

APSCC Monthly e-Newsletter

JANUARY 2020

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 December 1 to December 31.

INSIDE APSCC

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 Gregg Daffner, CEO, Gapsat; President, APSCC
Speakers	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 Peter Jackson, Director, PJ Square Ltd. Nick Roullier, VP, Customer Enablement Practice, Marketing, SES Networks

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

SATELLITE BUSINESS

Maxar Technologies to Sell MDA to Northern Private Capital

December 30, 2019 - Maxar Technologies has entered into a definitive agreement to sell MDA to a consortium of financial sponsors led by Northern Private Capital (NPC), for CAD\$1 billion (US\$765 million), subject to customary adjustments. The company expects to use proceeds to reduce leverage and improve its capital structure to prioritize investments for growth in its core areas of Earth Intelligence and Space Infrastructure. The transaction includes all of MDA's Canadian businesses, encompassing ground stations, radar satellite products, robotics, defense, and satellite components, representing approximately 1,900 employees. Following the completion of the transaction, the MDA team will operate as a stand-alone company within NPC's portfolio, retaining its name and standing as the leading space and defense company in Canada. MDA expects to continue to supply Maxar with certain components and subsystems, and the companies expect to sell each other's complementary satellite data. The completion of the transaction is conditioned on regulatory approvals, including review by the Committee on Foreign Investment in the United States, Hart-Scott-Rodino review by the U.S. Department of Justice and the U.S. Federal Trade Commission, and Canadian government reviews under the Radiocommunications Act and the Competition Act.

Thuraya Signs Strategic Partnership Agreement with Rockville Technologies

December 26, 2019 - Thuraya Telecommunications Company has signed a Service Partner agreement with Rockville Technologies (Pvt.) Ltd., one of the leading system integrators and IoT/M2M solution providers in Pakistan. The partnership will expand the availability of Thuraya's products and services across key vertical markets within the country. Headquartered in Islamabad, Pakistan with offices in Kuwait, UAE,

KSA, Sri Lanka, Bulgaria and Turkey, Rockville has developed a diversified portfolio of technologies and telecom solutions since its founding in 2002. The company is already associated with more than 25 top telecom GSM operators and now its first-class integration capabilities complement Thuraya's renowned satellites and network portfolio of M2M, IoT and Data services. The strategic agreement is a key milestone in Thuraya's plans to drive growth in its M2M and IoT business. It will further expand market potential by offering bespoke satellite communication solutions to a diversified customer base.

Inmarsat Government Orders Large Block of Airborne Satcom Terminals from Orbit

December 19, 2019 - Orbit Communication Systems and Inmarsat Government announced an initial order from Inmarsat Government for Orbit's Multi-Purpose Terminal (MPT) 46WGX. Orbit's MPT 46WGX is a 46cm (18-inch) modular, multi-role aviation terminal designed to be fully interoperable with military Ka-band systems and optimized for use over Inmarsat's Global Xpress constellation. The order comes on the heels of a co-development agreement signed between Inmarsat and Orbit Communication Systems, announced on March 20, 2019. Delivery of the satellite antenna systems is expected in early 2020 from Orbit's US-based production facilities.

Satellogic Announces \$50M in Funding from New and Existing Investors

December 19, 2019 - Satellogic announced \$50M in funding from new and existing investors. Today's announcement comes on the heels of Satellogic's \$38M Dedicated Satellite Constellation (DSC) agreement with ABDAS to deliver access to a dedicated fleet of satellites providing them with high-resolution geospatial insights that will contribute to the monitoring of agriculture over the Henan Province in China and strengthen governmental decisions. Existing investors, including Tencent and Pitanga, contributed approximately 40% of the \$50M in newly announced funding, with some existing investors requesting more than their pro rata share. The remaining capital comes from a number of new financial and strategic investors, including the Inter-American Development Bank (IDB), through IDB Lab, the innovation laboratory of the IDB Group.

Hughes Partners with VeloCloud to Deliver SD-WAN Platform for Distributed Enterprises

December 17, 2019 - Hughes Network Systems, LLC has added the VMware SD-WAN powered by VeloCloud platform to its HughesON Managed SD-WAN portfolio for enterprise customers. The addition of the VeloCloud platform further enhances the most robust portfolio of SD-WAN solutions in the marketplace, reinforcing Hughes as the trusted partner of all organizations, no matter their size or nature, to deliver the most cost-effective, cloud-delivered application performance. The addition of VMware SD-WAN by VeloCloud to the HughesON portfolio gives enterprise customers a platform option that includes support for multiprotocol label switching (MPLS), cloud on-ramp services, architectural flexibility, and native ability for Voice over IP (VoIP) optimization on both wired and wireless broadband networks. Deployed via a cloud-hosted, on premises, or hybrid model, the VMware platform supports Next-Generation Firewall (NGFW) and Zero Trust security architectures, integrating seamlessly across vendors for increased service flexibility and quality. For global enterprises, VMware's network of cloud-hosted gateways enables optimal application performance anywhere in the world.

Capricorn Space and Infostellar Cooperate to Enable On Demand Ground Segment Services

December 17, 2019 - Recently established Australian ground segment operator Capricorn Space and Japanese Ground Segment as a Service provider Infostellar have signed an agreement that will enable Infostellar customers access to their satellite constellations from the Australian Ground Network - West (AGN-W) site near Mingenew in Western Australia. Established by Capricorn Space to provide global satellite operators southern hemisphere coverage from the Indian Ocean to across the Australian continent, AGN-W currently comprises two 5m S/X-Band antenna systems and associated infrastructure. The facility became operational in October 2019 after a greenfield construction program was instigated at the beginning of the year. The site was officially inaugurated at an Opening Ceremony on location on December 10th 2019.

Gilat's ESA Terminal Demonstrates First-ever In-Flight Operation on Commercial Aircraft

December 17, 2019 - Gilat Satellite Networks Ltd. announced that Gilat's In-Flight Connectivity (IFC) Electronically Steered Antenna (ESA) is the first-ever to operate during flight on a commercial aircraft, thus well positioning Gilat to win the vast opportunities in the fast changing market of ESA. The industry milestone was achieved onboard Honeywell's Boeing 757 test aircraft with Gilat's ESA terminal operating over Ka-band capacity on Telesat's Telstar 19 VANTAGE High Throughput Satellite (HTS). Gilat's high throughput antenna demonstrated remarkable scores with complete gate-to-gate operation. Gilat's ESA

has no moving parts, full electronic beam steering and a flat panel with an extremely low profile. Gilat's innovative design combines the benefits of ESA with the advantages of Ka-band, as highlighted by the performance achieved in this testing. The ESA terminal can serve both GEO and NGSO constellations that operate in Ka-band and features Gilat's industry leading aero modem.

exactEarth Announces Agreement to Provide Indian Navy with Satellite AIS

December 17, 2019 - exactEarth Ltd. has renewed its contract with Antrix Corporation Ltd., the commercial arm of the Indian Space Research Organization, to provide Satellite-AIS data services to the Indian Navy. The two-year subscription revenue contract is valued at USD \$1.2 million in total. Under the terms of the agreement, exactEarth will provide live and archived data from exactView RT, the Company's second-generation real-time Satellite-AIS data service, to, among other things, help the Indian Navy to monitor, in real-time, maritime activity along its 7,500 km of coastline and near its significant offshore resources.

Centre for Quantum Technologies Hands over Satellite Operations of SpooQy-1 CubeSat to SpeQtral

December 13, 2019 - SpeQtral has taken over operations of the SpooQy-1 nanosatellite on behalf of the Centre for Quantum Technologies (CQT) at the National University of Singapore. SpooQy-1 is a shoebox-sized, 3U CubeSat hosting a quantum payload developed at CQT. It was launched April 2019 and subsequently deployed from the International Space Station on 17 June 2019. The quantum payload is the world's first entangled photon source compact enough to fit on a CubeSat and qualified for the harsh space environment. The primary objective of the SpooQy-1 mission is to produce and characterize entangled photon pairs in space such that they violate the CHSH (Clauser-Horne-Shimony-Holt) Bell's inequality. This is a core capability for future quantum communication networks. The CQT team is analysing scientific data from the mission and expects to publish results on the source's performance in 2020. In the meantime, CQT and SpeQtral have signed an agreement allowing SpeQtral to manage ongoing operations. Formed as a spin-out company to commercialize quantum communications technologies developed at CQT, SpeQtral will monitor the long-term performance of the quantum payload for radiation damage and other degradation effects in the space environment.

Plastimo and Sigfox Join Forces to Connect the Oceans

December 12, 2019 - Plastimo and Sigfox have joined forces to offer total geolocation coverage across all oceans from 2020. The new service will be supported by data from the ELO nano-satellite constellation, operated by Eutelsat, Sigfox's partner. With more than 50 years of industrial expertise in the manufacture and design of safety equipment for boating consumers and professionals, Plastimo is constantly searching for high-performance and innovative solutions. Plastimo turned to Sigfox's 0G network to improve and broaden the application of digital technologies integrated into its safety equipment, with a specific requirement to quickly and reliably locate seafarers in the ocean. By partnering with Sigfox, Plastimo will also benefit from the future ELO nanosatellite constellation, deployed and operated by Eutelsat. From 2020, the constellation will support Sigfox's connectivity services, providing global coverage across all seas and oceans.

Speedcast Delivers Connectivity to Mining Site in Western Australia for Leading Iron Ore Producer

December 11, 2019 - Speedcast International Limited has completed installation and commissioning of connectivity services for a leading iron ore producer in remote Western Australia. The 130Mbps service meets the site's increasing requirement for data connectivity to optimize mining operations and support crew welfare at the +300-worker site. The low latency satellite service provides a new level of operational efficiencies as well as giving crew access to streaming services. The installation at the mining site required motorized antennas capable of tracking two satellites as they cross from horizon to horizon and handing off service between them to maintain uninterrupted connectivity.

Cobham Releases LEON5 Processor IP Core

December 11, 2019 - Cobham Gaisler, a leading space technologies design center of Cobham Advanced Electronic Solutions, announced today that it will release a new processor Intellectual Property (IP) core based on the SPARC instruction set architecture (ISA). The new LEON5 processor IP core, which succeeds the previous LEON4 processor, will be made available on 25 December for download into Xilinx' Kintex UltraSCALE FPGAs. The new LEON5 IP core implements the SPARC V8 32-bit ISA, a 32-bit architecture. LEON5 is a super-scalar dual-issue processor that provides software backward compatibility with previous generation LEON processors while increasing performance both in terms of maximum achievable operating frequency and amount of computations performed per system clock cycle.

Iridium Continues GMDSS Readiness with Announcement of Launch Partners

December 11, 2019 - Iridium Communications Inc. announced the first seven companies it has authorized to provide its Global Maritime Distress and Safety System (GMDSS) services, planned for commercial introduction in the first half of 2020. The seven companies, Arion Communications, AST, Marlink, Marsat, NSSLGlobal, Satcom Global and Speedcast will be the first in the industry to provide truly global satellite GMDSS service to mariners, and the first to offer a new choice in satellite network and equipment. Iridium® GMDSS will be the first to feature all three GMDSS services - safety voice, distress alerting and maritime safety information messaging, as well as being able to utilize Iridium's global voice and data services - all in one cost-effective and compact terminal. These new GMDSS service providers will play a critical role in delivering and supporting Iridium GMDSS capabilities on ships, including for fleets interested in transitioning to the truly global Iridium network.

WORK Microwave Transforms Maritime Satellite Communications with Intellian and Telesat

December 11, 2019 - WORK Microwave, a leading European manufacturer of advanced satellite communications equipment, announced the results of its technology demonstration with Intellian and Telesat to increase the reliability, performance, and throughput of broadband for maritime applications. Recently, the companies successfully tested a high-throughput data link from Mount Jackson, Virginia to Pompano Beach, Florida using WORK Microwave's AX-80 wideband modem, the Intellian v150NX 1.5m Ka-band wideband antenna, and the Telesat T19 VANTAGE High Throughput Satellite (HTS). During the demo, a wideband 215 Msps single carrier with 225 MHz total bandwidth was used and data rates of 400 to 600 Mbps were achieved under ACM at any type of weather conditions. WORK Microwave's AX-80 wideband modem supports 500 Msps bidirectional throughput, enabling exceptional spectrum output and high-quality signal transmission. Featuring a flexible, scalable design, the modem offers full throughput with 256APSK and 3 Gbps per direction without any compromises or tradeoffs. Using the AX-80 wideband modem on Telesat's Ka-band HTS, maritime users can optimize the use of high-speed, IP-based broadband access.

Nautilus Labs Becomes New Inmarsat Fleet Data Application Provider

December 11, 2019 - Nautilus Labs, the technology firm advancing the efficiency of ocean commerce through artificial intelligence, and Inmarsat have signed an agreement for Nautilus Labs to join a premier group of dedicated application providers for Inmarsat's Fleet Data service. Nautilus Labs will use the Fleet Data API (Application Programming Interface) to help automate data collection as part of Nautilus Platform, a proprietary, fleet optimization UI (user interface) that provides shipping owners and operators with predictive analytics to reduce fuel consumption, allow for better decisioning, and meet international and local environmental standards - all in real time. Developed by Inmarsat and made commercially available earlier this year, Fleet Data collects signals from onboard sensors, pre-processes that data, and uploads it to a central cloud-based database - equipped with a dashboard and an API.

Industrial 5G Growth Strengthened with NGMN and 5G-ACIA Agreement

December 11, 2019 - The Next Generation Mobile Networks Alliance (NGMN) and the 5G Alliance for Connected Industries and Automation (5G-ACIA) have today announced to jointly shape and promote industrial 5G applications. The agreement comes as both NGMN and 5G-ACIA look to enhance cooperation between operators and industries to realize the opportunities that 5G technology offers. The partnership between NGMN and 5G-ACIA will provide the technological foundation for new business models that will unleash new markets and growth in the industry, extending far beyond the mobile broadband applications of 5G. NGMN has driven and guided the development of wireless innovation in 5G since its first 5G White Paper was published in 2015. With the support of its well-established global partnership and technical expertise, NGMN has become a leading voice in the 5G industry.

New Australian Teleport to Target LEO/MEO Market Using Innovative ViaLite Links

December 10, 2019 - Targeting the growing low/medium Earth orbit satellite market, Capricorn Space's new Australian teleport will be assisted by the use of ViaLite RF over fiber links. ViaLite's lossless, high-bandwidth links will be used to connect the teleport's main equipment room with the outdoor shelters located next to the S/X-band antenna dishes. Working with their UK-based antenna systems supplier, the ViaLite solution uses leading edge technology to carry three bands (L-band, S-band and IF-band) across the same ViaLite Wideband RF over fiber link. The antenna systems supplier also integrated the ViaLite Blue2 dual modules for the antenna end of the links. The Blue2 provides a highly efficient way of integrating two modules in a single compact enclosure and is available in three basic options: dual transmit, dual receive and transceiver. This saves space and cost, and also has very low power

consumption. The main equipment room uses ViaLite 3U rack cards and chassis, again utilizing the dual module approach, making the system highly integrated and expandable as the teleport grows its operations.

Comtech Receives \$1.3 Million Contract for Military Communications Amplifiers

December 10, 2019 - Comtech Telecommunications Corp. announced that during the second quarter of fiscal 2020, its Santa Clara, California-based subsidiary, Comtech Xicom Technology, Inc., which is part of Comtech's Commercial Solutions segment, received a \$1.3 million follow-on order from a domestic integrator for Traveling Wave Tube Amplifiers ("TWTAs") for a U.S. Government Satellite Communications application. The Ka-band TWTAs ordered for this challenging Army application are part of Comtech Xicom Technology's industry-leading high efficiency TWTA product line and will be delivered in 2020.

Leonhardt & Blumberg Renews Long Term Fleet Contract with Marlink

December 10, 2019 - MarLeonhardt & Blumberg (L&B), Germany's largest independent charter owner of 15,000-35,000 DWT container ships and ship management company, has renewed its long-standing partnership with Marlink for the provision of quality global VSAT connectivity. Marlink's managed connectivity service excellence and digital solutions are recognised as a strong foundation for L&B's ongoing fleet digitalisation, which will deliver more efficient and greener maritime operations. Marlink has established a firm position of trust through its existing partnership with L&B, thanks to consistently high quality of service and an active, supportive local maintenance and customer care presence.

Kacific Secures US\$160 Million in Long-term Credit Facilities

December 6, 2019 - Kacific Broadband Satellites Group (Kacific) announced that it has closed credit facilities totalling US\$160 million with a group of financial institutions including the Asian Development Bank (ADB) and GuarantCo. The financing from ADB comprises a loan from ADB and a parallel loan provided by the Leading Asia's Private Infrastructure Fund (LEAP), which is administered by ADB. Taken altogether, these credit facilities secure long-term financing that enables Kacific to repay short-term facilities used to fund the construction of the Kacific1 payload and the associated infrastructure and launch costs. The financing reflects the recognition, by Asian Development Bank and GuarantCo, of the impact Kacific1 will have on development within the region and the benefits that Kacific1 will bring to un- and under-served communities in Asia and the Pacific, particularly in rural and remote areas of small island nations in the Pacific, and larger island nations like Indonesia and the Philippines. The financing is underpinned by the large number of customers, in 25 nations, who have already signed up to Kacific's service in anticipation of the Kacific1 satellite commencing operation in early 2020.

Yahsat and Hughes Launch Satellite Services Joint Venture in Brazil

December 6, 2019 - Hughes Network Systems and Al Yah Satellite Communications Company (Yahsat) announced the commencement of a joint venture to provide satellite broadband services in Brazil. Now operational under the established Hughes do Brasil name, the new venture combines Hughes decades of experience delivering satellite networks and services in Brazil with Yahsat's strong position and capabilities in the region. The agreement to form the joint venture was announced in May 2019 and was subject to regulatory and other approvals which have now been obtained. Resulting ownership of Hughes do Brasil is now 80% by Hughes and 20% by Yahsat. In addition to delivering services over the Hughes 65 West and Hughes 63 West satellites, Hughes do Brasil now offers services over Yahsat's Al Yah 3 Ka-band satellite. The company will deploy additional JUPITER System ground network technology – the de facto industry standard – to deliver high efficiency services over the Yahsat satellite across the country, optimizing performance and throughput.

Kratos Awarded Sole-source Contract for 24-hour Space Based RF Signal Communication Services

December 6, 2019 - Kratos Defense & Security Solutions has been awarded a \$39 million sole-source contract for Geolocation Global Support Services. The award is a five year contract that includes a base year and four one-year options, for a total value of up to \$39 million. Kratos will provide continuous RF monitoring services for government leased bandwidth on commercial satellites and bandwidth on military satellite communications; including bandwidth identified by the Combined Space Operations Center, or CSpOC. Kratos will also support resolving interference events through employment of mitigation strategies and geolocation activities. These services use Kratos products including Monics and satID to identify, isolate and geolocate interfering signals. Monitoring services will provide the U.S. Government the ability to efficiently utilize leased bandwidth, saving money and resources while ensuring that critical satellite communication links stay operational.

Intellian and Japan Radio Announce New Strategic Maritime Satcom Systems Partnership

December 5, 2019 - Intellian has signed a strategic partnership with Japan Radio Co., Ltd. (JRC) in maritime satellite communication antenna technology. The marine industry is moving forward with the era of smart shipping, and demand from ship operators to share ship-to-shore navigation information, which is aimed at increasing efficiency and productivity in ship operations, has rapidly grown in recent years. In this purpose, highly reliable and high-speed connection between ships-to-shore is critical. Through this strategic partnership, Intellian and JRC will start from the mutual provision of satellite terminals and technologies, considering joint development in the future. Key to the partnership is Intellian's ability to provide a full range of proven, quality antennas to JRC, which is one of the largest and oldest companies in the maritime industry. This will strengthen JRC's satellite communications business in the maritime business with the new partner, Intellian, having a large selection of maritime satellite antenna terminals.

QuadSAT Antenna Testing Successfully Demonstrated to SES and Eutelsat

December 5, 2019 - QuadSAT has announced its antenna testing solution has been demonstrated to satellite operators SES and Eutelsat. Positive results obtained at a recent supervised testing session were sufficient for SES to consider adopting QuadSAT's antenna testing product for future commercial antenna qualification activity. QuadSAT's system uses drone technology to test, calibrate and measure the performance of VSAT antennas, specifically Comms-On-The-Move products. The system offers similar capabilities as a traditional antenna test range, and does so autonomously, by generating and receiving test signals in a highly controlled and consistent manner. The result is a portable, cost-effective, and time-efficient method to verify antenna performance. A series of tests were carried out at A1 Telekom Austria's Aflenz Teleport, witnessed by SES, Eutelsat, A1 Telekom, and Mike Bartlett (Mik The Dish), an independent antenna verification engineering consultant. The tests included horizontal and elevation off-axis radiation diagrams, cross-pol measurements, and raster scans created using QuadSAT's system.

Element 84 Achieves AWS Public Safety & Disaster Response Competency

December 5, 2019 - Element 84 has achieved Amazon Web Services (AWS) Public Safety & Disaster Response Competency status. This designation recognizes that Element 84 helps customers adopt rapid mapping, satellite, and drone processing technology at the edge to help first responders leverage the power of AWS to protect the public, and prepare, respond, and recover from natural or man-made emergencies and disasters. Achieving the AWS Public Safety & Disaster Response Competency differentiates Element 84 as an AWS Partner Network (APN) member that provides specialized demonstrated technical proficiency and proven customer success with implementing workloads focused on Disaster & Public Safety Data and Analytics Tools. To receive the designation, APN Partners must possess deep AWS expertise and deliver solutions seamlessly on AWS.

Panasonic Avionics Teams up with Eutelsat to Deliver XTS In-flight Connectivity

December 5, 2019 - Panasonic Avionics Corporation has signed a multi-year agreement for Ku-band capacity on two multi-beam payloads on the EUTELSAT 10B satellite, due to be launched in 2022. This contract with Eutelsat Communications will enable Panasonic to provide multiple gigahertz of new extreme throughput (XTS1) Ku-band connectivity to airlines and their passengers flying over a wide area across Europe, Africa and the Middle East. Panasonic will continue to optimize its worldwide network and add more state-of-the-art satellite capacity in high-density regions to ensure it can deliver very high performance everywhere its customers fly. This satellite also provides high performance over lower density area such as Africa. EUTELSAT 10B will be the second XTS satellite to join Panasonic's connectivity network which has been developed to meet the growing connectivity demands of airlines and their passengers and is designed to place capacity where it's most needed across the globe to meet demand.

Hughes JUPITER System to Power Ground Network for SES-17 Satellite

December 4, 2019 - Hughes Network System announced that SES will employ the Hughes JUPITER System to enable services on its SES-17 satellite, which is being built by Thales Alenia Space and expected to launch in 2021. The agreement calls for Hughes to supply its next-generation ground network system, including data centers and hub equipment, which will operate over SES-17, a satellite with a highly flexible payload optimized for aviation connectivity and other high-powered data services across the Americas, the Caribbean, and the Atlantic Ocean. The JUPITER System is the satellite platform for very small aperture terminal (VSAT) networks, designed and optimized for broadband services over both high-throughput and conventional satellites. For fixed applications, each JUPITER terminal supports 300 Mbps of throughput – ideal for applications such as cellular backhaul and Community Wi-Fi hotspots. In aero applications, the

JUPITER terminal is capable of delivering speeds greater than 600 Mbps and incorporates the latest air interface standard for satellite transmissions. Supporting a superior passenger experience, the JUPITER System enables airlines to deliver uninterrupted, gate-to-gate, high-performance connectivity.

Gilat's Wavestream Awarded US Department of Defense Contract

December 4, 2019 - Gilat Satellite Networks announced that its subsidiary Wavestream received orders for over 6 million dollars from the US Department of Defense (DoD) for its state-of-the-art GaN BUCs, to be supplied as the first award of a five-year base-period of potentially over \$10M of deliveries to the US DoD.

Inmarsat Launches Fleet LTE Service in the North Sea

December 4, 2019 – Inmarsat will extend its service portfolio for customers with the launch of Fleet LTE, following an agreement with subsea fibre and offshore LTE network operator, Tampnet. The new service which is primarily aimed at offshore support vessel operators, but could also be used by fishing and ferry operators operating in the area, leverages low-latency, high data speed communications available via a dedicated Access Point Name (APN) on the Tampnet North Sea LTE network and could be extended to other regions such as the Gulf of Mexico if successful. Inmarsat's new Fleet LTE service means customers can access high speed 4G, Fleet Xpress maritime VSAT Ka-band and continuous L-band connectivity within a single, fully managed hybrid package.

World's First 1.5-meter Global Xpress Terminal to Deliver Unmatched Fleet Xpress Performance

December 4, 2019 - Intellian, the global leader of mobile satellite communication antenna systems, is unveiling the world's first 1.5 m Global Xpress terminal, GX150NX at the International Workboat Show in New Orleans this week ahead of its commercial launch in 2020. As the largest terminal that will be available for the Inmarsat Fleet Xpress service following type approval and successful sea trials in 2020, the GX150NX will unlock the full power of the Global Xpress network for users with high bandwidth demands seeking the most resilient platform for digital and cloud-based operations. The Intellian GX150NX will offer high-speed data and leading performance throughout the Global Xpress Ka-band footprint, strengthened further with exceptionally efficient RF design that delivers unrivalled link performance on the Fleet Xpress service.

HCT Announces IoT Tests on Hiber Satellites

December 4, 2019 - Helical Communications Technology (HCT) have announced that their custom-built Quadrifilar Helical Antennas are now being tested live on Hiber's nano-satellites according to Sal Bologna, President of HCT. The ground stations have begun receiving information controlling the satellites' Internet of Things (IoT) capabilities. The first two satellites launched into low earth orbit at the end of 2018 from Vandenberg Air Force Base in California and the Satish Dhawan Space Centre in India. Providing antennas with modules aboard for multiple companies on one satellite is rare and HCT is the first U.S. antenna manufacturer to launch and test in this capacity. There will be a total of sixty (60) satellites entering orbit upon completion of the project. HCT is also providing assistance with testing the ground station to ensure uninterrupted transmission. Another prominent Israeli space agency will also utilize HCT antennas aboard their test platform in the coming days resulting in a significant number of antennas being ordered.

Azercosmos and RSCC Sign Satellite Communications Cooperation Agreement

December 3, 2019 - RSCC and Azercosmos signed a cooperation agreement pertaining to satellite communications and broadcasting services in Baku, Azerbaijan. The agreement is aimed at joining the efforts and making arrangements for the collaboration of both Azerbaijani and Russian operators in the domain of creation and development of satellite communications and broadcasting networks for a variety of economic and public administration sectors in Europe, the Middle East, Africa as well as in Russia and Azerbaijan. To that end, it is planned to use the potential of spaceborne satellites Azerspace 1, Azerspace 2, as well as RSCC's Express AM series satellites, which ensure a stable coverage of the aforesaid regions, including the CIS countries. The Russian and Azerbaijani satellite operators have unique experience in implementing satellite projects aimed at setting up corporate communications networks, trunk internet access channels, regional TV broadcasting, as well as operating mobile objects on land, at sea, and in the air. Collaborative project efforts will allow the two companies to strengthen their presence in the regions of the Eurasian and African continents and to secure the broadest possible coverage of vertical markets for satellite communications and broadcasting services.

Hughes Selected by Speedcast to Power Community Wi-Fi Hotspots across the Philippines

December 3, 2019 - Hughes Network Systems, LLC announced that Speedcast, a trusted provider of

remote communications and IT solutions, has chosen the Hughes JUPITER™ System to power Community Wi-Fi Hotspots across the Philippines. The operator will employ a JUPITER gateway and 3,000 satellite terminals to establish Internet access in public places across the island nation. The award is part of the Pipol Konek Free Public Internet Access Program implemented by the Department of Information and Communications (DICT) with support of the United Nations Development Program (UNDP). Pipol Konek provides Wi-Fi in public places such as parks, plazas, libraries, government offices, schools, universities, hospitals, airports and health clinics. Supporting more than 32,000 Community Wi-Fi Hotspots around the world, the industry-leading Hughes JUPITER System is the world's most widely deployed satellite broadband platform, currently serving more than 1.4 million subscribers across the Americas. With DVB-S2X technology, JUPITER delivers more than 300 Mbps of TCP throughput per terminal and has been deployed by leading operators on both conventional and High-Throughput Satellites (HTS). Ideal for Community Wi-Fi Hotspot applications with many concurrent connections, JUPITER terminals support 16,000 simultaneous sessions, and with built-in fraud protection which locks in the Wi-Fi access point to the modem.

ADB's First Satellite Financing to Expand Internet Access in Asia and Pacific

December 3, 2019 - The Asian Development Bank (ADB) signed a \$50 million agreement with Kacific Broadband Satellites International Limited (Kacific) to provide affordable satellite-based, high-speed broadband internet connections to countries in Asia and the Pacific, especially in remote areas of small island nations in the Pacific and larger island nations like Indonesia and the Philippines. This is ADB's first satellite financing. The Asia-Pacific Remote Broadband Internet Satellite Project will help make broadband internet connections more widely available to countries in the region, where more than 2 billion people do not have reliable internet access due to inadequate infrastructure, geographical challenges, and the high cost of services. The project will support the construction, launch, and operation of a shared geostationary earth orbit, high-throughput satellite. Kacific-1 is scheduled to be launched by SpaceX in December 2019 and will be operational in early 2020.

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

December 2, 2019 - SES and the Luxembourg Government has announced 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

ND SATCOM Selects WORK Microwave A-series DVB-S2X Gateways

December 12, 2019 - For its leading network product portfolio SKYWAN 5G, with hybrid MF-TDMA and DVB-S2X, ND SATCOM has selected WORK Microwave's A-Series DVB-S2X modulator platform. The SKYWAN 5G DVB solution features a unique two-way broadband satellite communication network for high-quality services, combining the widely adopted DVB-S2/S2X transmission standard with the ND SATCOM MF-TDMA technology optimised for real-time traffic in mesh topologies. SKYWAN 5G DVB comprises a DVB-S2 outbound link and up to 16 configurable TDMA full-meshed carriers. The SKYWAN 5G DVB solution performs policy-based dynamic routing and leverages DVB-S2/S2X and TDMA satellite access for highly efficient bandwidth utilisation to best fit end-user applications. ND SATCOM collaborated with WORK Microwave to seamlessly integrate the A-Series all-IP platform with SKYWAN 5G. The AT-60 IP Modulator was selected due to its high-performance features, including a flexible SDR (Software Defined Radio) architecture that was customised for SKYWAN 5G. Offering support for DVB-S2X up to 256APSK, the AT-60 IP Modulator and the AT-80 wideband variant are the perfect platforms for a variety of applications, from low to very high throughput.

ATEME TITAN UHD Powers TV CULTURA's First Live 4K-UHD Broadcast

December 12, 2019 - TEME, the emerging leader in video delivery solutions for broadcast, cable, DTH, IPTV and OTT has announced that TV CULTURA, the Brazilian public broadcaster recognized worldwide for producing educational and cultural content, and part of Fundação Padre Anchieta, successfully implemented ATEME TITAN to realize 4K-UHD benefits for the first time during the live broadcast of the grand finale of Prelúdio 2019. High-quality video content from the Prelúdio grand finale, a reality show dedicated to discovering talented classical musicians, was broadcast live on 11/24 in 4K-UHD from "Casa

Sao Paulo Concert Hall” using ATEME’s TITAN UHD solution. The live event was transmitted via satellite to a dedicated 4K channel of the major local cable TV operator as well as to TV CULTURA’s YouTube channel.

Telefonica Selects Eutelsat HOTBIRD Neighbourhood to Broadcast RTVE Video and Radio Content

December 11, 2019 - Eutelsat Communications has secured a multi-year capacity contract at its flagship HOTBIRD neighbourhood with Spain’s leading telecommunications operator, Telefonica. Telefonica has selected Eutelsat’s key orbital position at 13° East to broadcast RTVE free-to-air content consisting of two HD channels: TVE Internacional Europa, the world’s farthest-reaching Spanish general interest channel, and the news channel, 24 Horas, as well as six RNE (Radio Nacional de España) radio stations. RTVE will shortly benefit from the unrivalled audience of this hotspot covering Europe, the Middle East and North Africa. These channels were previously distributed on the 19.2° East orbital position.

ATEME Enables CJ Hello to Leverage Video Transcoding to Deliver High Quality Video Services

December 5, 2019 - ATEME, the emerging leader in video delivery solutions for broadcast, cable, DTH, IPTV and OTT, has announced that CJ Hello, the largest cable operator and a leader in Korea’s media industry, has successfully deployed its TITAN Live software solution for MPEG-2 HD transcoding for delivery of high-quality video services to its viewers. TITAN Live is a hardware agnostic, real-time multi-channel/format solution designed for processing SD, HD and Ultra HD content for any screen. TITAN Live enables CJ Hello to deliver a premium experience to its customers while providing the following major benefits: Lower OPEX - based on ATEME’s High-Efficiency MPEG-2 (HE-MPEG-2®), CJ Hello is able to save bandwidth and add additional HD channels to existing transponder; Flexible operations - ATEME’s software is server-agnostic and can run on any private/public and on/off-premises cloud infrastructure with the same benefits and value proposition; Future-proof solution - TITAN Live benefits from ATEME’s continuous research and innovation in video quality, allowing for future evolutions of the solution

LAUNCH / SPACE

China's Largest Carrier Rocket Long March-5 Makes New Flight

December 27, 2019 - China launched the third Long March-5, the largest carrier rocket of the country, from Wenchang Space Launch Center in south China’s Hainan Province on Friday evening. The rocket, coded as Long March-5 Y3, blasted off from the coastal launch center at 8:45 p.m. (Beijing time), carrying the Shijian-20 technological experiment satellite weighing over eight tonnes, the heaviest and most advanced communications satellite of the country. About 2,220 seconds later, the satellite was sent into its planned orbit. (source: Xinhua)

Commercial Suborbital Carrier Rocket Launched in China

December 25, 2019 - A commercial suborbital carrier rocket developed by a private Chinese company was launched from the Jiuquan Satellite Launch Center in northwest China. The rocket, Tansuo-1, was developed by Space Trek. It completed the whole maneuver flight and fairing separation at high dynamic pressure during the flight. The rocket can serve purposes of meteorological observation, microgravity testing as well as satellite payload experiments. It was the maiden flight of the first rocket developed by the company. The Chinese government encourages the participation of private enterprises in the space industry. The country had more than 60 private companies in the commercial space industry as of December 2018.

Super Low Altitude Test Satellite (SLATS) “TSUBAME” Sets New Record

December 24, 2019 - Japan Aerospace Exploration Agency (JAXA) announced that its Super Low Altitude Test Satellite “TSUBAME” has achieved the “lowest altitude by an Earth observation satellite in orbit.” The lowest altitude by an Earth observation satellite in orbit is 167.4 km (104 mi) and was achieved by JAXA’s TSUBAME during its mission from 23 December 2017 to 1 October 2019. TSUBAME was a Super Low Altitude Test Satellite operated by JAXA. With its ion engine, TSUBAME was able to capture high-resolution satellite images despite the atmospheric drag and density of atomic oxygen present in super low altitudes. It maintained seven different orbital altitudes, with 167.4 km being the lowest. A super low altitude satellite has the merit of being able to take high resolution satellite images using a small sensor. However, when in orbit at an altitude that is categorized as being super low – at an altitude between 200 km and 300 km – the satellite will be exposed to 1,000 times more atmospheric resistance and concentrated atomic oxygen that would cause it to deteriorate as compared to other Earth observation satellites orbiting at the usual altitudes. Thus, super low altitude has been considered as being unsuitable for Earth observation satellites that require precise positioning, orbit control and long-term satellite operations.

Mitsubishi Electric Chosen as Prime Contractor of Innovative Satellite Technology Demonstration-2

December 23, 2019 - Mitsubishi Electric Corporation has been designated by the Japan Aerospace Exploration Agency (JAXA) as the prime contractor of the new satellite for Innovative Satellite Technology Demonstration-2. Under the program, Mitsubishi Electric aims to establish a standardized platform for designing, manufacturing and operating small 100kg-class satellites incorporating standard parts for key functions such as attitude control and power supply. The new platform will enable unified functions and services provided via a global constellation of small satellites. Innovative Satellite Technology Demonstration-2 is a part of a Japanese government program aiming for the stable supply of core components to the nation's space program. The purpose of the new satellite developed under JAXA for this program is for in-orbit verifications and demonstrations of equipment, parts and microsatellites developed by private companies, universities or other entities. The satellite is scheduled to be launched on an Epsilon Launch Vehicle from Uchinoura Space Center in Kagoshima Prefecture, Japan in the fiscal year ending in March 2022.

New China-Brazil Earth Resource Satellite Sent into Space

December 20, 2019 - A new satellite, jointly developed by China and Brazil, was sent into space, pushing forward the aerospace cooperation between the two countries, according to the China National Space Administration (CNSA). The China-Brazil Earth Resource Satellite-4A (CBERS-4A) was launched on a Long March-4B carrier rocket from the Taiyuan Satellite Launch Center in north China's Shanxi Province. The satellite is the sixth satellite under the earth resource satellite cooperation program between the two countries. It will obtain global optical remote-sensing data and support the Brazilian government's monitoring of the Amazon rainforest and the country's environmental changes. The CBERS-4A will replace CBERS-4, which was launched in 2014, to improve the resolution of the remote-sensing data. It is equipped with three optical payloads: a wide-range panchromatic multispectral camera developed by China, and a multispectral camera and a wide-field imager developed by Brazil.

Arianespace Launches COSMO-SkyMed Second Generation, CHEOPS, OPS-SAT, EyeSat and ANGELS

December 18, 2019 - On its ninth and last mission of the year, Arianespace orbited innovative satellites that address the need for autonomy and reliable access to space by Italy, the European Space Agency (ESA) and the French space agency CNES (Centre National d'Etudes Spatiales). It also served the ambitions of two young innovative companies: Tyvak and Hemeria. COSMO-SkyMed Second Generation, the main payload on the mission, CHEOPS (Characterizing Exoplanet Satellite), and three auxiliary payloads, ANGELS, EyeSat and OPS-SAT, were successfully placed in orbit. The launch took place on Wednesday, December 18, 2019 at 5:54 am (local time) from the Guiana Space Center (CSG) in Kourou, French Guiana (South America). With this successful 23rd launch of the Soyuz medium-lift launcher from CSG, Arianespace has now launched a total of 159 satellites for European institutions, once again demonstrating the flexibility of its launcher family, comprising Ariane, Soyuz and Vega.

Successful Launch of JCSAT-18 Communications Satellite

December 17, 2019 - SKY Perfect JSAT Holdings Inc. and its wholly-owned subsidiary SKY Perfect JSAT Corporation announced the successful launch of the JCSAT-18 communications satellite. JCSAT-18 was launched aboard SpaceX's Falcon9 launch vehicle from Cape Canaveral Air Force Station, Florida, USA at 9:10 a.m. on December 17, 2019 Japan Standard Time (JST). The satellite was separated from the launch vehicle at 9:44 a.m. JST. Moving forward, satellite operations will begin once in-orbit testing verifies JCSAT-18 satellite's nominal performance. Since the successful launch of Horizons 3e in 2018, JCSAT-18 satellite marks the 2nd High Throughput Satellite to be owned by SKY Perfect JSAT. JCSAT-18 will provide Ku-band coverage and improve mobile and broadband services in the Asia-Pacific region, including the far eastern part of Russia.

Kacific's First Satellite Successfully Launches to Space

December 17, 2019 - Kacific1 was launched successfully into space aboard a SpaceX Falcon 9 rocket at 7.10pm eastern time (UTC-4) on 16 December 2019 from the Cape Canaveral Air Force Station, Florida, USA. It was placed into its target geostationary transfer orbit 33 minutes following initial ignition. Owned by Kacific Broadband Satellites Group (Kacific), the Boeing-built communications satellite will stream high-speed broadband to 25 nations in South East Asia and the Pacific Islands via 56 high-throughput beams. Kacific1 will cover Indonesia, The Philippines, Timor-Leste and South Asia with 28 spot beams, while the Pacific Islands and New Zealand will be covered with a further 28 beams. Following a sequence of in-orbit manoeuvres and tests that are expected to take approximately six weeks, Kacific1 is scheduled to begin commercial operations in the first quarter of 2020.

Capella to Start Commercial Operations in 2020 with Launch of Seven SAR Satellites

December 16, 2019 - Capella Space will launch seven synthetic aperture radar (SAR) satellites and start commercial operations in 2020. Powering this next step are Capella's breakthrough engineering technology innovations that make it the first small satellite SAR company in the industry to capture truly sub-0.5m very high-resolution (VHR) imagery. What's more is Capella's ultra-high capacity to capture more images per satellite relative to other small SAR satellites and its ability to deliver SAR data to customers in less than 30 minutes from collection with real-time tasking. Capella's technology advances over the past year produce economic benefits that cemented major deals with multiple divisions of the U.S. government, including a contract with the U.S. Air Force. Capella is fully funded to complete its seven satellite constellation launch in 2020, with very significant backing from multi-billion-dollar funds DCVC (Data Collective) and Spark Capital.

Airbus Drives OPTIMA Photonics Payload Technology to Next Level

December 13, 2019 - Airbus has validated and demonstrated photonic satellite payload technology to Technology Readiness Level 6, the last level before prototype in orbit, through the OPTIMA Horizon 2020 project. This proof of concept demonstrator brings the use of photonic payloads in telecommunications satellites one step closer. Photonic payloads have the potential to revolutionise the design, capacity and capability of future generations of telecommunications satellites. Photonic payloads will use light to transfer the signals throughout the spacecraft, replacing current radio frequency (RF) technologies, allowing for the development of more efficient and powerful satellites which are able to meet the increasing complexity and sophistication required by customers. OPTIMA takes into account the future evolution of telecom satellite payloads and inter-satellite links which are expected to enter the terabit per second and multi-Gb/s "era" in the 2020 horizon. OPTIMA technology enables the design of such payloads with significant reduction of mass, volume and power consumption against full microwave approaches, whereas Photonic Integrated Circuits enable low overall production and integration costs. The technology developed in OPTIMA will see the sustained entry of photonics into telecom satellite payloads. This will enable easier capacity upgrades of multi-beam telecommunication satellites and also leverage the R&D investment to address next generation coherent inter-satellite links with fully integrated and qualified components.

Northrop Grumman Signs Customer for First Flight of Omega

December 12, 2019 - Northrop Grumman has announced that Saturn Satellite Networks has selected the Omega space launch vehicle to launch up to two satellites on the rocket's inaugural flight scheduled for spring 2021. Omega will launch from Kennedy Space Center's Pad 39B and insert the SSN satellites into a geosynchronous transfer orbit. Northrop Grumman has a distinguished heritage in space launch. In 1990, the company developed Pegasus™, the world's first privately developed space launch system. The company's Minotaur launch vehicle has achieved 100 percent success on its 18 space missions and nine suborbital missions. Northrop Grumman's Antares™ rocket has launched more than 70,000 pounds of food, equipment and supplies to the astronauts aboard the International Space Station.

Blue Origin's 12th Mission Is a Success

December 12, 2019 - New Shepard had a wholly successful mission on December 11, 2019. This mission was another step towards verifying New Shepard for human spaceflight as we continue to mature the safety and reliability of the vehicle. This was the 6th flight for this particular New Shepard vehicle. Blue Origin has so far reused two boosters five times each consecutively, so today marks a record with this booster completing its 6th flight to space and back. This particular rocket has been an operational payload vehicle for several flights, meaning there are no more updates to the system. This was also the 9th commercial payload mission for New Shepard, and we are proud to have flown our 100th customer on board (with 23 customer payloads on board today). Also on the vehicle were thousands of postcards from students around the world for our nonprofit Club for the Future. The Club's mission is to inspire future generations to pursue careers in STEM and help visualize the future of life in space.

Kepler Communications Selects SpaceX to Launch Two Batches of its Nanosatellite Constellation

December 12, 2019 - Kepler has selected SpaceX as launch partner to deliver a portion of its first Low-Earth Orbit (LEO) satellite constellation into space onboard SpaceX's reusable Falcon 9 launch vehicle. Kepler has procured 400 kg of launch capacity from SpaceX for the deployment of multiple satellites. These spacecraft incorporate both a high-capacity Ku-band communications system and a narrowband payload, for both high-speed data transfers and for low-power direct-to-satellite IoT connectivity. This will be the first time the two companies are partnering for a LEO deployment, and it will be a historical event

as it marks Kepler's first use of SpaceX's new SmallSat Rideshare Program, which will see the launch of multiple small spacecraft into sun-synchronous orbit (SSO).

Gilmour Space Signs Strategic Statement of Intent with the Australian Space Agency

December 12, 2019 - Gilmour Space Technologies has signed a Statement of Strategic Intent and Cooperation with the Australian Space Agency, demonstrating their commitment to launch Australia to space. The signing ceremony, held at the company's new facility in Gold Coast, Queensland, was attended by Australia's Minister of Industry, Science and Technology Karen Andrews, and Australian Space Agency deputy head Anthony Murfett. Gilmour Space is developing new hybrid rockets to launch small satellites into low earth orbits by 2022. In the last two-and-a-half years, the company has successfully test-fired their proprietary hybrid rocket engine to a record 80 kilonewtons of thrust, completed testing a semi-autonomous mobile launch platform in rural Queensland, raised two rounds of venture capital funding, signed a Space Act Agreement with NASA, and tripled their team to 45 employees on the Gold Coast.

PSLV Successfully Launches RISAT-2BR1 and Nine Commercial Satellites in its 50th Flight

December 11, 2019 - India's Polar Satellite Launch Vehicle, in its fiftieth flight (PSLV-C48), successfully launched RISAT-2BR1 along with nine commercial satellites from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota. PSLV-C48 lifted-off at 1525 Hrs (IST) from the First Launch Pad. After 16 minutes and 27 seconds, RISAT-2BR1 was successfully injected into an orbit of 576 km. Subsequently, nine commercial satellites were injected into their intended orbits. After separation, solar arrays of RISAT-2BR1 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. RISAT-2BR1 is a radar imaging earth observation satellite weighing about 628 kg. The satellite will provide services in the field of Agriculture, Forestry and Disaster Management. The mission life of RISAT-2BR1 is 5 years.

Rocket Lab Launches Tenth Mission, Completes Major Success for Reusable Rocket Program

December 9, 2019 - Rocket Lab has successfully launched its tenth Electron mission and deployed seven spacecraft to orbit during a launch that marks a major step towards reusable Electron rockets. The mission, named 'Running Out Of Fingers' in recognition of Rocket Lab's tenth launch, lifted off from Rocket Lab Launch Complex on New Zealand's Māhia Peninsula on December 6. The seven satellites on board were for commercial rideshare customers Alba Orbital and ALE (the latter of which was procured by Spaceflight) bringing the total number of small satellites deployed by Rocket Lab to 47, continuing the company's record of 100% mission success for customers. ALE's payload was deployed to a 400km circular orbit, before the Kick Stage's Curie engine reignited and dropped the stage to a circular 385km orbit for deployment of Alba Orbital's payloads. Rocket Lab also successfully completed a guided re-entry of the Electron vehicle's first stage as part of the company's plans to make Electron a reusable rocket. The stage made it back to sea-level intact following a guided descent. As part of a block upgrade, Electron's first stage for this mission included guidance and navigation hardware, including S-band telemetry and onboard flight computer systems, to gather data during the first stage's atmospheric re-entry. The stage was also equipped with a reaction control system to orient the booster during its re-entry descent.

ESA Commissions World's First Space Debris Removal

December 9, 2019 - ClearSpace-1 will be the first space mission to remove an item of debris from orbit, planned for launch in 2025. The mission is being procured as a service contract with a start-up-led commercial consortium, to help establish a new market for in-orbit servicing, as well as debris removal. Following a competitive process, a consortium led by Swiss startup ClearSpace – a spin-off company established by an experienced team of space debris researchers based at Ecole Polytechnique Fédérale de Lausanne (EPFL) research institute – will be invited to submit their final proposal, before starting the project next March. At Space19+, ESA's Ministerial Council, which took place in Seville, Spain, at the end of November, ministers agreed to place a service contract with a commercial provider for the safe removal of an inactive ESA-owned object from low-Earth orbit. Supported within ESA's new Space Safety programme, the aim is to contribute actively to cleaning up space, while also demonstrating the technologies needed for debris removal. The ClearSpace-1 'chaser' will be launched into a lower 500-km orbit for commissioning and critical tests before being raised to the target orbit for rendezvous and capture using a quartet of robotic arms under ESA supervision. The combined chaser plus Vespa will then be deorbited to burn up in the atmosphere.

Australian Space Agency Links up with Global Satellite Company

December 6, 2019 - The Australian Space Agency has signed an agreement with space and defence giant, Thales, further strengthening Australia's international space connections to create new local jobs. Thales is a French company operating and investing in the Australian space and defence sectors, delivering satellite-based systems. Minister for Industry, Science and Technology Karen Andrews said this Statement of Strategic Intent and Cooperation is another important step in the Morrison Government's plan to create opportunities for Australian industry and new local jobs. The Australian Space Agency has also this week signed a Statement of Strategic Intent and Cooperation with EOS Space Systems. EOS specialises in the design, manufacture, delivery and operation of technology for Space Situational Awareness. It will establish further laser ranging sensors across Australia to increase the volume of space objects they track from 10,000 to 100,000 each week.

Thales Alenia Space Wins New EGNOS Contract from European Space Agency

December 5, 2019 - Thales Alenia Space announced that it has signed a new contract with the European Space Agency (ESA), on behalf of the European Commission, to upgrade Europe's EGNOS satellite navigation system. Via this contract Thales Alenia Space will develop a new version of EGNOS (version V242B), incorporating new advanced functionalities. Worth a total of about 78 million euros, this contract includes the following: expansion of the EGNOS SBAS coverage zone; installation of a new generation of reference stations (RIMS); improved algorithms in the computation center (CPF) to boost system performance; enhanced system security. Certification and commissioning of this latest version is slated for 2023. EGNOS, flagship program of the European Union, is the European satellite navigation system, designed to improve positioning messages from GPS (Global Positioning System). First deployed in 2005, with its open service operational since 2009, the current EGNOS system was developed by Thales Alenia Space as prime contractor.

S7 Space to Relocate Sea Launch Floating Spaceport to Russia in 2020

December 5, 2019 - S7 Space will relocate the Sea Launch floating platform and the command vessel to Russia's Far East in 2020, the company said in a statement on Thursday. By now, the company "has obtained all the necessary permissions for the spaceport's relocation, including from the US Department of State," the press office specified. After they are relocated to Russian territory, the launch platform and the assembly and command ship will be temporarily based at the Slavyanka Ship Repair Plant in the port of Slavyanka, the press office said. S7 Group (the holding company that integrates S7 Space Transport Systems) is the owner of the assets of the Sea Launch rocket and space compound where 36 launches (including 32 successful) were carried out by the end of May 2014. The sea compound comprises the Odyssey floating launch platform and the assembly and command vessel where rockets are assembled and control of pre-launch operations is exercised. The vessels are based in the state of California, the United States. Earlier, Energia Overseas Limited (a subsidiary of Russia's Energia Space Rocket Corporation) held a 95% stake in the Sea Launch project. *(source: Tass)*

Thales Alenia Space to Build Nilesat-301 Satellite

December 4, 2019 - Thales Alenia Space announced that it has signed a contract with the Egyptian operator Nilesat to build the Nilesat-301 geostationary communications satellite, winning the contract against an international field of competitors. Positioned at 7° West, Nilesat-301 will work with Nilesat-201 to provide Ku-band services for the Middle East and North Africa. Nilesat-301 will also help extend the company's provision of Ku-band communications and direct digital broadcasting services in two new large regions of Africa, while also providing broadband Ka-band connectivity over all of Egypt. As prime contractor, Thales Alenia Space will be responsible for satellite design, production, testing and in-orbit acceptance tests. Thales Alenia Space will also provide satellite control system for Nilesat in both Cairo and Alexandria. The satellite is based on the Spacebus 4000-B2 platform and will weigh about 4 metric tons at launch, which is scheduled for the first quarter of 2022. It offers a design life exceeding 15 years. Following Nilesat-201, Nilesat-301 is the second geostationary communications satellite built by Thales Alenia Space for Nilesat. It is also the fourth payload developed by Thales Alenia Space for the Egyptian operator.

Spaceflight's SEOPS-2 Mission to Launch Multiple Spacecraft from International Space Station

December 3, 2019 - Spaceflight announced that together with Hypergiant SEOPS, it will be launching three CubeSats from the International Space Station (ISS) and Northrop Grumman's Cygnus spacecraft in early January. The payloads will travel to the ISS through a NASA Commercial Resupply (CRS) mission aboard a SpaceX Dragon scheduled to launch atop a Falcon 9 from Cape Canaveral Air Force Station on December 4.

The payloads are expected to reach the ISS several days later. Once they arrive, the ISS crew will transfer the cargo from Dragon to the ISS, where it will be stored for several weeks until the Cygnus cargo vehicle is prepared to depart the ISS. At that time, astronauts will mount the dispensers with the satellites already attached on the Cygnus hatch bulkhead. Once the ISS side-hatch is closed, the space between the ISS and Cygnus spacecraft is depressurized. The ISS robotic arm will then unberth the Cygnus from the ISS. Cygnus will maneuver itself to a higher orbit (450-500 km altitude, 51.6-degree inclination) and then deploy the satellites in January.

China's Long March-8 Rocket Successfully Passes Engine Test

December 2, 2019 - China has successfully tested the second stage engine of the Long March-8 rocket, preparing for its maiden flight in 2020, according to the China Aerospace Science and Technology Corporation (CASC). The hydrogen-oxygen engine worked normally in the test and was shut down after completing all test procedures. Developed by the CASC, the Long March-8 rocket is a new type of rocket that uses module design and can be prepared in a short time, making it competitive for commercial launch. The first stage of the Long March-8 rocket is similar to that of the Long March-7 rocket and the second stage rocket is similar to the third stage of the Long March-3A rocket. It has a payload capacity of 5 tonnes to sun-synchronous orbit and 2.8 tonnes to geostationary transfer orbit. The Long March-8 rocket is being assembled and is estimated to conduct 10 to 20 launches annually after it hits the market.

Thales Alenia Space Welcomes Decisions Made by ESA's Ministerial Council Space19+

December 2, 2019 - Following the European Space Agency's (ESA) Ministerial Council meeting, Space19+, in Seville, Spain, Thales Alenia Space welcomed the announcements of the most ambitious plan for the European space sector and the sustained commitment of the Member States in space endeavors. The important decisions taken confirm Europe's central role in space, with a comprehensive set of programs to boost Europe's growing space economy and the competitiveness of its space sector and make breakthrough discoveries about Earth, our Solar System and the Universe. Thales Alenia Space fully supports Europe's decision to continue the journey to Mars and participate in the Mars Sample Return mission. This international mission to the Red Planet, designed to collect samples from the surface of Mars and bring them back to Earth, is a major new step forward in the exploration of the Solar System.

EXECUTIVE MOVES

SSTL Appoints Phil Brownnett as Managing Director

December 18, 2019 - Surrey Satellite Technology Ltd (SSTL) announces the appointment of Phil Brownnett as Managing Director, succeeding Sarah Parker who is stepping down from the role to pursue new challenges. Phil Brownnett, who is currently Managing Director of Geo Intelligence (UK), Airbus Defence and Space, will take up his new position on 1st February 2020, after a period of handover during January. Phil joined the Intelligence division of Airbus Defence and Space in September 2003 as a senior manager and in October 2012, he was appointed the Managing Director of the Intelligence (UK) division of Airbus Defence and Space with responsibilities for reshaping and developing the UK Earth Observation business in line with changing markets and technologies. Under his leadership, the business has evolved and achieved stability, growth and profitability.

Yahsat Boosts Leadership with 4 Emirati Executive Appointments

December 18, 2019 - The Al Yah Satellite Communications Company (Yahsat) has announced four new Emirati executive appointments across government, commercial, operational and technical business units. The new appointments, effective from January 2020 include the following engineers:

- Sulaiman Al-Ali, Deputy Chief Executive Officer of Thuraya
- Eisa Al Shamsi, Deputy General Manager of Yahsat Government Solutions
- Adnan AlMuhairi, Deputy Chief Technical Officer of Yahsat
- Khalid Al Kaf, Deputy Chief Operations Officer of Yahsat

Andrew Browne Joins Telesat as Chief Financial Officer

December 12, 2019 - Telesat announced that Andrew Browne, one of the industry's most experienced executives, has been appointed the company's Chief Financial Officer (CFO). Reporting to President and CEO, Dan Goldberg, Andrew will serve on Telesat's Executive Management Team and be based in the company's headquarters in Ottawa. Browne has had a long and distinguished career in the satellite industry. He was most recently the CFO of SES, a position he held since February 12, 2018. Prior to that, he was CFO of O3b Networks where he was involved in introducing the first Medium Earth Orbit satellite

constellation to users in the global Maritime, Energy, Enterprise and Government service verticals. Prior to joining O3b, Browne was CFO and member of the management board at SES from 2010. He served as CFO of New Skies Satellites between 1998 and 2008, where he worked alongside Dan Goldberg, then CEO of New Skies, overseeing IPOs on the NYSE and Euronext before the sale of New Skies to the Blackstone Group and ultimately to SES.

Stephen Rudd Joins Vislink as Vice President of Satcom Sales and Business Development

December 10, 2019 - Vislink Technologies, a global leader in the development and distribution of advanced communication solutions, announced that Stephen Rudd has joined Vislink as Vice President of Satcom sales and Business Development. In this role, Stephen will be responsible for driving worldwide revenues for the Company's satellite communications product offerings, by developing and implementing growth strategies, informing product development and establishing key client relationships in broadcast, military and government markets. Stephen Rudd's background includes substantial experience in sales and executive management positions for global manufacturing businesses. He joined the Advent Satellite Company, a division of Vislink plc, as Managing Director in 2004. In 2010, he relocated to Singapore and increased growth for the group's business in the Asia region.

Gregory Gabroy Joins Arianespace as Senior Vice President - Brand and Communications

December 9, 2019 - Arianespace appointed Gregory Gavroy as its Senior Vice President – Brand and Communications, effective January 13, 2020. He will be responsible for Arianespace's internal and external communications and brand strategy. He succeeds Isabelle Veillon, who is leaving the company to pursue other opportunities. Gavroy will be joining Arianespace's executive committee and reporting to CEO Stéphane Israël. As Senior Vice President - Brand and Communications, Gavroy's main mission will be to define and execute Arianespace's internal and external communications strategy and coordinate all actions in support of the company's brand image. Prior to his appointment, Gavroy was the Head of Content and Media at aircraft manufacturer ATR, in charge of media relations and social media, as well as corporate transformation and internal communications. From 2016 to 2019, he was Director of Corporate Communications at OneWeb, where he implemented a 360° communications strategy for this startup specialized in delivering Internet services to users around the world through its low-Earth-orbit satellite constellation.

Isotropic Systems Appoints Satellite Executive Scott Sprague Chief Commercial Officer

December 5, 2019 - Isotropic Systems announced satellite telecommunications executive Scott Sprague has been appointed the Chief Commercial Officer effective immediately. Sprague will lead Isotropic Systems' commercial activities worldwide. Sprague joins Isotropic with more than 40 years of experience in sales, marketing, product management and product development in satellite communications companies. He has served OneWeb, a new satellite operator whose mission is to connect everyone everywhere, NewSat, an independent satellite communications provider, Asia Broadcast Satellite Ltd, a global satellite operator, and SES, the world-leading satellite operator and the first to deliver a differentiated and scalable GEO-MEO offering worldwide, in various executive sales positions.

Intellian Names Cheng-Yu Tang as Vice President, and Head of APAC

December 2, 2019 - Intellian, the world's leading provider of satellite communications systems, has appointed Mr. Cheng-Yu Tang as Vice President and Head of Asia-Pacific region, based in Hong Kong SAR, China. He reports to CEO, Eric Sung; and his appointment is in-line with Intellian's plan to maximize business efficiency and to achieve its strategic objectives in the APAC region. Cheng-Yu Tang, who has more than 20 years of solid experience in driving sustaining business growth and management leadership especially in satellite communications, maritime and aeronautical industry, will oversee Intellian's entire APAC business including sales, technical support, business development and operations. He is also part of the Global Executives Team of Intellian in shaping global business strategies and eco-system partnerships to cope with the fast-growing satellite industry.

Gilat Hires Slava Frayter as Regional Vice President, North America

December 2, 2019 - Gilat Satellite Networks announced that Slava Frayter has joined the company as its Regional Vice President, North America. Slava Frayter comes to Gilat after 19 years with Newtec, where he served in various management roles, rising to the position of Vice President, Americas in 2008. During his tenure, Slava was instrumental in developing market strategy and leading significant expansion in the region. He brings extensive experience in satellite communications and various markets, including enterprise, government, broadcast, maritime and aero mobility.

Commercial Space Revenues to Reach \$485 Billion by 2028

December 21, 2019 - In its latest research titled, “*The Space Economy Report 2019*, previously named Satellite Value Chain”, Euroconsult projects that the commercial space value chain will see steady growth over the next decade, reaching \$485 billion by 2028. The upstream segment, which includes commercial revenues from manufacturing, launch and ground equipment is expected to increase from \$8 billion in 2018 to \$11 billion in 2028, a growth rate of four percent per year. The downstream segment consisting of commercial operations and satellite services, including satellite navigation, was valued at \$290 billion in 2018, projected to increase at a rate of five percent per year to reach \$474 billion in 2028. The research highlights global trends with key metrics for each of five satellite segments including manufacturing and launch, ground segment, satellite communications, Earth observation and satellite navigation. It shows that 2018 was the first year for satellite navigation to overtake satellite communications as the top commercial revenue sector.

Maritime VSAT Installations, Usage and Service Revenues Continued Growth Forecast

The estimate in our 2015 report of vessels in service increasing from around 20,000 at that time to around 50,000 vessels in 2019 being matched by this year’s numbers. COMSYS predicts that this number will increase to around 80,000 to 100,000 vessels by 2023. Whereas the price of satellite bandwidth has fallen by more than 90 per cent over the past eight years or so, the monthly cost revenue for cruise lines has increased by around ten times due to significantly increased data usage requirements from end users.

Satellite Communications Pricing to Stabilize through 2020 as Hiatus in On-Orbit Capacity Growth Comes into Play

December 12, 2019 - In its latest research titled, “*FSS Capacity Pricing Trends*,” Euroconsult details pricing for traditional C-band, Ku-band and High Throughput Satellite (HTS) capacity broken out by contracts, regions, spectrum bands, and applications. The report shows that as the growth of satellite capacity on orbit slows, pricing levels per megahertz (MHz) for regular capacity and per megabits per second (Mbps) for HTS capacity have both stabilized at lower rates of decline and are projected to continue that trend through 2020. Based on hundreds of data points spanning nearly all segments, frequency bands, and regions, the report uncovered broadening price disparity. It cites capacity pricing as low as \$800 per MHz per month for data applications in regions such as Sub-Saharan Africa, Russia, and Central Asia, and notes market resilience with pricing remaining as high as \$8,000 per MHz per month in important orbital hot spots for video broadcasting. While the cost per Mbps for HTS capacity has trended lower in the past 12 months, demand for high-quality HTS capacity in certain bands and regions has exceeded supply, enabling stable pricing in those markets.

Small-satellite Launch Service Revenues to Top \$28 Billion by 2030

December 12, 2019 - Frost & Sullivan’s recent analysis, *Small Satellite Launch Services Market, Half-yearly Update, H1 2019, Forecast to 2033*, tracks the number of small satellites, payload mass, and launch revenue on the basis of defined scenarios, satellite mass classes, and user segments. Frost & Sullivan forecasts the total number of satellites to be launched during the period 2019 to 2033 to be 20,425, with North America leading the way, followed by Europe. Such demand could take the small-satellite launch services market past the \$28 billion mark by 2030 and present significant growth opportunities throughout the industry. To keep up with market requirements, Frost & Sullivan anticipates high-volume demand for component manufacturers, dedicated launch service providers and low-cost ground station services. Government agency investment in R&D, capacity purchase, public-private partnerships, and establishing the enabling regulatory framework will be significant enablers for new entrants and established players.

Satellite Ground Segment Reaching the “Clouds”, Generating \$145 Billion in 10-year Cumulative Revenues

December 4, 2019 - NSR’s *Commercial Satellite Ground Segment, 4th Edition (CSGS4)* report, has been released, forecasts global annual revenues for the Commercial Satellite Ground Segment to grow to \$14.4 billion annually by 2028, with \$145 billion in cumulative revenue over the next decade. Despite turbulence in the video market, Satellite TV continues to generate the largest volumes, pushing STBs (Set-top Box) and antennas to capture the biggest share of revenues. However, growth will primarily come from data-centric use cases where HTS drives demand for both infrastructure segments (Baseband Equipment, Earth Stations) and applications (Consumer Broadband, Backhaul, Aero, Maritime, etc.). Both 5G and Network Virtualization are key contributors to this next wave of satellite ground segment growth.

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/ptc20/
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/ptc20/

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/>

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

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

CABSAT 2020, March 31- April 2, Dubai, UAE, www.cabsat.com/

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.