	19.13
Bangladesh	14.34	35.25
Bhutan		16.49
Laos	29.21	29.09
Maldives	67.96	9.86
Nepal	12.77	50.74
Pakistan	15.50	10.15
Sri Lanka	14.71	20.03

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INDUSTRY VIEW: MOBILE PREDICTIONS



Six predictions for the mobile industry in 2023 from the Mobile Ecosystem Forum



veryone hopes every year will be better than the last. One way to improve the chances of this happening is accurate forecasting. I asked several members of the Board of Directors at The Mobile Ecosystem Forum (MEF) to share their predictions for the mobile industry in 2023.

1. Mobile operators offering new identity services - Jason Lunn, MEF Board Member, and Global Connectivity, CPaaS at Cisco

Currently, mobile operators are really struggling to find ways to grow their revenues beyond traditional services: voice, SMS and

Dario Betti, Mobile Ecosystem Forum

data. Yet, one asset mobile operators can monetise is mobile identity.

Over the coming year, I expect we will see a breakout of systems whereby enterprise can query mobile operators to verify a customer's age, address, credit status, etc. This information is known and verified by mobile operators to establish a contract, and it is tied to a unique number: a phone number. So, phone numbers could become the unique identifier to verify all this information.

It will be interesting to see how enterprise will take all those pieces of information and use it to formulate an opinion on a customer that can be used and monetised. It would make things much easier for customers – rather than filling out forms and completing Know Your Customer (KYC) data, they could simply link their mobile number. In turn, this would also be very helpful to businesses.

2. Reverse brain drain - Anurag Aggarwal, MEF Board Member, and VP Partnership and Alliances at Tanla

The global West has been the dominant market for technology. But with the shift in digital transformation due to lockdown, the workforce is being redistributed, both between different organisations as well as geographic locations.

Take India. As a developing nation, India has often had to align foreign and economic policy with the West. But India has roughly a sixth of the global population. Prime Minister Modi has recognised this economic potential and, over the past three years, has established a very successful program to make India a self-contained economy.

As a result, I see 2023 bringing a reverse brain drain. Given the opportunities available, especially in the technology and the telecom space, a lot of that talent which moved out of India to the likes of US and UK is likely to move back over the coming years.

One effect of this will be that India will begin dominating the overall tech space and we will see more of Indians innovating solutions for India rather than for the global West.

Other countries may also follow suit. China and African nations are key areas to look out for. With their huge populations and greater access to technology and information, China and Africa could well become the tech powerhouses of the future.

3. Conversational AI will grow rapidly - Waheed Adam, MEF Board Member and executive chairperson at iTouch

In the coming year, we will see a huge shift in Rich Communication Services (RCS), with

many more enterprises having conversations with their customers rather than a one-way unilateral communication.

Brands are already slowly evolving into a more human-like entity. Even on social media, brands are almost emulating human behaviour to the world at large, which helps them embody their value systems. It also helps showcase their offerings as a human salesperson would, conversing with their end consumers in that same tonality.

With the rapid development in Conversational AI, powered by Conversational Process Automation (CPA), artificial intelligence can bridge the gap between the customer and process automation systems by automating both conversations and processes.

So, a business could launch a WhatsApp channel, showcase their items, and then allow customers to converse with an online Al salesperson to ask questions and complete their purchase.

The power of Conversational AI can be combined with breakthrough innovative payment technology, such as Unified Payment Interface (UPI), to allow customers to make bank payments instantaneously via their mobile number.

So, not only can customers browse through a carousel of products and talk to a sales Al, but they can even select the items, put them in a cart, and make the online payment transaction through WhatsApp. There is no need to step out of the WhatsApp ecosystem onto an external website. Everything is available end-to-end.

This is a powerful process and adds a lot of value to OTT services like WhatsApp and its regional equivalents. It brings omnichannel processes into a single channel, joining up the user's journey on their behalf.

4. Blockchain will take centre stage - Anurag Aggarwal, MEF Board Member, and VP Partnership and Alliances at Tanla

Blockchain is mainly known as the technology behind cryptocurrencies. However, the blockchain is a distributed public ledger of information and, as such, has vast potential applications beyond cryptocurrencies; healthcare and telecom have started using blockchain in a big way to help ensure the veracity and transparency of data.

Take, for example, a Cost per Acquisition (CPA) ecosystem, where the messages from the enterprise to the end user (and vice versa) go through a lot of hoops. Enterprises need to ensure complete traceability and visibility of the entire chain, but that poses certain challenges from both a security and data privacy perspective. So, by using blockchain, organisations can ensure a better flow of information, transparency of data, and end-toend visibility of information across all levels.

In India, there is the distributed ledger technology regulation, which remains the world's largest blockchain use case. Over 40 billion transactions every month go through the blockchain just because of this regulation in India.

So, with more regulation providing assurance for enterprise, blockchain will be increasingly used in several applications, such as managing end-to-end visibility of Call Detail Records (CDR) and enhancing data privacy.

Over the coming year, I expect we will see a lot more blockchain technologies out there but a bit less of a focus on digital currencies.

5. The challenge of globalisation - Jason Lunn, MEF Board Member, and Global Connectivity, CPaaS at Cisco

To ensure the security and standards across globalised technology, we need an alignment of policies. Yet, with the growth in tech dominance in India, China and Africa, this alignment is shifting out of the hands of the global West.

The traditional idea of globalisation was free trade across the world. Yet, new technology is no longer an issue for the consumer market, it has become an issue of national security. In the telecoms industry the tech infrastructure is now national infrastructure, and in countries like the US and UK, governments have specifically limited technology developed in China due to concerns around trust and security.

So, the interconnected digital world is not aligning with the increasingly disconnected political world, and I think that will lead to some major challenges. Over the next few years, governments are going to understand how important the players within the connectivity ecosystem are and how they play a key role within critical national infrastructure.

I expect this to lead to greater government subsidies to help telecoms businesses make their technology and security more robust and/or more regulation around security to help protect this critical national infrastructure.

6. Mobile industry will need to become more sustainable - Jason Lunn, MEF Board Member, and Global Connectivity, CPaaS at Cisco

Unfortunately, the mobile industry is a major contributor to global carbon emissions, with 3.5% of global CO2 emissions deriving from telecoms – that is double the amount from aviation. With the telecom industry growing very healthy, the amount of emissions will also grow, unless things change.

One thing that mobile operators can do to become more sustainable is to ensure that their code base is as efficient as possible. That could mean using more advanced programming languages — like Closure — that require fewer lines of code, reducing the amount of computer power that's required.

This can be more difficult for older players in the market as they will have a lot of legacy code and servers to update. But as new players enter the market with more efficient technology, sustainability will suddenly become a competitive advantage. So, big players need to investigate sustainability and efficiency now to prepare for that coming future.

We also need a clear standard and benchmark for measuring CO2 efficiencies. If we reduce the computer power needed, how much CO2 have we actually saved? This would make it easier for enterprise to prioritise efficiencies that lead to greater sustainability.

There is a lot of focus on sustainability and CO2 reduction at every level – from the UN to the US tax code. I think we will begin to see the fruits of that labour over the next year or so, with new legislation bringing clear benchmarks and responsibilities for the industry, and we need to be preparing for that change now. ■



Jason Lunn



Anurag Aggarwal



Waheed Adam



The factory of the future

eliable, low latency wireless connectivity can help manufacturers move faster, paving the way for major productivity improvements. The factory of the future is more connected, efficient, and cost-effective than ever before – making their wider rollout particularly timely given current global economic challenges.

Smart manufacturing delivering improved productivity

Telkomsel has deployed its IoT smart manufacturing solution with a leading multinational manufacturing company in Batam City, Indonesia. The 5G solution supports automated guided vehicles, remote assistance, augmented reality (AR) and virtual reality (VR).

The manufacturer has used the solution to equip staff with VR headsets that can help them fix faulty machinery, and to enable real-time reporting on plant operations. As a result, managers no longer need to prepare weekly reports, and worker productivity has improved by about 17%.

"This collaboration is the first use of industrial 5G technology services in Indonesia," said Alfian Manullang, vice president Telkomsel Internet of Things (IoT). It underlines "our commitment to present Telkomsel 5G service ecosystem by building partnerships with stakeholders, especially industry players."

Telkomsel's IoT smart manufacturing solution enables the customer's end-to-end supply chain to become more integrated, while enhancing production control and monitoring, execution and traceability, warehouse and energy management. The solution can deliver around 38% costs savings when embedded with Telkomsel's 5G enterprise network. It can be used to connect processes, people, and machines to improve efficiency, increase automation and optimization, as well as enabling factory layouts to be rapidly reconfigured for new products, and providing visibility across all operations to allow real-time decision-making, detect faults, and safety monitoring.

The smart manufacturing solution helps manufacturers to enhance existing or new businesses by adding data from multiple sources like sensors and tools, access data that can minimise errors, and improve the quality of decision-making and protect sensitive data with reliable telco-grade connectivity. It also supports remote control of machines operating in hazardous environments.

"Telkomsel IoT smart manufacturing will support a sustainable manufacturing industry by improving efficiency, productivity, and security at each operational level through accurate data analysis," said Manullang. "By transforming to IoT smart manufacturing, production output will increase 20%, machine utilisation will increase 20%, overall equipment effectiveness also will increase 15%, as well as reducing unplanned downtime to 30%."

5G: a game changer for tomorrow's manufacturers

Telkomsel describes 5G as a 'game-changer for manufacturers.' As well as providing highly

reliable, low latency connectivity, 5G can also deliver the high throughput and density that manufacturers need.

"For the past four years, Telkomsel has invested significantly in building out our 5G know-how, talent development, and setting up a comprehensive set plan to bring 5G to Indonesia," said Manullang. "With 5G, we can transfer a big amount of data in realtime. 5G will facilitate advanced technology, artificial intelligence, automation and industrial IoT. 5G is expected to be one of the mainstream technologies of the future, with alternate technologies playing complementary and selective roles."

The deployment in Batam City is the first stage in Telkomsel's 5G portfolio development for manufacturers. The operator is working closely with government, partners, and associations to expand Indonesia's digital infrastructure and support the implementation of Industry 4.0 concepts like greater automation, customisation, and responsiveness.

Telkomsel has recommended that other MNOs forge partnerships with app developers and vendors to identify 5G use cases that fit specific industry opportunities "because each vertical is different with unique connectivity, latency and reliability requirements – not to mention legislative sensitivities."

"We support Indonesia to be at the forefront of technology, facing the Industry 4.0 competition," said Manullang. "To be the first mover, we give a strong and clear signal to our ecosystem of partners."

Thailand's first 5G smart factory

TE has partnered with Advanced Info Service Plc. (AIS) and Suranaree University of Technology (SUT), to demonstrate Thailand's first 5G smart factory.

The technologies deployed include multiple advanced solutions like 5G cloud machine vision, 5G industrial AGV, AR remote guidance, VR panoramic monitoring and unmanned inspection robots. The demonstration showed industrial entrepreneurs the possibility of deploying 5G in their production lines and transforming their manufacturing plants into smart factories.

Partnering for the future

After the release of 5G license in 2020 by Thailand's regulator, AIS became the first operator to offer 5G service in the country.

SUT, located in Nakhon Ratchasima, serves the needs of the industrial sector with numerous curricula relating to digital technology such as Al, cloud, IoT, VR and AR. The university also offers training in 5G technology to businesses.

The partnership with ZTE and AIS is expected to provide SUT with equipment that enables the demonstration of a variety of 5G use cases. Industrial entrepreneurs would have the opportunity to exploit 5G technology for efficiency improvement at their plants by observing use cases at the university and then determining how to best implement the technology in their factories. Businesses may also discover opportunities to improve efficiency, reduce costs or increase manufacturing capacity.

Resolving heavier network demands with 5G

With the adoption of various new technologies, the future smart factory places heavier demands on network performance, especially regarding throughput and latency. Accordingly, for the smart factory's network coverage, the ZTE QCell solution is used to provide 5G coverage at 2.6GHz. With 40MHz bandwidth, the 5G QCell can provide peak throughputs of 250Mbps and 40Mbps for downlink and uplink respectively. Additionally, since the 5G network is used fully to serve the network connections of the smart factory, it can be considered a private campus network independent from AIS' 5G public network.

With the existing transmission path, the 5G network can connect with the AIS 5GC in Bangkok. In another data centre at Rone, the application servers are deployed for the smart factory. To further enhance the network performance for the smart factory, the ZTE MEC solution is also deployed at the same data centre next to the application servers. They all adopt the ZTE cloud platform.

In SUT's exhibition hall, PCs and TVs are installed to monitor and show the images fed back by applications and robots in the smart factory. Three new routes were created to ensure the links between the exhibition hall, the smart factory, 5GC and application servers.

The smart factory has integrated 5G technology with the traditional production lines. The equipment is connected to the 5G network through 5G CPEs or 5G modules. The 5G industrial AGV adopts LIDAR and cloud enhanced visual positioning and navigation technologies. It can rapidly and precisely plan its moving paths and operate automatically, making it a vital tool to boost efficiency inside a factory, warehouse or on a production floor.

Facial recognition-enabled 5G inspection patrol robots perform the duties of a security guard by patrolling various areas and reporting suspicious activities.

The 5G cloud machine vision processes the images uploaded from different working positions with the centralized machine vision station





deployed at the edge cloud and displays the status and control information of the equipment on a big monitoring screen. This solution responds to the key demands of product quality control, equipment management and production line monitoring that are widely present for modern manufacturing.

5G AR remote guidance enables work, training, and repair functions to be performed remotely without physical presence on site of relevant parties. Moreover, 5G VR monitoring acts as a real-time quality assurance inspection tool to ensure the application of uniform product standard from raw material to finished goods.

"AIS was the first to launch 5G service in February 2020, as the operator holding the most spectrum in low, medium and high bands," said AIS chief enterprise business officer (CEBO) Tanapong Ittisakulchai. "Over 35 billion baht budgets are allocated by AIS for year 2020 and 2021 to cover 100% of the occupied zones in the EEC and key public health centers across the country for the battle against COVID-19. With ZTE and SUT, we have jointly developed solutions to better address the needs of the industry. This smart factory demo is based on 5G Total Solutions for Industry. We have deployed 5G SA digital infrastructure on 2.6GHz with excellent properties to support this use case, including reduced latency to provide full support for IoT."

"As a major international provider of telecommunication, enterprise and consumer technology, ZTE is willing to expand 5G intelligent manufacturing in Thailand," Ling Zhi, vice president for ZTE global marketing. "Together with AIS and SUT, we are providing industrial customers with the innovative solution, aiming to serve the enterprises with 5G based flexible and intelligent end-to-end solutions. Committed to empowering traditional industries with 5G, ZTE has carried out innovations with partners for 5G applications across over 15 key industries. Moving forward, together with AIS and SUT, we will help Thailand's manufacturing industry to evolve towards a green, low-carbon, digital, and intelligent future."





Latest wireless communications news, views and technology from Asia

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Cambium Networks launches next generation fixed wireless platform - the ePMP 4600

Cambium Networks has introduced the ePMP 4600, a next generation fixed wireless platform that allows service providers and private network operators to utilize the entire 6GHz spectrum to deliver up to 4Gbps throughput per sector over fixed wireless

The ePMP 4600 is deployed in davs rather than the months it takes to deploy fibre and is dramatically less costly than satellite access technologies, enabling service providers in rural and suburban areas to offer up to 1Gbps service packages with low latency to business and residential customers.

Network operators report field tests showing multigigabit throughput per sector and more

than 1Gbps to subscriber modules at ranges greater than two miles. The new spectrum will especially hard-to-reach benefit rural communities most impacted by the digital divide by providing a rapidly deployable way to deliver high-bandwidth, low-latency services demanding applications. for as video. such streaming videoconferencing, and gaming.

The 4600 is the fourth generation of Cambium Networks' successful ePMP platform with more than 3 million radios deployed and serving customers globally. The ePMP platform offers scalability and interference mitigation based on its unique air interface. The platform takes advantage of the 802.11ax

standard and overlays ePMP features such as TDD synchronization, SmartQoS and frame optimization.

The upcoming 6GHz spectrum will offer 850MHz of new clean, low noise floor channels that will be ideal for the new capabilities offered in the ePMP 4600 such as orthogonal frequency-division multiple access (OFDMA), multi-user multiple-input, multiple-output (MU-MIMO) in both the uplink and downlink directions and TDD synchronization. For pointto-point (PTP) applications such as campus connectivity and business services, the Force 4600C builds on the proven ePMP Force 400C Series to offer multiple Gbps and leverage the unique ePTP protocol for higher network efficiency.



Ceragon releases new RAON software for reduced energy consumption

Ceragon Networks Ltd.'s new Radio consumption at a time when Aware Open Networking (RAON) software is now available for purchase as part of its IP-50FX Disaggregated Cell Site Gateway (DCSG) solution.

The RAON software is designed to increase operational efficiency, simplify radio monitoring and management, and reduce energy

global energy prices are adversely impacting OPEX. By enabling the cell site gateway to act as a virtual in-door unit with a single IP address, RAON empowers unified monitoring and management capabilities. It informs the cell site router of any changes in connected outdoor radios, allowing for data-driven decisions such as rerouting for optimal traffic flow.

The RAON-enabled two-in-one configuration combines a cell site router (CSR) and radio indoor unit (IDU) into a single device, increasing operators' flexibility to meet changing capacity demands

while also achieving cost savings. With the new software, the need to power, cool, connect, and provide rack space for two separate devices is eliminated, minimising energy consumption and reducing operational, administration, and maintenance (OAM) complexity, as well as provision complexity.

URGROUP's tunable DWDM transceivers to simplify 5G network management

URGROUP has announced the general availability of the ATOP family of Tunable DWDM transceivers.

Developed to meet increasing customer demand for high performance optical transceivers, the ATOP 25G Tunable DWDM benefits from a high-density form factor with extensive tuning range.

The range covers both 25G and 10G rates and a range of 10km to 80km.

Designed to simplify 5G network deployment and support flexible network management too, this product has already been extensively tested and qualified for OEM and operator clients in a wide range of 5G Radio Access Network (RAN) applications.

Highlights of the ATOP Tunable DWDM transceiver range include multiple data rates, 25.78Gbps, 24.33Gbps, 10.31Gbps, 10.13Gbps, and 9.83Gbps; 48 C-band channels, full band auto-tuning within 4 minutes; 10-80km transmission distance via single-mode fibre; max power consumption less than 2.5W; and extended operation temperature range (-20-85 °C).

Not only does the new range enable flexible network management



by supporting bandwidth changes as needed in enterprise or metro networks, but it also

significant long-term cost savings by reducing on-hand network inventory delivers and simplifying spare parts stocking.

Field Master MS2080A spectrum analyzer - ideal for emerging wireless networks

Anritsu Company's Field Master MS2080A, a multi-functional spectrum analyzer, integrates nine instruments into a single package for time and cost efficiencies in the most demanding field environments.

Covering 9kHz to 4GHz, the MS2080A has unprecedented performance and features for a compact and portable spectrum analyzer, bringing distinct benefits to interference hunting and 5G/ LTE base station installation and maintenance (I&M) applications.

It combines fast sweep speed of 45GHzps, advanced user features like interference source location by triangulation, and best-in-class RF performance, including +/- 1dB amplitude accuracy. Additionally, it supports a cable and antenna analyzer, power meter, and 5G/LTE analysis to make it an ideal generalpurpose instrument that addresses measurement requirements for legacy and emerging wireless networks.

An optional real time spectrum analyzer (RTSA) with 2.5µs probability of intercept (POI) is available. The RTSA has up to 40MHz analysis bandwidth and DANL of



<-150dBm, making it well-suited for capturing intermittent and digitally modulated signals that can be hard to identify. Spectrograms allow irregular and drifting signals to be captured, recorded, and displayed.

The MS2080A supports a full range of measurements for 5G frequency range 1 (FR1) radios to 4GHz, including C-band, to support I&M of 5G New Radio (NR) and LTE base stations. Gated sweep analysis for transmitter quality measurements to accurately verify FR1 carriers is provided. The MS2080A offers fullchannel, power-based, and 5G/LTE modulation quality measurementbased coverage mapping for accurate over-the-air (OTA) testing.

Field Master MS2080A is the only instrument in its class to provide 5W of continuous RF input overload protection, preventing costly damage to the instrument's front-end when used close to high power transmitters or in high signal level environments. A 10inch 1280x800 display meets the demanding IK08 specification for direct knocks and drops. Common functions are always accessible from the display, and side menus collapse to maximize graphical results. A soft case provides IP52 environmental protection to safeguard the instrument during transport or rain.

O Look out for...

Direct-tosatellite market to hit \$9 billion by 2030

New research from Kaleido Intelligence finds that direct-tosatellite connectivity, where regular smartphones and IoT devices leverage satellite communications networks, will see revenues for connectivity services reach over US\$9 billion annually in 2030.

Satcom services promise to enable the 'everything, everywhere' vision for cellular connectivity, serving as a failover for terrestrial coverage 'not spots.'

Kaleido anticipates significant potential for IoT initiatives, forecasting more than 460 million connections by 2030.

Chipset makers are supporting this new architecture while the 3GPP has started the path towards integrated cellular and satellite communications networks, following the finalisation of the NTN (Non-Terrestrial Networks) standard as part of 5G Release 17. Standardisation and hardware ecosystem support means that the market is now ripe for growth.

"Using existing GEO-based capacity looks the most sustainable way forward for LPWAN IoT connectivity, but few providers have opted for this path," said Steffen Sorrell, chief of research at Kaleido. "Meanwhile, the relatively low data rates offered by NTN-NR will ultimately mean that the revenue opportunity will remain constrained until at least 2030. Further industry consolidation is inevitable as the market positions itself."

While significant barriers to widespread rollout remain – including the high cost of satellite production, launch, and operations, and the corresponding impact on service pricing, as well as the ongoing divisions in spectrum use between nations having a limiting effect on capacity – direct-to-satellite is proving promising for markets across the world, particularly those with limited cellular coverage.

The delivery of truly global communications, including in remote and rural regions, could be game changing for a wide range of industries.

New access points meet WiFi 6 requirements for industrial vehicles

Westermo has added two new access points to its Ibex range of WLAN solutions to provide highperformance data communications onboard trains, industrial vehicles, and outdoor applications.

The Ibex-1310 and Ibex-1510 are concurrent dual band (2.4GHz and 5GHz) access points and clients designed to meet the IEEE 802.11ax standard, WiFi 6. By delivering enhanced performance and speed, especially in device-dense environments, the access points create networks that better support applications such as maintenance access, train data offloading and management systems, and hotspots for passenger WiFi.

The Ibex-1310 is approved for use on industrial vehicles, while the Ibex-1510 has been tested and

certified to meet rail standards EN 50155 and EN 45545-2, allowing deployment both onboard trains and trackside. The devices are designed to withstand the tough environment onboard vehicles. including the exposure to constant vibration, extreme temperatures. humidity and demanding electromagnetic environments. The compact and power efficient design enables easy integration in spacerestricted installations.

A range of design and construction features helps to ensure a high degree of reliability over an extended lifecycle, which reduces total cost of ownership. A GORE-TEX® membrane prevents internal condensation, while IP66 protection prevents ingress of water and dust, even at the quick connect QMA connectors available



on the Ibex-1510. A high level of isolation between all interfaces enables direct connectivity to vehicle auxiliary power and protects against overvoltage and surges.

The access points are very easy to install, operate and maintain. The two devices are powered by Westermo's robust and easy to use SW6 operating system, which provides the latest cybersecurity features and updates.

ABS Wavesight and Marlink partner on data delivery



Marlink and ABS Wavesight have signed an agreement to collaborate on using optimized connectivity to support

efficient delivery of sustainability services and data to clients' vessels. connects The agreement

Marlink's blended network with the vovage optimization and vessel management services provided by ABS Wavesight. The partners will collaborate to enable their mutual clients to enhance their use of digital tools and applications using the optimised Marlink network.

"Marlink is delighted to have put in place this agreement with ABS Wavesight, an innovative partner whose approach to the challenges faced by the maritime industry and the solutions required links so closely with our own," said Tore

Morten Olsen, president, maritime, Marlink. "We look forward to helping our mutual clients enjoy improved access to ABS Wavesight services and investigate how to further optimize connectivity for the next generation of digital services."

The companies will work together to improve connectivity and integration of software and services into client ships and systems. Vessel operators will benefit from faster and more regular data updates that can help them improve vessel performance and optimize voyage execution.

"ABS Wavesight is an industry advocate for both digitalization and decarbonization, delivering unmatched value through its suite of products and integrated solutions and providing the insights needed for vessels to operate more efficiently," said ABS Wavesight chief executive Paul Sells. "As we continue to partner with companies such as Marlink, we're expanding

our reach and strengthening our ability to help clients gain visibility their into existing operations mitigate risk and deliver to operational excellence."



WORLD NEWS

neXat and Servicio Satelital partner for satellite OSS/BSS tools

Servicio Satelital has partnered with neXat to provide its customers with advanced, satellite specific OSS/BBS tools via neXat's platform-as-a-service (PaaS) solution.

The PaaS managed service, which also includes a Business Management Portal and an eMarketplace, allows teleport operators to extend their own hub's capabilities. Operators can safely and securely offer any kind of services to their own customer base independently of their teleport's hub technology

neXat will be able to access ARSAT and Intelsat-based services in Latin America, and in return Servicio Satelital will be able to extend its global reach via neXat's everincreasing worldwide coverage.

"Our platform has a lot to offer to operators and internet services providers in the Americas thanks to the specialized suite of value-added services it can provide," said neXat's senior vice president, business development, and GM Americas, Guillermo Bosch. "This partnership also has strategic importance for neXat as it allows us to expand our presence in the region and access local businesses."

"The demand for the highest

quality connectivity continues to increase within the Latin America region, as population rises and the market grows," said Eduardo Lema, chairman at Servicio Satelital. "By working with neXat, we aim to grow our clientele and keep our current customers happy with the most up-todate and advanced services, as well as gaining coverage and awareness in areas we have not yet reached."

neXat's Point of Presence (PoP) in Florida allows operators and teleports in LATAM to gain access to the neXat platform, providing a route to a variety of benefits to the platform users and their customers.

Optus and **ISP** Pentanet partner on cloud gaming

Optus recently entered into а strategic partnership with ISP Pentanet to deliver cloud gaming services to customers, as the mobile operator targets an increased presence in the growing segment in the USA.

Optus explained that the tie-up was driven by the fact it viewed cloud gaming as "an emerging segment of the multi-billion-dollar global gaming market" and a key consumer use case for 5G.

Under the agreement, the companies will collaborate on improving user experience for Nvidia's cloud gaming platform GeForce Now, of which Pentanet has been the sole provider in Australia since 2021.

The partnership will also enable Optus customers to access the feature through its subscription platform and enable improved features through 5G.

"Our mission is to break down the barriers to gaming and offer our customers the freedom to play anywhere and anytime," said Matt Williams, MD of marketing and revenue at Optus.

Stargroup to expand LTE to rural communities in Mexico

Stargroup has selected the Hughes JUPITER System and managed satellite broadband to extend LTE service to customers in rural communities.

As part of the Mexican government's Comisión Federal de Electricidad Telecomunicaciones e Internet para Todos (CFE TEIT) initiative to help bridge the digital divide, Stargroup is connecting hundreds of remote cell towers using Hughes JUPITER System a terminals and Hughes JUPITER 2

high-throughput satellite capacity.

Powering connections from each cell tower to the network core, the Hughes JUPITER 2 satellite provides a bridge connecting rural mobile phone users to the internet with reliable, high-speed Ka-band capacity and enterprise-grade service-level agreements to meet the criteria for service delivery set by CFE Telecom.

At each location in the deployment. Hughes remote terminal. designed and optimized for LTE

backhaul (including support for GTP acceleration), powers services at 20-60Mbps down, ensuring fast and reliable internet connections for individual users.



Chile leads Latin America on wireless speeds

CELLSMART, the cellular intelligence division of SmartCIC, has released wireless performance data from Latin America that shows Chile is leading the region in both maximum download (371.7Mbps) and upload (102.5Mbps) speeds.

Panama followed in second place with a 249.0Mbps maximum download speed more than 120.0Mbps than the regional leader. Guatemala and Venezuela tied for second place in maximum upload speed with both delivering tests of 63.3Mbps.

Performance Survey shows that Chile had the highest average download speeds across 3G, 4G and 5G networks with 72.4Mbps. Uruguay (62.5Mbps), Dominican Republic (40.4Mbps), Brazil (39.0Mbps) and El Salvador (32.1Mbps) ranked in the top 5 for average download speeds. Average upload speeds were led by Panama (25.5Mbps) and followed by Peru (24.1Mbps), Chile (20.1Mbps). Brazil (17.0Mbps) and Dominican Republic (16.5Mbps) rounding out the top 5.

"The survey shows that the 5G revolution in Latin America is only The CELLSMART Global Cellular just starting. Cellular performance

varies widely across markets and metro areas with Chile delivering the most consistent results of any LATAM country. There is a lot of room for growth and development of local cellular networks, especially when compared to the average upload and download speeds we're seeing in North America and Western Europe," said Toby Forman, CEO at SmartCIC. "Speed tests were largely conducted on 4G and 3G across the region and show that network quality, speed and latency will improve when 5G is deployed more widely."

"Markets across Latin America are

developing rapidly. The results show that 3G and 4G are still providing a reliable foundation for wireless connectivity across the region. 5G is growing and overtime we will see an increasing number of speed test that show the power of 5G locally and across markets in Latin America. In markets that are transforming quickly, it is critical that enterprises and service providers have access to accurate cellular performance data." said Forman. "CELLSMART is constantly tracking and reporting accurate local intelligence to enable service provider partners to capture the opportunity in fixed wireless."

AALTO HAPS to connect Saudi Arabia's unconnected from the sky

AALTO HAPS has signed Memorandum of Understanding (MoU) to enter a strategic partnership with stc Group to partner on introducing HAPSbased solutions to the Kingdom of Saudi Arabia.

Stc Group will have access to AALTO's solutions, when the company rolls out commercial services by the end of 2024. Those solutions will enable stc to



expand its geographical coverage to rural and remote areas currently unconnected, improving the service quality. In addition, HAPS solutions can serve to augment coverage during critical events and can be deployed quickly and easily in case of natural disasters.

"We are very pleased to count stc Group, the leading digital enabler in the Kingdom of Saudi Arabia and a major player in the region, as one of our pioneering partners looking into HAPS as an efficient, sustainable, and an environmentally friendly new stratospheric layer of connectivity to improve existing service; and add new reach beyond current infrastructure," said Samer Halawi, CEO of AALTO HAPS. "Not only do our solutions offer a service that saves and improves lives, but they are also eco-friendly and respectful of the future of our planet."

Zephyr flies in the stratosphere, above conventional air traffic and provides lowlatency, direct-to-device 4G/5G services, acting as a tower in the sky with the capability to complement terrestrial networks.

"We look forward to working with AALTO. Zephyr has demonstrated a high level of maturity as a HAPS platform, and its innovation and sustainability are aligned with stc's values and objectives in designing the future," said Motaz Alangari, stc Group chief investment officer.

Orange to utilise OneWeb for African connectivity

Orange will leverage satellite operator OneWeb's growing low Earth orbit (LEO) satellite constellation to improve and expand its high-speed connectivity services in Africa, among other regions of the world.

"At Orange, we believe that satellite is a promising and complementary technology that showcases many recent innovations that will benefit businesses around the world and accelerate the digital inclusion of populations within our subsidiaries in Africa and the Middle East," said Jean-Louis Le Roux, director of international networks and services. Orange.

The partnership with OneWeb should enable Orange to improve the quality and coverage of its telecom and internet services in its various African markets. It should also enable the company to improve the Orange Business offer for the benefit of large, small, and medium-sized enterprises thanks to high-speed, resilient and low-latency solutions.



Uganda secures 1.8 trillion shilling loan for internet provision

The Ugandan government has secured an 1.8 trillion shillings loan from the World Bank to expand internet access in the country, according to Charles Oleny Ojok, deputy director general of the National Planning Authority (NPA).

This funding will be used implement the nationwide to connectivity project, which will start later this year. It will see the extension of the national fibre optic backbone to connect all rural and hard-to-reach areas of Uganda.

"Both Parliament and Cabinet have

given their consent to the Ministry of Finance to go ahead and secure this loan. This initiative is one of the most significant as it will transform the entire country and provide connectivity to homes, businesses, and government entities across Uganda," said Ojok.

This program is part of the Ugandan government's ambition to accelerate digital transformation to support economic recovery, create unlimited opportunities for youth and achieve "Vision 2040."

The extension of the national infrastructure should telecom make it possible to fill the gaps in the current infrastructure and to improve the coverage of the Ugandan population with high-speed telecom services while reducing costs. This will accelerate the penetration of mobile services and the Internet in the country. According to the latest statistics from the Uganda Communications Commission (UCC), the mobile and internet penetration rates are 69% and 53%, respectively.



Lower Saxony to gain new critical comms solution

Police and local authorities in lower Saxony, represented by ZPD, have commissioned Frequentis to supply multimedia communication its solution 3020 LifeX The implementation of this system across eight control centres, one alternate control centre and one test system will take place in three phases.

The project will establish a statewide standard for the control centre communication system within an IP-based system environment in Lower Saxony.

"Over the course of modernising the police and cooperative control centres in Lower Saxony, one of the main requirements, among other things, was updating the communication system, as an essential technical component. Against the background of many years of good experience with the

predecessor system. Frequentis ICCS 3020, in the state, the special challenges with regard to a longterm migration phase from the old to the new system, as well as the fulfilment of future multimedia communication requirements, we opted for the Frequentis successor system, 3020 LifeX," said Marc Stothfang, project lead, Operations Control System Lower Saxony (ELS NI). "With this. Lower Saxony has a reliable communication system with almost identical and extensive functional features at its disposal at all times, even during parallel operation, which provides the control centres with maximum technical performance, especially in view of the current security situation."

The existing Frequentis Integrated Command and Control Solution (ICCS 3020), in operation for more than ten years, will be replaced by the next generation of



Frequentis communication systems. Furthermore, it will realise the operational system interconnection of the control centres and enable interaction in case of overload or failure.

"The decision of the State of Lower Saxony to choose the Frequentis state-of-the-art LifeX multimedia communication system for its modernisation confirms

the innovative approach we have taken during the development. long-standing The partnership between the State of Lower Saxony and Frequentis will be continued and together we will provide the control centre operations with further new functions to meet future requirements," said Robert Nitsch. Frequentis vice president public safety.

2degrees replaces Huawei for 3G Core networking routing

2degrees has gone live with the BroadForward Signaling Transfer Point (STP), replacing Huawei for 3G Core network routing.

Underlying all software products is a common, converged signalling architecture with on-board support for protocols such as Diameter, SS7, SIP, ENUM, RADIUS and HTTP/2. BroadForward's software products are undergoing constant innovation and feature development, enabling operators to invest in the future while significantly reduce network complexity and costs. The design enables BroadForward products to be configured and managed through a common, powerful graphical user interface.

"We are pleased with the new STP and the relative ease with BroadForward which managed the replacement of the legacy systems," said Garry Joyce, head of core network at 2degrees. "Deploying the BroadForward STP alongside the BroadForward DRA not only ensures continued development and support of the current solution, but also provides an easy and logical path

to new network technologies and capabilities, including 5G."

"2degrees is a great customer to have, as they push the boundaries of technology to achieve the best possible customer experience. The fact that, after the BroadForward DRA, they have also chosen our STP, Firewalls and Number Portability, is a testament to the benefits that our converged platform brings, with an integrated approach for all core network signalling, including a clear growth path towards future 5G network functions," said Taco Schoute, CEO of BroadForward.

SKT employs AI voice authentication at call centres

SK Telecom (SKT) has signed a deal to use Pindrop's Albased voice authentication technology in its call centres to reduce customer consultation and wait times, with plans to commercialise the service by combining it with its own technology.

SKT began piloting the cloud-based service in 2021 and recently verified its effectiveness through evaluations with customers. The technology can identify a user's unique voice and authenticate an individual after a simple conversation without additional authentication. According to SKT, the service can register voiceprints with a "maximum accuracy of 98%" and is "widely used by many global companies" including Verizon and BT.

In addition to its call centres, SKT will deploy the service on devices requiring personal authentication including access control and biometric security. SKT expects the voice recognition technology to be used for authentication across applications including vehicle access and online shopping.

UAE and Oman to be linked via OEG

Omantel and du have announced plans to link the UAE and Oman through a newly activated 275km international fibre optic submarine cable, the Oman Emirates Gateway (OEG).

The UAE and Oman are currently connected through terrestrial and submarine routes. The new OEG cable system will serve as an express connection between both countries and reiterate du's and Omantel's position as leading wholesale players supporting the region's aims to evolve into a new global communication hub.

This is described as a firstof-its-kind regional fibre optic submarine cable which will connect two international data centres – Equinix MC1 in Barka, Oman and datamena DX1 in Dubai, UAE.

This link will act as a major facilitator for the hyperscalers, content providers and international carriers that are currently hosted in these data centres to make use of improved connectivity services and higher capacities. They will also be able to directly link their points of presence (POPs) in the region.

The partners say increased connectivity between the two data centres will also attract more global players to the region, and improve the quality of connectivity, which will in turn, boost customer experience.

Moldcell introduces Moldova's first MoMo



Moldcell has announced its entry into the financial services market with its

'first-of-its-kind' digital wallet called 'moldcell money.' Moldcell says that it has become

the first operator in Moldova to provide digital financial services that bring a new level of convenience and security to its customers.

This service is now available through the moldcell money app and offers subscribers of any mobile network in the country the chance to transfer money and pay for services directly from their mobile wallet.

The service is supported by digital financial solutions company Comviva, Comviva has deployed its flagship mobiquity Pay platform, which provides several innovative capabilities.

Users can make payments with their mobile numbers, without the



Nigeria unifying telco short codes

Nigerian telecom subscribers will soon be able to access the USSD service portals of different telecom operators using the same short codes.

The Association of Licensed Telecommunications Operators of Nigeria (ALTON) recently announced that telecom companies have started implementing the short code harmonisation process in accordance with the guidelines of the Nigerian Communications Commission (NCC).

According to ALTON, the migration to the new codes will continue until 17 May. During this time, the old and new common codes will work simultaneously. After the time, the old codes will stop working.

In April 2011, the NCC took over the administration and management of all shortcodes with the aim of providing a consistent regulatory framework and standard of practice and harmonizing the database of shortcodes in Nigeria. For the implementation of the project, transfer money to any mobile phone number or pay for services directly from the mobile app. The service also allows users to transfer money using an SMS code or through any Moldcell Centre store, ensuring the safety of personal data and instant payment. "The solution consists of three

need for bank cards or cash. and can

main components: the 'moldcell money' mobile application, which offers various services such as payments, bills, loans, government gaming payments. payments. money transfers to loved ones and bonuses; financial services available in Moldcell stores throughout the country; and the possibility to make payments with Moldcell number exclusively for Moldcell subscribers," said Olga Pavlic, mobile financial services and business innovation director at Moldcell.

the regulator hired Molcom Multi

Concepts Limited as a consultant in

2017. A National Short Code Plan

(NSCP) was then developed for players

Harmonization should facilitate

the access of telecom subscribers

to the practical services of telecom

operators. Subscribers with several

SIM cards will no longer have to

memorize the different codes of the

respective operators to check the

balance, recharge, or borrow airtime.

in the ICT sector

Vivo fails to sell Oi Movel base stations

Telefonica Brasil (Vivo) has halted its plan to sell off surplus base stations formerly belonging to Oi Movel after they failed to attract any bids.

Last year, Vivo alongside rivals Claro and TIM Brasil received regulatory clearance to acquire Oi's assets subject to several conditions - one of which was the divestment of half the base stations acquired through the public offering. Vivo duly made 2,700 base stations available for purchase, however, in March had attracted no interest.



OQ Technology to expand 5G NB-IoT constellation to 10 LEO satellites this year to enhance NTN services

first and only satellite operator of a 5G NB-IoT constellation, plans to grow its constellation from three to ten satellites in low Earth orbit (LEO) this year. The move will turn the company into the largest 5G NB-IoT satellite operator in the world.

The seven satellites that will be added to the OQ Technology's constellation, are the previously announced 'MACSAT' and 'PHI-Demo' satellites and five additional 6U nanosatellites, Tiger-4 to Tiger-8, which the company has already ordered. Concluding the launch of the first batch, all remaining satellite launches are planned for launch conditions, to possibly going into orbit in early 2024.

the added With satellites. OQ Technology will significantly enhance its 5G NB-IoT nonterrestrial networks (NTN) satellite connectivity service based on 3GPP for non-terrestrial networks (Release 17). The enlarged constellation will increase its global coverage and the satellites' revisiting times to multiple times per day. As a result, the company's terminals can send more data, received from mobile sensors, giving customers more of the latest sensor information in realtime. The increased capacity and revisiting times will serve customers

OQ Technology, the world's this year with the final ones, pending in both the energy and asset construction of our payload, and our tracking market.

> "Having pioneered satellite based 5G NB-IoT connectivity and launched our constellation before anybody else did, we are now cementing our position as the leading 5G NB-IoT satellite operator in the world," said Omar Qaise, founder and CEO of OQ Technology. "Being well ahead in the 5G IoT non-terrestrial networks market, we are continuing the expansion of our global coverage, entering new markets and accelerating the build-up of our constellation. The planned launches for this year will conclude our Batch 1 deployment, with Batch 2 already in preparation. It is thanks to a faster

5G NTN technology being developed in-house that OQ Technology is able to massively and quickly expand its constellation.'

OQ Technology's 5G NB-IoT connectivity service enables companies to connect their mobile devices for applications such as smart metering, precision agriculture, asset tracking, vehicle telematics, artificial intelligence critical alarms and environmental monitoring. With 85% of the world's surface lacking or having limited access to terrestrial connectivity the constellation services. provides global connectivity in remote regions.

A&**Q**

Nicholas Soo senior vice president (SVP) group sales strategy & enabler at TELIN, a member of MEF



What was your big career break?

I wouldn't call it a career break. but my accidental entry into the telecom world would be it. I came back from London with my Masters degree and joined a digital printing company.

On the first day back in the office, a recruiter hit me up and told me about a telecom company seeking to hire. At first, I was hesitant, but three days later the company gave me a good offer. I contemplated for a couple days, and then I took the job.

Who was your hero when you were growing up?

I would definitely say my dad has been the greatest influence in my life. He was a gentleman. He always reminded me and my brothers that we were supposed to under live a life not over live a life

prudent The word was constantly used in the family. We were always reminded to choose our words carefully.

He always taught us about the value of money from when we were young, and constantly remind us to live our lives with high integrity.

instead is to build myself a beach villa in Bali. I would invite all my friends and family to crash there whenever they want to.

Where would you live if money was no object?

I would definitely choose to live in Bali, Indonesia. I love the ocean, I love the laid-back lifestyle and it's also close enough to Jakarta, Kuala Lumpur, Singapore. Australia in case I need a little city vibe. After all I'm a city boy. Indonesia has been my adopted home for the past five years and I have grown to love it very much. I met a lot of wonderful friends along the way and also married one! It gives me a strong additional reason to stay and live here.

If you had to work in a different industry, which one would you choose?

Years ago, I applied to be a pilot in a commercial airline. I love to fly, but they rejected my application. I want to fly so badly because of the influence of the movie Top Gun.

I also applied for the Royal Air Force on a cadet programme, but I failed. I do sometimes imagine

"I wish for all countries to increase the statutory annual leave that a company must give its staff. This is very important, since it involves work life balance."

What would you do with US\$1 million?

This is an interesting question. I could go against what I've learnt from my dad about being prudent and live my life and just go on a world tour with my family and friends.

Traveling around the world would definitely be fun. But I guess, I would probably not do that. What I would choose to do what would it be like flying around the world and getting paid for it. Turns out, it's not much different from what I'm doing today.

I get paid to fly around to conduct meetings with business partners. On reflection I think that having jet lag, a strange hotel bed, and airplane food are not my favourite things. So, probably it's for the best that I got rejected and failed to become an airline pilot.

Which law would you most like to change?

I wish for all countries to increase the statutory annual leave that a company must give its staff. This is very important, since it involves work life balance. We need to work and also have good personal life. Annual leave is beneficial as it helps to support story on how he built his business. employees' mental health.

dreamer, he was a visionary, and he certainly had the knack of knowing what people want. He relentlessly pursues his dream of building a happy place for young people and adults. Disneyland is simply amazing.

I would love to have been able to meet him and to listen to his

"Communication has never been easier. It's more convenient to talk with friends, family, colleagues, business partner with just a simple call and they are also just a text away."

guess mental health is one thing that was not being addressed back when I was growing up. I'm happy to see that more and more companies and countries recognizing it and taking the step to make this change. So, definitely for me, a long statutory annual leave would be welcome.

What's the best piece of advice you've been given?

A time long ago, a good friend told me to never bring your ego to work. It is a common to hear people say, 'leave your ego at home.' I would argue against this. My reason is that neither bringing your ego to work or leaving your ego at home is a good idea.

I would say just keep it away somewhere not at work, and not at home either. Thank you for this question - it has been a good reminder and I'll be sharing this advice to all my friends.

If you could dine with any famous person, past or present, who would you choose?

I would choose Walt Disney, simply because he was a

The Rolling Stones or the Beatles? I am definitely a Beatles fan.

What's the greatest technological advancement in your lifetime?

Т bluow say the social like messaging application, WhatsApp, Line, Viber, and others. Their impact has been enormous. Communication has never been easier.

It's more convenient to talk with friends, family, collages, business partner with just a simple call and they are also just a text away.

However, it does disrupt the telecom industry that we're in. For example, International Direct Dial (IDD), SMS, and P2P have been directly impacted by these applications.

What did you want to be when you were growing up?

As а child, I had the weirdest imagination.

When all my school friends wanted to grow up to be a lawyer or doctor or engineer, I wanted to be Superman. A superhero that does great things and saves the world from villains.

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