

# Satellite Executive BRIEFING

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Industry Trends, News Analysis, Market Intelligence and Opportunities

## A Rising Chinese Space Sector: Expectations vs Reality

By **Blaine Curcio**

The rapid rise of China's space sector has been well-documented over the past few years. With more than 200 commercial companies having been established since 2014, and with a robust civil space sector providing infrastructural support, the Chinese space industry is fast evolving into one of the world's most comprehensively capable ones. Dozens of commercial launch startups, vertically integrated earth observation companies with IPO plans, and everything in-between: as is the case in so many industries, "Made in China" is likely to become a commonly heard phrase in the space sector.



With this rise will unquestionably come challenges and opportunities. These will be unique for all companies and industries, but having had a front-row seat to all things Chinese space for more than 5 years, we at OGC can provide an overview based on experience with clients, acquaintances, and other contacts within the Chinese space sector. We will first give a summary of the Chinese space sector and its growth to today, before discussing some of its inherent strengths and weaknesses, and finally opportunities for non-Chinese companies.

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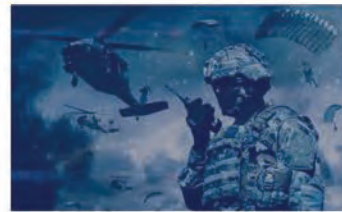
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The Asia-Pacific market is one of the largest markets for satellite services. The importance of this market will be highlighted again, after a three-year hiatus, during the week of May 31st-June 3rd with a number of key events anchoring on CommunicAsia 2022 in Singapore. CommunicAsia has seen a major rebrand, now known as ATxSG with a Satellite Asia component, to be held at the Singapore

Expo. One major addition to the event is the holding for the first time in Asia of Asia Satellite Business Week in coordination with Euroconsult.

The week will begin with the AVIA Satellite Industry Summit at the Park Royal Hotel on May 31st, followed by Satellite Asia exhibition and the Satellite Asia Business Week conference from June 1-3. It promises to be an eventful week.

We hope to see you again in Singapore. Drop by our booth # 4K3-01 at Satellite Asia. We look forward to seeing you there.

*Virgil Labrador*

**Virgil Labrador**  
Editor-in-Chief



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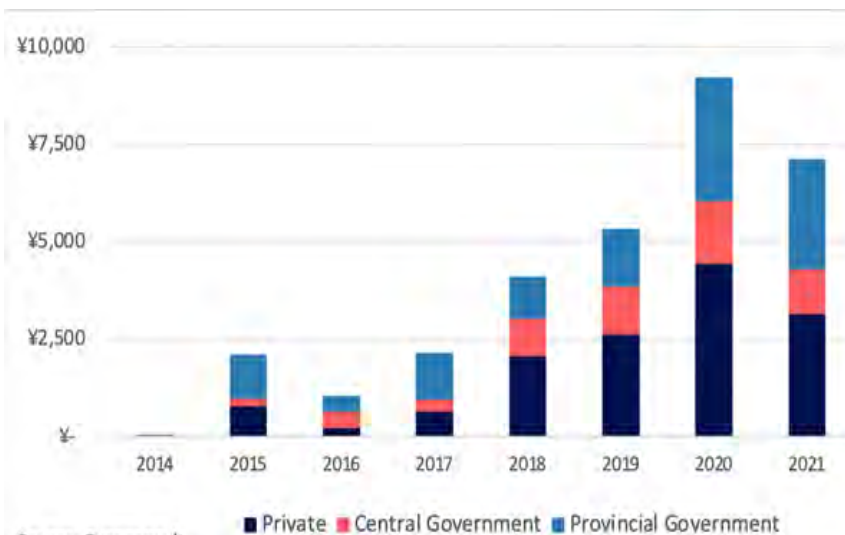
## A Rising Chinese Space Sector...

### Emergence of the Chinese Space Sector

The Chinese space sector was wholly state-owned until 2014, at which time the State Council published so-called Document 60, a proclamation calling for more private investment into areas such as launch vehicles and satellite manufacturing. Initially growth was slow—only a handful of commercial space companies were founded in 2015 and 2016. This was likely in part because of uncertainty about the meaning and extent to which the space sector was really open to private investment. In the ensuing 2-3 years, subsequent government support was published, giving investors and other stakeholders sufficient comfort to start investing into these startups.

And at least in terms of fundraising, the results speak for themselves. From basically zero in 2014, China saw a peak of more than ¥9 Billion (~US\$1.5 Bil.) invested into commercial space companies in 2020, with 2021 seeing a small dip to ¥7 Bil. (though noteworthily, 2020's biggest round by far was in December with CGSTL's massive ¥2.46 Bil. pre-IPO round....so annual totals in this case can be misleading). Total investment into Chinese commercial space since 2014 has been an estimated ~¥33 Bil., this according to Euroconsult's China Space Industry Report.

The nature of companies being founded has evolved since 2014, and we have seen several trends emerge very recently. The first few commercial space companies in China were primarily spinoffs from existing players.



**Chinese Commercial Space Funding by Source, 2014-2021 (¥M)**

The case-in-point would be CGSTL, China's leading commercial remote sensing company and one of its first commercial space companies, founded in December 2014. While nominally commercial, CGSTL was originally a spinoff from the Chinese Academy of Sciences (CAS) Changchun Institute of Optics and Precision Mechanics, where the team of researchers had collaborated on remote sensing satellite R&D for more than a decade.

Moving into the late 2010s, we started to see an increasing number of commercial space companies created

**"...From basically zero in 2014, China saw a peak of more than ¥9 Bil. (~US\$1.5 Bil.) invested into commercial space companies in 2020, with 2021 seeing a small dip to ¥7 Bil...."**

more organically, although with significant state heritage. Companies such as MinoSpace, Spacety, and Galaxy Space—all commercial satellite manufacturers among other things—were founded by teams combining former employees of the China Aerospace Science and Technology Corporation (CASC; the main state-owned space contractor), the CAS, and non-space sectors. These companies are primarily focused on systems-level technologies (satellites, rockets, etc.), and for the most part have been working to sell into state-owned enterprises, universities, or other government demand. With a certain level of SOE DNA, these companies tend to be somewhat less international than companies of similar size in other space ecosystems. Finally, most of this “first generation” of commercial space startups have some degree of flexibility which can be advantageous in the Chinese context. For example, a satellite manufacturer may also develop capabilities in terminals and applications, because the regulatory future of all three industries is not very clear (better to hedge one's bets).



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***"...The Chinese space sector has seen several competitive companies emerge, and there will undeniably be many more such companies in the future, aided by further tailwinds of government support at multiple levels..."***

### More Recent Ongoing

The first 2 years of the 2020s have seen an evolution in China's space sector. Startups continue to pop up at a rapid pace, but most of the commercial companies founded today are focusing on very specific technologies. In short, it's hard to compete in launch in China today as there are already ~25 launch companies—it makes no sense to create company #26 in 2022. But, many of the 25 launch companies need suppliers, and it might make good sense to create a company developing liquid methalox rocket engines to sell to all 25 commercial launch companies (and also the state). Jiuzhou Yunjian is a launch startup founded in 2018 doing exactly that. The same phenomenon has occurred in areas such as Hall Effect Thrusters (Yidong Aerospace and Xingkong Dongli, among others), laser inter-satellite links (HiStarlink and Laser Starcom, among others), and general satellite components (iStar Aerospace).

All these newly established commercial space companies exist in a diverse and multifaceted system with many stakeholders. The Chinese space sector has seen several competitive companies emerge, and there will undeniably be many more such companies in the future, aided by further tailwinds of government support at multiple levels. The unique structure

of the Chinese space industry means that opportunities and threats need to be viewed with much context, and will vary significantly based on company and vertical.

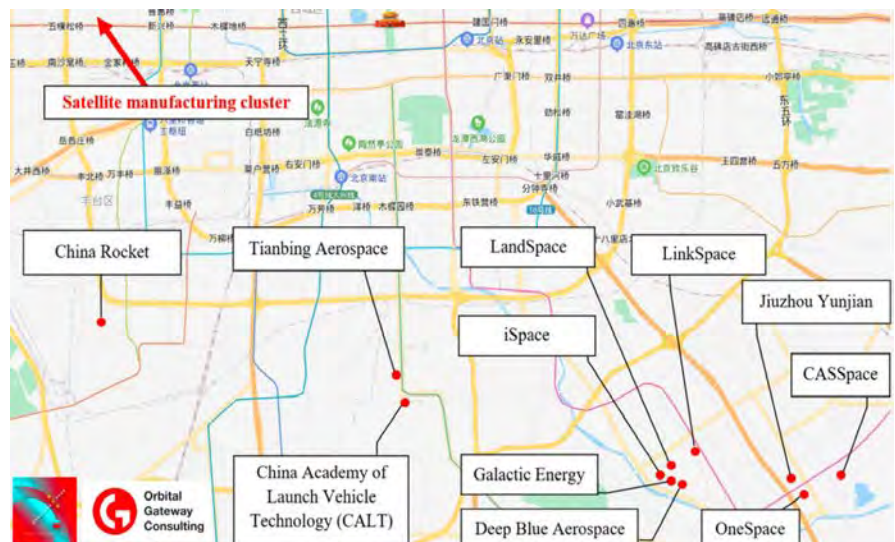
### Perspectives on the Industry: The Good

We've already established that China has seen some ~200 commercial space companies created over the past 8 years, having raised some ¥33B with plans to develop technologies, partly in support of a massive and diverse state-owned sector. Put another way: it's a big freaking market. But as is the case in China, things can be complicated, and recent geopolitical events have certainly not helped to

uncomplicate things. Having worked with, among others, foreign suppliers looking at the Chinese market, Chinese suppliers looking at foreign markets, American think tanks studying China commercial space, and just about everyone in-between, we at OGC have just about seen it all in the context of Chinese space.

First, the good. There are an astonishing number of companies, they are willing to try new things, and they are willing to move very fast. Taking the example of Spacety, the Chinese commercial satellite manufacturer has partnered with a number of European component manufacturers to offer on-orbit verification using a Spacety satellite platform as a ride to space. Part of the reason Spacety can win such business is that they launch smallsats very regularly—every couple of months or so—and they offer modular space on these launches. For a European component manufacturer, the option could be to wait 12-18+ months for a European launch slot, which may be the safer bet, or to wait ~3 months for a Chinese launch slot,

### Cluster of >10 commercial launch companies around CALT in Southern Beijing



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the perhaps riskier, but also certainly faster option. Commercial companies also have interesting collaboration with the state, with a launch cluster in Southern Beijing being the most obvious example of many startups clustering around one major SOE (in that case, CALT).

There is also support in the Chinese space sector across several levels of government, including support for international cooperation. At the local level, the city of Shenzhen published in July 2021 a list of available subsidies and support measures for companies developing satellite-related technology, which included support for reaching international certification, subsidies for international market access, and subsidies for JVs with foreign companies in related industries. Support for international cooperation can also be found at the highest levels of government.

In March 2022 at the Two Sessions (a pair of major political meetings in Beijing), Chief Designer of

China's Manned Space Program Zhou Jianping noted that China plans to welcome international astronauts to the Chinese Space Station after completion (to occur in late 2022). At the same time, Zhou called for more commercial involvement in China's space sector more broadly. Separately, China's 2021 Space White Paper—published in early 2022—called for more international cooperation across all fields, with the word international appearing 59 times (compared to “China”, which appeared 163 times). All things considered, we have a big market, and we have a fair amount of support for international collaboration. So far, so good. And yet, in China, it is never that simple, and complexity can make it difficult for foreign companies.

### **Perspectives on the Industry: The Bad, and the Ugly**

Despite the large market and ample government support, Chinese commercial space is not an easy market to access. First, as already discussed,

there are a lot of companies doing a lot of different things. This can be a good thing (large market), but can also be a bad thing: you probably have a competitor in China. And what's more, probably the competitor is pricing their products lower than you are. Several times have we gone to China with a foreign product expecting to find much interest, and several times have we found competitors with price points that are half that of the foreign supplier. Space in China is much like most industries in China: competitive, and with a lower cost structure. But this is far from the only challenge.

Recent years have seen China become more serious about developing space technology domestically, which has created a strange contradiction. On the one hand, government and industry officials call for international cooperation, while on the other hand, they call for building more products at home. This means that for most space products that are low value in terms of technology, there is probably



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already a Chinese manufacturer. And for products that are more technologically advanced, there is probably at least one Chinese company working to develop them. And in many cases, there is significant support from local or provincial governments for specific sub-sectors, creating more competition in the most lucrative verticals.

In terms of industrial structure, the Chinese commercial space sector is limited by a combination of regulations, and attitudes towards said regulations. For example, in the United States, there are certain areas of space law or policy related to space that are unclear. And for many commercial space companies in the United States, the strategy is to ask for forgiveness, rather than asking for permission. In the Chinese context, the laws are

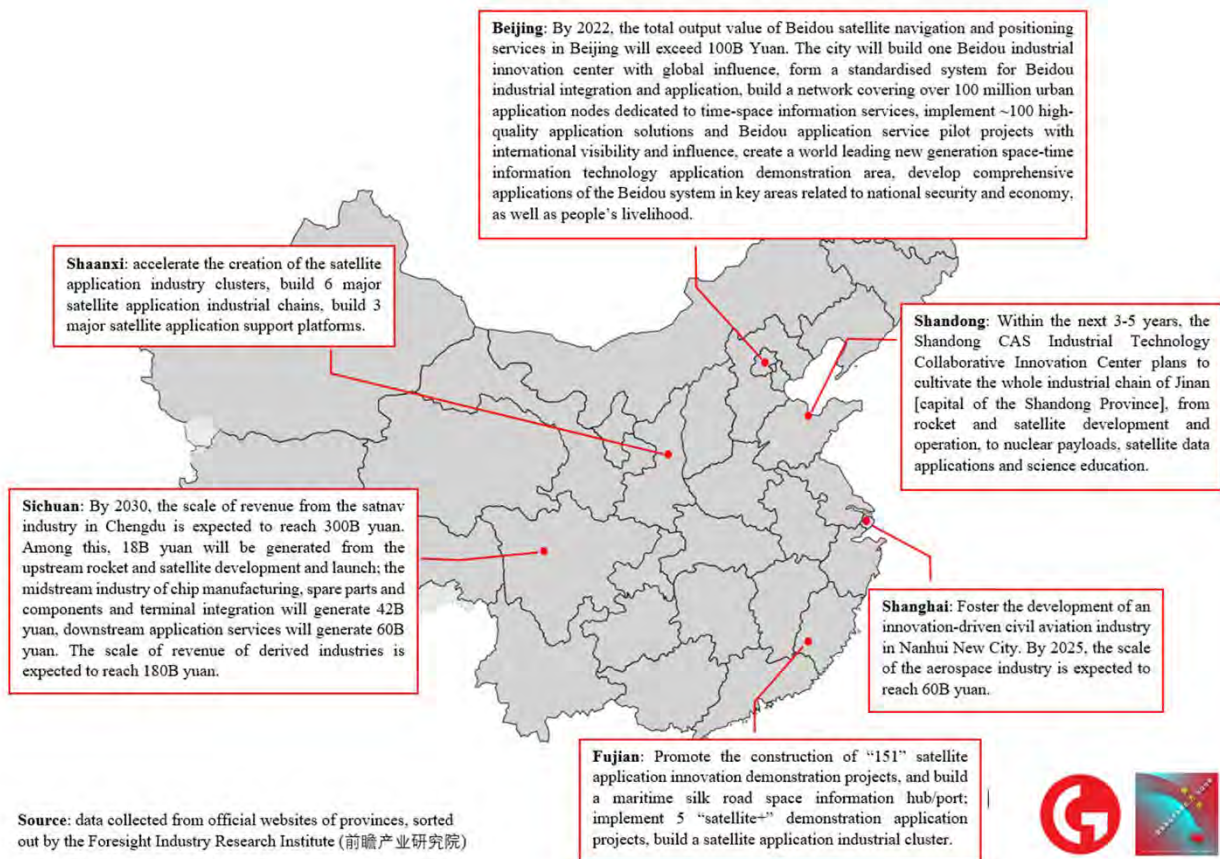
equally unclear (if not even more unclear), but the culture around them is completely different: companies will ask for permission rather than asking for forgiveness. This means that commercial companies are limited in what they can do: for example, no commercial launch company is building a rocket that competes with the big state-owned rockets. It is impossible to imagine a Chinese commercial space CEO having the same disregard for the Chinese authorities that Elon Musk has for US authorities.

### The Foreign Perspective: How to Work with China?

Different companies will have different strategies towards the Chinese market, but as foreign space companies, there are several avenues that may be worth exploring. For those

developing very niche or specialized technologies, there is likely a market for your product, especially in the short-medium term before Chinese competitors catch up.

For companies building systems-level things (satellites), the opportunities may be considerably better, with China being viewed as a source for inexpensive and reliable space hardware. For companies looking to scale production, find R&D partners, or otherwise participate in product development with the potential for government subsidies, there are many opportunities. And for up-and-coming space-faring nations, understanding the development of the Chinese space sector can provide insights on best practices for industrial development, while also giving food for thought on



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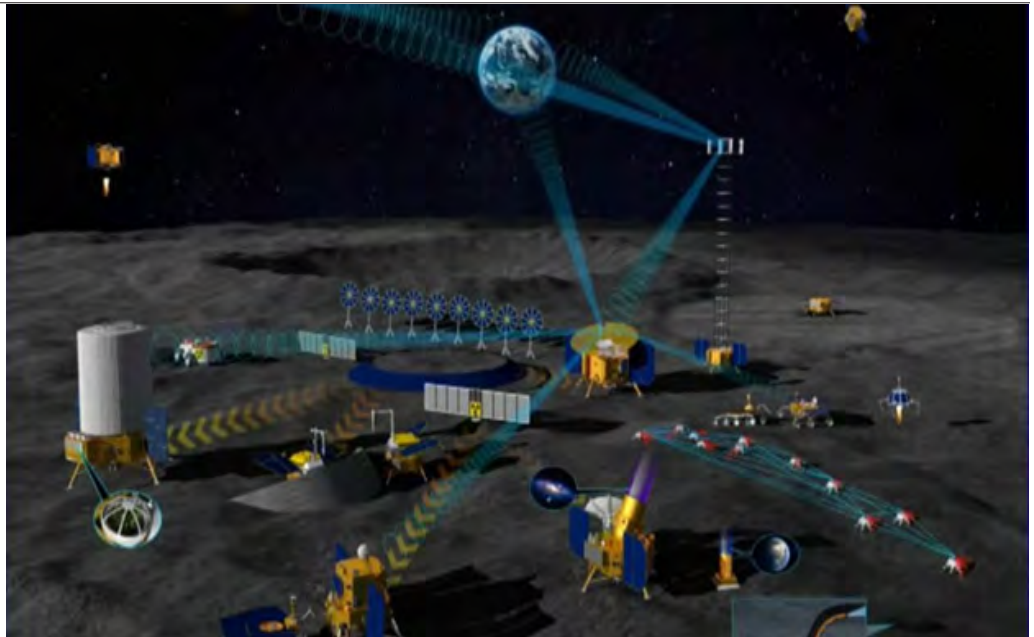
how one's national space industry can position itself relative to the Chinese.

At a civil space program level, countries with plans for human space travel or deep space exploration will likely find a willing partner in China. The country's Belt and Road Spatial Information Corridor is bringing a variety of space infrastructure (remote sensing and comms satellites, among other things) to a country near you. And for universities or institutes looking for academic and research exchanges, there are dozens of major universities in China pursuing space technology and R&D. All this is to say, there is a lot going on in Chinese space, and there is openness to collaborate.

Specific examples include a recent announcement by China Rocket of commercial rideshare capacity available on their upcoming Jielong-3 launches later this year, multiple foreign collaborations with commercial satellite manufacturer Spacety (including Italy's T4i and France's ThrustMe). In the civil space program, China's large-scale projects are opening doors for international partners, including the awarding of small amounts of Chang'e-5 lunar samples for research purposes.

## Conclusion

Over the past couple of decades, China's space industry has evolved into likely the world's second-largest national space industry. With more than 200 commercial space companies



**Phase 3 of the Sino-Russian International Lunar Research Station (ILRS). (CNSA photo)**

and a state-owned space apparatus employing hundreds of thousands of people, only the United States has a space sector of a similar scale. The current state of US-China relations, however, means that these two large markets will remain largely separate.

For all other countries, relations with these two superpowers will be a delicate balancing act involving many

trade-offs. Certainly not all western space companies will find a pot of gold in the Middle Kingdom. But in today's rapidly growing space industry, China is a very important player, and whether your perspective on China is good, bad, or ugly, there's a good chance it's a market that's too big to ignore.



**Blaine Curcio** is Founder of Orbital Gateway Consulting (OGC), a research and consulting firm focused on the Chinese space industry. In this role, Blaine oversees a variety of research into Chinese commercial space industry fundraising, market sizing, industrial base development, and governmental policies, for clients including commercial space companies, governmental institutions, financial institutions, and consulting firms. OGC is building out the first comprehensive suite of Chinese space industry data points in a series of databases available to subscription clients. Based in Hong Kong, he maintains close relationships with the local space ecosystem in Asia-Pacific, including regular collaboration with the Asia Pacific Satellite Communications Council (APSCC) and the Hong Kong Orion Astro-preneur Space Association (OASA). He is a Senior Affiliate Consultant with Euroconsult where he focuses on the global satcom industry, and is a regular moderator and contributor to the Euroconsult World Satellite Business Week. He can be reached at:

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**Aur lie Gilet**, an associate of Orbital Gateway Consulting, provided some editing and research assistance for this article.



# INNOVATIONS

## in Satellite Technology

**O**ur industry is known for innovation. Sometimes this comes from within, from well-established companies, and sometimes it comes from totally outside the industry, as Elon Musk did twenty years ago when he founded SpaceX. This makes trying to write a short article on innovation, all the more challenging, there is so much to choose from! So, I decided to focus on new entrants, but this still left very many interesting companies to choose from. In the end, I decided to limit myself to companies trying to solve a known problem, then rather arbitrarily selected four companies.

A company with a totally new method of securing communications, to eliminate, hacking and eavesdropping; a company aiming to improve the capabilities of future low earth orbit

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by **Elisabeth Tweedie**

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(LEO) systems and provide real-time communication for manned space missions; a company committed to carbon neutral launches, and lastly a company trying to help satellite operators avoid space debris.

### **Rampart Communications**

Rampart Communications is one of the most interesting companies that I came across whilst I was doing the research for this article. Keith Palmisano, the CTO said that the company had been described as “a baby with a mustache.” Which is actually a very apt description for a relatively new company, that has a well validated, unique yet ubiquitous product.

The company, was founded in

2016 by physicists, mathematicians, RF engineers, and computer scientists whose previous experience includes the US Department of Defense (DoD), the US Central Intelligence Agency (CIA) and the National Reconnaissance Office (NRO) amongst others. The primary product, for which it holds the patents, and the one that is the main focus of its current efforts, is Unitary Braid Division Multiplexing (UBDM). There are other equally revolutionary products in the pipeline. Essentially, UBDM is “wrap-around” technology; it provides the first “secure-by-default,” wireless modulation solution. UBDM can be deployed in any wireless network including satellite, WiFi and cellular. UBDM has been independently verified by MITRE which stated: “UBDM essentially removes vulnerabilities at the

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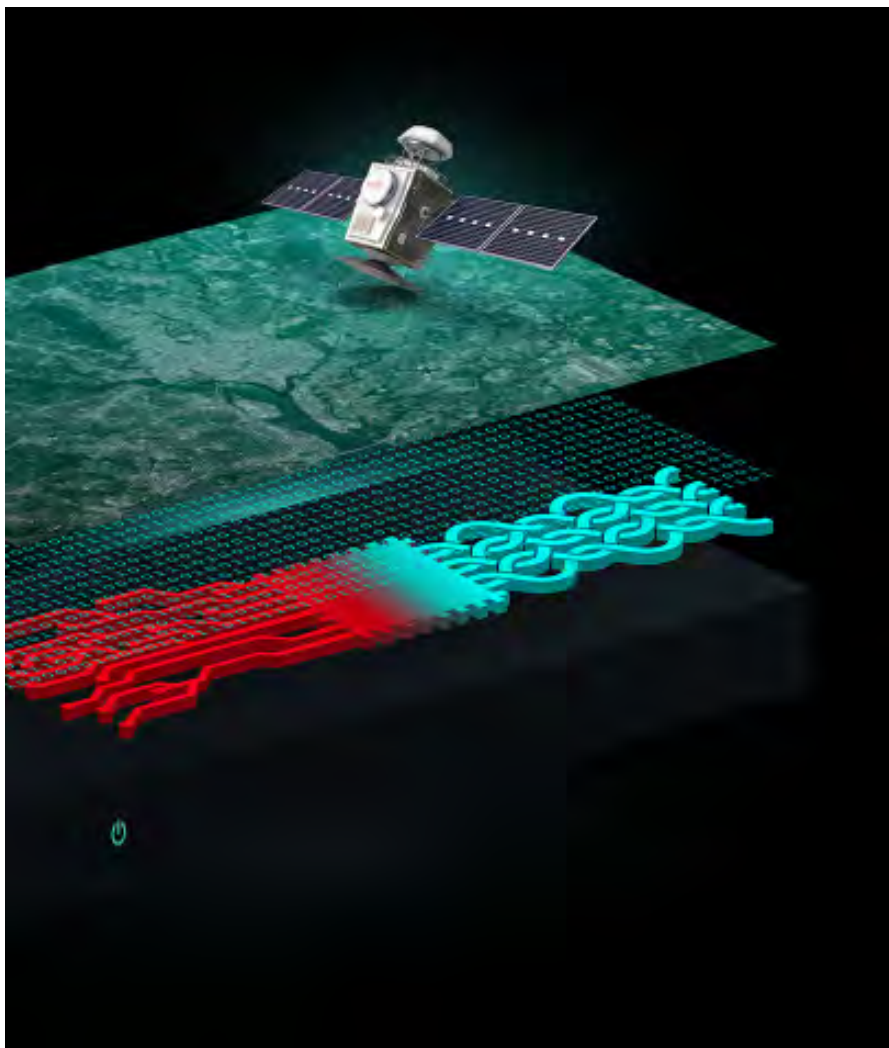
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**Rampart's patented Unitary Braid Division Multiplexing (UBDM) modulation technology provides categorical security at the physical layer. UBDM is new science: secure-by-default, not security-as-an-afterthought.** (image courtesy of Rampart Communications)

link layer,...and...is not vulnerable to any known cryptographic attacks.” A second endorsement came from Independent Security Evaluators, Inc. which stated:

“UBDM is resilient against known cryptographic and information theoretic attacks” and “significantly increases and expands the security over existing schemes, protecting both user and control data, and eliminating the attack surface of the wireless link.”

As wireless networks grow and edge computing becomes the norm, the attack surface of a network expands. Most of the security systems available today focus on protecting user data, and detecting attacks. These rely on the assumptions that it is possible to identify every single device, piece of data and activity in a network and that it is possible to know everything about every potential network threat. Neither of these assumptions is really valid. Rampart

approached the issue from a different perspective. That of encapsulating and securing every single bit that is transmitted at the Physical layer. In military terms it is the next generation of COMSEC and TRANSEC. There is no way that unintended recipients can listen in to or interfere with the traffic. With UBDM increasing the size or location of a network doesn't increase risk. Most importantly for the user, UBDM doesn't degrade network performance, nor does it add to the operating complexity. Because it works at the physical layer, it is compatible with all modulation techniques and wireless protocols.

UBDM will work with all wireless networks but the initial focus is on satellite and government and military. Satellite footprints stretch over large geographic areas and so have a large attack surface. UBDM will protect that entire surface regardless of whether it is static or moving. Had Viasat been using the technology, it would have been impossible for Russia to interrupt service as happened earlier this year. The technology is also ideal for launch and manned spaceflight communications. For satellite one of the key advantages is that the software requires far less power consumption than current link encryption. “Increased reliability without increasing complexity, increased security without limiting performance,” to quote Palmisano. It also removes the threat of command link injection.

Rampart has not yet announced any customers in the satellite industry, but it is working with Lockheed Martin to prototype next generation U.S. Marine Corps 5G communications.

### SpaceLink

SpaceLink, winner of the 2022

MSUA Chairman's Award for Outstanding Innovation, is in business to improve the efficacy of new LEO constellations, and other missions requiring real-time communications, whether those be manned space flights or unmanned military missions. The company, which is owned by the Australian company Electro Optical Systems (EOS) was granted the rights to 21 GHz of space-to-ground and space-to-space spectrum, previously owned by Audacy, by the FCC. The caveat being that the spectrum has to be brought into use by June 2024.

The business model is based on the premise that transferring data from a LEO to the ground is an ever-increasing challenge. There are several reasons for this: firstly, as LEOs pass their ground stations, there is a limited amount of time in which to transfer data, secondly the elapsed time between the data being uplinked and the satellite passing over a suitable ground station, adds more latency into the equation. Also, the sheer numbers of LEOs being launched means that the spectrum is becoming congested, and as yet no one has come up with a proven way of cramming more bits into a hertz, so adding-in another challenge for new entrants.

SpaceLink plans to launch four Medium Earth Orbit (MEO) communication relay satellites, with both optical and RF communication links. In order to use the service, the LEO operator will

have to install an optical transmitter on its satellites. This will then be used to relay the data to Spacelink, which will then either downlink it directly, or optically transfer the data to another relay satellite for downlink to one of its three ground stations. The downlink uses RF so as to achieve 99.9% availability. Using the Q and V-Band spectrum means that the data is downlinked at rates up to 40Gbps. For the LEO operator, data can be instantly transferred to Spacelink, as one the satellites will always be in sight, using optical links means the data will be transferred at rates up to 10 Gbps. Another major advantage for a new LEO operator, is that using SpaceLink to downlink data, eliminates the need to establish multiple ground stations.

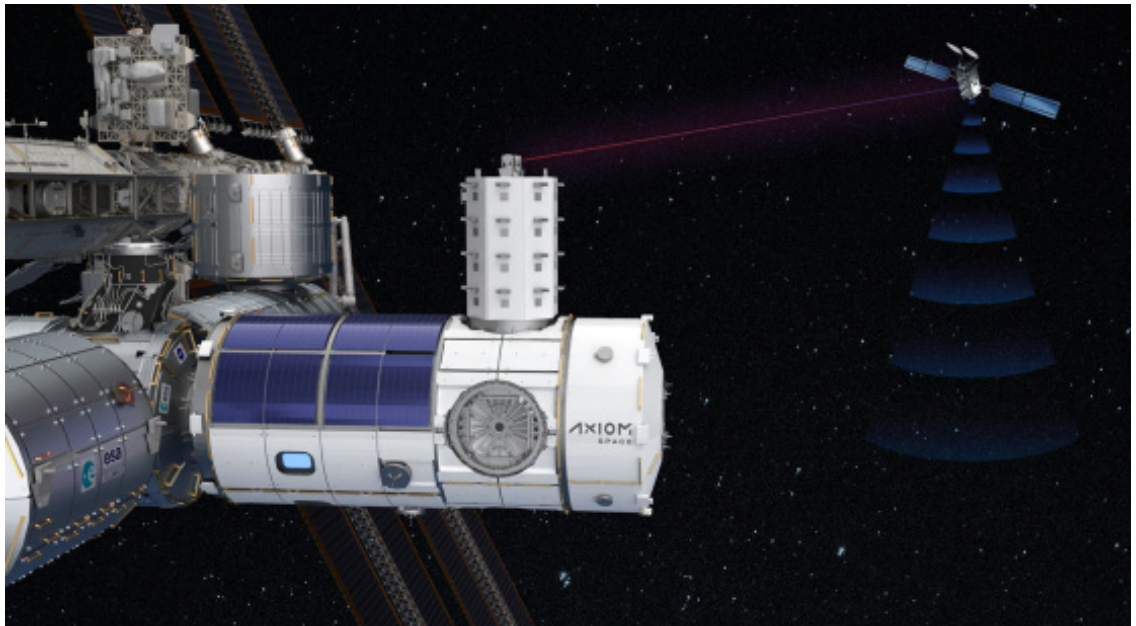
The original plan was to have OHB build the four satellites. Following a design review which modified the original design and added to the build time, it was decided to start initially with smaller satellites to ensure that the

FCC operational deadline could easily be met. The contract for these satellites has not yet been awarded, but an announcement is expected very soon. The new plan, is that the first constellation of smallsats will launch in 2024, followed by a second constellation of smallsats in 2026. The original larger OHB satellites are planned for 2028 and by 2030 Spacelink expects to have a 10Tbps orbiting optical cloud.

Spacelink has been selected by Center for the Advancement of Science in Space (CASIS), manager of the International Space Station U.S. National Laboratory, for a funded demonstration of its end-to-end relay service to provide secure, continuous, high capacity communications between spacecraft and the ground. The demonstration will validate the use of a 10 Gigabit per second optical terminal, for real-time voice, video, and data exchange between ISS crew, onboard systems, experiments, and terrestrial users. The Spacelink relay

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**In February this year, SpaceLink named Axiom Space as its Implementation Partner for demonstration of its end-to-end communications relay service on the International Space Station.** (image courtesy of Spacelink)



network is designed to pick up where the NASA Tracking and Data Relay Satellite System (TDRSS) leaves off.

“Our demonstration on the ISS is the first step to proving SpaceLink’s capabilities to advance space science and the emerging space economy,” said David Bettinger, SpaceLink CEO. “Support from CASIS marks an important milestone in SpaceLink’s roadmap to providing massive bandwidth for organizations that need real-time connectivity between space and the ground,” he added.

## Orbex

An innovative approach to launches is being taken by Orbex, a British company founded in 2015. What makes Orbex unique is that the rocket, named Prime, will be powered by biofuel. The rocket is 19 meters long with seven engines in total for its two stages. It is being made in the UK and Denmark. Six of the engines will take the rocket to the first stage, which is at an altitude of about 80 kilometers. The seventh engine will take the rocket to a low earth orbit for the release of satellites. The engines are 3-D printed and the rocket is designed with built-in reusability, with an innovative low mass recovery and re-flight system, leaving no orbital debris.

Using a renewable, bio-propane fuel cuts carbon emissions by 90% compared to traditional hydrocarbon fuel. Josef Aschbacher, director general at the European Space Agency, said: “I am deeply impressed with the speed at which the Orbex Prime rocket was developed...and I am equally impressed by the low carbon footprint technology applied. My sincere congratulations to the whole Orbex team for this impressive achievement.”



**Orbex unveiled the first full-scale prototype of the Prime orbital space rocket on its dedicated launch pad in Scotland on May 11, 2022. Prime is a 19-metre long, two-stage rocket that is powered by seven engines, that is being designed and manufactured in the UK and Denmark. The six rocket engines on the first stage of the rocket will propel the vehicle through the atmosphere to an altitude of around 80km. The single engine on the second stage of the rocket will complete the journey to Low Earth Orbit (LEO), allowing the release of its payload of small, commercial satellites into Earth's orbit.** (image courtesy of Orbex)

Prime will launch from Space Hub Sutherland, the first vertical launch site in the UK and according to Orbex the only spaceport in the world that has committed to being carbon neutral. However, the initial assembly for testing the first integration of a full scale Orbex prototype launch vehicle has just been completed on a launch pad at Kinloss, Scotland near the company’s headquarters.

The target market is the small satellite industry. Prime will be able to launch payloads with a mass of 10-180 kilograms in various configurations, ranging from small 5 centimeter PocketQubes to 16U standard cubesats measuring 10 centimeters on each side. Prime’s first launch will be an experimental satellite to LEO for Surrey Satellite Technologies, it also has six other commercial launches booked for earth observation and

communications satellites.

Although a relatively new company, Orbex staff have backgrounds with NASA, ESA and other commercial spaceflight organizations. Collectively, the staff have developed more than 50 rocket engines and launch vehicles including Ariane 5 and 6. Equipment developed by team members has flown on more than 50 deep space missions.

To date the company has raised £38 Million (US\$46.4 Million at current exchange rates) from a variety of public and private sources, including investment banks and the UK Space Authority (UKSA).

## Vyoma

No article on innovative companies would be complete without mentioning the winner of this year’s Startup



...designed for perfect signals

## "FlexLink K4" Switch Matrix



## "Fiberlink2plus" Dual RF-over-Fiber



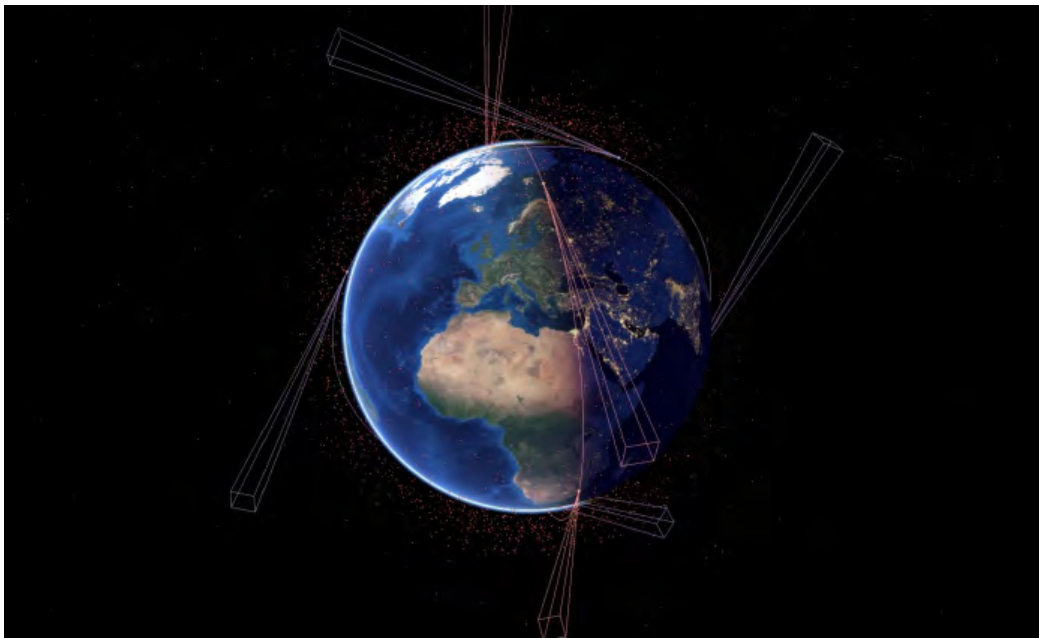
## "HQ Series" Line Amplifiers



## "LSCX414" Hybrid Splitter/Combiner



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- ▶ **RF-over-Fiber Solutions for Indoor & Outdoor Applications**
- ▶ **Line Amplifiers (Single, Dual, Quad, 1+1 & N+1 Redundant)**
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- ▶ **Single & Quad Redundancy Switches**
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- ▶ **Perfectly Suited for Satellite Earth Stations, Teleports, VSAT ...**



**One of the newest entrants to the field is Vyoma, a German company founded with the help of the Technical University of Munich (TUM). Vyoma's goal is to track objects in low Earth orbit (LEO) using a constellation of observation satellites, then use machine learning to automate collision avoidance procedures for clients' satellites. (image by Vyoma)**

Space Competition, Vyoma. Based in Germany, Vyoma aims to ensure the safety of satellites in space. As discussed in my article in this magazine last June 2021 on “State of the art: On-Orbit Services” space debris is a very real and rapidly increasing problem. Vyoma is a space debris monitoring and tracking company. Currently service is provided from the ground using a partner network of ground sensors. It is planned to launch two demo satellites that will carry cameras to track debris from space, by the end of 2023. Tracking debris from space has significant advantages over tracking from the ground. Firstly, objects can be observed up to 30 times a day, making tracking far more reliable, and facilitating very accurate predictions of the trajectories of debris objects. Secondly, smaller objects, down to one centimeter, can be observed. Currently only larger objects are tracked, but

even really small pieces of debris can cause significant damage. The goal is to track individual pieces of debris from a constellation of observational satellites, and use machine learning to automate collision avoidance procedures for client's satellites.

Vyoma will locate pieces of debris by combining two sensor systems. On-board cameras observe objects illuminated by the sun, and determine their position relative to Vyoma's satellites using the stars. When this information

is coupled with information from the on-board global navigation satellite system (GNSS) receivers on Vyoma's own satellites, it is possible to precisely locate the debris and determine its characteristics and trajectory.

Combining all this data, Vyoma aims to provide satellite operators debris cataloguing and collision warnings, and ultimately full automation services planning and performing evasive maneuvers.

Vyoma closed pre-seed and seed rounds (of undisclosed sizes) in 2021, kicking off the production of its space cameras. As well as winning the Startup Space Competition this year, It has also won the German NewSpace Award and the Weconomy award, and been inducted into the Gallileo Masters Hall of Fame in the last few years.

Four companies: Rampart Communications, Spacelink, Orbex and Vyoma. Four countries: America, Australia, the UK and Germany and four very different innovative ideas. What do they all have in common? They are all companies and technologies worth keeping an eye on. 



**Elisabeth Tweedie** has over 20 years experience at the cutting edge of new communications entertainment technologies. She is the founder and President of Definitive Direction ([www.definitivedirection.com](http://www.definitivedirection.com)), a consultancy that focuses on researching and evaluating the long-term potential for new ventures, initiating their development, and identifying and developing appropriate alliances. During her 10 years at Hughes Electronics, she worked on every acquisition and new business that the company considered during her time there. She can be reached at [etweedie@definitivedirection.com](mailto:etweedie@definitivedirection.com)

# Fighting Fires by Satellite

**Weather data from space provides accurate forecasts where fires are and makes it possible for artificial intelligence to predict their course**

**F**ire. In our homes, it brings us light, warmth and hope. In the depths of the forest, it brings terror.

A forest fire is a massive wall of heat and flame. Driven by high winds, it can leap across roads, spin into columns of fire, turn homes to ash.

But every year, around the world, men and women walk into the fire to save the forest, the homes, the people. They are wildfire fighters, and they do one of the world's hardest jobs.

Working 16 hours a day for two or more weeks straight, they go without showers or regular meals, and they sleep on the ground. Most of all – in that same unforgiving ground – they dig. Water isn't enough to fight forest fires – they are too big for that. Digging trenches and burning brush keeps fuel away from the fire. And so, they dig.

It's a dangerous job. An average of nineteen American wildfire fighters perish in the flames each year.

## Cellular Ends at the Forest Edge

To save forest and homes and lives – including their own – firefighters turn to satellite technology. Weather data from space provides accurate forecasts of conditions on the ground. Satellite image data helps fire commanders see where fires are and makes it possible for artificial intelligence to predict their course. But all the knowledge in the

world can't help unless it reaches the firefighters on the line.

As Tim Dunfee, Deputy Fire Chief at the Angeles National Forest in California, put it: “When you hit the forest boundary, all cellular communications essentially go dead. Even our typical satphone devices have a hard time getting out up there. And I was just amazed we were able to drive to Chantry Flat, which is shadowed by geography in almost all directions and pick up the iPhone. To have a device where essentially they turn the inverter on, hit a

power button and within a couple of minutes, it's ready to go. That's priceless.”

A company called Kymeta produces a satellite terminal that mounts easily on the roof of cars or at a base camp. With the push of a button, the Kymeta u8 terminal powers up and connects to a satellite, without the

need for specialized training.

It provides a local Wi-Fi signal that lets commanders and firefighters use the phones, tablets, and laptops they are used to. The cost of the terminal and connectivity are bundled into a single package, making it easy and affordable.

## A Better Chance of Survival

What does that Wi-Fi connection mean to a firefighter? A better chance of beating the blaze, because crews can coordinate their work even when they are far apart. A better chance of survival, by warning each other about where fires are spreading. A chance to connect with home, and let their






More than 40 wildfires burning across the Canadian province in June 2021 being monitored by NASA's Earth Observing System (EOS), a coordinated series of polar-orbiting and low inclination satellites for long-term global observations of the land surface, biosphere, solid Earth, atmosphere, and oceans. (NASA photo)

loved ones know they're safe.

You may live far from the places where forests catch fire – but you can't escape their impact. In the most recent season, wildfires burned more than 10 million acres of the American West and sent smoke as far as Europe. Australia lost 46 million acres to wildfires, and they put as much ash into the air as a volcanic eruption. A heat wave in Siberia drove massive fires that filled the atmosphere with more than 244 million tons of carbon.

The u8 terminal is transforming how we predict and fight fires. Along with thousands more satellites poised to launch, it is helping turn terror into hope – for the forest, the firefighters and for all of us. 



Produced for Satellite Executive Briefing by Space & Satellite Professionals International. See more stories and videos of satellite making a better world at: [www.bettersatelliteworld.com](http://www.bettersatelliteworld.com)



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iKO Media Group is a boutique end-to-end media service partner for broadcasters and content owners. We provide tailor-made solutions focused on our customer needs. A leading and trusted partner to hundreds of global and local networks, iKOMG is identified with expert knowledge, dedicated service and professionalism.

# Where a Paycheck and the Supply Chain Meet

By Lou Zacharilla

I am not an economist but rather a keen observer. I know how to watch a 401k fall to the bottom of an elevator shaft.

I am also a patient listener. I heard my financial advisor say that “market capitulation is right around the corner and NOW is the time to get back in.” The only thing that went right around the corner is the back of that bus that hit the global economy. The result has been the Great Strangling of the supply chain. For those who protested against the evils of “globalization,” how you feeling now?

But take heart. Here’s an outlook from an economist who said that “falling demand for goods will alleviate some labor and supply chain pressures. This will in turn tamp down key ingredients of inflation. Declining stocks (ok, plummeting stocks) could drive some people back to the labor market. As Conor Sen responded in Bloomberg Opinion: “Isn’t this exactly what we wanted?”

In the commercial space and satellite industry, according to people who are on the front line of things like Human Resources and the support of logistics and things such as supporting humanitarian relief efforts, which the industry does endlessly, it is indeed.



The overall employment data for our industry is actually good. Globalization is good for wages in industry’s like this. In fact the commercial space industry not only prefers globalization, it thrives on it.

The industry has many virtues. The proximity to death perhaps one that is a tonic for our collective Soul. We depend on each other as a matter of physical survival. Just read the accounts of astronaut Nicole Stott, author of the new book Code Blue

<https://www.sspi.org/cpages/better-satellite-world-this-planets-on-fire> about what happens when an alarm goes off on the ISS. The industry is global and so is the philosophy.

The simple fact is our customers have wide and global footprints and we are the connecting tissue. We work cross-border when science demands and when a crisis erupts.

Pandemics and wars are anathema and perhaps our view above the earth allows us to instinctively know it. On Earth satellites anchor the communications infrastructure and hence the economies of the world with increasing importance and celebrity. The data on wages for the industry, when compared to the overall economy, testify to this.

And you don’t need to be an economist to figure it out.

As GVF Secretary General David Meltzer wrote in Connectivity Business, “These are good times to be an employee in the U.S. space industry and, conversely, space industry employers are having to pay a premium to recruit and retain employees.”

This defies what had transpired for two decades within the rest of the

This defies what had transpired for two decades within the rest of the labor force, where despite the fact that American employers added jobs for 101 continuous months through the Summer of 2018 real average wages (wages after accounting for inflation) had the same purchasing power they did 40 years before! The wages mostly flowed to the highest-paid tier of workers.

This was seen clearly in The Space Foundation's 2022 Report. Pay for employees in the private space sector of this industry average US\$ 125,214. Again, as if you need reminding, I'm not an economist but that is more than double the US\$ 62,247 average annual salary of U.S. private-sector jobs and 27.3% more than the average salary of US\$ 98,340 for STEM occupations.

The desirability and growth in the space and satellite industry is remarkable. Also remarkable is the growth of satellite's positive impact on humanitarian aid. However global pandemic, political failures (which is what a war is by definition) and the havoc of climate change have presented a global footprint and a basketful of Nasty.

The supply chain issue is a nasty one we did not anticipate or consider. Especially the type of supply chain that most concerns leaders in the industry: people.

In a revealing Podcast about the supply chain challenges to humanitarian relief providers who rely on the satellite industry, Meltzer and Ultisat CEO David Myers readily agreed on my "The Better Satellite World" podcast that the real supply chain issue in the satellite industry is the

*...Satellites, like symbols, icons and images of ancient cultures are powerful totems for hope. In the bloodied but unbowed communities of virtue in Ukraine they have been helping to reinforce resilience...*

inability to find and onboard qualified employees to accommodate the rate at which the industry is growing and the clip at which aid workers are desperately needed. <https://www.sspi.org/cpages/untangling-the-supply-chain-podcast>


The good news is that while there are more disasters the data reveals that fewer and fewer people are being killed by them. Both gentlemen agreed that an investment in disaster preparedness and satellite solutions has been at the root of this "success."

In the non-profit world labor remains an ongoing challenge. The people to provide humanitarian aid is in short supply. It is the same with the burgeoning numbers of people required to fill jobs in the industry. Untangling that supply chain is an area of executive management that will require us to let people know that if

they want to "do well by doing good," the job is theirs.

For more information about the new Space Business Qualified online course offered for new and existing employees visit: [www.SpaceBQ.org](http://www.SpaceBQ.org) and <https://youtu.be/PmNT-c3ubjcw>

Notes

<sup>1</sup>Pew Research: <https://www.pewresearch.org/fact-tank/2018/08/07/for-most-us-workers-real-wages-have-barely-budged-for-decades/> 



**Lou Zacharilla** is the Director of Innovation and Development of the Space and Satellite Professionals International (SSPI). He can be reached at:

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@LouICF [www.sspi.org](http://www.sspi.org)

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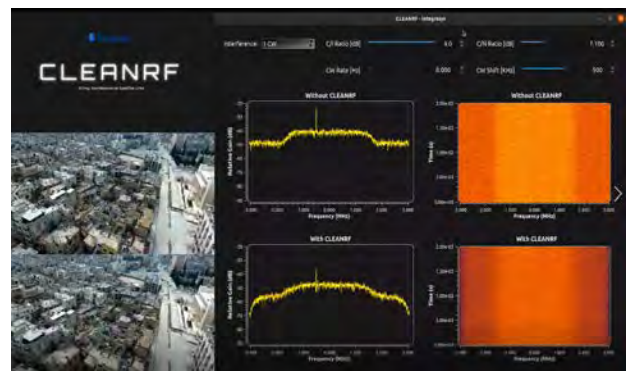
Integrasys is a privately owned company specializing in engineering and manufacturing Satellite Spectrum Monitoring Systems in the telecommunication and broadcasting markets. Integrasys was founded in 1990 by a group of Hewlett-Packard engineers experts on Automated RF & Microwaves Test Systems and Software and

the marquess of Antella. Since then Integrasys has evolved towards today's company, offering a wide range of signal monitoring products and VSAT Deployment and Maintenance and Link Budget solutions for different telecom and satellite services globally with the best customer care that our customers deserve.

At Satellite Asia, Integrasys will be showcasing its innovative Interference Canceller System CLEANRF, which was awarded the Government Mobile Innovation 2022, by the MSUA at the Satellite Show 2022 in Washington. The smart solution allows the detection, identification, separation, and cancellation of RFI sources that affect the service signal to be processed by receivers or transceivers operating in satellite links. CLEANRF can effectively cancel a significant number of harmful interference sources on satellite-to-ground links for both GSO and NGSO satellites.

The solution enables secure and robust communications, protecting the network terminals from the most common and harmful interference sources. The new innovative interference canceller provides an elegant, fully automated interface to solve the most common and harmful interference problems affecting the Asian market, maximizing the amount of usable clean spectrum.

For more information go to: [www.integrasys-space.com](http://www.integrasys-space.com)





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## SKYWAN – The New Dimension in Airborne Satellite Communication ND SATCOM In The Air: Powering Rotary Aircraft Communication

@Satellite Asia visit ND Satcom at the German Pavillion booth # 4G2-14

Diverse rotary aircraft have far-ranging operational missions, from military to border security, search and rescue to medical transport. Real-time communication, live video feeds, and other data transmissions are critical to informed decision-making and rapid response. Unlike fixed-wing aircraft, the longstanding engineering challenge with helicopters had been the impact of rotor blade action on satcom signals, interrupting communication receipt and transfer.

With its superior engineering expertise and commitment to R&D investment, ND SATCOM has successfully developed a rotary "beyond the line of sight" satcom solution its clients have sought with the utmost reliability clients expect. This new Airborne SatCom system will be the European market's it-product for rotary aircraft in 2022. ND SATCOM's exacting standards include partnering with European helicopter manufacturers and their avionics platforms for a series of performance tests and field results.

The Airborne SatCom's three-part system consists of a Ka- and Ku-band antenna, antenna control unit (ACU) and SKYWAN modem, an ITAR-free airborne solution that offers a point-to-point configuration from helicopter to ground providing broadband transmission (e.g. videos, data, voice). SKYWAN modems use a robust TDMA burst waveform to transmit and receive through the rotor. This optimised new waveform confers several advantages. One is the high flexibility given to helicopter manufacturers as to where to place the antenna. Another is this waveform automatically adapts to a specific helicopter model and its rotor speed. The SKYWAN-integrated one-box unit for this rotary Airborne SatCom system is certified for avionic use according to RCTA DO-160 criteria.

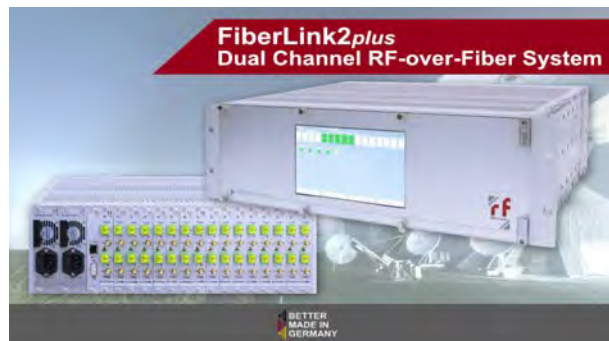
The future possibilities are exciting. In addition to fully integrating the rotary aircraft terminals into existing SKYWAN networks, ND SATCOM envisions remotely piloted or autonomous rotary aircraft as benefitting from this new solution. ND SATCOM's launch of Airborne SatCom system is the next-gen innovation setting the rotary-wing world **alight in 2022**.



For more information, go to: [www.ndsatcom.com](http://www.ndsatcom.com)

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Oliver Vogel, Director Sales & Marketing at RF-Design will be present at Satellite Asia 2022 from June 1-3. He is looking forward to meet with you during the show. Please send him an e-mail to [o.vogel@rf-design-online.de](mailto:o.vogel@rf-design-online.de) for arranging a meeting.

For more information, go to: <https://rf-design-online.de> or email [contact@rf-design-online.de](mailto:contact@rf-design-online.de)

## Spacebridge

**@Satellite Asia visit Spacebridge at booth # 4K1-01**



**SpaceBridge** is a proud developer and provider of satellite network equipment and services, including VSAT HUBS and Terminals for Point-to-Point, Point-to-Multi-Point, and Mesh typologies, as well as SCPC and broadcast modems for GEO and NGSO satellite constellations. SpaceBridge also provides Cloud-Based autonomous managed services for its customers.

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**U7720-SA , Stand Alone, Broadband Satellite Router**

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**XipLink** is the technology leader in wireless link optimization (WLO) using industry standard SCPS TCP acceleration, UDP enhancements, data/header compression, link bonding and Internet optimizations to deliver a better wireless experience over stressed communication links. Our award-winning XipOS software dramatically improves web experience and optimizes other Internet traffic in markets such as maritime, cellular backhaul, ISP backhaul, military and aviation broadband. The XipLink solution is packaged into appliances or virtual images and sold through OEM, Integration and Service Provider partners around the world. XipLink is a private, employee owned company with headquarters in Montreal, Quebec Canada and field personnel worldwide.

At its booth in Satellite AS, XipLink will provide information on SD-WAN Optimization, Link Bonding/Balancing, Traffic Steering, Firewall and Security.

For more information go to: [www.xiplink.com](http://www.xiplink.com)

## Securing Spectrum Authorization

*Rotoiti, a space consulting firm, interviewed several spectrum management experts. This brief summarizes the complexities of securing spectrum authorization and the need to plan accordingly. The process described below is general; in practice, details vary depending on the satellite system.*

**S**ecuring radiofrequency spectrum authorization is critical for satellite systems. In order to use spectrum to communicate in national governments' jurisdictional areas, satellites and ground infrastructure need authorization from those governments. And in order for satellites to generate value, it is almost always necessary for them to use spectrum to communicate in at least some national jurisdictions. This means that spectrum authorization from national governments is a fundamentally important asset; securing it is not a simple administrative task. A satellite

system's prospects critically depend on its status in terms of spectrum authorization. Without a strategy in place to secure authorization, a system's value is severely undermined.

- In most countries, the radiofrequency spectrum is seen as a valuable resource which governments must regulate by segmenting users in terms of time, location, and frequency. Managing the spectrum in this way helps avoid signal interference and thus ensures that various

users can depend on the spectrum for communication purposes.

**Securing spectrum authorization can be a lengthy, complex, and costly process;** it is necessary to employ relevant expertise in order to navigate this process effectively. As described in the below paragraphs, satellite systems must be filed with the International Telecommunica-

terms which indicate that professionals have relevant expertise.

**In order to secure spectrum authorization from national governments, satellite systems must first be filed via a national government with the International Telecommunications Union (ITU).** An ITU filing provides technical characteristics of a planned system (e.g.

the intended orbits and frequencies used by satellites). Firms do not submit filings directly to the ITU. This is rather done by organizations appointed by national governments of ITU member states. In the United States, for instance, the organization is the Fed-

eral Communications Commission (FCC).

- The ITU is an agency of the United Nations. ITU membership is open to all UN member states, and all UN member states except the Republic of Palau are ITU members.

**National governments vary in terms of what they require in order to support an ITU filing.** Some governments simply require the same information which the ITU re-



tions Union, assigned the right to use certain frequencies, and then finally authorized by national governments to use those frequencies. Understanding this process requires legal and business expertise, familiarity with radiofrequency technologies, and awareness of domestic and international politics. Many larger firms employ in-house experts. Smaller firms more commonly hire outside consultants to assist them. "Regulatory engineering" and "spectrum management" are two

quires. Other governments require significantly more information (e.g. orbital debris management plans).

Governments also differ in terms of preferences for the sorts of filings which they support; they may, for example, prefer filings that involve certain levels of local economic benefit. Another difference regards disclosure; more or less information about ITU filings is publicly disclosed.

- Larger countries are better positioned to require more information to support a filing. This is because firms developing satellite systems often want to access larger markets, and they are thus willing to provide more information if doing so helps with market access. (Note that filing via a government does not necessarily ensure the later authorization necessary for market access, but filing often facilitates authorizations; filing via a government, in other words, may help secure access to a national market.)

**Once a satellite system has been filed, it must be coordinated with other systems to address potential interferences.** The ITU identifies other systems with which there may be interference issues. It is then typically left to the filing firm, not the ITU or filing governments, to coordinate with other systems by refining the technical characteristics of the various systems. Representatives from the various systems have meetings which are usually bilateral; it is unlikely that a representative of a satellite system, in other words, will convene a group meeting with representatives of all of the other systems with which there may be interference.

***"...In most countries, the radiofrequency spectrum is seen as a valuable resource which governments must regulate by segmenting users in terms of time, location, and frequency. Managing the spectrum in this way helps avoid signal interference and thus ensures that various users can depend on the spectrum for communication purposes..."***

- Informally, filing firms prioritize which potential interferences to address. Highest priority usually goes to earlier filings that are likely to actually become active, since the ITU obligates later filings to protect earlier filings. Filing firms may have insight which leads them to ignore coordinating with some other systems – they may, for instance, know that some of the other identified systems are unlikely to ever become active.

- The ITU has mechanisms to try to ensure intent behind filings. These mechanisms are designed to prevent firms from “warehousing” spectrum – filing without intent to activate satellite systems, solely to protect frequencies from other parties.

**If a satellite system is coordinated and activated within seven years, the ITU assigns the system the right to use certain frequencies, paving the way for national authorizations.** After filing with the ITU, satellite systems have seven years to coordinate with other systems and to be activated; activation means they must start to be put into use, and this is defined differently for different types of systems. If coordination and activation happen within seven years, a frequency range for the system is assigned in the ITU’s Master International Frequency Register (MIFR). National authori-

zations are based on MIFR assignments; if the MIFR assignment is in a certain band, for instance, then the national authorization (if awarded) will let the system communicate in that band. If a system is not activated within seven years, its filing is cancelled.

**Spectrum authorizations from national governments vary by country; regardless of which government was involved in the ITU filing,** it is necessary to engage with all relevant governments to secure authorizations in national jurisdictions where a system will operate. If a satellite system plans to use spectrum in two countries, for instance, it must secure authorization from each government. The process for securing authorization varies across 3 countries. There are, for instance, no universal types of spectrum authorizations that all governments offer, nor are there even universal naming conventions. Associated costs also vary greatly. There is furthermore variation in terms of which parties must secure which authorizations. There are moreover sometimes spectrum uses for which no authorizations are necessary. That being said, there are three general categories of authorizations commonly mentioned as relevant for satellites (note there are many exceptions to these descriptions):

- One common group of authori-

rights”, which allow satellites (or “space stations” in industry parlance) to transmit data down to ground infrastructure; it is usually satellite operators which must secure landing rights.

- Another common group of authorizations is often called “spectrum licenses”, which allow operation of ground infrastructure. Parties which must secure spectrum licenses can variously be satellite operators, ground station operators, or service providers.

- A third common group of authorizations is often called “service licenses”, which allow selling data to end users; service providers usually must secure these licenses.

**The three parts of the process described above – filing with the ITU via a national government, being assigned frequency by the ITU, and securing national authorization – do not necessarily occur sequentially.** In practice, the chronological order varies, or the steps may be concurrent or interconnected. Depending on the national government, for instance, certain elements of authorization can be secured before ITU coordination or assignment are complete. Some governments’ pre-ITU information requirements, on the other hand, essentially serve as a guarantee of national authorization, pending completion of phases of the ITU filing process.

**Firms should consider participating in World Radiocommunication Conference (WRC) deliberations in order to more effectively strategize how to secure spectrum authorization.** The WRC regularly



**Securing spectrum authorization can be a lengthy, complex, and costly process; it is necessary to employ relevant expertise in order to navigate this process effectively.**

(image courtesy of CFI)

revises the Radio Regulations (RR), and revisions ultimately affect national spectrum authorizations. The RR are an international treaty which governs spectrum use and which defines a global table of frequency allocations. This table in turn defines frequency assignments for satellite systems in the ITU’s MIFR. National spectrum authorizations in turn accord with the MIFR. By participating in WRC deliberations, firms can thus be better informed about which frequencies they should plan to secure for satellite systems, and potentially they can influence frequency allocations to their benefit.

years in advance, and it is thus possible to anticipate which parts of the frequency allocation table may change.

- RR revisions result from highly complex negotiations involving many parties – national governments, private firms, and various organizations representing collections of other actors. Participating in this opaque process is resource-intensive, which poses a barrier to entry for smaller firms. For smaller firms, therefore, it may be worth pooling resources in order to better participate in the WRC process.

- Potential agenda items for WRC deliberations are set several



**Rotoiti** provides market research, strategic advisory, and business development services. Clients are company executives, government policymakers, and academic researchers. Rotoiti focuses on the Asia-Pacific and works in all segments of the space industry. For more information go to: [www.rotoiti.space](http://www.rotoiti.space)

# Singapore Calling!

by Martin Jarrold

“The world must adjust to living with Covid-19” is a phrase becoming increasingly commonplace in mainstream media reporting of the continuing pandemic. Whilst perhaps reflecting the ongoing practical realities of Sars-Cov-2 some 26 months after the World Health Organization declared the disease a global pandemic, it is a phrase of little comfort to the millions who have lost relatives and friends, nor to those continuing to suffer from “Long Covid”, nor to those in remote locations and in less developed nations still awaiting vaccination. Obviously, this is not to dismiss the significance of the achievement of successfully rolling out vaccines to much of the world’s population such that, according to ‘Our World in Data’, as of 23 May 2022 some 60.4 percent of humanity has been fully vaccinated, with an additional booster so far given to 25.1 percent of the world.

It is against this background that over recent months many of us in the global satellite business community have returned to at least some of our international travels, attending meetings, meeting customers and suppliers, staffing exhibition booths, speaking at conferences, etc. After a break of two-and-a-quarter years I too have resumed boarding aircraft to rapidly traverse international borders, with my trips in May being to represent GVF at ‘Future Tech 22’ in Basra, Iraq, and at CABSAT in Dubai, United Arab Emirates.

GVF’s Secretary General, David Meltzer, resumed his travels earlier than me, and over recent months has represented the association at a GVF Member event in North Africa and at a CITEL event in Latin America, as well as at domestic events within the United States from his base in Washington, DC. For Mr Meltzer’s next destination, Singapore, he will represent GVF at a number

of events taking place in the city state over the period 31 May to 3 June.

For the Avia ‘Satellite Industry Forum’ at the ParkRoyal Collection Marina Bay on 31 May he will moderate ‘The Customers Talk’, a forum where the end users’ perspective on the satellite industry will be explored. The panellists will be Yossi Gal, VP Regional Sales, Gilat Satellite Networks; Bhaskar Majumdar, VP Business Development, Planetcast Media Services; David Gelerman, President & CEO, SpaceBridge; Chris

Hill, CTO, Speedcast; and Sandeep Kumar, Head of Satellite Sales, Telstra Enterprise. Details of the program can be found following the link at <https://gvf.org/event/satellite-industry-forum-2022/>. GVF Members can use the VIP code GVF15 to register for this event with a 15 percent discount.

This year ‘Asia

TechX Singapore’ (ATxSG), featuring various events located at The Ritz Carlton, Millenia Singapore and the Singapore EXPO, is partnering with Euroconsult’s ‘Asia Satellite Business Week’ (ASBW). On 1 June David Meltzer will lead a discussion on ‘Revolution in the Satellite Ground Segment’ with Phil Carrai, President Technology & Training Solutions, Kratos Defense & Security Solutions; Vaibhav Magow, VP International Division, Hughes Network Systems; Louis Dubin, SVP Product Management, Comtech; Sean Yarborough, VP Product Management, ST Engineering iDirect; David Gelerman, President & CEO, SpaceBridge; and Alvaro Sanchez, CEO, Integrasys. Full agenda details can be seen by following the link at <https://gvf.org/event/asia-sat->

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[elite-business-week/](#). GVF is ‘Knowledge Partner’ for ASBW and GVF Members receive 50 percent discount on registrations with code ASBW50.

Euroconsult is one of GVF’s Strategic Partners, and as well as this being reflected in the ‘Knowledge Partnership’ for ASBW, GVF and Euroconsult will collaborate for ‘World Satellite Business Week’ (WSBW) in Paris in September. Something GVF and WSBW share in 2022 is that both are celebrating their Silver (25th) Anniversary. In celebration of GVF’s first quarter century milestone, WSBW will feature the presentation ceremony for the GVF ‘Quarter Century of Excellence Award’. This Award will be conferred upon the GVF Member which is deemed by a panel of independent industry experts to have made the most significant aggregate achievement and contribution to the satellite industry over the last 25 years. Nominations for the Award closed at 23:59 British Summer Time on 24 May and the winner will be announced, and the Award given, on 14 September at WSBW.

A thread linking my travel to CABSAT – to moderate panels at the embedded ‘SatExpo Summit’ – and Euroconsult’s latest market research forecast is space sustainability. This topic is now a major industry agenda item. It was addressed both in the SatExpo Summit session I chaired in Dubai, ‘Stakes and Solutions in Responsibly Managing Space’, and frequently throughout the rest of the Summit program. Additionally, and increasingly, we see publication of research papers analyzing not only the importance of maintaining the sustainability of our useful orbital space but also examining the role of orbital space in driving sustainability, security, and development on Earth. Indeed, this is the subject of a 2022 McKinsey & Company/World Economic Forum briefing paper.

The imperative of space sustainability is generating a new space market niche, and according to the First Edition of Euroconsult’s ‘Space Logistic Markets’ report, is driving “a nascent but growing set of on-orbit space services, to be articulated as a space logistic ecosystem from launch to satellites’ end of life...”. Six markets covered in the report highlight the development of end-to-end on-orbit mobility and associated services through Access to Space, Last Mile Logistics (LML), Life Extension, Active Debris Removal (ADR), On-orbit Assembly and Manufacturing (OOAM) and Space Situational Awareness (SSA). Euroconsult’s forecast is that this diverse set of on-orbit services will generate US\$4.4 billion by 2031, with SSA estimated as the largest market with earnings

of US\$1.4 billion over the next ten years. “Watch this space!”

Of course, whilst international business travel has resumed it has not wholly returned to pre-pandemic levels, and the webinar continues as an important enabler of global industry dialogues. Given that a recent GVF webinar – ‘New Technologies, New Services’ which brought together GVF Members Astranis, Avealto, and Omnispace on 28 April – proved to be exceptionally popular in reaching a live and on-demand audience of over 1,700, the GVF Webinar Series (in partnership with ‘Connectivity Business News’) is planned to continue. As shown at <https://gvf.org/webinars/>, by the time you read these words the next webinar in the series will have taken place.

On 26 May ‘Innovation and the Ground Segment’ featured Darin Beakley, Owner & Vice President, Sat-Lite Technologies; Sean Yarborough, Vice President Product Management, ST Engineering iDirect; and Todd Brown, Director Business Development, AvL Technologies, with discussion moderated by Tim Farrar, President of TMF Associates. Compared to space segment, with its spectacle of launches, enormous GEOs, and the massive constellations of New Space LEOs, ground segment innovations have often been given only cursory consideration. However, ground segment innovation is now of a nature and scale which is driving change in the former perceptions, and changes to ground segment are now rightfully observed as equally important as those of the space segment to achieving a more connected world. Whilst New Space has been extensively characterized, the idea of New Ground – a cohesive, comprehensive, all-encompassing approach to recognizing and evaluating the importance of advances across the entire ground segment ecosystem – is not yet so well established, albeit that the subject of innovations in antennas has significantly increased in topicality in recent years.

If you did not Zoom in to this event on 26 May, you have not missed out. The video recording is available on-demand at <https://gvf.org/webinar/innovation-and-the-ground-segment/>.

**Martin Jarold** is Vice-President of International Program Development of GVF. He can be reached at: [martin.jarold@gvf.org](mailto:martin.jarold@gvf.org)





# Cancelling Interference in Asia

by **Alvaro Sanchez**

The Asia-Pacific market is generating a great impact on the satellite manufacturing and launch market segments. NSR forecasts over US\$ 105.7 billion for 9,200 satellites to be generated between 2020-2030 from the region, a quarter of the global satellite orders. The interest in the satellite industry for the

from the satellite industry's perspective, it is an opportunity to provide the defence sector with reliable satellite communication. The importance of the ground segment in the case of ensuring a secure ecosystem is mandatory, surveillance & reconnaissance capabilities are linked to resilient communication among the forces. Due to



Asian market is tangible.

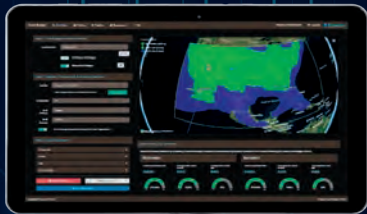
Over the last years, due to the pandemic, the Asian market has experienced considerable growth in the number of satellite users, in order to have resilient communication across the continent, especially now that the continent is increasing its investment in the defence sector. In 2020, the APAC region invested 528,000 million USD in defence (an increase of 2.5% compared to the previous year), according to the Stockholm International Peace Research Institute (Sipri). The new approach of the Asian countries is to cover representatively their government and defense needs. Therefore,

the conflict in the EMEA region, and the war-like situations across different parts of the world, and tensions within APAC countries, the investments in communication infrastructure for military purposes have grown significantly in Asia. Ground defence communication systems and smart solutions ensure the safety of the troops against imminent threats, the main values that these types of solutions offer to the defence sector are the maximization of survivability, reliable connectivity, and capacity of manoeuvre.

This incipient need to guarantee secure communications in the defence field has led to an opportunity for



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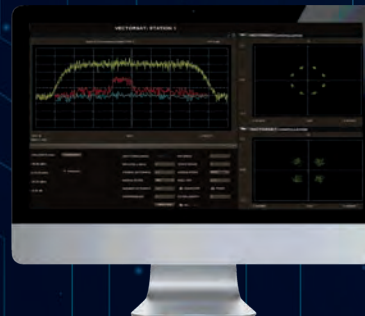
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new technologies that could be integrated into cyber security, Command & Control, and C4ISR, systems, in order to ensure a reliable environment for military communications in hostile environments, which are subjected to extreme conditions. A challenge that is commonly faced in Asia's defence communications is the ones derived from RF interference (RFI). The above-mentioned smart solutions on the ground must be the additional weapon for the troops to be connected resiliently. The resulting technologies must be fully effective, in real-time and in any situation, and fully compliant with the militaries' demands for service requirements. RF Interferences are treated as a threat; however, the problem is that, due to the congested communications environment, there are intentional interferences that are extremely dangerous due to the disruption they cause, as well as unintentional interferences that have become a critical issue when military activity is located in a conflict area with, different networks coexisting. Therefore, the most recommendable technologies when it comes to RFI problems are the interference cancellers, even though there are lots of anti-jamming techniques, they are not rapid and reliable enough, and the idea of cancelling the interference is quite innovative within the Asian market.

The most innovative Interference Canceller System is CLEANRF developed by INTEGRASYS, and awarded as the Government Mobile Innovation 2022, by the MSUA at the Satellite Show 2022 in Washington. The smart solution allows the detection, identification, separation, and cancellation of RFI sources that affect the service signal to be processed by receivers or transceivers operating in satellite links. CLEANRF can effectively cancel a significant number of harmful interference sources on satellite-to-ground links for both GSO and NGSO satellites. The solution enables secure and robust communications, protecting the network terminals from the most common and harmful interference sources. The new innovative interference canceller provides an elegant, fully automated interface to solve the most common and harmful interference problems affecting the Asian market, maximizing the amount of usable clean spectrum. Communications



***"...The Asian market is investing in satellite communications for the defence sector on the ground, and the new technologies need to be aligned with this new approach, therefore the best complement for security systems are smart tools that can be combined in order to ensure resilient connectivity among the commands..."***

through these types of links are usually called "protected communications" and typical users are those that manage critical infrastructures, government assets, communications for security forces etc., as well as all satellites/payload control operators. Moreover INTEGRASYS also has jamming technologies that can attack communication systems when it is required.

The Asian market is investing in satellite communications for the defence sector on the ground, and the new technologies need to be aligned with this new approach, therefore the best complement for security systems are smart tools that can be combined in order to ensure resilient connectivity among the commands. 

**Alvaro Sanchez** is Integrasys CEO and Marquess of Antella (Noble Title from 17th century in Spain). Alvaro is a Software and Industrial engineer by European University and holds a Master Degree in Management, Sales & Marketing by ESIC Business School. Alvaro during the last 10 years has worked at Integrasys as Management, Sales Director and Executive roles were he was very successful growing the sales, revenue, profit and responsibilities within the company; and previous to that he was working at CERN European Organization for Nuclear Research as a RF Engineer measuring timing in a Nanosecond Synchronization for measuring the Neutrino Speed. The Noble Title that he hosts, is coming in his heritage from 1649 from his ancestor Nicolo Palavicino, given by Phillip IV in Sicily for the Antella region near Florence. He can be reached at: [alvaro.sanchez@integrasys-sa.com](mailto:alvaro.sanchez@integrasys-sa.com)

## LiveU Announces the Acquisition of Cloud-based Video Production Provider easylive.io

**Hackensack, NJ – May 12, 2022** – LiveU, the leader in live video streaming and remote production solutions, today announced the acquisition of easylive.io as part of its strategy to expand its cloud video platform, enabling customers to grow their audiences with original, interactive and quality live content. The move will provide remote and collaborative tools for cloud-based and hybrid productions, enabling customers to operate and scale up, while still lowering budgets, quickly and easily from anywhere including video switching, audio mixing, adding graphics, localizing content and bringing on guests.

easylive.io provides a live streaming production studio in the browser, allowing users to mix any type of content into live stream videos and distribute them to the widest audience, creating innovative and interactive live experiences. All the tools needed to edit, mix and broadcast live streams are combined in the all-in-one user-friendly cloud solution, reducing production and equipment costs. It ensures the reception of all format types and their conversions for optimal management and redistribution to multiple destinations.

Samuel Wasserman, CEO and Co-founder, LiveU, said, "We have been reinforcing our cloud strategy as the industry moves to cloud-based production, introducing brand new services that meet the needs of customers moving to the cloud. Rec-

ognized as the leader in mobile back-packs, we're now consolidating our leadership in cloud-based offerings. This announcement is an important step, delivering future-proof tools that help our customers grow their business, building on our deep expertise in live production. We believe there is a significant part of the market for cloud production that wants and needs a vertically integrated solution. Our goal is to offer a fully end-to-end solution for live contribution, cloud production, orchestration, ingest and distribution, serving the needs of every type of customer from global broadcasters to niche sports and entertainment."

Phillippe Laurent, CEO & Co-founder, easylive.io, said, "Teaming up with our long-term partner has been a natural fit thanks to our shared vision and common growth opportunities. We are extremely proud of what has been accomplished for the past 10 years and incredibly thankful to our customers for their trust. This acquisition is a big step but just the beginning of the journey. Together with LiveU, our service will bring customers the best cloud live production experience with incredible new features to be announced soon. We're thrilled to join the LiveU family, excited to continue our adventure by their sides and enthusiastic to disrupt the live production market together."

## Analysys Mason Acquires NSR

**Cambridge, Mass., May 3, 2022**--Analysys Mason, a management consultancy focused on telecoms, media and technology (TMT), today announced the acquisition of Northern Sky Research (NSR).

Founded in 2000, NSR is a prominent global provider of satellite and space market research and consulting services specialising in the analysis of growth opportunities across four core industry sectors: satellite communications, satellite & space applications, financial analysis and satellite & space infrastructure.

The combination of NSR's industry-leading satellite and space expertise and Analysys Mason's strong international market position in the TMT sector will provide an exceptional breadth of services to new and existing clients worldwide, underpinned by a unique knowledge base spanning 5G, fibre and satellite platforms.

Christopher Baugh, founder and CEO of NSR said, "We are very excited to be joining Analysys Mason. Against a backdrop of accelerating integration of terrestrial and satellite networks, as well as the rapid expansion of space activities worldwide, our combined knowledge and track record provides a tremendous opportunity to enhance our position globally as a satellite and space research and consulting provider."

Analysys Mason has its head office in London, and offices in Bonn, Cambridge, Dubai, Dublin, Hong Kong, Kolkata, Lund, Madrid, Manchester, Milan, New Delhi, New York, Oslo, Paris, Singapore and Stockholm. 



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## Comtech Promotes Timothy Jenkins to President of its Safety & Security Technologies Product Group



**Timothy Jenkins**

**Melville, NY, May 12, 2022** — **Comtech Telecommunications Corp.** (NASDAQ: CMTL), today announced that **Timothy Jenkins** will become President

of its Safety and Security Technologies product group, effective a June 1, 2022.

Jenkins has been with Comtech for over three years, joining the company through its 2019 acquisition of the state and local government next-generation 911 business from General Dynamics Information Technology, Inc. Most recently, he has served as Group Vice President and General Manager within the Safety and Security Technologies organization, leading the implementation of next-generation 911 capabilities for customers across the United States. Jenkins has been involved in the public safety and 911 industry for over 28 years, serving in leadership positions at Ameritech and SBC Communications (subsequently acquired by AT&T) and Intrado.

Kent Hellebust, the current President of Comtech's Safety and Security Technologies product group, will be retiring as of May 31, 2022, after serving in the role since April 2018. This culminates Hellebust's decade of service at Comtech after joining

in January 2012 and holding a variety of leadership roles related to the 911 business.

Mike Porcelain, Comtech President and CEO, commented, "Tim has played a key role in the growth and development of our next-generation 911 product line. He has been an invaluable contributor to the organization, leading customer operations and support. I look forward to Tim's continued leadership and contributions to Comtech as he assumes the role of President."

"We want to thank Kent for his outstanding leadership, significant contributions and dedicated commitment to Comtech throughout his distinguished career. Kent has worked diligently to lead, support and grow our next-generation 911 product line throughout his time at Comtech. We wish Kent the very best as he retires and moves into the next chapter."

## New Senior Executive Appointments at Intelsat

**McLean, Va., May 5, 2022**



**Anthony O'Brien**

**O'Brien** will become Intelsat's next chief financial officer (CFO). Bringing a wealth of experience to the job, O'Brien most recently served as corporate CFO for Raytheon Technologies (NYSE: RTX) after a five-year

— Satellite operator **Intelsat** named four seasoned aerospace and tech leaders to key financial and commercial roles.

**Anthony (Toby)**

stint as CFO for Raytheon Company before its merger with United Technologies. He led teams for more than three decades at Raytheon, both in corporate and various divisional and business unit finance roles, and was a key player in several strategic initiatives including the Raytheon Technologies merger and integration. O'Brien will report directly to Intelsat's new CEO, David Wajsgas.

**Michael DeMarco**, currently Intelsat's chief services officer will become the new chief commercial officer (CCO), responsible for all Intelsat commercial services offerings to include product management, sales activities, sales engineering, and pricing. He will continue to report to Wajsgas. DeMarco has been with the company for more than 20 years, previously leading Intelsat's product, engineering and operations teams. He was also responsible for the company's digital transformation strategy and the delivery of the company's end-to-end service portfolio.

**Clay McConnell** has been named the company's senior vice president of Corporate Communications and Marketing. McConnell came to Intelsat after three decades in communications at Delta Air Lines (NYSE: DAL) and Airbus SAS (AIR.PA), where he most recently served as head of communications for Airbus Americas. McConnell also reports directly to Wajsgas.

Jeff Sare joins the company as the new president of Intelsat's Commercial Aviation division. Sare comes to Intelsat from his role as vice president and Connectivity Solutions business segment leader at Panasonic Avionics. He also has held several executive roles in other aerospace and electronics companies, including work for Thales in strategic planning and inflight en-

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tainment and connectivity. Sare will report to DeMarco.

"As we execute our strategy to create an environment of seamless global connections with transformational technologies, we are committed to reestablishing the market and innovation leadership that has been the hallmark of Intelsat for decades," said CEO Wajsgas. "Talented people like Jeff, Mike, Toby, and Clay will help the team position our company to deliver on our strategic objectives. They share Intelsat's dedication to building and leveraging our unified communications network to help our customers stay connected – all the time, everywhere."

DeMarco, O'Brien, and McConnell will be based in the company's McLean, Virginia office, while Sare will be based with Intelsat's Commercial Aviation team in Chicago. All begin their roles this month.

## Comtech Appoints Ken Peterman to Board of Directors

Melville, N.Y. – May 10, 2022 – Comtech Telecommunications Corp.



Ken Peterman

(NASDAQ: CMTL), a leading global provider of next-generation 911 emergency systems and secure wireless communications technologies, announced that it had appointed seasoned satellite executive **Ken Peterman** to Comtech's Board of Directors. Ken will join the Board's Science and Technology Committee.

(NASDAQ: CMTL), a leading global provider of next-generation 911 emergency systems and secure wireless communications technologies, announced that it had appointed seasoned satellite executive **Ken Peterman** to Comtech's Board of Directors. Ken will join the Board's Science and Technology Committee.

"This is a significant and pivotal time for Comtech, as we strive to be the global leader in Failsafe Communications. Ken's expertise in satellite technology and decades of experience with U.S. government contracting speaks for itself, providing an impeccable foundation from a strategic, executive leadership and governance perspective. He is a remarkable individual with a unique skillset, and I am delighted to welcome him to our Board," said Michael Porcelain, President and CEO of Comtech.

An award-winning global executive leader, Peterman's accomplished career spans over forty years in the defense segment, accumulating credentials across a wide array of markets and both commercial and government satellite systems. He has augmented a strategic landscape in tactical and satellite communications, cybersecurity, and C4 defense technology sectors through tenures at the President/CEO and VP/GM level of top defense companies including Viasat, ITT/Exelis, Collins Aerospace, Raytheon and SpyGlass Group. Most recently, as President at Viasat Government Systems, Peterman led a world-class satellite communications, mobile networking and cybersecurity portfolio.

At Raytheon, he developed a \$1B/year Tactical Defense Electronics Systems Division with market-leading performance. While at ITT/Exelis, he led major restructuring actions across twelve states plus the U.K. (with sales of ~\$1.3B/yr), improving resource utilization and reducing infrastructure to align with emerging market and budget realities while creating double-digit growth.

## Victor Au joins AsiaSat's Leadership Team as General Counsel



Victor Au

Hong Kong, 3 May 2022 – Asia Satellite Telecommunications Company Limited (AsiaSat), Asia's premier satellite solutions provider,

announced the appointment of Victor Au as General Counsel.

Victor joins the company with more than two decades of experience working across international and local law firms and in-house legal departments in areas of corporate, commercial and intellectual property. He will be responsible for overseeing legal affairs and regulatory compliance of the AsiaSat Group.

"We are pleased to have Victor join our management team as his broad expertise will be a tremendous asset to AsiaSat as we continue through our transformation and business growth," said Roger Tong, Chief Executive Officer of AsiaSat.

On his appointment, Victor Au, General Counsel of AsiaSat said, "I'm truly excited to take up this new and challenging role."

Prior to joining AsiaSat, Victor was the Asia Pacific General Counsel of Vertiv Holdings Co., a US-based multinational corporation, with overall responsibilities of Asia-Pacific legal, intellectual property and compliance functions. Prior to Vertiv, he had also served as the in-house counsel of IDT International Limited, a Hong Kong listed company.



# Land Mobile Satellite Market Moving to Broadband and US\$1.2 Billion Revenue Potential

Cambridge, Mass., May 5, 2022—In its 10th year, NSR’s landmark Land Mobile via Satellite (LMvS10) report finds a significant revenue migration underway from narrowband to broadband applications. Though currently dominated by narrowband services, connected vehicles and High Throughput Satellite (HTS) Comms on the Pause (COTP) services are positioned as the fastest growing satellite land mobile sector markets through the decade.

In the short-term, COTP growth takes the lead through Aid, NGO, disaster relief and energy market developments. In the longer-term, demand accelerates for connected vehicles - including cars, RVs, trucks, trains, buses and first responders.

With cumulative revenues reaching \$1.2 Billion and a 43.9% CAGR over the decade, connected vehicles are the strongest net growth opportunity with trucking the highest revenue driver. Services remain mostly an aftermarket solution, increasing installation costs, especially if diagnostics and telematics are requirements to be bundled in along with broadband connectivity.

In contrast, average Mobile Satellite Services (MSS) narrowband revenues grow at 1.6%, despite continuing and strong sales by some sub-seg-

ments. Churn on MSS narrowband remains much higher than what is expected for connected vehicles and COTP devices.

“Traditional handhelds are now past their revenue peak despite continuing to bring in solid revenues, shifting interest to the connected vehicle opportunity as the one to watch,” notes NSR report author Alan Crisp. “However, capturing the connected vehicle market won’t be easy; this will be a high risk, high reward play compared to other opportunities.”

## Global AVOD spend to reach US\$70 Billion

London, UK, May 13, 2022 — AVOD revenues for TV series and movies will reach US \$70 billion in 2027, up from US\$ 33 billion in 2021. 13 of the 138 countries covered will generate more than \$1 billion in 2027, up from only five countries in 2021 according to Digital TV Research.

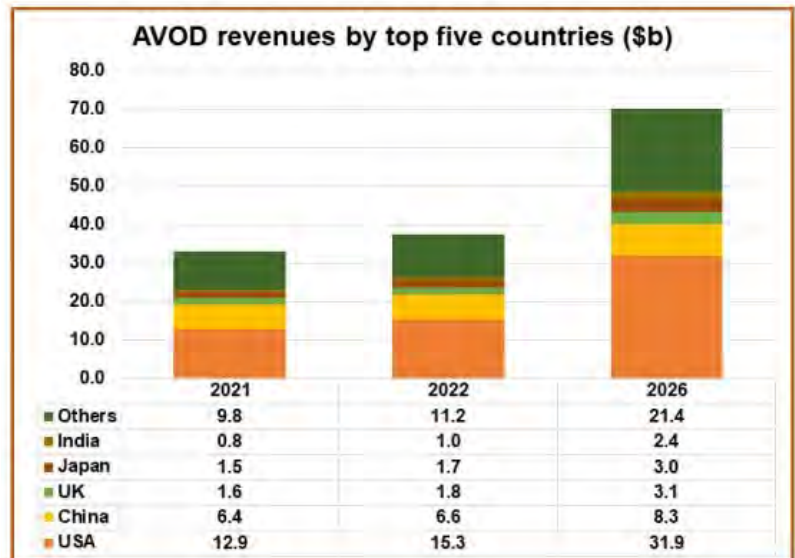
Simon Murray, Principal Ana-

lyst at Digital TV Research, said: “US AVOD will grow by \$19 billion to \$31 billion by 2027 – remaining the largest country by far. The US has the world’s most sophisticated advertising industry by some distance, plus AVOD choice is greater in the US than anywhere else. The US will account for 46% of the global total by 2027, up from 39% in 2021.”

Second-placed China slumped in 2020 due to its economic downturn. It will take until 2024 for China to better its 2019 total. In 2021, the government clamped down on fan-based culture, which resulted in far fewer reality shows from the OTT platforms – and less viewer demand.

## Major Pay-TV Providers Lost About 1,950,000 Subs in 1Q 2022

Durham, NH, May 17, 2022 — Leichtman Research Group, Inc. (LRG) found that the largest pay-TV providers in the U.S. – representing



Source: Digital TV Research



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about 93% of the market – lost about 1,955,000 net video subscribers in 1Q 2022, compared to a pro forma net loss of 1,910,000 in 1Q 2021, and 1,960,000 in 1Q 2020.

The top pay-TV providers now account for about 74.1 million subscribers – with the top seven cable companies having about 40.5 million video subscribers, other traditional pay-TV services having 26.2 million subscribers, and the top publicly reporting Internet-delivered (vMVPD) pay-TV services having about 7.4 million subscribers.

Key findings for the quarter include:

- Top cable providers had a net loss of about 825,000 video subscribers in 1Q 2022 – compared to a loss of about 780,000 subscribers in 1Q 2021
- Other traditional pay-TV services had a net loss of about 625,000 subscribers in 1Q 2022 – compared to a loss of about 865,000 subscribers in 1Q 2021
- Top publicly reporting vMVPDs had a net loss of about 505,000 subscribers in 1Q 2022 – compared to a loss of about 265,000 subscribers in 1Q 2021

“Pay-TV net losses of about 1.95 million in 1Q 2022 were similar to the net losses in the first quarters of 2021 and 2020,” said Bruce Leichtman, president and principal analyst for Leichtman Research Group, Inc. “Over the past year, top pay-TV providers had a net loss of 4,735,000 subscribers, similar to a loss of about 4,820,000 over the prior year.”

## Space Logistics Markets to Grow as On-orbit Supplier Services Materialize

**Paris, France, May 18, 2022** —

A nascent but growing set of on-orbit space services, to be articulated as a space logistic ecosystem from launch to satellites’ end of life, are being developed by more than 50 companies. According to Euroconsult’s 1st edition of Space Logistic Markets report, this diverse set of on-orbit services is expected to generate US\$ 4.4 billion by 2031.


The six markets covered in this report highlight the development of end-to-end on-orbit mobility and associated services through Access to space, Last Mile Logistics (LML), Life Extension, Active Debris Removal (ADR), On-orbit Assembly and Manufacturing (OOAM) and Space Situational Awareness (SSA) at different stages of maturity

The markets’ maturities are uneven across the space logistics value chain, with the report estimating SSA as the largest market with earnings of US\$ 1.4 billion over the next ten years, and LML evaluated as ten times smaller. A continuously growing satellite demand and a congested orbital environment are fueling the need for SSA services, whilst satellite operators are endorsing SSA services to increase domain awareness and protect their assets both above and on the ground.

Like any other satellite business, Government players will play a key role in increasing Technology Readiness Levels (TRL) and becoming early customers by providing suitable regulatory frameworks and unlocking

more funding. However, whilst a larger ecosystem could materialize by combining applications, competitions between each other also need to be considered.

Space logistic markets are leveraging on multiple rapid changes across space industry access that could lead to an average of 220 launches in the next 10 years in the most optimistic scenario. Despite a 52% increase in value between 2012- 2021 and 2022-2031, Euroconsult anticipates that the average launching price will be divided by a three-fold factor. This is due to the emergence of new vendors, ranging from dedicated smallsat access to space to super-heavy reusable launchers with various design-to-cost value propositions. With a new generation of GTO-capable (Geostationary Transfer Orbit) launchers expected, the market is currently experiencing a challenging transition with a short-term bottleneck. However, with reusability on the horizon gradually being endorsed by competitors of current master SpaceX, super heavy and fully reusable launchers currently under-development could disrupt satellite design and fuel elasticity in the launch demand.

Space logistics suppliers are integrating their technologies and services in the already existing satellite value chain, offering flexibility, customization, cost efficiency, and bringing more resiliency and sustainability to satellite operators. The space logistics markets are still in the early stages, with few in-orbit demonstrations achieved in the past five years, paving the way for more ambitious demonstrations like refueling-ready satellites, reusable orbital transfer vehicles, large scale on-orbit 3D printing and integrated catalogs of space objects. 

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