

APSCC Monthly e-Newsletter

DECEMBER 2019

The **Asia-Pacific Satellite Communications Council (APSCC) e-Newsletter** is produced on a monthly basis as part of APSCC's information services for members and professionals in the satellite industry. Subscribe to the APSCC monthly newsletter and be updated with the latest satellite industry news as well as APSCC activities! To renew your subscription, please visit www.apscc.or.kr. To unsubscribe, send an email to info@apscc.or.kr with a title "Unsubscribe."

News in this issue has been collected from November 1 to November 30.

INSIDE APSCC

The APSCC 2019 Conference & Exhibition Marks Great Success!

The APSCC 2019 Satellite Conference & Exhibition successfully ended on November 21 in Bangkok, Thailand after 3 days of in-depth conference sessions and diverse networking events with more than 400 delegates attending the event. At APSCC 2019, thought leaders covered major issues impacting the Asia-Pacific satellite industry, including market insight on the latest trends, new applications, and innovative technical solutions throughout the three-day discussions and presentation sessions.

The APSCC-ISU Youth Development Workshop

The 2019 APSCC-ISU Youth Development Workshop was successfully held on November 21 in Bangkok concurrently with the APSCC 2019. The workshop provided a platform for the brightest up-and-coming engineering students and young professionals in Indonesia to connect with leading satellite and space industry experts and learn more about the opportunities in the sector. The 2019 APSCC-ISU Youth Development provided the students with a deeper understanding of the industry through lectures and case studies.

The 2019 APSCC Awards

Each year, APSCC recognizes outstanding individuals through the APSCC Awards to honor industry veterans for their collaboration, guidance and support in helping APSCC reach its mission as well as for their contribution to the satellite industry. At 2019 APSCC Awards Ceremony held on November 19, APSCC awarded 'Lifetime Achievement Award' to Ted McFarland, former Commercial Director, Sales, Marketing and Customer responsibilities, Blue Origin for his outstanding achievements and named Christian Patouraux, CEO and Founder of Kacific Broadband Satellite as 'Satellite Executive of the Year in the Asia-Pacific' for his achievements and contributions to the satellite industry in the Asia-Pacific Region, and by taking the lead to enhance the satellite industry.

The 2019 APSCC Young Talents Awards

The APSCC Young Talent Award is the latest initiative of APSCC to ensure a healthy future for the satellite industry and to attract and retain young talent to the satellite and space industries in Asia-Pacific region. The Award is presented to give the best of the young staff encouragement and public recognition of their contributions to the Asia-Pacific satellite and space community. 2019 APSCC Young Talent Awards' 4 winners were Vinothan Nadarajah, Assistant Manager, Measat; Angga Risnando, Strategic Business Development Officer, Telkomsat Indonesia; Ibnu Rusydi Sudirman, Bus & TTC Engineer, PT Pasifik Satelit Nusantara; Jamie Rose Sy, Engineer, SES. Ibnu Rusydi Sudirman, PT Pasifik Satelit Nusantara was selected as the winner of the 2020 SH-SSP program on November 21 at the APSCC 2019 Satellite Conference & Exhibition, in Bangkok. The winner received the scholarship to enroll the Southern Hemisphere Space Studies Program of International Space University (ISU).

2019 APSCC New Space Pitch Competition

The 1st APSCC annual New Space Pitch Competition was held at InterContinental hotel Bangkok, Thailand on November 21. This event aims to encourage New Space startups to share their thoughts on developing and growing the New Space economy in Asia with established satellite operators, manufacturers, and investors. This year five New Space entrepreneurs participated in the competition and Singapore/UK startup Infinite Orbits were presented the Judges' Award. Infinite Orbits is a geostationary satellite life-extension startup with services that include station keeping, GEO satellite disposal, and relocation services.

2 other companies were presented the Audience Awards: Delta-V Robotics, an India-based startup offering a cloud-based satellite design software, and Singapore-based Terran Space Technologies, which is working on cubesat manoeuvrability using water-propelled 3D-printed thrusters.

APSCC – PTC'20 Session: Satellite and 5G

With the advent of 5G, satellite has the opportunity to become a mainstream solution seemingly integrating with terrestrial technologies. Be it connecting the unconnected, offering ubiquitous internet for planes, ships and connected cars, or unlocking new use cases like multicasting content to edge-servers or scaling IoT platforms to global levels, the business models triggered by 5G are limitless. 5G is rapidly becoming the core philosophy in the design of back-end satellite systems and understanding ramifications of the new standard, together with its market potential, is crucial to assess the future of the satellite industry.

Date	Tuesday, 21 January'20 (1530 – 1645)
Venue	Hilton Hawaiian Village Waikiki Beach Resort, Honolulu, Hawaii
Moderator	Christopher Baugh, President, NSR
Speakers	Gregg Daffner, CEO, Gapsat; President, APSCC
	Ji-in Kim, Engineer, Technology Cooperation, KT SAT
	Michael DiPaolo, Vice President of Business Development, Comtech EF Data
	Terry Bleakley, Regional Vice President, Asia-Pacific, Intelsat

APSCC cordially invites members and colleagues to the APSCC – PTC'20 session. APSCC members can take discounted registration fee when registering.

SATELLITE BUSINESS

InterSAT Selects Hughes JUPITER™ System to Power Satellite Services in Sub-Saharan Africa

November 5, 2019 - Hughes Network Systems, LLC, announced that InterSAT Communication Services FZCO (InterSAT), one of the largest and most respected providers of Internet solutions in Africa, has selected the Hughes JUPITER™ System to power its new SkyFi satellite broadband service for consumers and micro/small-to-medium enterprises (MSME/SME) across sub-Saharan Africa. The agreement calls for implementing a latest generation JUPITER gateway and hundreds of high-speed customer terminals. Designed with the advanced DVB-S2X industry standard, the Hughes JUPITER System enables high capacity and efficiency for any satellite broadband implementation. Optimal utilization of High-Throughput Satellite (HTS) bandwidth provides operators significant cost and performance advantages. Operators on six continents have successfully deployed the JUPITER System to power services across more than 40 satellites – whether in C-band, Ku-band or Ka-band – including broadband Internet/Intranet access, Community Wi-Fi Hotspots, cellular backhaul and Airborne services.

Thuraya MarineStar Offers Voice, Tracking and Monitoring in a Single Flexible Product

November 5, 2019 - Thuraya has responded to strong demand from the maritime sector and distributors by launching the MarineStar, its best in class, affordable maritime voice solution with advanced two-way tracking and monitoring capabilities. Designed by the world's most innovative provider of mobile satellite communications, the MarineStar is Thuraya's new flagship voice terminal for entry-level maritime users. It is based on the same successful platform as other Thuraya voice hardware that have sold in excess of 1 million units to date. Quick and easy to install, Thuraya MarineStar is a one-stop solution for a wide range of operations including vessel tracking and monitoring, crew welfare and voice communications. Thuraya MarineStar is perfectly suited to small vessels, and highly scalable to satisfy the operational requirements of larger vessels. The service will be available through Thuraya's global distribution network, and will cover the world's busiest sea routes and fishing hotspots within the Thuraya satellite footprint.

Comtech EF Data Announces Heights Networking Platform Selected by Telefonica

November 6, 2019 - Comtech EF Data Corp. announced that its Heights™ Networking Platform selected by Telefonica for a multi-year program to upgrade Vivo Brazil and Telefonica Argentina mobile networks in support of 2G, 3G and LTE backhaul. To complement the Heights™ Networking platform, Telefonica also ordered RF amplifiers. Today, both Brazil and Argentina are experiencing high growth in terms of mobile traffic and subscribers as customers transition from 2G to 3G and LTE to experience mobile Internet.

Regulators in both countries realize the value of connecting the unconnected to bridge the digital divide and have established challenging performance requirements for Mobile Network Operators (“MNOs”) to reach new markets with high quality solutions. Comtech EF Data has supplied its award-winning and bandwidth-efficient satellite modems with optimization features to Mobile Network Operators for over 20 years. A constant drive to innovate and to drive down the total cost of ownership and improve Quality of Experience enables MNOs to profitably offer services in the most diverse and challenging environments.

EL AL Israel Airlines Goes Full Fleet with Viasat High-Speed Internet

November 6, 2019 - EL AL Israel Airlines, the national air carrier of Israel, and Viasat announced they expanded their successful relationship, adding the Boeing 777 widebody fleet to the mix of EL AL aircraft with Viasat's equipment for high-speed in-flight connectivity (IFC). In addition to the Boeing 777 fleet, Viasat equipment currently powers the connectivity experience across EL AL's Boeing 787 Dreamliner, Boeing 737-900 and part of Boeing 737-800 aircraft. EL AL plans to have all widebody aircraft equipped with Viasat's latest generation IFC solution and all narrow-body fleet equipped with Viasat's in-flight entertainment and connectivity (IFEC) offering. EL AL expects to have the majority of its fleet connected with the Viasat service by the end of 2020. The Viasat in-flight Wi-Fi service offers an at-home or office experience in the sky, keeping flight crews connected for enhanced passenger service and enabling passengers using smartphones, tablets or laptop computers the ability to browse websites, connect to email and instant messaging, use apps and social networks and to stream music and/or films when in-flight.

NBN Launches Business Satellite Service Created, Designed and Managed by Speedcast

November 6, 2019 - Speedcast announced that Australian government-owned infrastructure provider NBN Co is now delivering satellite services in collaboration with Speedcast to business and government users across regional and remote parts of the country. NBN Co's new Business Satellite Service (BSS) leverages an extensive network designed, built and managed by Speedcast Managed Services, with access to up to 58 beams from 10 gateways, two data centres, and a network operations centre powering the company's new high-data internet and IoT service offerings. NBN Co's BSS offerings are initially focused on remote business requirements for high-data internet access and IoT services, with an additional product – Access Bandwidth Service – to launch next year. NBN Co's BSS is a pioneering platform, showcasing the experience of NBN and Speedcast in delivering satellite services to business customers. Speedcast's managed service supports an unparalleled range of services, technical capabilities, and service levels through best-in-class satellite technology, a custom-built OSS/BSS platform and a 24/7 network operations centre. Speedcast will play an important role in helping secure NBN Co's future as an industry-leading infrastructure provider.

Thuraya and eSAT Global Successfully Complete Tests of Pioneering Satellite IoT Technology

November 7, 2019 - Thuraya and eSAT Global, a pioneer in low cost Satellite IoT connectivity, announced the completion of successful tests validating eSAT's revolutionary Global LPWAN (Low Power Wide Area Network) communications technology over Thuraya's satellite system. As a leading provider of mobile satellite services (MSS) over its geostationary (GEO) satellites, Thuraya offers an expanding range of compelling voice, broadband data, and M2M/IoT capabilities for land, maritime and aeronautical applications. These include cost-effective solutions, catering to a wide range of technical and commercial market requirements. To date, only modest consideration has been given to the use of direct links to GEO MSS satellites for LPWAN connectivity for Internet of Things (IoT) applications. eSAT's tests of its breakthrough technology over Thuraya's robust GEO MSS system reveal that this approach is not only practical, but also highly advantageous, and that low latency, low-cost LPWAN connectivity is about to become a reality with the use of Thuraya's cutting-edge technology.

GVF and Satellite Operators Issue Updated Guidance for New Antenna Products

November 7, 2019 - GVF and a group consisting of premier operators of communication satellite networks – AsiaSat, Eutelsat, Inmarsat, Intelsat and SES – have collaborated to produce updated guidance to antenna manufacturers regarding the satellite operators' expectations for new antenna products and how to demonstrate compliance with the Satellite Operator Minimum Performance Specifications (SOMAP). The SOMAP requirements and initiative have been undertaken to improve the Quality of Service (QoS) worldwide for the industry and to minimize interference. The availability of quality products, which have demonstrated compliance with satellite operator specifications, will provide manufacturers with a valuable sales tool to differentiate their products. The SOMAP satellite operator group has the final

authority for resolving questions regarding the compliance of a particular product. The SOMAP objective is to offer consistency across the industry for customers and antenna manufacturers. It does not replace the formal type approval procedures for each of the operators, but rather establishes minimum performance that each of the operators expect when deploying equipment which has not been formally type approved.

Inmarsat Unveils New SwiftBroadband Helo X-Stream High Data Rate Service for Rotary Aircraft

November 5, 2019 - Inmarsat announced the launch of SwiftBroadband Helo (SB-Helo) X-Stream, a new system for X-Stream services specifically developed for rotary aircraft. The tailor-made solution is designed to achieve advanced streaming performance on intermediate and high-gain antennas, alleviating the connectivity constraints traditionally caused by rotary blades. SB-Helo X-Stream is an enhancement of Inmarsat's X-Stream service and builds on the company's commitment to further meet the needs of government customers and partners. The new technical solution will expand the resilience of the service on the aircraft by mitigating against data packet loss. Based on testing conducted earlier this year, the helicopter-grade SB-Helo X-Stream service has been proven to achieve a 40% reduction in data packet loss compared to the standard background IP service, as well as delivering throughputs of up to 400kbps per single channel. Multiple channels can be aggregated enabling enhancements in the overall performance of the system.

Thales to Deliver Iridium Certus Aircraft Connectivity Services

November 8, 2019 - Thales has expanded its partnership with Iridium as the newest Iridium Certus aviation service provider. With FlytLINK, Thales already offers the avionics that use the Iridium Certus service, and will now be able to offer both the Iridium Certus™ terminals and Iridium Certus connectivity services to business jets, commercial aircraft, rotorcraft, general aviation, military and UAVs. Thales will begin delivering its FlytLINK terminal and antenna to customers in the first half of 2020, being first to market with an Iridium Certus aviation solution capable of 352 Kbps transmit and 704 Kbps receive speeds. Thales FlytLINK will provide new generation, truly global connectivity for cockpit and cabin communications using the L-band broadband platform. This includes a hybrid FlytLINK solution that combines Iridium Certus capabilities with Iridium's traditional narrowband services which will be available with its initial release. Its safety features include support for current and next generation Air Traffic Control systems, high quality voice, ACARS and IP data up to 704 kbps. It also supports electronic flight bag pairing, real-time weather, secure pilot and crew Wi-Fi access and enhanced calling.

AMOS-17 Satellite Wins Angola Contract for HTS Capacity

November 11, 2019 - Spacecom, operator of the AMOS satellite fleet, announced that a leading Angolan satellite services company has signed a contract for C-Band HTS capacity on the newly launched AMOS-17 communication satellite. The Angolan company will utilize capacity on AMOS-17 primarily for cellular backhaul to better connect rural and low-density communities throughout the Southern African country. AMOS-17's C-band HTS capabilities enable the satellite to target all of Angola with a single beam rather than use a number of smaller beams, as in most other HTS satellite. This technological advantage leads to economic benefits by reducing the client's initial CAPEX costs as well as providing lower ongoing OPEX costs for it and its customers. Spacecom's Vertical Solutions Division is supporting infrastructure deployment for the Angolan company.

Fleet Xpress Agreement Marks New Stage in Bourbon Digitalisation Strategy for Offshore

November 11, 2019 - Bourbon, a world leader in marine services for offshore oil and gas, has signed a contract committing more than 100 offshore support vessels (OSVs) to Inmarsat's Fleet Xpress, the maritime broadband service that combines the speed of Ka-band with continuous back up from Inmarsat's FleetBroadband operating on L-band. The deal represents a breakthrough offshore contract for Fleet Xpress, which is already installed on some 7,000 vessels - mainly seagoing merchant ships. Well-known for high performance vessels and operational excellence of its services, Bourbon's response to prolonged lower oil prices has emerged as the action plan '#BOURBONINMOTION'. The plan includes the Smart Shipping Programme, structured around a new vessel operational model, onshore support and a remote support centre, which seeks to leverage digital and connectivity tools to reduce fleet operating costs. Set for completion by 2021, the programme envisages deployment on 133 'smart' vessels.

Myriota & Motherson Partnership Creates a New Wave of South Australian Space Industry Manufacturing

November 11, 2019 - Myriota, global leader in nanosatellite Internet of Things (IoT) connectivity, has

entered into a partnership deal with global manufacturer Motherson to produce its Myriota Module; a cutting edge, low powered device that securely transfers data to the Myriota Network of satellites from anywhere on the planet. Production is well underway, with Motherson already manufacturing tens of thousands of Myriota Modules. The units are being manufactured at Motherson's South Australian design and manufacturing facility, and subsequently delivered across the globe. Myriota's growing list of partners and customers include Optus, Amazon's AWS and Boeing. It is the first partnership that Motherson has entered into with a space or Internet of Things (IoT) business within Australia; enabling Motherson to expand its business into these industries.

SES Provides Satellite Capacity: GA-ASI to Conduct Series of Capability Demonstrations in Europe

November 11, 2019 - General Atomics Aeronautical Systems, Inc. (GA-ASI), a global leader in Remotely Piloted Aircraft (RPA), announced that they are working with the Hellenic Air Force (HAF) in Greece to conduct a series of demonstration flights for European countries in December. Flights will base out of the HAF's site in Larissa and use a GA-ASI MQ-9 Guardian RPA to showcase maritime surveillance capabilities, as well as a GA-ASI-developed Detect and Avoid (DAA) system that enables RPA to fly safely in civil airspace alongside manned aircraft. GA-ASI is also partnering with SES, a leading satellite communications (SATCOM) operator and managed services provider, with over 70 satellites in Geostationary Orbit (GEO) and Medium Earth Orbit (MEO). SES will provide the GEO satellite connectivity that enables the MQ-9 to operate securely with a high-capacity datalink, enabling real-time transmission of sensor data from the aircraft, and extending its effective operational range far beyond that of "line-of-sight" datalinks.

Nokia and Globalstar Partner to Deploy Digitalization Platform Utilizing 3GPP Band 53 Spectrum

November 11, 2019 - Globalstar, Inc. announced its partnership with Nokia. The Fourth Industrial Revolution (4IR) sweeping steadily across the African continent highlights the increasing need for solutions that are tailored for, and compatible with, the digital transformation journey of enterprises across many vertical domains. The need for high capacity, low latency and secure connectivity that is easy to deploy in multiple sites, and often across national borders, poses a real challenge. One of the key enablers is spectrum for local deployments combined with an appropriate automation platform. Globalstar and Nokia have developed an innovative solution, which allows enterprises to deploy intelligent network applications in a dedicated spectrum band. It is based on Nokia's industrial-grade private wireless Digital Automation Cloud platform together with Globalstar's 3GPP Band 53 spectrum.

Arabsat 6A and Newtec Dialog to Transform Sudasat's Broadband Internet Connectivity

November 12, 2019 - Arab Satellite Communications Organization (ARABSAT) announced the signing of a contract between leading satellite service provider, Arabsat, Sudan-based VSAT service provider, Sudasat and global leader in IP-based satellite communications, ST Engineering iDirect. The agreement will see the installation of a Newtec Dialog® hub that will provide Internet services across Sudan on the Arabsat 6A Ka-band satellite, which was launched by a Falcon Heavy earlier this year and is dedicated to connecting the Middle East and African regions. The latest Newtec Dialog hub to be installed in Africa will enable Sudasat to enhance its broadband connectivity across the Sudanese territory, with the prospect of connecting many hundreds of remote sites. It will also offer Sudasat the possibility to take advantage of Newtec Dialog's multiservice capabilities in the future, enabling it to grow into other market segments such as mobility, cellular backhaul and broadcasting.

BlackSky Secures Funding from Intelsat

November 12, 2019 - BlackSky has announced it has secured a \$50 million senior secured loan from Intelsat. The transaction results in an industry first, creating a strategic relationship that pairs Earth observation with a global communications infrastructure. The new capital will allow BlackSky to augment existing assets and alliances, ensuring BlackSky remains a leader in delivering actionable Earth intelligence faster, with greater accuracy and more affordably than anyone else in the industry. Over time, BlackSky could incorporate access to Intelsat's robust global communications infrastructure, delivering first-to-know insights to customers no matter where in the world they are. With an established manufacturing capability, mission operations center and sales channels in place, BlackSky is in the process of expanding its constellation of smallsats that will deliver the highest revisit rate in the industry. The company is also leading the industry in fusing AI/ML-powered computer vision, high revisit rate imagery from orbital assets and open-source intelligence to provide customers with comprehensive, deep insights about the locations in the world they care about. BlackSky currently has four 1-meter satellites in orbit with another four slated for launch in early 2020, and plans to have 16 satellites in its constellation by

early 2021.

Gilat Awarded Five-year Project for 3G/4G Backhaul Services in Peru

November 12, 2019 - Gilat Satellite Networks has been awarded a \$10M five-year project for 3G/4G backhaul services in Peru. The infrastructure and network that Gilat recently started to operate is the basis for mobile coverage to be provided by a large mobile infrastructure operator for the rural areas. Gilat expects that the current contract will significantly expand over time to additional multiple millions of dollars in this region, as well as in other regions operated by Gilat. Leveraging the infrastructure and network deployed by Gilat will allow the mobile infrastructure operator to reach their goal of bringing 4G mobile internet to rural locations and thousands of Peruvians who are in remote areas. The Gilat solution allows overcoming the complex geography that limits the arrival of telecommunications and will support an important positive impact on local economies by enabling access to information and digital platforms.

EchoStar Mobile Launches the Hughes 4500 S-band Terminal

November 12, 2019 - EchoStar Mobile, a subsidiary of EchoStar Corporation and a mobile satellite operator providing connectivity across Europe, the North Sea and the Mediterranean through an integrated satellite and terrestrial network, announced the launch of the new Hughes 4500 S-band terminal to provide reliable connectivity over satellite networks for mobile, land and maritime network applications. The Hughes 4500 features an omni-directional antenna and is designed for mobile and fixed operations. The Hughes 4500 is the first S-band terminal in the market featuring low power consumption, ultra-light weight, and a simple installation process. These factors make the terminal extremely well suited for mobile operations and long-term fixed deployments in remote, power-challenged locations and in extreme weather environments. It ensures always-on network connectivity and will automatically restore connectivity in the event of an interruption.

Kepler Communications and Cobham SATCOM Form Strategic Partnership

November 13, 2019 - Kepler Communications and Cobham SATCOM announced a strategic partnership aimed at eliminating barriers to widespread adoption of high capacity data services over Kepler's Low Earth Orbit (LEO) network. Under the new arrangement, organizations evaluating Kepler's ability to cost-effectively move multiple gigabytes of data per day around the globe can experience a fully managed trial of the service anywhere on the planet with no upfront CAPEX spend, no lengthy service commitment, and certified installation & support executed through Cobham SATCOM's global Technical Service Partner network. Effectively offering 'User Terminal-as-a-Service' (UTaaS), the Kepler-Cobham partnership centers on three core principles: shifting equipment costs to a monthly operational fee from a more traditional one-time capital expense; embedding installation, technical support, terminal maintenance, warehousing, and transport services into the monthly fees with future capabilities for add-on services; and exchanging technical know-how to improve the delivery of LEO wideband services going forward.

Thuraya Successfully Conducts Aero Mobility Demonstration to Key Government Customers

November 13, 2019 - Thuraya, the mobile satellite services subsidiary of the Al Yah Satellite Communications Company (Yahsat) in partnership with SCOTTY, a developer of beyond line-of-sight (BLOS) satellite communication solutions based in Austria, has successfully conducted a live demonstration of its Aero Mobility capabilities platform - Thuraya Aero, replicating a real-time ISR (Intelligence, Surveillance & Reconnaissance) mission over satellite communications to key government customers. The technology demonstration highlighted the reliability and effectiveness of Thuraya's Aero solution for various ISR (Intelligence, Surveillance & Reconnaissance) operations associated with border patrol, maritime and environmental protection, in addition to disaster relief missions. Thuraya's L-band satellite network enabled the real-time transmission of HD aerial video and position data from an inflight fixed-wing Diamond DA62 MPP surveillance aircraft to the mission control centre. The live surveillance imagery, flight tracking, and duplex data was displayed on the ground using SCOTTY's Mobile HD portable receive station that supports critical applications including live exchange of Intelligence, Surveillance and Reconnaissance (ISR) information, transmission of border/coastal patrol imagery and first-responder support.

Global Eagle Places Order with Wavestream for In-Flight Connectivity Transceivers

November 14, 2019 - Gilat Satellite Networks' subsidiary Wavestream has received an order from Global Eagle Entertainment for approximately US\$5 million for its Ku-band 25W High-Power Transceiver (HPT) in support of In-flight connectivity (IFC). The Wavestream HPT are line fit for Boeing 737 aircraft. Global

Eagle delivers rich media content and seamless connectivity solutions to aircraft, ships and ground stations worldwide. To support the continued rollout of its airborne systems, it chose the Wavestream (Inflight Connectivity) IFC transceiver for its best-in-class quality and performance.

Gilat Signs Contract with SES to Develop and Deploy O3b mPOWER MEO Communications System

November 18, 2019 - Gilat Satellite Networks Ltd. has reached a major landmark with the selection by SES for development and deployment of a global multiple application VSAT platform for its O3b mPOWER Medium Earth Orbit (MEO) communications system. This multi-million-dollar contract establishes Gilat as a significant Non-Geostationary Orbit (NGSO) player through the technological innovation of its multi-orbit GEO/NGSO platform.

Live Testing of Intellian's Advanced Antenna Technology with Telesat Ka-band Satellites

November 19, 2019 - Telesat and Intellian have conducted a live testing campaign with the U.S. Navy, the results of which demonstrate that a single antenna aperture can deliver outstanding maritime broadband performance while switching between satellites in different orbits. The live testing used Ka-band capacity on Telesat's Phase 1 LEO and Telstar 19 VANTAGE high throughput GEO. Both satellites were connected to Intellian's v150NX(link is external), the world's first and only 1.5m Ka convertible VSAT – a future-proof system supporting 2.5GHz wide Ka-band networks operating in GEO and LEO orbits. Testing highlighted how the Navy and other USG customers can access high capacity broadband from commercial satellites in different orbits with robust links that provide improved security, flexibility and resiliency. The U.S. military has shown growing interest in advanced commercial space systems, such as Telesat's LEO constellation, that can deliver highly secure and reliable broadband anywhere in the world with added benefits of global persistence, ultra-low latency, and rapid technology refresh.

Qatar Airways Selects Gogo for its Inflight Connectivity

November 19, 2019 - Gogo announced that it has been selected by Qatar Airways to install the Gogo 2Ku high-speed inflight connectivity solution and live TV on 70 of the airline's aircraft. 2Ku is the industry's leading inflight connectivity solution and delivers a ground-like internet experience for passengers. The launch of high-speed Wi-Fi will be coupled with live TV to passenger devices as well as seatback screens. The carrier will install 2Ku on its Boeing 787-9, 787-8 and Airbus A380 fleets. Service on Qatar Airways is expected to go live in 2020.

Intellian Launches World's First 1.25 Meter Ku-Ka Convertible VSAT System

November 19, 2019 - Intellian has released the latest model in its new NX Series future-proof, performance-leading and low lifecycle cost VSAT antenna portfolio. The v130NX is the world's first Ku-Ka convertible VSAT terminal with a 1.25-meter reflector, making it an ideal platform for high-speed global Internet on ships, offshore vessels, and superyachts. The v130NX is a flexible system supporting Ku-band and Ka-band (2.5 GHz Wide) networks. It is also compatible with GEO (Geostationary Earth Orbit), MEO (Medium Earth Orbit) and LEO (Low Earth Orbit) constellations. As with all NX Series antennas, the v130NX is easily converted from Ku-band to Ka-band by changing the Radio Frequency (RF) Assembly and Feed, as the reflector and radome are already optimized for operation across both frequency bands. The v130NX features a highly efficient design and high-power BUC options up to 40 W, giving it the power to deliver the highest RF performance of any 1.25-meter system on the market today. Its smart satellite handover capability (enabled by an integral mediator and orbit-agnostic tracking proficiency) provides a seamless network service on practically any satellite. This fulfills the need for enhanced resilience, reliability, and redundancy whilst maximizing the long-term value of the investment by reducing the cost of migrating to future GEO High Throughput Satellites (HTS) and low-latency MEO and LEO networks.

SES Delivers Connectivity to Verizon and Nokia's Operation Convergent Response Event

November 20, 2019 - SES announced that it will be providing satellite capacity to Verizon and Nokia's Operation Convergent Response (OCR) 2019 event at the Guardian Centers in Perry, Georgia. OCR gives law enforcement, fire, EMT and other first responders the chance to experience first-hand how advanced technologies can work under pressure in a live action simulated crisis in a realistic, but controlled environment. SES is providing the managed connectivity services from its high-capacity, low-latency O3b Medium Earth Orbit (MEO) satellite-based data communications system. The fiber-like connectivity for delivering carrier-grade, cloud-ready services will provide WiFi connectivity to participants with the help of other technology partners and power the event's key emergency simulations.

China Launches Satellite Service Platform

November 20, 2019 - A Chinese company launched a satellite service platform to make satellite resources more accessible for users. China Aerospace Science and Industry Corporation (CASIC), the platform's designer, announced the news at the 5th China (International) Commercial Aerospace Forum in Wuhan. A common satellite operating business focuses on satellites rather than services, which makes it difficult to share satellite resources among users due to the considerable knowledge and expertise required to access the information. The new platform can provide users with integrated satellite resources through a ground station network, which is more streamlined and user-friendly, according to Yuan Hongyi from the CASIC. As part of the commercial space development plan of the group, the platform is aimed at meeting the demands of various industries for satellite resources, said Xu Tao from the CASIC.

Comtech Telecommunications Announces Strategic Acquisition of UHP Networks

November 21, 2019 - Comtech Telecommunications Corp. announced that it has entered into an agreement to acquire UHP Networks Inc. (UHP), a leading provider of innovative and disruptive satellite ground station technology solutions, for a purchase price of approximately \$40.0 million. Founded in 2005, UHP is based in Canada and has developed revolutionary technology that is transforming the Very Small Aperture Terminal (VSAT) market. Key Strategic Benefits for Comtech Include: Expands Comtech's product line in the satellite ground station market, which has a growing need for reliable, high capacity satellite equipment, particularly in the private and high-performance enterprise VSAT market; Allows Comtech to integrate a revolutionary TDMA technology into Comtech EF Data Corp.'s industry leading HEIGHTS™ platform (which includes our HEIGHTS Dynamic Network Access (H-DNA) dynamic Single Carrier per Channel (dSCPC) technology); Brings new relationships with top tier U.S. mobile network operators, Fortune 500 global companies and international government agencies.

Gilat Achieves Fastest Ever Modem Speeds of 1.2 Gbps Total Throughput over Telesat's LEO Satellite

November 21, 2019 - Gilat Satellite Networks announced that it has achieved the fastest ever modem speeds of 1.2 Gbps total throughput over Telesat's Phase 1 LEO satellite. This industry milestone demonstrates the potential of high throughput Non-Geostationary Orbit (NGSO) satellite constellations. Gilat's technology opens opportunities for new telecommunications products and a wider range of customer experiences to markets demanding very high throughputs such as cruise ships, large airplanes, trunking and high-capacity government applications. Additionally, the combination of high throughput provided by Gilat's innovative technology and the low latency from NGSO creates opportunity for delay-sensitive applications such as 5G.

ZTE Partners with China Mobile to Provision the 5G End-to-End Network Slicing + MEC Services

November 21, 2019 - ZTE Corporation, a major international provider of telecommunications, enterprise and consumer technology solutions for the Mobile Internet, and the Guangdong Branch of China Mobile today have provisioned the MEC-related B2B2C end-to-end network slicing services. The provisioning of the new services will promote new 5G business models and industry innovations, thereby building a win-win 5G ecosystem. Together with other industry partners, ZTE and the Guangdong Branch of China Mobile have deployed end-to-end slicing operation systems by adopting the MEC solution to provide industry customers with end-to-end digital transformation support. This solution can support and satisfy the requirements of digital transformation of industrial applications by means of the subscription of the slice capability in the slicing operation system. It is also combined with advanced MEC technologies, such as local software/hardware acceleration, AI video rendering, L3-L7 high-performance route distribution and capability exposure.

IPSTAR Launches Broadband Service with VSAT Technology from UHP Networks in New Zealand

November 21, 2019 - IPSTAR New Zealand, a major provider of satellite connectivity services in Australia, New Zealand and throughout the Asia-Pacific region through its parent company Thaicom, has launched Choice, a new service in New Zealand. The service provides high-speed broadband access in the country's rural areas. Key applications include public services, distance learning, internet banking and WiFi spots. The Choice offering delivers the highest broadband speed available in New Zealand with only 0.84 m antenna at the remote terminal. The download and upload speeds are up to 5 times faster compared with standard technology. The service operates over high-power IPSTAR Ku-band HTS satellite and uses cutting-edge VSAT equipment from UHP Networks, the Canadian manufacturer. At the heart of the ground infrastructure is a multi-beam VSAT Hub with DVB-S2X technology and MF-TDMA with Adaptive Coding and Modulation. The modular software-defined architecture of the UHP Hub ensures high-availability of

the network.

ST Engineering Sets up Entity in Israel

November 22, 2019 - Singapore Technologies Engineering Ltd (ST Engineering) announced that it has set up a wholly owned subsidiary, ST Engineering (Israel) Smart Cities Ltd, in Israel with an initial equity injection of NIS 900,000 (approximately S\$360,000). The subsidiary will be engaging in the growing smart city business in Israel, including autonomous vehicle and robotics. The setting up of the subsidiary is not expected to have any material impact on the consolidated net tangible assets per share and earnings per share of ST Engineering for the current financial year.

Thuraya Unveils Landmark Tracking and Monitoring Solution Enhanced with New Capabilities

November 25, 2019 - Thuraya unveiled its highly versatile T2M-DUAL IoT/M2M solution with enhanced capabilities. Operating on both satellite M2M and cellular networks, Thuraya T2M-DUAL is the world's only dual-mode tracking and monitoring solution with the widest choice of connectivity over Satellite, including Satellite Messaging, GmPRS IP Data and Circuit Switched 9.6 data. It enables smarter, more streamlined and automated data capture from multiple sources, including fixed and mobile assets. Thuraya T2M-DUAL brings unprecedented ease of integration to applications that are traditionally more complex to monitor and manage. The terminal's robust system and interoperability make it the best-in-class solution for large scale mobile operations in sectors like transportation, government, energy and utilities, agri-tech, hydro environment and mining. Moreover, its automated network mode selection based on least cost routing ensures optimized connectivity and unrivalled total cost of ownership. Thuraya T2M-DUAL provides three independent modes of operation. On tracker mode, it relays CANbus, GPS or I/O data from moving entities. When assets are fixed or deployed, the terminal can also be used in logger or modem mode to interface with data loggers to exchange vital information from remote sites.

KT SAT Conducts Satellite 5G Connection

November 25, 2019 - KT Corp. said its satellite-operating subsidiary, KT SAT, has successfully conducted a 5G data transmission with a satellite connection. The test was aimed to expand the fifth-generation technology linked to KT's 5G network and KT SAT's KOREASAT 6. KT SAT and the KT Institute of Convergence Technology executed the project together. They implemented "hybrid terrestrial-satellite 5G transmission," which combines different networks to deliver data better than typical 5G service, and "5G edge cloud media transmission using satellite communications backhaul links." That meshes satellite communications with the content delivery network (CDN) for video transmissions from the 5G edge cloud. The 5G edge cloud can be seen as a virtual data center. It handles data generated from user terminals at the nearest possible spot in order to maximize the 5G capacity for ultra-low latency. The key to hybrid satellite-terrestrial 5G transmission is a router jointly developed by the KT institute and KT SAT. 5G terminals connected to this device can simultaneously transmit and receive various data, or use separate routes, to and from a 5G network and a satellite. KT SAT, by using this technology, successfully maintained normal service operations with KOREASAT 6 alone, after the 5G network was intentionally disconnected. The test showed how the hybrid 5G transmission technology can enable 5G-based automated machinery or moving vehicle to maintain its network connection when 5G coverage becomes unavailable, or a natural disaster has occurred.

The Satellite Industry Welcomes WRC-19 Decisions

November 26, 2019 - The Global Satellite Coalition (GSC) welcomes the decisions taken at the ITU World Radiocommunication Conference 2019 (WRC-19), Sharm-el-Sheikh, which allow satellite services to continue to bridge digital, education, health and social divides and connect more and more citizens around the world. At the start of WRC-19, the GSC called for a practical approach to address both the world's unresolved communications challenges and the technological imperatives of the future. WRC-19 proved again the vigour and vitality of the satellite industry. Not only was the satellite industry able to effectively contain the persistent encroachments on spectrum allocated to satellite services, but also achieved big wins in terms of added flexibility and new spectrum allocations. The decisions of WRC-19 demonstrate that countries around the world recognize the important role that satellite communications plays in the development and growth of their economies and the provision of critical services to their citizens. The GSC praises the WRC-19 decision on Earth Stations in Motion (ESIM) in the Ka Band (28 GHz and 18 GHz bands) into which billions of dollars of investment have flowed over the last decade. The decision unmistakably answers the need for more flexibility in the use of existing spectrum allocations to address increased demand for connectivity for users on planes, ships and trains. Of crucial importance to millions of satellite

users at this Conference, was the decision to protect C-band downlinks in Africa and Asia using the 3.6 - 4.2 GHz range. Administrations in these regions can now be assured that their vital C-band services in this band will remain protected for years to come. The GSC also praises the Conference decisions on defining a regulatory framework for non-geostationary (NGSO) satellites to operate in the Q/V bands, the new allocation of 1 GHz of spectrum for the fixed-satellite service (FSS) in the 51.4-52.4 GHz band for feeder links, and the decisions to make ample spectrum available to HAPS (High Altitude Platform Stations) and IMT, (International Mobile Telecommunications) which both acknowledge the need to protect incumbent services.

Papua New Guinea Air Services Limited to Deploy Aireon's Space-based Technology in PNG

November 27, 2019 - Papua New Guinea Air Services Limited (PNGASL) announced it has signed an agreement to deploy Aireon's space-based Automatic Dependent Surveillance-Broadcast (ADS-B) air traffic surveillance service in the Port Moresby Flight Information Region (FIR). This announcement will enable the near-term deployment of 100 percent, real-time air traffic surveillance of all ADS-B equipped aircraft. Since its operations commenced in 2008, PNGASL has relied on ground-based infrastructure for its surveillance capabilities. However, because of Papua New Guinea's extremely mountainous and difficult terrains, as well as unpredictable inclement weather, it has been a challenge for PNGASL to efficiently install and effectively maintain ground stations. To solve the geographic constraints that limit existing ground-based surveillance, PNGASL previously relied on local third-party communications links. However, the ongoing disrupted power supply and outages in service availability has made dependence on third party solutions an unreliable approach. With space-based ADS-B, PNGASL will no longer be constrained by these geographic and technical challenges.

Kacific and Tata Communications Ink Global IP Connectivity and Cyber Security Deal

November 28, 2019 - Kacific Broadband Satellites Group (Kacific) has selected Tata Communications, a leading global digital infrastructure provider, to provide terrestrial connectivity services as it readies for the launch of its first satellite, Kacific1. Tata Communications will provide global internet and state-of-the-art cyber security services for Kacific's Ka-band satellite network. Tata Communications is a leading digital infrastructure service provider and is one of the world's largest telecommunication companies with a global network reaching over 200 countries and territories. The company serves over 7,000 customers globally that represent over 300 of the Fortune 500. Tata Communications' global network will provide multi gigabit connectivity with unparalleled redundancy and security to Kacific. Kacific will benefit from the Tata Communications' advanced subsea fibre network which underpins the internet backbone, where its network carries around 30% of the world's internet routes. Kacific1 is a High Throughput Satellite (HTS) that will use 56 high-power Ka-band beams to deliver affordable, high-speed broadband to telecommunications companies, internet service providers and governments in South East Asia and the Pacific.

Cobham Awarded ESA Contract for GR740 SBC Reference Design

November 28, 2019 - Cobham Gaisler, a leading space design center of Advanced Electronic Solutions, announced that it is leading a consortium for a new development contract from the European Space Agency (ESA). Cobham Gaisler and RUAG Space, both located in Gothenburg, Sweden, with specification input from Airbus Defense and Space, Thales Alenia Space and OHB Systems, will together design a reference design and basic software for a single board computer (SBC) based on the GR740 Quad-Core LEON4FT Microprocessor. Sponsored by the ESA, this single board computer reference design and software will be available for all European space users. It will be based on Cobham's GR740, a radiation hardened system-on-chip that has been designed as the European Space Agency's Next Generation Microprocessor (NGMP) and is part of the ESA roadmap for standard microprocessor components. The development will include breadboard and basic software to be verified on a functional and performance level, as well as a test plan for future space qualification. The availability of the reference design will shorten the development time and reduce the risk for space users when designing their custom single board computers and flight software based on the GR740 processor.

Inmarsat and ABB Marine & Ports Sign Agreement to Enable Digitalisation via Fleet Data Platform

November 28, 2019 - Inmarsat and ABB Marine & Ports, two driving forces behind maritime digitalisation, have signed a milestone Master Supply Agreement. The implementation of the agreement tackles an obstacle identified by ship owners themselves which has stopped them using IoT (Internet of Things) technology. A recent 2018 Inmarsat survey of 125 owners found 51% identifying an inability to get data

off ships in real-time as their obstacle to IoT adoption. The agreement recognises ABB as a certified application provider to work with Fleet Data, the IoT platform developed by Inmarsat and Danelec Marine which collects information from onboard sensors, pre-processes it, and uploads it to a secure cloud-based database. The new Certified Application Provider (CAP) agreement means analytics, monitoring and decision-support software, developed by ABB Marine & Ports to benchmark fleet performance as well as enhance ship efficiency and safety, can seamlessly integrate with a database via the Fleet Data Application Programming Interface (API).

SES and Luxembourg Government Renew Orbital Concession, Establish New Fund for Space Sector

November 29, 2019 - SES and the Luxembourg Government announced today that they have reached an agreement to renew SES's concession to operate satellites flying under Luxembourg jurisdiction for 20 years, effective from January 2022 when the current concession expires, with an annual fee of EUR 1 million from 2025 onwards. As part of the agreement and starting from 2022, SES will also contribute a maximum of EUR 7 million per year into a fund to support and strengthen the Luxembourg space sector as well as benefit the wider local economy.

BROADCAST

Times Network Adopt Quicklink TX for Daily News Contributions

November 4, 2019 - Times Network, a subsidiary of The Times Group, have adopted the Quicklink TX Quad to introduce guest contributions into their live daily news bulletins. Times Network, headquartered in Mumbai, India, has a global presence across 100 countries and includes prestigious brands such as Times Now, ET Now, Mirror Now, Movies Now, MN+, Romy Now and MNX. Times Now News, the digital arm of Times Network, has adapted itself to serve the diverse nature, interests and delivery of its content-savvy audience. The Quicklink TX, designed in partnership with Microsoft, is a video call management system. It is a transceiver that enables professional reception and transmission of multiple Skype video calls through SDI inputs/outputs and HDMI interface. As the Quicklink Skype TX can receive from and send to any Skype user it provides unrivalled global access to millions of Skype users in order to broadcast the calls in HD quality.

Optus Differentiates with 5G Delivering Both Mobile 'on the go' and in the Home with New 4K Ultra HD Video Streaming Partnerships

November 4, 2019 - With over 290 5G sites today in Sydney, Canberra, Adelaide, Brisbane, Melbourne, Perth and other key locations in NSW, Victoria and Queensland and 1200 sites planned by March 2020, Optus is officially launching its market leading 5G offer. From today our 5G Home service will be available to up to 138,000 homes in selected areas for purchase online and through more than 170 stores as a walk-out working option for customers. Optus 5G will also be available 'on the go' through a range of 5G compatible smartphones. Mobile services are supported by three 5G capable handsets including the Samsung Galaxy Note 10, Samsung Galaxy S10 5G and the Oppo Reno 5G. Optus is also working closely with OTT Video content partners 7plus, Amazon Prime Video, Netflix, Fetch and Stan with others to follow to ensure that their 2020 4K Ultra HD Streaming Video content line-up is optimised for the Optus 5G network.

Eutelsat Announces First Signing of Eutelsat CIRRUS Solution on the African Continent with Orao Telecom Congo

November 12, 2019 - Eutelsat Communications has announced a multiyear contract signature with Orao Telecom Congo for video capacity aboard one of its satellites located at 7° East, a privileged position for Africa. In a first for the African continent, Orao Telecom Congo has also signed up to Eutelsat CIRRUS; Eutelsat's hybrid satellite/OTT delivery of channels. Orao has selected a satellite located at one of Eutelsat's key positions to launch from mid-December a pay-TV bouquet of 15 channels featuring Congolese content made up of series, movies, sports, kids shows and news. The DTH bouquet will be broadcast to the Democratic Republic of Congo, while Orao will also leverage the Eutelsat CIRRUS content delivery platform to offer an OTT service aimed at the Congolese diaspora worldwide.

Irdeto and Amlogic Launch Netflix-integrated Hailstorm Hybrid Set-top Box Platform

November 13, 2019 - Irdeto, the world's leading digital platform security solution provider, and Amlogic, a leading semiconductor company, have launched a set-top box (STB) platform that is pre-certified under

the Netflix Hailstorm Hybrid program. The program is designed by Netflix to reduce the integration time and effort for pay TV operator partners on the Android TV platform. Devices pre-certified under the program allow operators to ensure their STB devices can reliably deliver the great experience synonymous with Netflix. Delivering a great viewing experience to consumers who want premium content quickly on future-proof platforms requires world-class security. Through this program, operators leverage Irdeto's 360-degree security solution that ensures the integrity of the platform and uncompromised content security.

LAUNCH / SPACE

China Launches Gaofen-7 Satellite

November 3, 2019 - China launched a new Earth observation satellite, Gaofen-7, which will play an important role in land surveying and mapping, urban and rural construction and statistical investigation. The Gaofen-7, launched on a Long March-4B rocket from the Taiyuan Satellite Launch Center in north China's Shanxi Province, is China's first civil-use optical transmission three-dimensional surveying and mapping satellite that reaches the sub-meter level. The satellite and carrier rocket were developed by the China Academy of Space Technology and the Shanghai Academy of Spaceflight Technology under the China Aerospace Science and Technology Corporation. Via the same carrier rocket, three other commercial and scientific experiment satellites including one developed for Sudan were also sent into space. The development of the Gaofen-7 has achieved a breakthrough in sub-meter level 3D mapping camera technology, meeting the highest mapping accuracy requirement among the Gaofen series Earth observation satellites. It can obtain high-resolution optical 3D observation data and high-precision laser altimetry data and can realize 1:10,000 scale satellite 3D mapping for civil use in China.

Spaceflight's Third Rideshare Mission with Rocket Lab to Launch ALE's Space-related Entertainment Satellite

November 5, 2019 - Spaceflight announced it has arranged for Tokyo-based ALE to launch its entertainment and science satellite on Rocket Lab's next Electron launch. The mission, called "Running Out of Fingers" by Rocket Lab to signify its tenth mission, represents Spaceflight's third launch with Rocket Lab this year. It follows the launch of seven spacecraft on its inaugural "Make it Rain" mission in June and three on the "Look Ma No Hands" mission in August. Like the previous missions, Spaceflight managed the launch capacity procurement, integration, and mission management services for the rideshare spacecraft. The Electron, carrying the ALE satellite, will lift-off from Rocket Lab's Launch Complex 1 at the southern tip of Mahia Peninsula, on the east coast of New Zealand's North Island. The launch window opens on 25th November NZDT. ALE's Sky Canvas, the world's first man-made shooting star project, will deploy to a 400km circular Sun Synchronous orbit, which is beneath the International Space Station. The company's satellite will create man-made shooting stars by safely releasing particles, precisely controlling the reentry location, date, and timing. When the particles reenter the Earth's atmosphere, they fully burn up, creating the appearance of shooting stars on the ground.

UK and Australia Team up to Use Space Technology to Protect Pacific from Climate Change and Natural Disasters

November 7, 2019 - Pacific island countries vulnerable to climate change will benefit from space technology to help them plan for and prevent natural disasters, thanks to a new UK and Australian partnership. The UK Space Agency is looking for project ideas, to be delivered through UK aid, that use the data collected by satellites to improve decision-making for disaster risk reduction, ocean monitoring, mangrove mapping and maritime management. This will also see Australia's national science agency, CSIRO, work with the UK Space Agency and invite UK organisations and other international partners to work with them to scope projects designed to deliver sustainable benefits to Small Island Developing States in the Pacific. The work will build on those systems already under way to help prevent and plan for disasters that are a consequence of rising sea levels and climate change.

SSTL Announces NovaSAR-1 Data Deal with the Philippines

November 7, 2019 - Surrey Satellite Technology Limited (SSTL) has signed an agreement with Republic of the Philippines' Department of Science and Technology-Advanced Science and Technology Institute (DOST-ASTI) to provide a share of the tasking and data acquisition services from NovaSAR-1, the innovative small S-Band radar satellite launched into a 580km sun synchronous orbit in September 2018.

The agreement gives DOST ASTI tasking priorities over the Philippines and the ability to access the raw data directly from the satellite, with a license to use and share the data with their partners over an initial 5 year period, extendable to the actual lifespan of the satellite. Synthetic Aperture Radar (SAR) has the ability to image the Earth through cloud cover and at night, and DOST-ASTI will use data from NovaSAR-1 in support of a number of applications, including disaster monitoring, agricultural and forestry management, and coastal and maritime applications such as ship detection.

Paspalis Innovation Investment Fund Backs Singaporean Space Startup

November 7, 2019 - Darwin-based Paspalis Innovation Investment Fund has made a S\$500,000 investment in Singapore-based space propulsion startup Alenia as it looks to boost the Northern Territory space economy and forge greater ties with the region. Alenia, which is developing a plasma-based electric propulsion system for small satellites, raised a total of S\$1.5 million (A\$1.6 million) in a round led by Cap Vista Private, the investment arm of the Defence Science and Technology Agency of Singapore. As well as the Paspalis contribution, Silicon Valley-based venture capital firm 500 Start-ups also participated. As part of the investment, Alenia will work with the Darwin Innovation Hub to advance its solution as well as collaborate towards the development of the Arnhem Space Port in the Northern Territory, which NASA is considering for a potential site for launching sounding rockets into equatorial orbit. Further, Paroulakis noted that Alenia, as a start up from Singapore's Nanyang Technological University, brings important international ties to the region.

SSTL Ships Target Satellite to Tokyo for Astroscale's ELSA-d Mission

November 7, 2019 - The ELSA-d mission comprises of a Chaser satellite and the Target satellite, and will demonstrate key technologies for orbital debris removal. Surrey Satellite Technology Ltd (SSTL) has shipped a 16kg Target satellite for Astroscale's End-of-Life Services by Astroscale demonstration (ELSA-d) mission to Tokyo, where it will be bolted to the Chaser satellite for environmental testing ahead of launch in 2020. The ELSA-d mission is designed to simulate capture of orbital debris and validate key technologies for end-of-life spacecraft retrieval and disposal services. The Target and Chaser satellites will be attached for launch and de-orbit, but while on-orbit at 500-600km they will be deployed in a series of increasingly complex separation and capture manoeuvres using search, identification, rendezvous, docking, and de-orbit technologies. The ELSA-d Target satellite was designed and manufactured by SSTL in Guildford UK and incorporates S Band communications, GPS positioning, and a 3-axis control system. It will also fly an HD camera and lighting to record the capture sequences during eclipse. A ferromagnetic docking plate with optical markers is attached to the Target, allowing the ~180kg Chaser satellite to identify and estimate attitude before deploying a capture extension mechanism with a magnetic plate to latch on to the Target satellite.

NanoAvionics to Build 12U Nano-satellite for Singapore's CaLeMPSat Research Mission

November 11, 2019 - Nano-satellite mission integrator NanoAvionics received a contract to build a 12U nano-satellite bus for the Singaporean research mission "Cathode-Less Micro Propulsion Satellite" (CaLeMPSat). Developed by SpaceSATS, Plasma Innovation Labs (PILS) and the Plasma Source and Application Center (PSAC) at National Institute of Education (an autonomous institute of Nanyang Technological University), CaLeMPSat will test miniature Hall effect thrusters (HETs) that operate at power classes never before achieved. The CaLeMPSat mission will test miniature HETs that operate at power classes far below the 100W-class thrusters of today's satellite industry. The research payload will consist of a 60W HET, an integrated 30W HET (in a 1.5U volume), and two 10W Hall Effect Micro Jets (HEM-Jets). A 3-axial, 5-nozzle cold gas thruster will round out the experimental thruster payload. NanoAvionics has committed to deliver the satellite bus before the end of February 2020 and SpaceSATS and its partners are targeting launch of CaLeMPSat in late 2020.

China Sends Five Satellites into Orbit via Single Rocket

November 13, 2019 - Five new remote-sensing satellites were sent into planned orbit from the Taiyuan Satellite Launch Center in north China's Shanxi Province. The five Ningxia-1 satellites were launched by a Long March-6 carrier rocket. The satellites are part of a commercial satellite project invested by the Ningxia Jingui Information Technology Co., Ltd. and will be mainly used for remote sensing detection. The satellites and carrier rocket were developed by the DFH Satellite Co., Ltd. and the Shanghai Academy of Spaceflight Technology.

China Sends Two Global Multimedia Satellites into Planned Orbit

November 17, 2019 - The two global multimedia satellites, KL-a-A and KL-a-B, was launched by Kuaizhou-1A (KZ-1A), a carrier rocket at 6:00 p.m. (Beijing Time). The two satellites are international cooperative commercial projects delivered by the Innovation Academy for Microsatellites of the Chinese Academy of Sciences. They are mainly used for the Ka-band communication technology test, and the user is a German company. KZ-1A is a low-cost solid-fuel carrier rocket with high reliability and a short preparation period. The rocket, developed by a company under the China Aerospace Science and Industry Corporation, is mainly used to launch low-orbit microsatellites. This launch was the third mission for KZ-1A this year.

Signed Protocols on Exploitation of Ariane 6 and Vega-C

November 20, 2019 - ESA, Arianespace, and respective industrial prime contractors ArianeGroup and Avio signed protocols on the Launchers Exploitation Phase for Ariane 6 and Vega-C. With development of Ariane 6 and Vega-C now in the final phase, these protocols will govern the long-lasting exploitation of Ariane 6 and Vega-C. They cover aspects related to technical and industrial responsibilities in the wide range of areas pertaining to operations such as compliance with high-level requirements over the lifetime of both launchers, launch authorisation, configuration management, and maintenance of various assets. Ariane 6 and Vega-C are of primary importance in guaranteeing access to space for public European missions. ESA has adopted for its missions, and recommended to other European institutional customers, a set of guiding principles for an effective and complementary exploitation of Ariane 6 and Vega-C, based on the respective launcher performances.

MEASAT Selects Arianespace for Launch of MEASAT-3d

November 21, 2019 - Arianespace and MEASAT Global Berhad (MEASAT), the leading Malaysian satellite operator, announced the signature of a launch services contract for MEASAT-3d. MEASAT-3d, a new multi-mission telecommunications satellite, will be launched into geostationary transfer orbit by an Ariane 5 heavy-lift launch vehicle from the Guiana Space Center, Europe's Spaceport in Kourou, French Guiana (South America) in 2021. MEASAT operates five satellites, providing coverage over Asia, Middle East, Africa, Europe and Australia. MEASAT-3d will serve the growth requirements of 4G & 5G mobile networks in Malaysia while continuing to provide redundancy and additional distribution capacity for video in HD, 4K, and ultimately 8K in the Asia-Pacific region. The satellite will weigh approximately 5,734 kg. at launch, and offers an operational life of 19 years. When positioned at 91.5 degrees East, MEASAT-3d will be co-located with MEASAT-3a and MEASAT-3b satellites to replace and enhance capacity in Malaysia, Asia, Middle East and Africa. The new MEASAT-3d satellite will carry multiple payload types: C- and Ku-band payloads for direct-to-home television broadcasting and other telecom services, as well as a high-throughput Ka-band payload for internet connectivity. MEASAT-3d also will carry an L-band navigation payload for Korean satellite operator KT Sat as part of the Korea Augmentation Satellite System. Airbus Defence and Space built MEASAT-3d using the Eurostar E3000 satellite platform.

Airbus Presents Ground-breaking Technology for EUTELSAT QUANTUM

November 21, 2019 - Airbus, ESA and Eutelsat have presented the new ground breaking multibeam active antenna payload today at Airbus in Madrid. Airbus' ELSA+ (ELectronically Steerable Antenna+) is a first for commercial satellite communications in Europe. The versatility of its performance represents a step change for communications satellites with a spacecraft able for the first time to adapt to the customers' business cases as and when needed by means of software control. The electronically steerable reception antenna, works in Ku-band with eight independent reconfigurable beams. This inherent flexibility enables the operator to reconfigure the radio frequency beams over the coverage zone, allowing for an unprecedented flexibility in multimedia and broadcasting services. In addition, these capabilities can be implemented on each beam either independently or simultaneously including hop up to several tens of predefined different configurations per beam (beam hopping). Another new feature is the capability of the antenna to mitigate possible interference, intended or not, thanks to its ability to locate any sources of interference and null them. This new antenna technology complements new generation fully digital payloads where the operator can thus change the orbit position, frequencies and the power of their spacecraft.

China Plans to Complete Space Station Construction around 2022

November 26, 2019 - China plans to complete the construction of a space station and have it put into operation around 2022, said Zhou Jianping, the chief designer of China's manned space program, at a forum held in south China's Guangdong Province. The space station is designed to weigh 100 tonnes and

accommodate three astronauts, which could be enlarged if needed, according to Zhou. The space station will be built as China's main platform for space science research, with the purposes of mastering the technologies in constructing and operating large space facilities, the technologies that guarantee life and health of astronauts who often fly in orbit, and the construction of a national space lab, according to Zhou.

Ariane's 250th Mission is a Success: TIBA-1 and Inmarsat GX5 are in Orbit!

November 26, 2019 - Arianespace has successfully orbited two geostationary satellites: TIBA-1, for Thales Alenia Space and Airbus Defence and Space on behalf of the Government of Egypt; and GX5 for the operator Inmarsat. The launch took place on November 26, 2019 from the Guiana Space Center in Kourou, French Guiana. TIBA-1 is a civil and government telecommunications satellite for Egypt developed by Thales Alenia Space and Airbus Defense and Space as co-prime contractors. Thales Alenia Space is the consortium's lead, and Airbus Defense and Space is the direct Arianespace customer for this mission. TIBA-1 will be owned and operated by the government of Egypt. TIBA-1 is the fourth satellite to be launched by Arianespace for Egypt, with Arianespace having deployed the three satellites for the operator Nilesat between 1998 and 2010. TIBA-1 also is the 22nd satellite launched by Arianespace for a mission in the cooperation between Airbus Defense and Space and Thales Alenia Space. Inmarsat GX5 is a mobile communications satellite built by Thales Alenia Space for Inmarsat. It will provide mobile services across the Middle East, Europe and the Indian sub-continent. As the most advanced satellite in the GX constellation, GX5 will deliver greater capacity than the entire existing GX fleet combined (GX1-GX4). A very high throughput satellite (VHTS), GX5 will address the rapid growth in customer demand for GX services in Europe and the Middle East, particularly for satellite Ka-band Wi-Fi services from the Global Xpress (GX) fleet. Today's mission, VA250, marks a symbolic milestone in the history of Ariane, since it was the 250th Ariane launch since December 24, 1979 – when the cornerstone Ariane 1 version performed its maiden flight.

PSLV-C47 Successfully Launches Cartosat-3 and 13 Commercial Nanosatellites

November 27, 2019 - India's Polar Satellite Launch Vehicle, in its forty ninth flight (PSLV-C47), successfully launched Cartosat-3 along with 13 Nanosatellites of USA from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota. Cartosat-3 was successfully injected into a sun synchronous orbit of 509 km. Subsequently, the 13 nanosatellites were injected into their intended orbits. After separation, solar arrays of Cartosat-3 were deployed automatically and the ISRO Telemetry Tracking and Command Network at Bengaluru assumed control of the satellite. In the coming days, the satellite will be brought to its final operational configuration. The mission life of the Cartosat-3 is 5 years. Cartosat-3 will address the increased user's demands for large scale urban planning, rural resource and infrastructure development, coastal land use and land cover, etc.

SPACE19+: Fundamental, Ambitious Decisions for the Future of Europe's Launchers

November 28, 2019 - ArianeGroup, lead contractor and design authority for Ariane 6, and its subsidiary Arianespace, which markets and operates the Ariane 5, Ariane 6, Soyuz, Vega, and Vega C launchers, welcome the important decisions benefiting the European launch industry, crucial for independent access to space, at the Ministerial Council of the European Space Agency (ESA) in Seville, Spain. These decisions allow the start of the transition between the two launch systems i.e., the end of Ariane 5 operations and Ariane 6 ramp-up to full operational capacity in 2023. With the funding approved for the next three years, they also secure the development of the main technological building blocks needed to keep Ariane evolving towards ever-greater competitiveness, such as the demonstrators for the new low-cost Prometheus engine, the Icarus ultra-light carbon upper stage, and the reusable Themis stage. In addition to the inaugural Ariane 6 flight scheduled for the second half of 2020, series production of the first 14 Ariane 6 launchers – scheduled to fly between 2021 and 2023 – is underway at ArianeGroup sites in France and Germany, as well as at European industrial partner sites in the 13 countries taking part in the Ariane 6 program. Ariane 6, an ESA program, will be a versatile, competitive launcher specifically designed to be able to adapt to changes in the market. It is modular and will be available in two versions, Ariane 62 (two P120 solid-fuel boosters common with Vega-C) and Ariane 64 (four P120 solid-fuel boosters), so that it can carry out all missions, to all orbits, and guarantee continued European access to space. Industrial lead contractor for development and operation of the Ariane 5 and Ariane 6 launchers, ArianeGroup coordinates an industrial network of more than 600 companies (including 350 SMEs) in 13 European countries. Arianespace is responsible for operating Ariane, Soyuz, and Vega launch systems. It is in charge of marketing the launchers and guarantees their flight readiness as well as preparing missions on behalf of its customers.

EXECUTIVE MOVES

Denis Allard Named General Manager of Thales Alenia Space's Toulouse Plant

November 4, 2019 - Denis Allard has been named General Manager of the Thales Alenia Space plant in Toulouse. He replaces Albert Cerro, who has retired. A graduate of the Ecole Supérieure d'Electricité electrical engineering school (1982) and the Institut d'Administration des Entreprises (IAE) business school in Toulouse (1990), Denis Allard joined the Space division of Thomson CSF in Toulouse in 1984 as a systems engineer, working on the development of ATHOS and then Syracuse 2. He was named head of payload integration for Telecom-2 in 1987.

SES' Pascal Wauthier is New Chairman of SDA

November 6, 2019 - Pascal Wauthier, Space Operations Senior Vice President at SES, has been elected as the new Chairman of the Space Data Association (SDA) an international non-profit association of satellite operators. Pascal has succeeded Inmarsat's Mark Dickinson, who will remain a director of the SDA. Pascal brings a wealth of knowledge and expertise to the role. He joined SES in 1990 as Flight Dynamics Engineer and is currently leading SES Space Operations. He is responsible for safely operating SES GEO and MEO (O3b) satellites. This includes charge of operational teams of the Satellite Control Centres located in Gibraltar, Luxembourg, Manassas and Princeton as well as the Flight Dynamics Engineering, Software Engineering and Operations Architecture teams.

ManSat Group Appoints Alexis Martin as Chief Consulting Officer

November 11, 2019 - The ManSat Group has expanded its ITU and Spectrum service offerings by further strengthening its leadership team with the appointment of Alexis Martin as Chief Consulting Officer. Alexis has held key positions across the satellite industry supporting regulations, strategy, market intelligence and asset management for the likes of Airbus, Avanti and SES, more recently serving as director of market and technical advisory in a public policy firm. From filing services through the Isle of Man and Iceland to end-to-end consulting services for the life of a filing, ManSat now offers comprehensive solutions to address each company's unique spectrum requirements.

Thomas Van den Driessche and Frederik Simoens Appointed to Key Executive Roles for ST Engineering iDirect

November 18, 2019 - ST Engineering iDirect has named Thomas Van den Driessche and Frederik Simoens to pivotal executive leadership roles following ST Engineering's successful acquisition of Newtec Group NV. Thomas Van den Driessche has been appointed the President of the Executive Strategic Board and Chief Commercial Officer. Building on his wealth of management experience, most recently as Newtec's Chief Executive Officer, Thomas will lead the newly-formed Strategy Group which comprises product lifecycle management (PLM), vertical market development, marketing and strategic business development. In this role he will spearhead the company's efforts to establish a new standard in ground infrastructure to propel further transformation and market opportunity across the satellite communications (satcom) industry. As CCO Thomas will steer the global sales organization to better serve customer needs as the industry evolves. Frederik Simoens has been appointed to the role of Chief Technology Officer. He will draw upon his history of innovation, which will be invaluable to ST Engineering iDirect as it further harnesses its pioneering role in leading the satellite industry forward. Frederik has served as Newtec's CTO since 2015 and brings with him invaluable expertise in satcom, standardization, physical layer technologies, networking and network virtualization.

Astroscale Welcomes the Appointments of Gene Fujii as Chief Engineer and Mike Lindsay as CTO

November 20, 2019 - Astroscale Holdings Inc. announced that Gene Fujii and Mike Lindsay, two experienced and highly respected space industry professionals, will join the management team. Fujii joins the company as Chief Engineer and Lindsay joins as Chief Technology Officer with appointments effective as of December 9, 2019. Both positions will be based in Japan, working out of Astroscale's Tokyo headquarters. Fujii joins Astroscale with over 25 years' experience in technology management and satellite mission design in the commercial space sector. He most recently held the role of Vice President, Space Segment Group at ORBCOMM, overseeing the development, test, launch and on-orbit checkout, and on-orbit operations of a constellation of small communications satellites from multiple manufacturers. Prior to working at ORBCOMM, Fujii was a Principal Systems Engineer at Orbital Sciences Corporation (now Northrop Grumman) where he worked on several small low-Earth orbit and geosynchronous equatorial orbit commercial communications satellites. Lindsay comes to Astroscale from OneWeb, where

he most recently served as Director, Spectrum Architecture. His extensive experience includes not only areas such as mission design, systems engineering and spacecraft performance, but also background in regulatory compliance and spectrum management. Bringing a passion for orbital sustainability, Lindsay joins Astroscale after working at NASA, Google, and OneWeb, where he designed the initial constellation of satellites with attention paid to the necessity of an adequate deorbit plan.

REPORTS

HTS the Key to 480+ Gbps of GovMil Bandwidth Consumption by 2028

November 6, 2019 - NSR's newly released *Government and Military Satellite Communications, 16th Edition (GMSC16)* report finds another year of growth for commercial satellite connectivity. As HTS-based services start to really take-off in the market, retail revenues are up \$600M from 2017, to over \$5.6 Billion. Driven by strong growth for Aeronautical Platforms (both Manned and Unmanned), the market remains poised to double over the next ten years.

Market Survey on Satellite Operators Reveals Shifting Strategies and New Market Entrants

November 20, 2019 - In its latest research titled, "*FSS Operators: Benchmarks & Performance Review*," Euroconsult shows that 11 new FSS providers have emerged over the last five years including two in 2018. Many of these companies are state-owned national operators, which will mostly serve national interests. Twelve new satellite operators are planning to enter the FSS geostationary (GEO) market by the early to mid 2020s, including companies targeting national market such as NepalSat, and Royal Group of Cambodia. Included in these twelve operators, are three with plans for small GEO satellites, which may indicate a new trend in the FSS industry facilitated in part by digital payloads, electric propulsion, and lower launch costs. The research demonstrates that the market structure of the FSS industry remains concentrated at the top with growing fragmentation at the bottom. The top four operators (SES, Intelsat, Eutelsat and Telesat) today represent approximately 60 percent of the industry's revenue, a share that has decreased in recent years. Five years ago, they combined for 64 percent of total revenue. The landscape behind the top five is rapidly evolving with three new companies joining the top ten in the past five years. These include YahSat, China Satcom, and ISRO.

UPCOMING EVENTS

CES - Consumer Electronics Show, January 7-10, Las Vegas, NV, USA, www.ces.tech

PTC'20: Vision2020 and Beyond, January 19-22, Honolulu, Hawaii, USA, www.ptc.org

PTC's Annual Conference is a strategic springboard for the global communications industry, providing all attendees with a three-day platform to focus on planning, networking, and discovering what lies ahead for the ICT industry. Start the new year off right at PTC'20: Vision 2020 and Beyond, 19-22 January 2020. See you in Honolulu!

APSCC - PTC'20 Session: Satellite and 5G, January 21, Honolulu, Hawaii, USA, www.ptc.org

SmallSat Symposium 2020, February 3-6, Silicon Valley, CA, USA, <https://2020.smallsatshow.com/>

GSTC 2020 - Global Space and Technology Convention, February 6-7, Singapore, www.space.org.sg/gstc

Singapore Air Show 2020, February 11-16, Singapore, <https://singaporeairshow.com/>

Convergence India 2020, February 19-21, New Delhi, India, www.convergenceindia.org

Satellite 2020, March 9-12, Washington DC, USA, <https://2020.satshow.com/>

CABSAT 2020, March 10-12, Dubai, UAE, www.cabsat.com/

Global Aerospace Summit, March 17-19, Abu Dhabi, UAE, www.aerospace summit.com

36th Space Symposium, March 30 - April 2, Colorado Springs, Colorado, USA, www.spacesymposium.org/

Editorials and Inquiries

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About APSCC

APSCC is a non-profit, international organization representing all sectors of satellite and space-related industries. The aim of the organization is to exchange views and ideas on satellite technologies, systems, policies and outer space activities in general along with satellite communications including broadcasting for the betterment of the Asia-Pacific region. Conferences, forums, workshops, and exhibitions are organized through regional coordination with its members in order to promote new services and businesses via satellite as well as outer space activities. APSCC membership is open to any government body, public or private organization, association, or corporation that is involved in satellite services, risk management or associate fields such as data-casting, informatics, multi-media, telecommunications and other outer-space related activities with interests in the Asia-Pacific region. More information is available at www.apscc.or.kr.