

# APSCC Monthly e-Newsletter

## JUNE 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.apsc.or.kr](http://www.apsc.or.kr). To unsubscribe, send an email to [info@apsc.or.kr](mailto:info@apsc.or.kr) with a title "Unsubscribe."

*News in this issue has been collected from May 1 to May 31.*

### INSIDE APSCC

#### **APSCC 2020 E-SERIES Starts with Live Webinar on COVID-19: Impact on Asian Satellite Operators**

APSCC 2020 E-SERIES is an ongoing series of webinars – as part of the renowned APSCC 2020 Satellite Conference & Exhibition event – a forum for knowledge-sharing and discussion on the key issues of the satellite and space industries in Asia. With more than 300 attendees, the first live webinar, moderated by Christopher Baugh (President, NSR) was held on June 3. Christian Patouraux (CEO & Founder, Kacific), Huang Baozhong (Executive Vice President, APT Satellite), Patompob (Nile) Suwansiri (Chief Commercial Officer, Thaicom) discussed a general overview of the satellite industry in the region – before, during and after COVID-19. The recorded Webinar is available on <https://apscsat.com/>.

#### **APSCC 2020 E-SERIES Live Webinar on India Space Policy: Recent Announcements and Future Expectations, June 24, 2020**

The 2<sup>nd</sup> Webinar of APSCC 2020 E-SERIES on **India Space Policy: Recent Announcements and Future Expectations** will be held on June 24. The event provides a general overview of India's new space policy that paves the way for growth in India's private space sector and discusses how the Indian space industry is evolving in a new environment.

Title: **India Space Policy: Recent Announcements and Future Expectations**  
Date: Wednesday, June 24 (15:00 –16:00, KST)  
Moderator: Gagan Agrawal, Senior Analyst, NSR  
Panelists: K. Krishna, Vice President & CTO, Hughes Communications India  
Dr. Rajeswari (Raji) Pillai Rajagopalan, Distinguished Fellow & Head, Nuclear and Space Policy Initiative, Observer Research Foundation  
Prateep Basu., Co-founder & CEO, SatSure

Registration is free to APSCC members, but space is limited. To register go to <https://apscsat.com/e-series/>

### SATELLITE BUSINESS

#### **SES to Restructure and Consolidate Part of European Operations into Luxembourg Headquarters**

May 29, 2020 - SES announced that it plans to restructure its operations worldwide, including the consolidation of part of its European regional operations into the company's global headquarters in Betzdorf, Luxembourg. SES aims to improve operational efficiency, collaboration and overall effectiveness by consolidating functions in fewer locations while enhancing sales and customer-facing activities in the markets served. As a result, SES plans to close its offices in Brussels, Central London, the Isle of Man, Warsaw and Zurich, redistributing activities in these locations to other offices in Kiev, Stockholm, Stockley Park in London and The Hague as well as its headquarters in Luxembourg. In March 2020, SES announced Simplify & Amplify as a comprehensive programme to position the company for future growth and deliver maximum value to current and future customers and stakeholders. The programme comprises a series of strategic actions to enable SES to best deliver against its declared purpose of doing the extraordinary in space to deliver amazing experiences everywhere on Earth. In addition to consolidating SES's global footprint and streamlining operating functions, other restructuring and delayering is underway including the removal of numerous open positions. SES has launched a compelling voluntary phased retirement programme and is retraining and realigning resources internally towards high-value future market opportunities and to bolster its position in cloud, mobility and other emerging verticals. In aggregate,

these changes will impact between 10% and 15% of its global employee base. Given that a number of these changes will impact employees in Luxembourg, SES has engaged its personnel representatives to discuss the implementation of a social plan.

### **Comtech Awarded Development Contract to Support Critical Air Force and Army Anti-Jam Program**

May 27, 2020 - Comtech EF Data Corp. has received a \$4.7 million contract for engineering services from a large prime U.S. Department of Defense (DoD) contractor to support a critical Air Force and Army Anti-jam Modem (A3M) program under the U.S. Space Force's Space and Missile Systems Center (SMC). The A3M program will provide the Air Force and Army with a secure, wideband, anti-jam satellite communications terminal modem for tactical satellite communication operations. The jam-resistant modems will support SMC's Protected Tactical Waveform technology, an anti-jam capability operating on military satellite communication terminals through the Wideband Global Satcom constellation. The prime contractor was awarded a five-year, \$500 million ceiling, indefinite delivery, indefinite quantity ("IDIQ") contract. The prime has received an initial delivery order in excess of \$30 million for the development and prototype phase. Comtech EF Data will be a key subcontractor providing both engineering and hardware services and has received initial funding of \$501,000 with additional orders expected during the Company's fourth quarter. Once development is completed, Comtech EF Data expects to receive significant hardware orders in future periods during the production phase.

### **CSIRO to Track over 1000 Feral Water Buffalo in Northern Australia**

May 26, 2020 - More than 1000 feral buffalo and unmanaged cattle roaming Northern Australia will be tagged and tracked as part of the world's largest satellite herd-tracking program, announced by Australia's national science agency, CSIRO. Coinciding with National Reconciliation Week this week, the \$4 million, 3.5 year project aims to turn the destructive pests into economic, environmental and cultural opportunities for Indigenous communities across the region, as well as create new 'best practice' for managing large herds using space technology. Satellite GPS-tracking tags will be attached to the animals' ears and deliver real-time, geographically-accurate insights into herd density, accessibility, and transport costs. The animals will be tracked across a combined area of 22,314 square kilometres, taking in the Arafura swamp catchment in Arnhem Land in the Northern Territory, and Upper Normanby and Archer River on Cape York Peninsula in Queensland.

### **Intelsat Opts into FCC Accelerated C-band Clearing Plan**

May 26, 2020 - Intelsat, operator of the world's largest integrated satellite and terrestrial network, filed a written commitment with the U.S. Federal Communications Commission (FCC) to accelerate clearing of the U.S. C-band spectrum. Intelsat completed the filing in advance of the FCC's May 29 deadline. In March, the FCC finalized its Expanding Flexible Use of the 3.7 to 4.2 GHz Band order, which requires the lower 280 megahertz of the 3.7 to 4.2 gigahertz C-band spectrum, plus a 20 megahertz guard band, to be cleared and repurposed for use by 5G services, by relocating existing satellite services to the upper part of the band. Intelsat has created a comprehensive transition plan to meet the requirements of the FCC order, and company representatives are collaborating with customers to ensure a smooth transition. Over the coming months, Intelsat experts will work closely with customers and with incumbent downlink earth stations throughout the continental U.S. to retune and repoint antennas, and to install 5G signal-blocking filters. In advance of filing its transition plan with the FCC, Intelsat filed a Petition for Reconsideration requesting the FCC make very limited technical changes to the C-band order in order to mitigate post-transition interference and protect certain satellite control transmissions.

### **Comtech Announces Service Enhancement Worth \$9.1 Million with a Tier One Carrier**

May 26, 2020 - Comtech Telecommunications Corp., a world leader in secure and highly reliable location, public safety, navigation, and communication technologies, has announced, that during its third quarter of fiscal 2020, its Location Technologies group, a division of Comtech's Commercial Solutions segment, has finalized a contract worth \$9.1 million for its 5G Xypoint virtual Mobile Location Center (vMLC) enabling a wide variety of Location Based Services (LBS), including both public safety and value added services applications, with a U.S. tier one mobile network operator (MNO). The term of the contract will be for 5 years.

### **NSC-Group Renews Long Term VSAT Connectivity Contract with Marlink**

May 26, 2020 - NSC-Group, a leading technical and operational shipmanager, has renewed its agreement with Marlink for provision of high bandwidth Sealink VSAT to its fleet of more than 40 vessels. The agreement enables NSC-Group to support its strategy for digitalisation and vessel performance

optimisation with always-on connectivity and added value services. The Marlink VSAT service is supported by Marlink's XChange Power communications management system and business critical solutions such as SkyFile Mail email service and SkyFile AntiVirus premium security solution. Marlink also provides voice calling services and L-band back-up communications. NSC-Group operates a diverse fleet consisting of containerhips, multi-purpose carriers, bulkers, con-bulkers, car carriers and tankers. Its move to VSAT connectivity has enabled the company to leverage bandwidth and capacity to bring a digitalised approach into its vessel operations. Under the new agreement, NSC-Group will undertake a test of Marlink's latest value added services, including XChange Cloud Premium and IT-Link remote monitoring tool.

### **ITU and Kacific Join Forces to Boost Emergency Telecoms and ICT Development in Vanuatu**

May 21 2020 - International Telecommunication Union (ITU) and Kacific have joined forces to boost the capacity of Vanuatu to provide a reliable communications network when disasters strike – and to improve connectivity to boost socio-economic development. The collaboration aims to bring connectivity, in particular to remote and outer islands, including parts of Vanuatu where existing telecommunications networks were recently destroyed in the wake of the Category-5 Cyclone Harold, which cut a deadly path through the north of the country in early April. The collaboration is already having a significant impact across the region, not least in hard-hit Vanuatu where Kacific and ITU provided equipment, such as Very Small Aperture Terminals (VSATs), to provide crucial connectivity to help relief efforts after normal network coverage was wiped out.

### **Intelsat Launches End-to-End Managed Cellular Backhaul Solution for U.S. Mobile Operators**

May 21, 2020 - Intelsat launched Intelsat CellBackhaul, an end-to-end managed service that helps Mobile Network Operators (MNOs) provide cost-efficient and rapid 4G and 5G broadband coverage to Americans everywhere, including those living, working and traveling in rural areas of the United States. Much of the U.S. is rural, and there are still many areas where communities, farmers, ranchers, tourists, industrial and construction workers, and emergency personnel currently have no access to mobile broadband coverage. With Intelsat CellBackhaul as part of their network planning strategy, MNOs of any size can cost-effectively offer mobile broadband coverage to these areas – connecting more subscribers, land areas, roadways and IoT devices. In addition to expanding their coverage areas, MNOs can utilize Intelsat CellBackhaul for network densification, and to provide backup coverage, ensuring their subscribers stay connected, anywhere they go.

### **Virgin Orbit Makes the Inflight Connection with Panasonic Avionics**

May 21, 2020 - Panasonic Avionics Corporation (Panasonic) has been selected by Virgin Orbit to provide inflight connectivity for its airborne rocket launch platform. Panasonic's latest generation high speed inflight connectivity system has been installed on Cosmic Girl, the modified Boeing 747-400 that serves as the carrier aircraft for Virgin Orbit's LauncherOne system. Virgin Orbit is currently undergoing final rehearsals for an orbital launch demonstration expected soon. The inflight connectivity service will enable Virgin Orbit to monitor the health of the launch system over land and sea. The high bandwidth capacity of Panasonic's connectivity network will ensure Virgin Orbit's mission control center can quickly and easily communicate with the rocket prior to launch.

### **Kacific Commits Satellite Service to Help Remote Medical Clinics Combat COVID-19**

May 21, 2020 - As recent epidemics have shown, rural and remote communities, although isolated, are particularly vulnerable during an epidemic, once community transmission takes effect. To help governments during Covid-19, Kacific Broadband Satellites Group is offering over 1,000 small satellite dishes, at no cost, and make them available to healthcare departments throughout Asia Pacific, so they can rapidly connect rural and remote medical clinics to high-speed internet. Internet connectivity will assist better tracking of developing clusters of infection in communities. It will also allow faster and more efficient response of medical staff in smaller towns and rural locations as they tackle the Covid-19 virus. Kacific also extends exclusively to healthcare departments during the Covid-19 crisis, special bandwidth packages at US\$1.7/Gbyte or less, depending on local regulations. Although bandwidth will be prioritised and offered at lower cost for healthcare, communities and other facilities around these 1000 and more health facilities would also benefit as more bandwidth can be pushed through those satellite dishes. Kacific invites Ministries of Health, medical communities or NGO active in healthcare within the coverage range of Kacific1 and not already in discussions with Kacific, to make contact.

### **Avanti to Provide Niger with Satellite Capacity and Equipment to Support its Response to Covid-19**

May 20, 2020 - Avanti Communications is supporting the Niger government's response to Covid-19. As the world seeks to stay connected from behind closed doors, satellite connectivity is playing an important role in guaranteeing secure and reliable communication for government bodies, first aid responders and health organisations. Using HYLAS 4 capacity, Avanti provides resilient and secure satellite connectivity and equipment to 10 government sites across the country, keeping lines of communication open for key government bodies in Niger. Avanti are collaborating with the National Agency of Information Society (ANSI), the technical arm of the government of Niger responsible for coordinating ICT solutions in the Covid-19 response in Niger. The first site was set up on 15 April 2020 and the remaining 9 will be installed over the next few weeks.

### **Intellian's v85NX Antenna System Gains Telenor Satellite Thor 7 Type Approval**

May 20, 2020 - Intellian announced that its v85NX antenna has earned type approval for Telenor Satellite's Thor 7 Ka-band service, following successful sea trials. Significantly the v85NX – which is the first 85cm antenna to be certified on the Thor 7 network – will benefit from the same airtime pricing as 1m antennas. As service provision for smaller antennas is usually more expensive owing to their lower gain, this recognizes the outstanding performance of the v85NX and makes it a competitive choice for customers looking for a compact design with low capital and operational expenditure. Offering up to 25 simultaneously active spot beams, the Thor 7 service is designed to provide optimal HTS Ka-band VSAT connectivity across Europe, covering busy shipping lanes in the North Sea, Norwegian Sea, Barents Sea, Baltic Sea and Mediterranean Sea.

### **Hellas Sat Chooses DataMiner at their Cyprus Teleport**

May 20, 2020 - Skyline Communications, the global leader in end-to-end multi-vendor network management and OSS software solutions for the broadband and media industry, has recently added yet another key satellite player to their extensive client list. The latest addition is Hellas Sat, a leading satellite operator that offers services in Europe, the Middle East and Southern Africa. DataMiner will manage and control all of Hellas Sat's uplinks and downlinks at their teleport in Cyprus.

### **Isotropic Highlights Satellite's Key Role as It Prepares for the 5G Future**

May 18, 2020 - Isotropic, the trusted provider of global Internet services offering unrivaled certainty, has launched a whitepaper that details the integral role that satellite has to play in the 'Network of Networks'. The team has been heavily involved in the validation of new satellite-based applications for 5G and various demonstrations that prove seamless end-to-end satellite and 5G terrestrial services. Due to satellite's unique ability to reach anywhere, it is going to be very important in terms of extending the reach of 5G networks, but it will also play a critical role in enabling network operators to benefit from bandwidth savings, performance, redundancy and QoS especially as demand for mobile bandwidth will see exponential growth as 5G expectations are placed on networks. Operators will face a number of challenges as 5G becomes reality. They will require cost-effective solutions that enable a frictionless user experience. They will need to meet an insatiable appetite for bandwidth and speed as a result of consumer demand for greater connectivity. Isotropic's Datadragon™ has been developed to enable operators to take total control of their network through an intuitive bandwidth management platform that enables users to see, shape and distribute available bandwidth in real time. Datadragon offers application-level transparency, so that users can fine-tune how bandwidth is allocated across single, multi-use or hybrid networks.

### **Astroscale Opens Series E Funding Round and Secures First Investor**

May 18, 2020 - Astroscale Holdings announced it has opened a Series E funding round and has secured I-NET CORP. (I-NET), a leading Japanese data center provider, as its first investor for an undisclosed amount. The additional financing will be used to broaden Astroscale's current business services and achieve the company's mission of securing a sustainable orbital environment. Despite the many complications brought on by the onset of COVID-19, Astroscale has shown steady growth and success in the first half of 2020. In January the company was awarded a grant of up to US \$4.5 million from the Tokyo Metropolitan Government's "Innovation Tokyo Project," and in February, Astroscale was selected as commercial partner for Phase I of the Japan Aerospace Exploration Agency's (JAXA) first debris removal project. Astroscale's offices in the United Kingdom and United States continue to make key additions to their management and technical teams and are well positioned to service future commercial and institutional customers. In addition to building technical capabilities and securing contracts, Astroscale continues to work with industry and government representatives to develop standards and best practices for safe and sustainable satellite servicing and debris removal. Astroscale's success in the first half of the year is expected to



continue. Notably, in the later half of 2020 Astroscale is on track to launch its End-of-Life Services by Astroscale-demonstration (ELSA-d) mission, the world's first demonstration of commercial orbital debris removal.

### **Intelsat Undertakes Financial Restructuring to Pave the Way for Future Innovation and Growth**

May 13, 2020 - Intelsat announced that it has undertaken a financial restructuring to position the Company for long-term success. The restructuring process is intended to enhance the Company's liquidity and will likely result in a substantial reduction of Intelsat's legacy debt burden, allowing for Intelsat to emerge with a strengthened balance sheet to complement its strong operating model and future growth plans. One of the primary catalysts for restructuring the balance sheet now is Intelsat's desire to participate in the accelerated clearing of C-band spectrum under the Federal Communications Commission order in support of a build-out of 5G wireless infrastructure in the United States. To meet the FCC's accelerated clearing deadlines and ultimately be eligible to receive \$4.87 billion of accelerated relocation payments, Intelsat needs to spend more than \$1 billion on clearing activities. These clearing activities must start immediately, long before costs begin to be reimbursed. The Company is also managing the economic slowdown impacting several of its end markets caused by the COVID-19 global health crisis. To facilitate the financial restructuring, Intelsat and certain of its subsidiaries have filed voluntary Chapter 11 petitions in the U.S. Bankruptcy Court for the Eastern District of Virginia, Richmond Division. Intelsat General (IGC), which serves the Company's U.S. commercial, government, and Allied military customers, is not part of the Chapter 11 proceedings.

### **Kratos to Update Satellite Ground System for Air Force Satellite Control Network (AFSCN)**

May 13, 2020 - Kratos Defense & Security Solutions announced that it had been awarded a \$4.9 million contract to modernize the infrastructure and systems that interconnect the Air Force Satellite Control Network (AFSCN) sites under the AFSCN Network Edge Transport System (ANETS) program. The ANETS system will enable the AFSCN to meet the growing needs of its user community. Kratos will provide CACI, the prime contractor for this program, and the government a modular, low-risk, turnkey, integrated solution based on mature Commercial Off-the Shelf (COTS) technology. The solution will be comprised of two systems: Wide Area Network Interface Function (WANIF) and a Wide Area Network (WAN) Resource Manager (WRM) system. Kratos will supply the WANIF units, based on a highly modular and scalable design, to interconnect AFSCN sites. The WANIF units utilize Kratos' cutting edge technology that provides protection against data loss during IP network transport. Kratos will also supply the WRM, which is based on COTS software applications running on COTS hardware (dedicated servers or private cloud), to proactively manage and control the WANIF units that are deployed globally. The WRM encompasses Kratos' suite of network management and control products for terrestrial and enterprise network operations, satellite networks and network devices. The core COTS technologies for ANETS are currently in operation supporting some of the largest and most critical space-ground systems in the world for the Intelligence Community, U.S. Department of Defense and commercial sectors.

### **Telesat Joins C Spire-led Consortium on Rural Broadband Access**

May 13, 2020 - Telesat has joined a group of tech firms led by Mississippi-based C Spire working to bridge the "digital divide" and help solve the rural broadband access and adoption problem. Telesat, one of the largest and most successful global satellite operators, has joined a group of tech firms led by Mississippi-based C Spire working to bridge the "digital divide" and help solve the rural broadband access and adoption problem. The firms, which also include Airspan Networks, Microsoft, Nokia and Siklu, joined forces last year and have been testing technology solutions, creating and building new business models and providing training resources for individuals and communities in digital skills to help improve internet access in rural areas. In addition to Telesat's state-of-the-art global, geostationary satellite fleet, the company is building Telesat LEO, a low earth orbit network that will deliver fiber-like connectivity with a combination of high speeds, high capacity, affordability and ultra-low latency. Telesat will provide analysis tools and its experience with LEO technology to help the consortium work on new business models designed to encourage and promote third-party engagement. Telesat has partnered with the Canadian government to provide backhaul to rural and remote communities as part of an effort to bridge the "digital divide" affordably and quickly connecting the remaining 2.2 million households across the country.

### **Rajant and Hitachi Announce the Successful Deployment of Autonomous Hauling System**

May 13, 2020 - Rajant Corporation, the provider of Kinetic Mesh® wireless networks, and Hitachi Construction Machinery Australia are improving operational safety and productivity through the use of autonomous haulage systems in an Australian coal mine. Hitachi selected Rajant Kinetic Mesh because it is

the only industrial wireless network enabling vehicle-to-vehicle (V2V) communication, which allows autonomous vehicles to talk directly to each other, providing enhanced coverage and reliability. Distinct to Rajant Kinetic Mesh is the proprietary InstaMesh® networking software protocol, which dynamically optimizes Kinetic Mesh performance as network characteristics change, without the need for a controller node or human intervention. Mobile nodes can communicate directly with each other to enable V2V communications between both manned and unmanned vehicles.

#### **exactEarth Joins Mayflower Autonomous Ship project**

May 13, 2020 - exactEarth Limited, the leading provider of Satellite AIS data services, has joined an international effort to build an unmanned, fully autonomous transatlantic research vessel that is set to launch on the fourth centenary of the original Mayflower voyage. exactEarth joins an illustrious international project team led by ProMare and its technology partner, IBM. The Mayflower Autonomous Ship (MAS) mission will not only commemorate the original Mayflower crossing, but also advance technologies that could transform the shipping industry and help gather critical data about the ocean. The exactAIS data service provides flexible access to all the AIS messages captured by exactView™ RT, the Company's second-generation satellite constellation. exactView RT consists of 58 operational payloads and seven orbital spares that were designed and built by L3Harris Corporation and that are hosted onboard the Iridium NEXT constellation of satellites, which is owned and operated by Iridium Communications Inc. exactView RT tracks a population of more than 500,000 unique vessels worldwide and generates Average Global Revisit rates and Average Latency rates of less than one minute.

#### **HISPASAT and EasyTV to Bring Internet Access to Remote Areas in Brazil**

May 13, 2020 - HISPASAT and EasyTV, the provider of innovative entertainment and digital content solutions, have joined forces to bring internet access to Brazilian towns located in regions that lack connectivity. The first phase of the project includes the installation of 50 new WiFi satellite hotspots in Brazil, powered by Facebook Connectivity's Express WiFi platform. This will enable EasyTV to provide practical and reliable high speed internet access using coverage in the Ka band of HISPASAT's Amazonas 5 satellite. EasyTV is the first company that HISPASAT has worked with to provide connectivity service using the Express WiFi platform. The WiFi satellite hotspots installed by HISPASAT and EasyTV are located in remote communities in the state of Maranhão, where connectivity has been lacking due to insufficient telecommunications infrastructure.

#### **Airbus Supplies EU with Satellite Communications**

May 12, 2020 - Airbus has won the new satellite communications framework contract for military and civil missions of the European Union and its member states. This four-year framework contract was awarded by the European Defence Agency (EDA) and is estimated to be worth tens of millions of euros. The contract named 'EU SatCom Market' will allow EU member states to centralise their satellite communications requirements and obtain coordinated, more economical and effective access to these services. Some 32 contributing members, including 20 European defence ministries, can now swiftly and efficiently get access to satellite solutions and services through EDA, which has been supplying the members of the 'EU SatCom Market' project with satellite communications capabilities since 2012. These satellite communications solutions can be deployed worldwide. They play an essential role in European civil and military peacekeeping and security missions, as well as in technical and economic development and cooperation missions. This is already the case in several EU civilian and military missions and operations where EU SatCom Market services have been successfully implemented for several years. The armed forces of EU member states also use these solutions. The 'EU SatCom Market' contract covers the provision of satellite communications (in C, Ku, Ka and L frequency bands), the sale and rental of terminals, as well as the provision of 'turnkey solutions', particularly in theatres of operations outside the EU. For this contract, Airbus has teamed up with Marlink, which will supply some of these terminals and specific L- and Ku-band services.

#### **Intelsat and Andesat Bring Mobile Broadband to Rural Communities in Perú**

May 12, 2020 - Intelsat and Andesat are partnering to bring end-to-end mobile broadband (3G) service to remote communities across Perú. The two companies have developed a new model that will quickly and efficiently bring life-changing 3G access to 154 rural Peruvian communities in 2020, and as many as 400 remote sites in Perú over the next 18 months. The collaborative model holds the potential to be replicated throughout Latin America and help MNOs connect end-users in remote and rural areas. The Peruvian government alone has identified over 16,000 rural sites of National Interest in need of connectivity. Andesat is using its Rural Mobile Infrastructure Operator license (OIMR) to connect remote sites in Perú,

sourcing tower sites, designing and building towers and taking point on equipment for the connectivity initiative. Intelsat is leveraging its scale, infrastructure and expertise to assist Andesat in building out the integrated land-space, mobile broadband (3G) infrastructure, bandwidth capacity and service operations to meet evolving end-user demand.

### **Spacecom and Comtech Demonstrate 1.3 Gigabit C-band Link over AMOS-17**

May 12, 2020 - Spacecom, operator of the AMOS satellite fleet, and Comtech Telecommunications announced the successful demonstration of a 1.3 Gbps link using Comtech EF Data's CDM-760 Advanced High-Speed Trunking and Broadcast Modems operating over AMOS-17 C-band HTS payload. The exceptionally high throughput of 1.3 Gbps on a single link was established between two Telemedia facilities over AMOS-17's C-band spot beam using a single CDM-760 modem per facility. Telemedia is a leading provider of broadcast and teleport services in South Africa. In addition, using the DoubleTalk Carrier-in-Carrier adaptive cancellation functionality of the CDM-760, the team established a symmetrical 270Mbps/270Mbps link between two Telemedia sites using a total of only 62.8MHz on AMOS-17, achieving spectral efficiencies of 8.6 bits/Hz in such a high capacity C-band link. Ping tests showed that these links had a round-trip delay of less than 500ms, including the satellite link, modems and external routers, which is extremely low latency for a GEO satellite link.

### **EchoStar, Hughes and Intelsat Support FCC's Draft Regulatory Fee Order**

May 11, 2020 - EchoStar Corporation and its Hughes Network Systems, LLC business segment join with Intelsat in support of the draft Regulatory Fee Order under consideration by the Federal Communications Commission for its May 13, 2020, Open Meeting. Jennifer A. Manner, Senior Vice President, Regulatory Affairs, EchoStar/Hughes stated: "The draft Order is extremely important to US satellite operators, including EchoStar/Hughes as well Intelsat, as it rebalances the regulatory fee structure to ensure that foreign satellite operators providing US service, like domestic operators, pay regulatory fees for the work from which they benefit. This cost allocation will have several benefits, including removing an incentive for US operators to move off-shore." Susan Crandall, Associate General Counsel, Intelsat US LLC, stated: "The draft Order's conclusion to require foreign-licensed satellite operators to pay regulatory fees is a fair result that treats all satellite operators providing service to the US equally." Together, EchoStar/Hughes and Intelsat support the draft Order and, upon adoption at the upcoming Open Meeting, anticipate a fair outcome that will advance US leadership in space innovation.

### **K-CAT Digital Competence and Assessment Tool Successfully Supports Siem Offshore**

May 11, 2020 - Kongsberg Maritime is pleased to report that its K-CAT (KONGSBERG Competence Assessment Tool) is receiving positive reports from the global oil & gas fleet supplier Siem Offshore, consolidating a deal between the two companies worth in the region of 700,000NOK. An innovative digital tool which enables personnel assessments to be carried out online, K-CAT's abilities range from pre-employment evaluation through to crew competence verification. It is available via all computers and smart devices with an internet connection, and can also be configured in offline mode. Of particular relevance to Siem Offshore, the K-CAT's range of competence assessments can determine how well personnel understand dynamic positioning (DP) systems, as well as gauging the knowledge level and practical expertise of DP operators. These assessments comply with both the DNV-GL and IMCA M 117 (Training and Experience of Key DP Personnel) standards.

### **Inmarsat Launches Telemetry and Satellite Communications Solution for Rail Industry**

May 6, 2020 - Inmarsat has launched a comprehensive new Rail Telemetry and Communications Solution for the global rail industry. The solution provides real-time data transfer and push-to-talk (PTT) communications for rail operators working in remote areas across the globe, connecting drivers and railway staff to drive operational efficiencies and improve the overall safety of the railway. This builds on Inmarsat's existing industry-leading work with the rail sector. Inmarsat's Rail Telemetry and Communications Solution leverages its Broadband Global Area Network (BGAN), which offers industry-leading reliability of up to 99.9% uptime. Low form factor satellite terminals, such as the new Cobham EXPLORER 323, are mounted on locomotives providing real-time GPS, telemetry and PTT capabilities anywhere in the world. This means control centres can efficiently and safely monitor and schedule the movement of locomotives, rolling stock and goods across an entire rail network, while enabling communications with crew wherever they are located.

### **Eutelsat Selected by Telenor Maritime for Maritime Mobility Services**

May 6, 2020 - Eutelsat Communications has secured a multi-year contract with Telenor Maritime to

provide Ku coverage on a regional basis for sailing areas in Europe, Trans-Atlantic crossings, the Caribbean and South East Asia. Eutelsat will leverage several of its satellites in order to deliver targeted capacity with guaranteed levels of throughput to specific sailing areas under a managed services agreement. It will enable the delivery of high speed internet connectivity to cruise and ferry passengers by extending GSM roaming to the vessel and/or selling access to on-board WiFi networks. From the outset of the contract, Telenor Maritime Vessels will progressively transfer vessels onto the network in a proactive manner. At a later stage, Telenor Maritime will migrate vessels onto Eutelsat's Ka band satellite, Konnect VHTS in Europe when it is available, making it the first reference customer from the maritime industry on the new satellite.

### **Azercosmos Signs a Partnership Agreement with TheAngle of the United Arab Emirates**

May 6, 2020 - Azercosmos has signed a partnership agreement with TheAngle, which provides satellite network services in the Middle East. According to the agreement, Azercosmos and TheAngle will provide secure and highly reliable communication services including but not limited to the internet, network, voice, video, mobile, and other data services in the Middle East and Europe. It is also worth mentioning that the company offers broadband satellite services and numerous satellite applications in the field of telecommunications in the Middle East and Europe.

### **Curvalux - Advanced Communications R&D and Manufacturing Investment in UK**

May 6, 2020 - Curvalux UK, the innovative developer and manufacturer of new generation wireless broadband solutions and Sheffield City Region Mayoral Combined Authority (SCR) announce a joint investment to open a state-of-the-art telecommunications R&D Centre and production facility. Curvalux announces that it will bring state-of-the-art digital communications R&D and manufacturing to the UK – with an initial investment in Sheffield. The company is developing next-generation broadband wireless systems based on smart multi-beam phased-array antennas and aims to bring low-cost, high-speed internet access to rural communities and underserved urban areas across a £multi-billion global market. Curvalux has been demonstrating its systems with major service providers in Asia, Middle East, and USA since 2018 with further trials planned for 2020 including Europe and South Africa. The patented low-energy technology avoids costly power infrastructure.

### **Inmarsat and Cobham Launch New Solution Connecting Remote Workers**

May 5, 2020 - Inmarsat and Cobham SATCOM have launched a comprehensive new Broadband Global Area Network (BGAN) push-to-talk (PTT) solution to connect remote workers using vehicles across the globe. The solution provides real-time data transfer and PTT communications to enable remote utilities, mining, aid and NGO, agricultural work and more, as well as for use in public safety and emergency response. Inmarsat's and Cobham's new solution responds to these challenges by utilising its BGAN solution, which offers industry-leading reliability of more than 99% uptime. Low form factor satellite terminals, such as the new Cobham EXPLORER 323, are mounted on vehicles providing real-time GPS, telemetry and PTT capabilities, through the EXPLORER Mobile Gateway anywhere in the world. This means control centres can efficiently and safely monitor the movement and performance of their vehicles, while enabling communications with crew wherever they are located. An important feature of the solution is the integration with existing equipment on board. The Cobham EXPLORER Mobile Gateway integrates easily into any existing radio equipment, allowing the organisation to keep and use their existing trusted equipment. PRISM PTT+, a service powered by Cobham SATCOM's innovative PRISM (Private Routing & Intelligent System Management) technology enables the BGAN PTT Solution to switch between connectivity types such as UHF or VHF, 3G/4G and satellite making the solution cost-effective and easy to use. The switching process is unique in the market because it is completely seamless and offers an economical approach to voice communications.

### **ST Engineering iDirect and Spacecom Join Forces on High Throughput Low Power Demonstration**

April 5, 2020 - ST Engineering iDirect and its long-term partner Spacecom announced the successful demonstration of VSAT return capabilities on AMOS-17. The demonstration resulted in an exceptionally wide return link for a small VSAT of 47Mbps (15Msym) using the iDirect iQ 200 modem's Adaptive TDMA return over AMOS-17's high power C-band HTS beams. The combination of the 2.4m C-Band terminal and AMOS-17's high-performance beams generated a highly efficient solution. The large return data rate enabled simultaneous transmission of multiple high data streams from South Africa to Europe with a small antenna, resulting in the low-power Communications-on-the-Pause (COTP) solution. This opens up many operational and business opportunities to customers, such as emergency deployments, government applications, coverage of events and backhaul services. Conducted from the UK-based SMS Teletop, an



AMOS-17 European Gateway partner, the modem and antenna were installed in a communications truck located between Johannesburg and Pretoria, South Africa. The truck was provided by Telemedia, a leading provider of broadcast and teleport services across Africa. The iQ 200 is a DVB-S2/DVB-S2X modem with Adaptive TDMA returns, combining high-performance features with mobility, making it an ideal solution for real-time, cost-effective, small to medium enterprise applications, such as IP trunking for disaster response and emergency services as well as mobility solutions such as maritime.

#### **Crowley Maritime Corp. Signs up to Inmarsat's Fleet Xpress**

May 5, 2020 - Crowley Maritime Corp. has agreed a contract to install Fleet Xpress from Inmarsat, the world leader in global, mobile satellite communications, on a majority of its vessels. The 127-year old Florida-headquartered business owns, operates and manages a diverse fleet of almost 100 vessels, including conventional and dual fuel (liquid natural gas – LNG) container ships, tankers and ship assist and offshore services tugboats and barges. The deal was signed following successful trials in Alaska on Aframax tanker, California, and the recently reflagged vessel Rio Grande Express, which helped showcase the combination of high-speed Fleet Xpress on Ka-band with continuous back up from FleetBroadband on L-band, significantly enhancing stability of communications and available uptime.

#### **Kratos Awarded Contract for Satcom Bandwidth Monitoring and Utilization Assessment**

May 4, 2020 - Kratos Defense & Security Solutions announced that it had been awarded a sole-source contract for satellite bandwidth utilization services. The base year of the contract is valued at \$3,061,221; if all four option years are exercised, the total value will be \$19 million. Kratos will provide continuous monitoring services of commercial satellites leased by the U.S. Space Force (USSF). Specifically, Kratos will provide 24x7 near-real-time performance monitoring data and bandwidth utilization assessment Radio Frequency (RF) monitoring services. RF data is the spectrum used by space systems to communicate with their ground systems. Kratos monitors the strength and characteristics of the signal, not the content. Bandwidth monitoring and utilization assessment and reporting services are required across all commercial satellites that are leased globally by the USSF.

#### **Isotropic Puts the Power in the Hands of First Responders with its New Emergency Communications Platform**

May 4, 2020 - Isotropic Networks has announced the availability of its new Emergency Communications Platform (ECP). The platform is rapidly and easily integrated into emergency vehicles to provide an instant means of communication no matter where it is needed, allowing emergency managers to effectively coordinate a response using voice, data, and video services as well as manage available bandwidth. With its compact design and just-add-power portability, the ECP can be installed on any vehicle in a fraction of the time of traditional solutions, without the need for large clusters of rooftop equipment that introduce more opportunities for technical difficulties. The ECP is built on a software-defined wide-area network (SD-WAN) connection that automatically shifts between VSAT and LTE networks in microseconds. The technology behind the ECP features the Kymeta GEO flat panel antenna with an integrated iQ 200 modem board from ST Engineering iDirect at its core, promising unflinching, always-on connectivity. This is coupled with the Isotropic Datadragon bandwidth management platform that puts the power to monitor, control, and optimize data usage in the hands of relief teams. The platform is supported by Isotropic's customizable flat-rate flexible service plans designed to scale and work not only with the ECP, but also with pre-existing technology configurations.

## **BROADCAST**

#### **Signal TV Selects Hughes JUPITER System to Launch Satellite Internet Service in Philippines**

May 27, 2020 - Hughes Network Systems, LLC announced that Signal TV Inc., the Philippines premier direct-to-home (DTH) satellite provider, has selected the Hughes JUPITER™ System to enable satellite broadband service to its two million subscribers. Under the agreement, Hughes will provide Signal TV with user terminals and a network management system using the same technology that Hughes employs to power HughesNet®, its flagship satellite Internet service with more than 1.5 million subscribers. The JUPITER System is the next-generation Very Small Aperture Terminal (VSAT) platform from Hughes for broadband services over both high-throughput and conventional satellites. Employing the DVB-S2X standard for highly efficient use of satellite bandwidth, the JUPITER System powers services on more than 40 satellites around the world, and is the foundation for HughesNet, the satellite Internet service from Hughes available in countries throughout the Americas. The JUPITER System supports applications such as community Wi-Fi hotspots, cellular backhaul, enterprise networks and in-flight connectivity services, in

addition to broadband Internet access.

### **SES Unveils First TV Market Reception Survey Results in the Philippines**

May 27, 2020 - SES has revealed the results of its first-ever TV market reception survey in the Philippines. Out of the 3,000 residential households interviewed across the Philippines, SES unveiled that households who subscribed to satellite TV ranked highest in terms of satisfaction with their TV service. A large majority of satellite TV households were very satisfied with their TV service (76%), in comparison with cable TV (70%), digital terrestrial (69%), analogue terrestrial (59%) and IPTV (54%) respectively. Satellite TV (17%) is also the second-most popular mode of TV reception in the Philippines, behind terrestrial TV (66%) but ahead of cable TV (15%) and IPTV (2%), according to the SES Satellite Monitor report. The Philippines stands as one of the most dynamic and highly-penetrated TV markets in Asia Pacific with over 20.8 million TV households and 86.8% TV penetration rate. The research further highlighted the importance of image quality and viewing experience for Filipino households, with 99.6% of those surveyed indicating it as important or very important. Yet while 57% or 12 million households in the country already own HDTV screens, only about 13% of TV channels are broadcast in HD quality.

### **Eutelsat's HOTBIRD Selected by Travel Africa Network to Launch First HD African Travel Channel**

May 22, 2020 - Eutelsat Communications' HOTBIRD video hotspot has been selected by Travel Africa Network for the broadcast of its first High Definition African travel channel, with 100% African content dedicated to promoting tourism and hospitality in Africa. The multi-year contract will enable Travel Africa Network to broadcast high-quality content throughout Europe and MENA, covering African gastronomy, culture, the best places to travel and stay and destination documentaries. With its unique pan-European coverage, the high-power HOTBIRD satellites at 13° East form one of the largest broadcasting systems in EMEA, delivering content to more than 135 million TV homes in Europe, North Africa and the Middle East.

### **AsiaSat Keeps the World Connected as Linear TV Viewing Witnesses Upsurge amid COVID-19 Lockdown**

May 21, 2020 - Recent media reports have revealed shifts in consumers' viewing behaviours as COVID-19 situation evolves with individuals and families spending more time at home, which noted a spike in linear TV viewing, in terms of penetration and time spent across multiple markets and all generations. News channels and programmes have seen a surge in viewership as news updates and government announcements on new regulations and the pandemic development become profoundly important to the public. During this period of uncertainty, satellite continues to be a reliable and cost effective means for content delivery, serving audiences nationally and abroad with critical and timely news and information. As Asia's leading provider of broadcast platforms, AsiaSat strives to meet consumers' evolving demand for content and viewing quality. Among the 550 TV and radio channels originated from more than 30 countries and regions in 30 languages delivered by the AsiaSat fleet, more than 80 are news channels, with 60% of them in local languages targeting local markets as well as expatriates and travellers who want to stay abreast of the happenings in their home countries.

### **SKY PerfecTV Renews Broadcast and Digital Rights of Bundesliga for 5-years Starting 20/21 Season**

May 20, 2020 - SKY Perfect JSAT has signed with Bundesliga for the next 5-seasons from 20/ 21 to 24/25 season. Currently SKY PerfecTV/ is in the 2nd season from the current 18/ 19 season, which will be extended further for 5 seasons. Bundesliga is one of the 4 major football leagues in Europe and is known as the most enthusiastic league amongst these leagues, with high attendance rates and number of goals per match. The new partnership will expand beyond media rights, where both parties have agreed to execute joint promotion projects and marketing opportunities to further grow the league within Japan.

### **Bridge Technologies Partner with Appear TV to Provide Advanced IP-based Production and Distribution**

May 14, 2020 - On the back of their recent announcement of the new Integrated Services Monitoring (ISM) model, Bridge Technologies has demonstrated the value and robustness of their approach with technology collaborators Appear, in a setup which facilitates end-to-end delivery and monitoring of data, uncompressed to compressed, from production to end user. ISM seeks to bring together the Bridge Technologies portfolio of products into a turnkey, easy-to-install media monitoring system. It represents Bridge's recognition of the increasingly merged and hybridized nature of the industry, where single entities may now operate on multiple layers of the broadcast and media cycle; from production through signal acquisition, contribution streams, picture archiving, OTT/streaming media, to traditional broadcast distribution with DTT or Satellite. The advanced IP-based production and distribution setup - which

would have also been demoed at NAB this year – is a successfully tested proof of concept for a full-length monitoring solution from production to end user, using standards SDI, SPTS, MPTS and OTT. The setup has been fully tested with four cameras with SDI outputs feeding an IP network processor to seamlessly bridge SDI and IP networks.

### **BBC World News and SES Extend HD Deal to ASTRA 19.2 Degrees East**

May 13, 2020 - TV viewers across Western Europe will continue to be able to watch BBC World News thanks to an extended deal with SES. BBC Global News delivers its HD news channel, BBC World News, free-to-air across Europe on SES's Astra satellite at 19.2 degrees East. The total HD reach at Astra 19.2 degrees East has increased every year, rising from 65 million homes at year end 2015 to 88 million by year end 2019, a 34% growth in five years. The BBC World News channel, which has been available in HD through SES since 2015, is distributed via a multiplex operated and uplinked by SES from its Luxembourg headquarters.

### **Viasat Consumer and Canal Digital Merger Completed**

May 5, 2020 - The previously announced combination of Viasat Consumer and Canal Digital into a new joint venture company has been completed. The two TV distributors have now become one, and the new company will go by the name Allente. The closing of this transaction creates a large-scale player that can compete on a Nordic level, make sustained investments in content and technology, deliver even better combined customer offerings, and generate substantial revenue and cost synergies. The new company, known as Allente, will offer TV distribution via satellite, streaming services as well as IPTV solutions, and fibre broadband via open networks to 1.2 million customers in Norway, Sweden, Denmark and Finland. NENT Group and Telenor Group each hold 50 percent of the shares in the new company, which is headquartered in Stockholm and Oslo. The joint venture will operate at an arm's length from NENT Group and Telenor Group, and is an open platform providing content from multiple providers.

## **LAUNCH / SPACE**

### **NASA Astronauts Launch from America in Test Flight of SpaceX Crew Dragon**

May 30, 2020 - For the first time, NASA astronauts have launched from American soil in a commercially built and operated American crew spacecraft on its way to the International Space Station. The SpaceX Crew Dragon spacecraft carrying NASA astronauts Robert Behnken and Douglas Hurley lifted off at 3:22 p.m. EDT Saturday, May 30 on the company's Falcon 9 rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida. Known as NASA's SpaceX Demo-2, the mission is an end-to-end test flight to validate the SpaceX crew transportation system, including launch, in-orbit, docking and landing operations. This is SpaceX's second spaceflight test of its Crew Dragon and its first test with astronauts aboard, which will pave the way for its certification for regular crew flights to the station as part of NASA's Commercial Crew Program. The program demonstrates NASA's commitment to investing in commercial companies through public-private partnerships and builds on the success of American companies, including SpaceX, already delivering cargo to the space station. SpaceX controlled the launch of the Falcon 9 rocket from Kennedy's Launch Control Center Firing Room 4, the former space shuttle control room, which SpaceX has leased as its primary launch control center. As Crew Dragon ascended into space, SpaceX commanded the spacecraft from its mission control center in Hawthorne, California. NASA teams are monitoring space station operations throughout the flight from Mission Control Center at the agency's Johnson Space Center in Houston. The SpaceX Crew Dragon spacecraft is scheduled to dock to the space station at 10:29 a.m. Sunday, May 31.

### **Syrlinks Selected by Thales Alenia Space for Omnispace's First Space and Ground 5G Network**

May 27, 2020 - Syrlinks has been selected by prime contractor Thales Alenia Space to collaborate in the construction of the first two satellites for the Omnispace's low earth orbit constellation. Syrlinks, which develops radiocommunication systems for space and defense, will contribute to this project by manufacturing the S-band instruments of the payloads integrated in the first two satellites of the Omnispace constellation. This first set of non-geostationary orbit (NGSO) satellites, scheduled for a launch in 2021, will help to establish the design, capability and capacity of the future Omnispace constellation. Thales Alenia Space and Syrlinks are currently collaborating on the design of payloads dedicated to data collection, in particular for the Argos NEO demonstration mission on board of CNES' ANGELS satellite. They are also working together on the Kinéis constellation of nano-satellites dedicated to the Internet of Things. Syrlinks was chosen for its expertise in the design of miniature radiocommunication equipment embedded on small satellite platforms and for its mastery of the NewSpace reference system.

### **The 45th BeiDou Satellite Starts Operation in Network**

May 27, 2020 - The 45th satellite of the BeiDou Navigation Satellite System (BDS) has started operation in the network after completing in-orbit tests, according to the Satellite Navigation System Management Office. The satellite will provide services in place of the 3rd BeiDou satellite, a geostationary earth orbit satellite of the BDS-2 system. The replacement will help reinforce the BDS-2 system and support a smooth transition from the BDS-2 system to the BDS-3 system. The third satellite will stay in orbit after the replacement. The third and the 45th satellite were launched at the Xichang Satellite Launch Center on Jan. 17, 2010 and May 17, 2019, respectively. Both were developed by the China Academy of Space Technology under the China Aerospace Science and Technology Corporation (CASC).

### **Airbus Wins ESA Contract to Construct Third European Service Module for NASA's Orion Spacecraft**

May 26, 2020 - The European Space Agency (ESA) has signed a contract with Airbus for the construction of the third European Service Module (ESM) for Orion, the American crewed spacecraft. The contract is worth around €250 million. By ordering this additional service module, ESA ensures the necessary continuity in NASA's Artemis programme. The third European Service Module (Artemis III Mission) will be used to fly astronauts to Earth's neighbour in space in 2024 – the first to land on the Moon since Apollo 17 following a hiatus of more than 50 years. The first non-crewed Orion test flight with a European Service Module (Artemis I) will fly in 2021. It is as part of the following mission, Artemis II, that the first astronauts will then fly around the Moon and back to Earth. The ESM will provide propulsion, power, air and water for the astronauts, as well as thermal control of NASA's new spacecraft.

### **Thales Alenia Space to Supply Thermomechanical Systems for Orion European Service Module**

May 26, 2020 - Thales Alenia Space has signed a contract with Airbus Defence and Space, prime contractor for US space capsule Orion service module, to develop and produce the thermomechanical systems for the third model of the European Service Module (ESM) on the Orion spacecraft. Orion is NASA's human transportation vehicle for deep space exploration. The Orion service module will be developed under ESA contract and will provide structure, propulsion, power supply, thermal control and main life support capabilities for the American spacecraft. The ESM3 contract signed by Thales Alenia Space is worth approximately 75 million euros. Thales Alenia Space, as contractor of Airbus Defence and Space, will develop and supply critical service module systems for the third flight unit, including structure & micrometeoroid protection, thermal control and consumable storage and distribution.

### **PROMISE Project Led by Thales Alenia Space Will Enable the Creation of Satellites 100% European**

May 26, 2020 - Thales Alenia Space leads from Spain the consortium of a revolutionary project, PROMISE (PROgrammable MIXed Signal Electronics), that will provide technological independency to Europe in future space missions and guarantee its competitiveness in the field. PROMISE, which will see the light in 2022, is an integral part of the HORIZON 2020 research and innovation program of the European Commission, which has European autonomy in space as one of its pillars. The European aerospace industry depends today on non-European countries as USA, where most of the Mixed Signal ASIC (Application-Specific Integrated Circuit) are produced, the electronic chips considered to be the "brains" of the satellites and one of the elements that are more costly to produce. The PROMISE project will develop a library of blocks designed and tested to be used in these chips, allowing to cut by one third the lead time of these satellite components and to sensibly reducing its cost.

### **Equatorial Space Systems & Southern Launch Australia sign MOU**

May 25, 2020 - Equatorial Space Systems has signed a memorandum of understanding to use the facilities of Southern Launch Australia for its upcoming suborbital mission program. The Singapore-based launcher company, notable for its innovative hybrid propulsion systems, revealed the Dorado sounding rocket, capable of delivering up to 25 kilograms of payload beyond the boundary of space, last month. Southern Launch is providing infrastructure and logistics to meet the increasing global demand for orbital and sub-orbital launches of satellites and space payloads. With two multi-user launch sites located in South Australia, having good year-round weather and minimal air and maritime traffic, customers benefit from greater launch window availability and improved launch schedule flexibility. Equatorial Space Systems is a space tech startup developing innovative technologies for space launch and exploration activities. With its proprietary hybrid propulsion, its technology allows for cheaper, safer and greener alternatives to existing solutions in both orbital launch systems, as well planetary landing missions.

### **Russian Space Firm to Team up with Japanese Company in Satellite Production and Export**

May 25, 2020 - The Russian private space firm Sputnix has signed a memorandum with the Japanese



company Mitsui & Co. Moscow on cooperation in producing and exporting microsatellite components and providing microsatellite-based services. Under the deal, the Japanese company can acquire Sputnix products and services and will also represent its interests on the territory of Asia and the Middle East, the statement says. Overall, the partners plan to cooperate in the sphere of organizing the production of hi-tech components and technologies for microsatellites, satellite platforms, microsatellites themselves and microsatellite-based services.

### **Virgin Orbit Ignites LauncherOne Rocket During First Launch Demo, Mission Safely Terminated**

May 25, 2020 - Virgin Orbit conducted a launch demonstration of its innovative air-launched rocket in the skies over the Pacific Ocean just off the California coast. The company successfully completed all of its pre-launch procedures, the captive carry flight out to the drop site, clean telemetry lock from multiple dishes, a smooth pass through the racetrack, terminal count, and a clean release. After being released from the carrier aircraft, the LauncherOne rocket successfully lighted its booster engine on cue – the first time the company had attempted an in-air ignition. An anomaly then occurred early in first stage flight, and the mission safely terminated. The carrier aircraft Cosmic Girl and all of its crew landed safely at Mojave Air and Space Port, concluding the mission. The company's next rocket is in final stages of integration at its Long Beach manufacturing facility, with a half-dozen other rockets for subsequent missions not far behind. Virgin Orbit's decision to begin production of multiple rockets well in advance of this test flight will enable the team to progress to the next attempt at a significantly faster pace, shortly after making any necessary modifications to the launch system.

### **UK's First Complete Ground Rocket Test in 50 Years Takes Place in Scotland**

May 20, 2020 - The UK's space race heats up as Skyrora effectively made the UK ready for launching rockets into space after a team successfully built a mobile launch complex and completed a full static fire test with the Skylark-L rocket on it – in only five days. Skyrora's combined achievement also signifies the first vertical static fire test of this magnitude in the UK since the Black Arrow Programme, 50 years ago. The Skylark L rocket could be ready to launch from a British spaceport as early as spring 2021 and the inaugural launch of the low Earth orbital (LEO) Skyrora XL rocket by 2023. The ground test at the mobile launch complex at Kildemorrie Estate in North Scotland earlier this month, saw Skyrora's launch vehicle, Skylark-L perform all actions of a launch while restrained to the ground and prevented from taking off. Skylark-L is a bi-liquid propellant launch vehicle. It is Skyrora's first sub-orbital flight vehicle, ready to reach a height of approximately 100km, just on the Karman line, and carry a payload of up to 60kg. Skylark-L uses a propellant combination of Hydrogen Peroxide and Kerosene which are pressure fed into a Skyrora 30kN engine. Building up to the static fire test, the rocket engine itself has gone through three hot fire tests before integration into the vehicle. When commercial, the company plans to use their own Ecosene, an equivalent Kerosene fuel made from un-recyclable plastic waste. In Skyrora's rocket suite, its aim is to start with launching sub-orbital rockets and move to orbital by 2023.

### **ISS-Reshetnev Wins Contract to Build New Loutch Satellite**

May 19, 2020 - ISS-Reshetnev Company has been selected for a contract by the ROSCOSMOS State Corporation to design and build a new satellite to augment and replenish the orbital constellation of the Russian data-relay system Loutch. The Loutch-5VM satellite will be the first of the new series of modernized data-relay satellites with some additional features improving their functionality. They will replace the satellites currently operating as part of the multifunctional space-based data-relay system Loutch. All work to design and build a new satellite and to modernize the system's ground infrastructure will be done by ISS-Reshetnev Company in accordance with the Federal Space Program of Russia for the 2016-2025 period, and the new state contract signed by ISS-Reshetnev and ROSCOSMOS. The Loutch-5VM satellite is due to launch not later than 2024.

### **Thales Alenia Space Wins Two Contracts from ESA to Study EGNOS Upgrades**

May 18, 2020 - The European Space Agency (ESA) has awarded two contracts to Thales Alenia Space concerning EGNOS (European Geostationary Navigation Overlay Service). These contracts, fully financed under the European Commission H2020 programme, concern study phases on the system evolution. They will call on Thales Alenia Space's expertise as program prime contractor for over 25 years to study and develop upgrades for the EGNOS satellite navigation system. The first contract concerns possible upgrades for EGNOS aeronautical services, designed to improve performances in order to increase landing safety under limited visibility conditions (from current CAT-I to CAT-II), over the current EGNOS footprint, focused on Europe. The second contract will study changes required to extend its aeronautical services worldwide. Based on state-of-the-art technologies, this upgrade will call on the A-RAIM (Advanced

Receiver Autonomous Integrity Monitoring) concept and the global coverage of the Galileo satnav constellation. RAIM is an already deployed technology that assesses the integrity of signals in the receivers that are part of a global positioning system, mainly GPS. Galileo will now be incorporated in the advanced version of this concept, A-RAIM, to provide enhanced horizontal guidance performance, not possible with RAIM using only GPS. The new concept would thus provide "Safety of Life" aeronautical services, including approaches with vertical guidance, thanks to inputs from GPS and Galileo via EGNOS.

### **Boeing-built X-37B Launches in Second Mission for U.S. Space Force**

May 17, 2020 - The Boeing-built X-37B autonomous spaceplane launched on top of a uniquely configured United Launch Alliance Atlas V rocket. Boeing is the prime contractor for the X-37B spaceplane and facilitates the integration of all experiments into the vehicle ensuring they receive the correct power, thermal and data services required. Boeing also works to identify future reusable platform experiment opportunities on each mission. The X-37B's sixth mission is the first to use a service module with additional payload capability to support a variety of experiments for multiple government partners. The mission will deploy FalconSAT-8, a small satellite developed by the U.S. Air Force Academy and sponsored by the Air Force Research Laboratory, to conduct experiments on orbit. Further, two NASA experiments will study the impact of radiation and other space effects on certain materials and seeds used to grow food. Another experiment by the Naval Research Laboratory will transform solar power into radio frequency microwave energy which could then be transmitted to the ground. In addition, the mission will test reusable space vehicle technologies.

### **ULA Successfully Launches the Sixth Orbital Test Vehicle for the U.S. Space Force**

May 17, 2020 - A United Launch Alliance (ULA) Atlas V 501 rocket carrying the USSF-7 mission for the U.S. Space Force lifted off on May 17, 9:14 a.m. EDT, from Space Launch Complex-41. This marks the 84th successful launch of an Atlas V rocket, 139th launch for ULA, the second launch for the U.S. Space Force and the sixth flight of the X-37B Orbital Test Vehicle (OTV-6). A United Launch Alliance (ULA) Atlas V 501 rocket carrying the USSF-7 mission for the U.S. Space Force lifted off on May 17, 9:14 a.m. EDT, from Space Launch Complex-41, Cape Canaveral Air Force Station, Florida. Along with OTV-6, this mission deployed FalconSat-8, a small satellite developed by the U.S. Air Force Academy and sponsored by the Air Force Research Laboratory (AFRL) to conduct experiments on orbit. The mission also carried two NASA experiments, including a material sample plate to determine the results of radiation and other space effects on various materials, and an experiment which will assess space effects on seeds used to grow food. Another experiment sponsored by the Naval Research Laboratory will examine the ability to transform solar power into radio frequency microwave energy which could be transmitted to the ground.

### **China Tests 3D Printing in Space for First Time**

May 14, 2020 - A "space 3D printer" developed independently by China and two samples it printed in orbit successfully returned to Earth Friday, according to the China Academy of Space Technology (CAST). They came back in the return capsule of China's new-generation manned spaceship for testing, which was launched from the Wenchang Space Launch Center in southern China's island province of Hainan on Tuesday and touched down at the Dongfeng landing site in northern China's Inner Mongolia Autonomous Region on Friday. It is China's first in-orbit 3D printing test, which has realized space 3D printing of continuous carbon fiber reinforced polymer composites for the first time in the world. Developed by a research institute of the CAST, the 3D printing system completed the scheduled tasks in orbit at 1:58 a.m. on Thursday. The images transmitted by the experimental spaceship showed that the two samples were printed successfully and could be distinguished clearly. Researchers will further check the performance of the returned printer and printed samples and give a comprehensive evaluation. *(source: Xinhua)*

### **Space Video Streaming Company Sen Awards Momentus Orbital Deployment Contract**

May 13, 2020 - Sen, a British space company establishing a video streaming service to provide real-time and timely Ultra-High Definition (UHD) video of Earth, and Momentus, a provider of in-space transportation services for satellites, today announced a contract for the orbital deployment of Sen's first satellite, with an option to launch a further four satellites for Sen in 2022. Under the agreement, Momentus' Vigoride orbital transfer vehicles will carry Sen's satellites to sun-synchronous orbit riding on SpaceX Falcon 9 rockets, with the first launch booked for summer 2021 and a further four satellites scheduled for late 2022. From their drop-off orbits, the Vigorides will deploy the EarthTV satellites to their final desired altitudes. In the case of the cluster of four, Vigoride will also equally distribute the satellites in their orbital plane. Built by NanoAvionics under a separate contract that was announced in March, the EarthTV satellites are cubesats with a 16U form factor, which makes them the largest payloads contracted

to Momentus so far. This is also the first agreement specifically leveraging the orbital maneuvering capabilities of the Vigoride shuttle.

### **LeoLabs Unveils First Automated Collision Avoidance Service for Satellite Operators**

May 13, 2020 - LeoLabs, Inc. introduced LeoLabs Collision Avoidance, a ground-breaking platform for automating and modernizing satellite operations, aimed at addressing the threat of orbital space debris. Powered by LeoLabs global network of radars and built on the LeoLabs SaaS data platform, LeoLabs Collision Avoidance offers a real-time stream of alerts and on-demand risk analyses that uniquely support collision monitoring. LeoLabs Collision Avoidance removes existing barriers to navigational security by delivering a comprehensive suite of cloud-based services for real-time alerts on close approach events and high-fidelity risk assessment. Users now have direct access to timely, high quality conjunction event data and analytics using a worldwide network of phased-array radars working around the clock on their behalf. The LeoLabs Collision Avoidance system is operational today and ready to serve the needs of commercial satellite operators, civil regulatory and space agencies, defense satellite operators, research satellite operators, and human spaceflight missions. Over the next 24 months, as LeoLabs adds additional high-fidelity phased array radars to its global sensor network, LeoLabs Collision Avoidance will expand collision alerts to include previously uncatalogued small debris.

### **Airbus and Xenesis Sign Payload Contract for New Bartolomeo Platform on the ISS**

May 5, 2020 - Airbus and Xenesis have signed a contract for a payload slot on the International Space Station (ISS) Bartolomeo platform for the demonstration of their Xen-Hub optical communication space terminal. The Xen-Hub is a greater than 10 gigabyte per second optical communications terminal. The terminal was enabled with a technology transfer from the NASA Jet Propulsion Laboratory and is designed to increase satellite communications bandwidth. The Airbus-built Bartolomeo platform offers external science and payload hosting capabilities on the ISS, providing new opportunities for science and research. The platform, launched from the Kennedy Space Center in Florida, was installed on the ISS Columbus module on 1st April. Bartolomeo was developed by Airbus using its own funds, is an investment of Airbus and is operated in a partnership with ESA, NASA and CASIS. The low orbit of the ISS offers a stable location for proving ultra-low latency communications, in excess of 10Gbs. Bartolomeo is located in an optimal position on the ISS, offering direct views of Earth from approximately 240 miles altitude, allowing Xen-Hub to maximize its pass time and increase the throughput of data.

### **China's New Large Rocket Long March-5B Makes Maiden Flight**

May 5, 2020 - China's new large carrier rocket Long March-5B made its maiden flight on May 5, sending the trial version of China's new-generation manned spaceship and a cargo return capsule for test into space. The white large rocket blasted off from the Wenchang Space Launch Center on the coast of southern China's island province of Hainan at 6 p.m. (Beijing Time), according to the China Manned Space Agency (CMSA). About 488 seconds later, the experimental manned spacecraft with no crew, together with the test version of the cargo return capsule, separated with the rocket and entered the planned orbit. The successful flight inaugurates the "third step" of China's manned space program, which is to construct a space station, said CMSA. Specially developed for China's manned space program, Long March-5B will be mainly used to launch the modules of the space station.

### **Maxar Selected to Support Dynetics in Designing and Building a Lunar Human Landing System**

May 1, 2020 - Maxar Technologies announced that it has been selected to support Dynetics, a wholly-owned subsidiary of Leidos, in designing and building a Human Landing System for NASA's Artemis program, which will send the first woman and the next man to the Moon by 2024 and enable future crewed missions to Mars. Dynetics' Human Landing System will be designed to deliver two astronauts from lunar orbit to the lunar surface and back, including surface habitation for about a week. As part of the Dynetics team, Maxar will deliver a broad range of services and hardware solutions that will enable power, control, communications, robotic manipulation and thermal optimization for the Human Landing System. Maxar will also provide engineering and mission operations support. Maxar's role on Dynetics' Human Landing System team expands the company's significant contributions to NASA's Artemis program. Maxar is developing the Power and Propulsion Element for the lunar Gateway that will enable a sustainable human deep-space presence in collaboration with international partners. And the company is building a robotic arm called SAMPLR for Masten Space Systems' XL-1 unmanned lunar lander that will deliver nine technology demonstration experiments to the lunar south pole in 2022.

## EXECUTIVE MOVES

### **Rajant Introduces Jon Lederman as Vice President of Artificial Intelligence**

May 28, 2020 - Rajant Corporation, the provider of Kinetic Mesh® wireless networks, announced today Jon Lederman joined the team as Vice President of Artificial Intelligence (AI). In this newly created position, Mr. Lederman will enable new applications and capabilities for Rajant's Kinetic Mesh partners and end customers to enhance their productivity further using machine learning (ML). Target markets include warehouse automation, robotics, energy, transportation, public safety, military, and mining. Jon Lederman is a tech entrepreneur, scientist, and engineer. He is the CEO and founder of New York-based Spinor, which is developing AI technology for creating conversational voice experiences for enterprise and consumer applications.

### **Optus Appoints Executive Leadership Team**

May 26, 2020 - As Optus continues to play a critical role in supporting Australians during these uncertain times, the business has strengthened its executive leadership team with the appointment of Kate Aitken, Libby Roy and Poppy Fassos. Kate Aitken is set to join Optus as Vice President, Human Resources in August responsible for end-to-end HR at Optus and aligning HR initiatives across the Singtel Group. Libby Roy has joined Optus as Managing Director SMB having recently been PayPal's Managing Director in Australia. Libby will be responsible for driving sales, product development, marketing, service delivery and operations. Poppy Fassos has joined Optus as Head of Business Risk Management, responsible for Business Risk Management for Consumer Australia. This role is focused on assisting the business to manage its risk and compliance responsibilities, while balancing customer and business needs. Former SMB Managing Director Ben White will continue to lead the Wholesale and Satellite teams and adds Strategy to his area of responsibility. Each of the three new executive appointments will report directly to Optus Chief Executive Kelly Bayer Rosmarin.

### **Peter Guggenbach to Leave RUAG**

May 19, 2020 - Dr. Peter Guggenbach, the long-standing Head of RUAG Space, has decided to leave RUAG and take up a new professional challenge. Luis De León Chardel will assume responsibility on an interim basis for the Space segment as of June. Luis De León Chardel is taking over the management of RUAG Space on an interim basis. He is currently Senior Vice President Operations and Deputy Head of RUAG Space. Since October 2017, the Spaniard has been responsible for managing and improving RUAG's global operations internationally. Luis De León Chardel has more than 20 years of international experience in leading positions and has a proven track record of transformational change in various industries.

### **Christophe Valorge Appointed Chief Technical Officer of Thales Alenia Space**

May 13, 2020 - Thales Alenia Space has appointed Christophe Valorge as Chief Technical Officer, effective on May 1st, 2020. He succeeds to Patrick Mauté who will be retiring. Christophe Valorge has been Director of R&D and Product Policy at Thales Alenia Space in Toulouse since 2016. He has a long and proven track record in space industry. Holding degrees from the Ecole Polytechnique (1987) and the Sup'Aero aeronautical engineering school (1989), Christophe Valorge started his career in 1989 as an engineer at CNES, the French Space Agency. He was promoted to various management positions, from Advisor on Technical Policy in 2005 up to the roles of Deputy Director of Scientific Payloads and Imaging in 2008 and Deputy Director of Orbital Projects in 2011.

### **ST Engineering Appoints May Ng as New Director**

May 12, 2020 - Singapore Technologies Engineering Ltd (ST Engineering) announced the appointment of Ng Bee Bee, May as an independent non-executive Director of the Company with effect from 1 June 2020. Ms May Ng, 52 is currently the Chief Executive Officer of Pan-United Corporation Ltd (Pan-United), the largest local ready-mixed concrete and cement supplier that supplies to major infrastructure projects like Changi Airport Terminal 5 and LTA MRT lines and private developments like Guoco Towers. She was previously the Executive Director from January 2004 to February 2011. Ms Ng sits on the boards of several subsidiaries in the Pan-United group. She is also the Chairman of Mercatus Co-operative Ltd and a director of NTUC Enterprise Co-operative Ltd.

### **Paolo Minciacchi is the new CEO of e-GEOS**

May 10, 2020 - The Board of Directors of e-GEOS, a joint venture between Telespazio (80%) and the Italian Space Agency (20%), has appointed Paolo Minciacchi as the new CEO of the company. Paolo Minciacchi joined Telespazio in 1990, taking on roles with increasing responsibilities. In 2000, he was appointed as



head of the technical services for engineering and operations at the Fucino Space Centre. In 2002, he joined the Earth Observation division of Telespazio, holding several management positions that will lead him to work to the plan for the inception of e-GEOS. In 2009, he took up the position of head of operational planning, industrial management and added value production in the newly created company. In 2011, he joined Spaceopal, an equal joint venture between Telespazio and DLR-Gesellschaft für Raumfahrtanwendungen, as technical director and member of the executive committee. In 2019, he is appointed as Chief Executing Officer of Spaceopal.

## REPORTS

### **NSR Report: Cloud Computing via Satellite to Drive 52 Exabytes of Traffic by 2029**

May 27, 2020 - NSR's *Cloud Computing via Satellite* report, has released, projects 52 Exabytes of Traffic by 2029, with players in the satellite and space industry contributing cumulative revenue of \$16 B from 2019-2029. The market is largely satcom-centric, with a significant portion of the revenue flow going to service providers and satellite operators. The primary Cloud verticals, Maritime Offshore and Passenger Cruise, along with Aeronautical satcom, will generate more than \$7B cumulatively over the 10-year forecast period. Additionally, Onshore Energy, Gov/Mil, and Retail & Banking satcom markets are set to expand their Cloud-first digitization strategies. NSR recognizes that Cloud might not be a scalable cost for all, despite its tremendous value add. Still, newer applications such as the use of satellites for Cloud storage and compute capabilities are nascent markets set to grow strongly over the coming decade.

### **Euroconsult Report: Growing Maritime Connectivity Market Faces COVID-19 Setback**

May 21, 2020 - In its latest research titled, "*Prospects for Maritime Satellite Communications*," Euroconsult projects that the previously growing maritime connectivity market will experience a significant setback due to the Covid-19 pandemic. Maritime VSAT connectivity reached an all-time high of 28,200 connected vessels at the end of 2019 but because of the current health crisis, the previous projection of 49,300 terminals by 2023 has been reduced to 40,600 units. The research provides detailed analysis of five market segments including merchant shipping, the cruise industry, offshore energy production, fishing, and private yachting, all of which are expected to reflect some slowing in the current environment. Merchant shipping is the largest market segment for VSAT with 17,700 connected vessels and revenues of \$565 million in 2019.

### **NSR Report: Flat Panel Satellite Antennas on Track for \$12 Billion over Next Decade**

May 13, 2020 - NSR's *Flat Panel Satellite Antennas, 5th Edition (FPA5)* report, now released, forecasts cumulative revenue from flat panel satellite antenna sales to reach \$12 billion by 2029. Mobile applications, particularly government and commercial aviation, drive the opportunity, at 98% of the market value over the next decade. Fixed applications, mainly consumer and enterprise broadband, drive volume with over 582,000 FPAs to be shipped in the same timeframe.

### **WTA Report: "Finding Growth in Media Services," Provides Key Insights into the Challenges and Opportunities of the New Media Market**

May 7, 2020 - The World Teleport Association (WTA) released *Finding Growth in Media Services*, a new research report that explores the challenges teleport executives and vendors face, the opportunities they have seized, and how their companies have changed to meet the needs of the next generation of media and entertainment. Today's media customers still have major needs that teleport operators can service – they are just different needs than in the past. Legacy programmers need to continue extracting the maximum revenue and profit from their existing business of distribution to network affiliates, cable headends and homes. They also need help with the complex migration of their distribution to OTT and other new markets.

### **NSR Report: Maritime Satcom Buoyed by Broadband Demand despite COVID-19 Impact**

May 6, 2020 - NSR's *Maritime SATCOM Markets, 8th Edition* report finds mixed impact to Maritime Satcom Markets in the near-term, a challenging middle period, yet optimism for longer-term sector health. On the footsteps of a strong 2019, with 24,000 VSAT-enabled vessels and over \$2.8B in retail revenues, 2020 had initial signs of another strong year. However, widespread economic shutdowns due to COVID-19, unprecedented pause to the Cruise sector, and collapsing oil prices have caused significant near-term disruption. While ships continue to require crew, transport goods, and perform essential services, these bright spots cannot mask the near-term systemic risks.

## UPCOMING EVENTS

**OTT Virtual Summit**, June 29-July 3, Virtual Edition, <https://ottsummit.asia>

**APOS (Asia Pacific Operators Summit)**, July 21-23 and September 1-3, Virtual Edition, <https://visitapos.com/>

**APSAT 2020**, September 23-24, Jakarta, Indonesia, <https://apsat.assi.or.id/>

**Satellite Industry Forum**, September 28, Singapore, <https://www.aviasif.com/>

**ConnecTechAsia 2020**, September 29 - October 1, Virtual Edition, [www.connectechasia.com](http://www.connectechasia.com)

**APSCC Summit @ConnecTech Asia**, September 29 - October 1, Virtual Edition, <https://apscc.or.kr/apscc-connectech-asia-2020/>

**Future of Video India**, October 6, Mumbai, India, [https://avia.org/all\\_events/the-future-of-video-india-2020/](https://avia.org/all_events/the-future-of-video-india-2020/)

**IAC 2020**, October 12-14, Virtual Edition, <http://www.iafastro.org/events/iac/iac-2020/>

**Convergence India 2020**, October 20-22, New Delhi, India, [www.convergenceindia.org](http://www.convergenceindia.org)

**CABSAT 2020**, October 26 - 28, Dubai, UAE, [www.cabsat.com](http://www.cabsat.com)

CABSAT now in its 26th edition presents SATEXPO, the only platform in the MEASA region bringing senior buyers in sat-comms, tech and business solutions together for 3 days under one roof. SATEXPO represents the entire ecosystem of satellite carriers, manufacturers, service providers and integrators serving government and military.

**Asia-Pacific Regional Space Agency Forum (APRSAF-27)**, October 27 - 30, Hanoi, Vietnam, [https://www.aprsaf.org/annual\\_meetings/aprsaf27/meeting\\_details.php](https://www.aprsaf.org/annual_meetings/aprsaf27/meeting_details.php)

**Asia Video Summit 2020**, November 9-11, Singapore, <https://asiavideosummit.com/>

**World Satellite Business Week**, November 9-12, Paris, France, <http://www.satellite-business.com/en>

**APSCC 2020 Satellite Conference & Exhibition (APSCC 2020)**, November 17-19, Virtual Edition, <https://apsccsat.com/>

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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](http://www.apscc.or.kr).