

# Satellite Executive BRIEFING

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Industry Trends, News Analysis, Market Intelligence and Opportunities

## The Future of Satellite Broadcasting: Transitioning to Data Multicasting!

by **Thomas Wrede**

Satellite broadcasting remains the best way for bringing highest quality video content to millions of subscribers at much lower cost than any other (terrestrial) media distribution technology. And this is unlikely to change in future. Both satellite and terrestrial broadcasting in the past did benefit from significant improvements of channel coding and modulation techniques as developed by the DVB Project with its DVB-S2(X) and DVB-T2 standards. Other standardization projects (ATSC/ISDB) followed the same path



for their target markets. Furthermore, new, more efficient video codecs have lowered the bandwidth demand and hence the transmission costs for broadcasters--a trend that will continue.

However, looking at the recent financial reports of major DTH satellite operators reveals that satellite broadcasting continues to decline. The reasons are manifold: 1) consumers prefer the viewing flexibility, comfort and choice that comes with internet distribution and 2) with streaming services broadcasters can much better place (targeted)

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## The Broadcast Market for Satellite



To coincide with the NAB to be held this month in Las Vegas we focus on the Broadcast market for satellites, which has been decidedly shrinking over the years with the rise of alternative content delivery channels like IP, OTT and others. The NAB (the organization, not the show) which is celebrating its 100-year anniversary this year. When the NAB was founded in 1923, television was

non-existent and so was the internet. So, predicting the future is a very dicey proposition.



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But there are definitive signs that point to certain trends and one of this multicasting as expounded in our cover story by broadcast technology expert Thomas Wrede. Many satellite companies have been transitioning to the new media environment and expanding their offerings to seamlessly integrate satellite with other delivery systems. One thing that history can tell us--is the resiliency of the satellite industry.

Enjoy this issue.

*Virgil Labrador*

Virgil Labrador  
Editor-in-Chief



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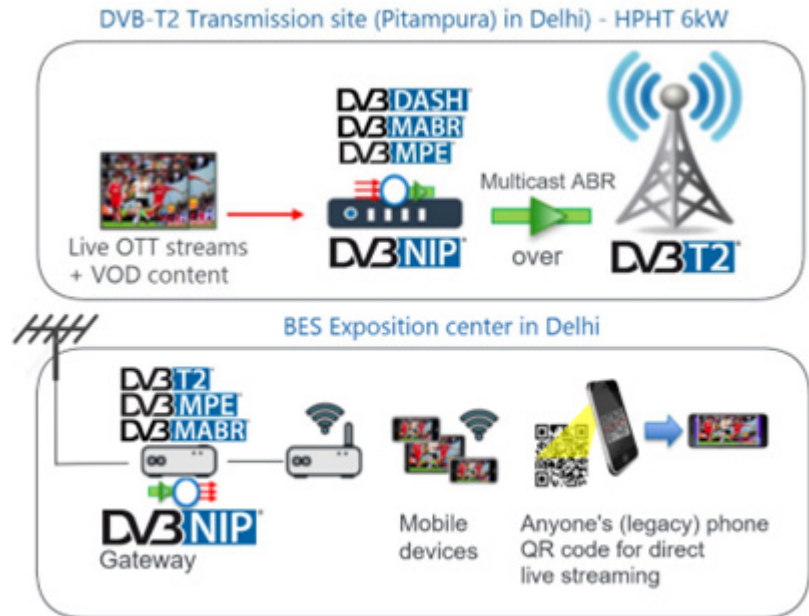


## The Future of Broadcasting... ...from page 1

advertisements and additional content offers. With streaming services, the operators' costs for set-top-boxes could disappear as the respective hard and software is integrated in today's flatscreen TV sets, tablets and mobile phones.

After a huge commercial success from the mid-80s onwards, satellite DTH broadcasting now seems to be considered by satellite operators as a cash cow, financing exciting new projects and services in non-geostationary orbits.

What will be the future of satellite broadcasting? In markets with millions of satellite free-to-air viewers and/or pay-tv subscribers, it will certainly stay for a very long time, often complemented by online content (delivered by streaming technology). The commercial objective of satellite operators must be to convince their still numerous standard definition (SD) customers to finally make the switch to high definition (HD) and to continue developing DTH delivery in emerging markets. There is also some, although minimal, potential for new services in UHDTV 4K quality. Of course this will hardly compensate for the significant commercial loss that comes with an overall declining market and we will very likely see operator consolidation plus increasing efforts to grow new market segments by investing into LEO and MEO constellations, a segment where competition has heated up enormously in the past 2-3 years.



Source: DVB

Satellite TV broadcasting has the opportunity to over a long-time transition to multicast delivery of content to CDN caches, to broadcast tower sites and to public or private head ends for Wi-Fi redistribution. This would help operators to save terrestrial distribution costs and would lower the significant carbon footprint of conventional terrestrial streaming delivery.

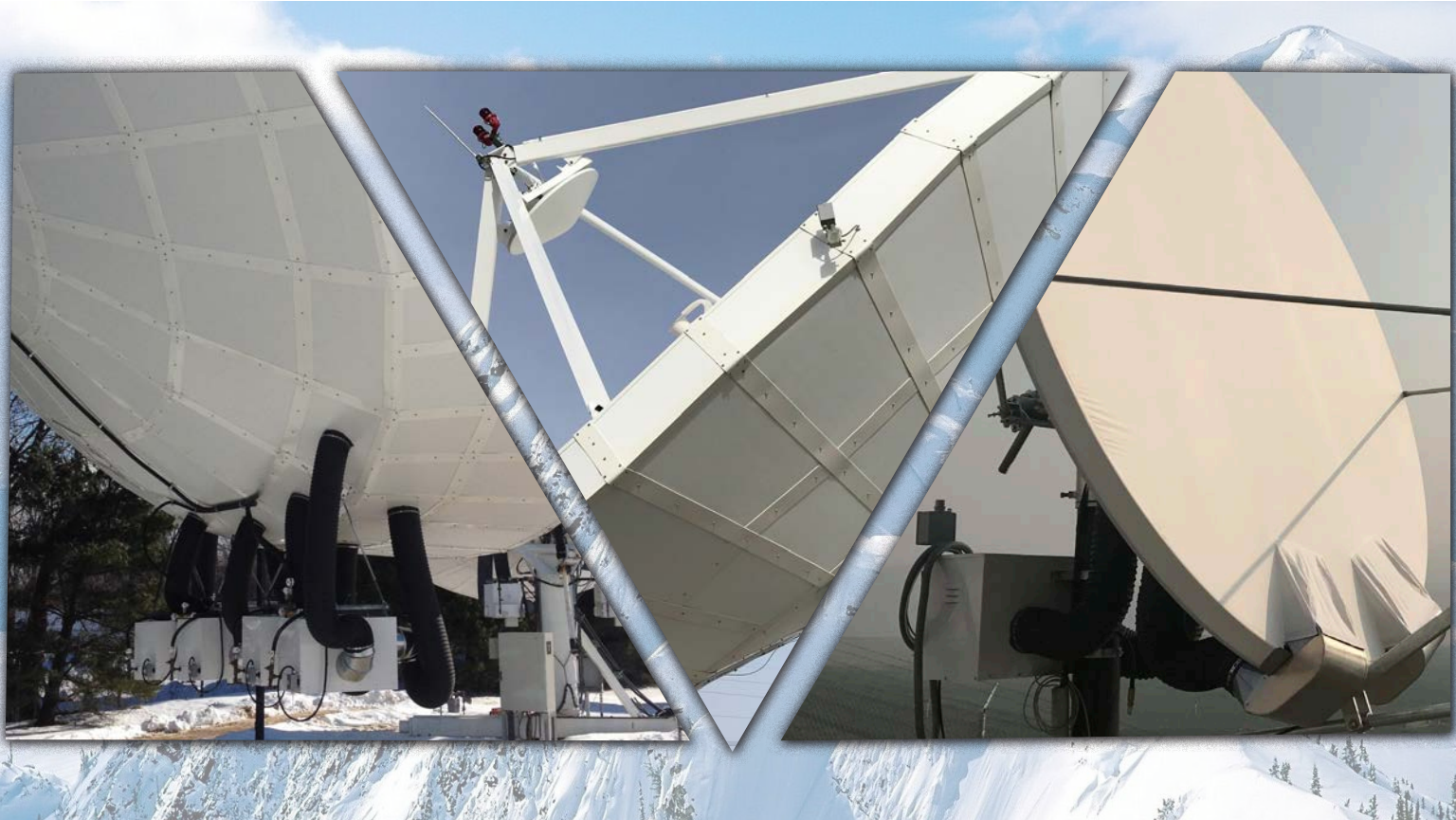
For these applications the DVB Project last year developed the Native IP standard (DVB-NIP). It is built upon DVB-I for service discovery and program metadata, DVB-AVC and DVB-DASH for source coding and stream formatting and DVB-MABR, DVB-GSE and the physical layer specifications DVB-S2X, DVB-S2 and DVB-T2 for transport. DVB-NIP hence is a protocol stack for satellite and terrestrial broadcasting

entirely based on IP and is no longer relying on the MPEG-2 Transport Stream layer. And DVB-NIP is also backwards-compatible with existing DVB networks as it includes a mode that uses multi-protocol encapsulation (DVB-MPE) to carry IP packets within a MPEG-2 Transport Stream.

An important milestone for DVB-NIP – and a proof that the standard also supports the terrestrial DVB-T2 transmission system - has been a live demonstration at the BES India 2023 in February where an existing DVB-T2 transmission site has been transmitting multicast MABR streams using the DVB-NIP standard. At the exposition center in Delhi the streams were converted back to unicast in a gateway to feed IP-enabled devices with typical OTT content over Wi-Fi.



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This demonstration had been supported by DVB members EasyBroadcast, Quadrille, EKT and ST Engineering iDirect.

Innovative technologies such as DVB-NIP could bring a second spring to satellite broadcasting in emerging markets. In established markets, DVB-NIP can help content providers and network operators reducing costs for CDN unicast streaming at higher video resolutions. However, satellite operators and equipment manufacturers will have to actively market and promote the respective solutions to broadcasters. This won't be a market that is developing on its own! 



**Thomas Wrede** is the founder and managing director of Technology Vision Consulting, a company specialized in project studies, standardization and prototype developments in the fields of satellite communications and wireless technologies. Thomas has over 35 years of professional experience in the communications industry. In his 28 years at satellite operator SES in Luxembourg he has been deeply involved in the development of digital satellite television, in-home signal distribution concepts, digital satellite radio, satellite return channel technology, Internet via satellite and High Definition as well as Ultra High Definition (4K/8K) television. Thomas currently represents SES in the DVB Commercial Module ([www.dvb.org](http://www.dvb.org)) as chair of the CM-S subgroup. In his leisure time Thomas is an active amateur radio operator experimenting with software defined radio platforms and antenna designs. He can be reached at: [thomas.wrede@me.com](mailto:thomas.wrede@me.com)



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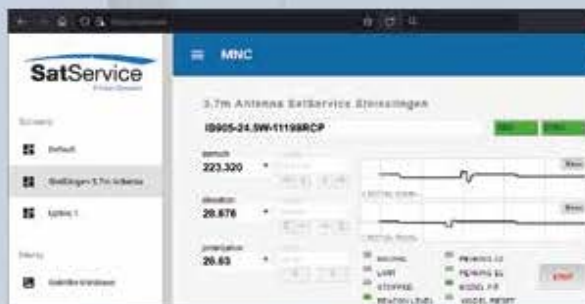
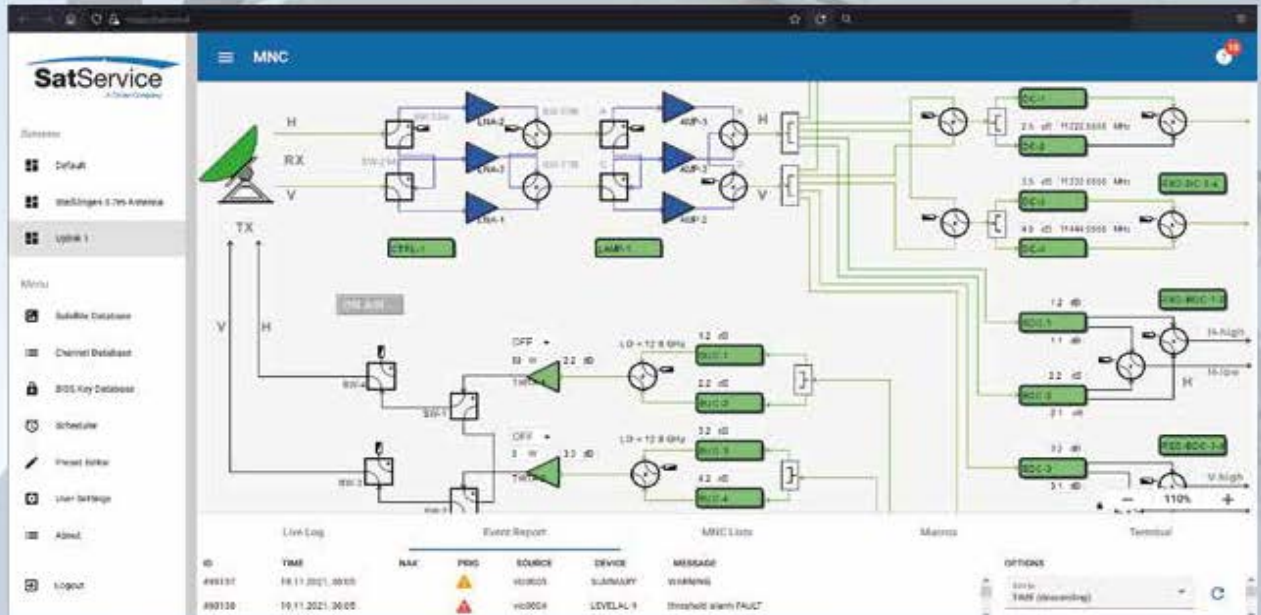
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# Key Takeaways from Satellite 2023

by **Elisabeth Tweedie**



Perhaps the most surprising thing about Satellite 2023, was what was not mentioned, namely video. Once regarded as satellites' raison d'être and still accounting for approximately 70% of revenue, it didn't feature as a topic in any of the sessions, nor – unless it was hidden in the “miscellaneous 5%” – did it figure in any of the questions posed to NSR, an Analysys Mason Company, before its regular Breakfast Briefing session. To me, this alone speaks volumes as to how the industry has changed in the last few years.

It was inevitable that discussions around the low earth orbit satellites (LEOs) would dominate many of the sessions. One of the main unanswered questions is: “is there sufficient demand for the capacity that is going to become available in the next few years?” In other words that age-old question: “Technology push or market pull?” Opinions were divided, with Eva Berneke, CEO, Eutelsat striking an optimistic note at the opening session, on Tuesday, saying: “That there is a market is simply accepted by everybody, is it going to be US\$16 billion or US\$25 billion by 2030 is the question”. She went on to add, that if satellite could bring prices down to a level where it's competitive with telecom then the market is probably 1,000 times bigger than it is today. Echoing that thought, in a different session that same day, Brian Holz, CEO, Magenta

Networks talked about the rise of flexible payloads conceivably leading to prices of US\$0.25 per gigabyte per month.

David Wajsgas, CEO, Intelsat was equally upbeat, commenting that the under and unserved populations around the world were not the only prime markets. He also pointed to the continued growth of traditional markets such as enterprise and mobility, as well the demand that will come with 5G and expanded offerings to the vertical segments, such as agriculture and energy. “From everything I've seen and read, the demand is continuing to outpace the supply. Apparently, he did not attend the NSR briefing, or he would have seen a chart, that predicted quite the opposite. From 2025-2031, NSR is indicating that supply will be well in excess of capacity demand.

Mark Dankberg, the industry veteran and CEO, Viasat, was more cautious. He pointed out that this wasn't simply an issue of supply and demand, other factors such as national security and landing rights come into play. There is also the issue of available launch capacity. Right now, it's looking as if there may be a shortfall in the next few years. To a certain extent this is being driven by Amazon's Project Kuiper, which is buying out a lot of the capacity, leading to escalating prices.

Project Kuiper attracted a lot of attention, not just because Amazon chose to unveil its antennas during the show, but also out of interest or maybe fear as to what its impact would be on the other operators. Unlike Starlink, Amazon does not have an in-house launch vehicle, but in all other ways it is vertically integrated, designing and building the satellites and terminals itself.

The standard customer terminal is approximately 11x11 inches and one inch thick and is expected to deliver up to 400 Mbps. Amazon stated that it expects to produce these terminals for “less than US\$400 each.” In comparison, Starlink consumer terminals currently sell for US\$599, so unless Amazon puts a large markup on the terminals, they should undercut the Starlink ones. There is a smaller Kuiper customer terminal at just 7 inches square which will deliver up to 100Mbps and for enterprise and government customers, a large terminal measuring 19 x30 inches will be offered. This should be capable of delivering up to 1Gbps. The same inhouse designed baseband chip,



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known as Prometheus, will be used in both the satellites and the terminals. According to the press release, the chip “combines a 5G modem, the capability of a cellular base station to handle traffic from thousands of customers at once, and the ability of a microwave backhaul antenna to support point-to-point connections.”

The first two prototype satellites are due to be launched shortly. Manufacturing of the satellites (and terminals) is being scaled up, and it is expected that the first production satellites will be launched in the first half of 2024, with service beginning later that year.

Given its experience in mass producing consumer electronics, its distribution network and its reputation for customer service, it’s understandable that Project Kuiper is regarded with some trepidation by the rest of the industry. According to NSR, between them, Project Kuiper and Starlink will account for 74% of total launches and 25% of manufacturing and launch capex, between 2021-31.

The other subject dominating the sessions and conversations, was that of satellite – cellular integration. Historically, satellite has generally been regarded as a necessary evil by the telcos, or the technology of last resort. This is definitely changing with the advent of the low earth (LEO) constellations, and the associated low latency. It was however surprising, to hear one of the analysts at the NSR briefing, saying that at Mobile World Congress (MWC) in Barcelona this year: “no (mobile operator’s) stand was complete without some reference to satellite.” Given that MWC is so large, it’s unlikely that he was able to visit every mobile network operator’s



(MNO) stand, so there will be some poetic license in there, nevertheless, that is still quite a turnaround!

One of the most talked about areas of satellite – cellular integration, is direct-to-device (D2D) communications. Discussions about this featured not only in the sessions, but also on the floor and in the corridors, it was definitely one of the hot-topics of the event.

Although it wasn’t mentioned at the show (apart from on Thuraya’s booth), it strikes me that SatSleeve, launched in 2013 deserves a mention in this context. The new generation of D2D services will use what appears to be an unmodified smart phone (although in some cases an additional or modified chip may be incorporated. SatSleeve is different. As the name suggests it is a sleeve or case for a cellphone, that incorporates an L-Band antenna. It only works with Thuraya satellites, so there is no coverage over North America. It does however, provide access to phone calls, email and social networking, as well as text messaging. SatSleeve+ allows the user to set up a local hotspot, so the phone can be used indoors as well. SatSleeve essentially turns the cell phone into a

satellite phone, and does so regardless of which mobile network operator (MNO) the cellphone operates on.

There are two varieties of the current approach being taken to the D2D market. One uses cellular frequencies, so requires no modification to the handset, but does require dedicated antennas on the satellite, and cooperation with the MNOs. This is the approach being taken by AST mobile, Starlink and Lynk. Lynk, with three satellites already launched will be the first to market in this group. Charles Miller, CEO Lynk, in a panel on Monday, said that his company has agreements with 41 MNOs around the world and is currently testing the system, which is limited to basic short messaging (SMS) only. Miller predicted that 1,000 first generation Lynk satellites will be in orbit by 2025. The second generation is designed to provide broadband service.

Starlink has an agreement with T-Mobile and will incorporate the additional antenna on its second-generation satellites. Unlike Lynk, which already has FCC approval, Starlink still needs to get this for the service in the US.

The other approach, incorporating




## SHOW REPORT

a satellite chip into the cellphone has several devotees, including Globalstar and Iridium. Iridium has teamed up with Qualcomm to produce a chip that will be incorporated into Android phones. Suzi McBride, COO Iridium was very bullish about this agreement; in a session on Monday she stated that: “by the end of 2023, Iridium will be a household name,” attributing this primarily to its presence in the D2D market. In a different panel that day Matt Desch, CEO, Iridium struck a far more cautious note, laughing at analysts’ projections for the market.

Globalstar has teamed with Apple, and emergency SMS service is already available on the iPhone 14. As a result of this Apple’s iPhone 14 was the winner of the 2022 Satellite Technology of the Year award.

Other awards made during the show, include Melanie Stricklan, CEO, Slingshot Aerospace as Satellite Executive of the Year. The WTA named US ElectroDynamics, Inc (USEI) as Teleport Operator of the Year and the award for the Teleport Technology of the Year went to Integrasy for its CleanRF.

Satellite is changing. Words used

to describe it, include: “convergence, competition and confusion” from Chris Baugh, founder and partner NSR, an Analysys Mason Company, and “flexibility, interoperability, resilience and sustainability” from Steve Collar, CEO, SES. Whichever words you choose, the energy at the Satellite 2023 was palpable. This is a dynamic, vibrant industry again. 



**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)

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# Satellite IoT and the rise of the Low Power Global Area Networks

by Hub Urlings

Around seven years ago, a new breed of I.T. entrepreneurs entered the satellite communication market. They launched a number of satellite IoT (SatIoT) start-ups to provide low-cost/low-power IoT connectivity using small satellites in Low Earth Orbit to serve the fast-growing Internet Of Things.

The new-space IoT operators directly challenged the incumbent SatIoT networks. Government-owned IoT networks like the French/US Data Collection System, the later privatised Inmarsat, or commercial SatIoT networks like Iridium, Orbcomm and Globalstar that had been ruling the market

for the last ten years in what some called an oligopoly. The incumbents offered global connectivity but were regarded as expensive and engineering-heavy.

The new-space plans were made possible with the new cubesat technology featuring 10x10x10 cm satellite building blocks used in the academic world since 2000. Due to the low costs for the small satellite constellations and hence the low connectivity cost, the new breed of entrepreneurs advocated a new type of network called Low Power (and low Cost) Global Area networks (LPGAN). Their goal was to get a share of the global Internet of Things market, which was showing strong growth in the 85% of the world, also in areas where no terrestrial connectivity was available.

The mission of the LPGAN systems was to extend that market significantly with their low-cost offerings to segments and customers that so far could not afford the expensive engineering-heavy offering from the incumbents. In short, the new-space SatIoT operators wanted nothing less than to break the incumbent oligopoly and disrupt the market with the low LPGAN connectivity costs. In addition, bullish market research reports forecasting tens of millions of SatIoT units in the coming decades fueled their plans and attracted more players and investors. As a result, more than 40 SatIoT networks are "in the market" now.



In this article, we will look closer at the SatIoT market supply side developments over the last few years and discuss how the SatIoT network landscape has changed since then. Our focus will be on narrow-band SatIoT systems. As such, this article draws on the re-

sults of the latest M2sat IoT Monitor 2023 (third edition) conducted by Satellite IoT Lab for use in their Strategic Satellite IoT workshops.

For incumbent SatIoT networks during that time, it was business as usual. They continued focusing on the maritime market with their need for reliable communications and on high-value markets like energy, utilities, government, where costs are less of an issue for whom communication is critical.



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However, new-space SatIoT networks entered the market in waves with much gusto and promised to democratise space and bring low-cost global IoT connectivity. Let's first look at what happened to the first wave of new-space systems: the smallsat-based LPGAN systems using custom-made narrow-band protocols. Then go into the next wave of SatIoT networks that has started more recently and take a more hybrid approach applying existing terrestrial protocols in satellite communication.

### How are the LPGANs doing?

The first wave of new-space satellite IoT operators was diverse. It included network initiatives worldwide: Fleet and Myriota from Australia, Kepler from Canada, as well as Lacuna, Kineis, Hiber and Astrocast from Europe.

From the first wave of LPGAN operators, three have crossed the commercial launch milestone:

- U.S.-based Swarm is up and running commercially, having started operational service in the U.S. and a limited number of other countries. Backed by parent company SpaceX, Swarm is running a constellation of the world's smallest two-way communication satellites, based on the FCC approval for 150 VHF and 450 UHF 0.25U CubeSats. The company is now working to prepare its licensing and landing rights worldwide. An example and important step for South America was achieved in 2022 when the Brazilian authority Anatel granted Swarm the right to use radio frequencies for the Swarm satellite system, through its legal representative, Swarm Brazil Satélites Ltd, until September 7, 2035.

- Swiss-based Astrocast continues steadily implementing its satellite network, recently extending its satellite constellation by launching four more satellites. The more satellites, the higher the reliability and the lower the latency between sending an IoT message to the satellite and receiving it in the headquarters. Although their satellite network is in a bit earlier completion stage, Astrocast is the most advanced European SatIoT network. They are now shifting their attention to the business's commercial side, focusing on marketing and distribution. At the end of 2022, they also took over Dutch Hiber, which abandoned its small satellite plans in 2021.

- Myriota from Australia also has a commercial service, mainly simplex tracking and tracing services. However, the Australian-based company is still in the network

development phase. They are still working on perfecting a two-way service and bringing down the relatively high latency. Myriota is building up its satellite fleet in cooperation with Spire's Satellite-as-a-Service capability, which should lead to a near-real-time connectivity service when ready.

### Still under Development

- Kineis is the French network backed by private and public investors, including the French government's space agency CNES (Centre National d'Études Spatiales) and CLS (Collecte Localisation Satellites). Building on the foundation of the existing Argos network, the next-generation network is still in the development phase. Kineis has secured a multi-launch contract with RocketLab that should bring their complete 25-satellite constellation into orbit in a couple of launches starting in 2023.

- Lacuna Space from the U.K. was one of the first new-space IoT operators. Unlike most others that applied dedicated protocols to lower connectivity costs, Lacuna's philosophy was to work with LoraWan and offer an open standards-based ecosystem. As such, they were among the first of what I would like to call the second wave of new-space SatIoT players that tried combining terrestrial and space-based communication protocols to achieve low-cost connectivity. The company has launched several satellites and focuses on testing its network with a limited number of critical users. More about Lacuna Space later in this article.

### Drifting into space?

- Australian operator Fleet Space Technologies was relatively quiet in the past year about their SatIoT activities. However, there were many publications on other space-related activities in Australia. Fleet seems to be heading into the space exploration and E.O. sphere leveraging their LEO and small-sat expertise. They are also spending a lot of time as one of the frontrunners building up the general space capability in Oz.

- Kepler Communications from Canada seems also to shift its focus to space. They are building a space-based infrastructure to relay data between space assets in LEO and earth, using their proven high-speed Ku band connectivity technology. Such an infrastructure saves future LEO missions for IoT connectivity or Earth Observation, the effort to build a global ground station infrastructure. However, Kepler is much quieter about the progress of their SatIoT service.

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One of the first systems to use LoraWan via satellite was UK-based Lacuna Space. (image courtesy of Lacuna Space)

**LPGAN results so far**

With three of the first wave of new-space SatIoT operators into commercial operations, the promise of low-cost / low-power IoT connectivity has been met. Two more operators are still developing their satellite networks and working towards commercial service. Others seem to deploy the technical skills and capabilities in other space sectors like Earth Observation or deep space communications. Although there have been some general casualties along the way, the first wave of new-space SatIoT players fulfilled their promise to bring an operational SatIoT service to the market. The next step is to complete the regulatory framework for them and establish the necessary sales and distribution channels. All this may not go as fast as many new breeds of entrepreneurs or investors might have wanted, but as they say on the technical side: "satellite IoT is not a sprint, but a marathon."

**The second wave new-space SatIoT operators: integrating terrestrial and satellite protocols**

Where the first wave of LPGAN operators used proprietary protocols to make low-cost connectivity, the second wave of new-space sat iot networks tried a hybrid approach combining terrestrial and space-based protocols. Their reasoning was relatively straightforward: using existing 5G NB-IoT or LoraWan connectivity protocols

and equipment would more organically extend extending terrestrial IoT network infrastructure to a global scale. In addition, customers could also benefit from the low prices for mass-produced hardware and terminal equipment.

Let's first have a look at the NB-IoT SatIoT players

In a 2022 press release, Spain-based Sateliot announced that in cooperation with the Future Telecommunication Projects Division of ESA, it had proven the technical feasibility of using NB-IoT protocols over satellites. "Tests have been conducted that have demonstrated the successful operation of a set of NTN NB-IoT protocols compliant with the recent 3GPP Release 17 NTN NB-IoT standard developed by Sateliot."

The feasibility of 5G IoT for satellite IoT is based on the premise that network operators will be able to interoperate, e.g. for connecting with the smallsat network using a roaming service when they need 5G coverage to offer connectivity

The successful test means that Sateliot has moved up a step on the Technology Readiness Level ladder, but a test is a test, not a commercial service. As a result, the company still has to take a number of steps to come to a commercial hybrid NB-IoT satellite service. To meet this challenge, Sateliot is currently looking for funding for the launch of its first constellation of satellites. They hope to raise 100 million euros in B series funding.

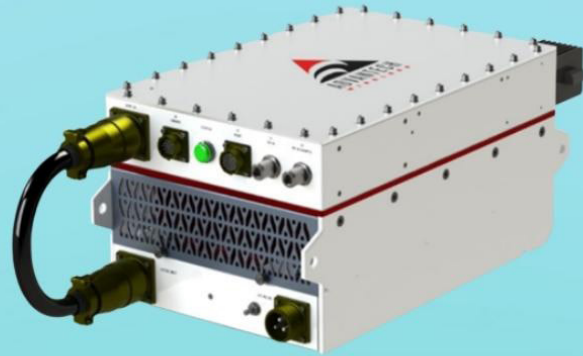
The challenge of integrating NB-IoT with satellite communications lies not only in the technical domain but also in the regulatory domain. The complex and country-based regulatory and licensing environment for using 5G frequencies represents a huge challenge for this wave of SatIoT operators as it will have to deal and negotiate with all individual countries.

Terrestrial networks use dedicated frequency bands that cannot automatically be used for satellite connectivity. Although the recent 3GPP Release 17 NTN NB-IoT standard is a huge step forward, national regulations and licenses determine the possibilities of offering commercial service in a country. Therefore, any satellite IoT service, though technically available globally, can only be offered country-by-country due to national regulations.

**OO**

The Luxembourg start-up OO currently qualifies as the largest 5G SatIoT network. OO's LEO satellites use Rel





## Introducing **GENESIS** - the new series of Ku-band SSPAs and BUCs from Advantech Wireless Technologies.

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Additional frequency bands and higher power levels based on the **GENESIS** platform will become available in the coming months.



17 5G Internet of things technology to provide connectivity in remote and rural areas. The company seems to have landed in the Middle East, notably the Kingdom of Saudi Arabia. Not only did it secure funding there, but also a launching customer. OQ works closely with the Saudi Ministry of Energy to connect remote assets, such as wellheads, pipelines and smart meters, for oil and gas company Saudi Aramco. The cooperation reflects the 13 million Euro Series A funding round led by Wa'ed Ventures, the venture capital arm of Aramco, in September 2022.

OQ technology will use the funds to develop its technology solutions further and acquire more (national) spectrum licenses, grow its SatIoT constellation, and build its first satellite control centre in the country.

### LoraWan players

Several SatIoT companies and start-ups plan to use the terrestrial LoraWan protocols to communicate with the satellites. The significant advantage of these types of networks is that they complement one of the dominant terrestrial IoT ecosystems. We will only mention the solid backup from the Semtec Lora chip manufacturer here. This will bring advantages regarding equipment costs and leveraging existing back office infrastructure.

### Lacuna Space

One of the first systems to use LoraWan via satellite was UK-based Lacuna Space. With only a few satellites launched, the company is focused on testing its network with limited users. An example is the Drought Early Warning System in New Zealand, where Lacuna implements IoT-enabled LoraWan sensors into a network of low-cost rainwater tanks.

A major area for development is also Lacuna Space's licensing position. Lacuna used UHF ISM band initially. According to ITU rules, however, that band is not intended for land-to-space communications like in satellite IoT but only for land-to-land terrestrial IoT. On top of that, the ISM band is also prone to interference from terrestrial users. Despite these limitations, Lacuna validated their in-orbit constellation over the last years.

It's positive news that Lacuna recently partnered with Omnispace, which brings S-band licenses as an important

***"...The challenge of integrating NB-IoT with satellite communications lies not only in the technical domain but also in the regulatory domain. The complex and country-based regulatory and licensing environment for using 5G frequencies represents a huge challenge for this wave of SatIoT operators as it will have to deal and negotiate with all individual countries..."***

asset into the partnership. With Lacuna's IoT Network's on-orbit operation validated through several years of LEO satellite testing and optimisation, the collaboration with Omnispace would leverage their licensed 2GHz S-band spectrum rights.

Once integrated, the Omnispace and Lacuna infrastructure can provide a service that will allow devices to connect seamlessly between existing terrestrial networks and previously un-connected regions around the globe. With this offering of commercial LoRaWan Direct-to-Satellite Connectivity, it looks as if the pair could become an important player in the satellite IoT market

Says Rob Spurrett, CEO of Lacuna. "Our customers will be able to access Lacuna's IoT service directly from inexpensive, battery-powered LoRa® devices to extend connectivity to even the most remote areas of the world."

### Eutelsat LEO for Objects (ELO)

Eutelsat's SatIoT plans have been quiet over the last year, and the Eutelsat LEO for Objects (ELO) network development status is unclear. The satellite operator initially drew on the terrestrial IoT technology of Sigfox, which operated a unique terrestrial narrow-band network dedicated to the IoT but later switched to LoraWan.

AAC Clyde Space built two 6U cube satellites to initialise Eutelsat's low earth orbit Internet of Things constellation. If that mission proves successful, Eutelsat plans to expand it into a full commercial constellation of 25 satellites dedicated to IoT services. The launch is planned for 2023 but is not confirmed yet. It is also unclear what frequency bands Eutelsat is planning to use for the service, an essential factor for the viability of using LoraWan via satellite. Maybe Eutelsat is preoccupied with their broadband LEO plans?

Spanish Fossa Systems, is a non-profit association developing picosatellite technology to, in their own words: "democratise access to space". The company launched its

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third smallsat mission via a SpaceX Falcon 9 rocket on January 13 2022, deploying six picosatellites in Sun Synchronous Orbit. Licensed by the Spanish Ministry of Economic Affairs and Digital Transition, the company is enabled to operate a public, satellite-based IoT network and the transmission of IoT data in Spain.

Over the last year, the company has generated a lot of publicity to get funding to build up its network and to launch an 80-satellite constellation by 2024.

### Second Wave of Newspace SatIoT systems

The ratio behind using terrestrial IoT protocols for satellite communications is compelling. SatIoT networks like that would be very much complementary to the existing terrestrial infrastructure and ecosystem. In addition, this would bring advantages in equipment and integration costs. Early tests seem to validate the technical feasibility, but all systems still have several steps to take on the Technological Readiness ladder before they reach commercial maturity. Apart from the technological challenges, there is also the frequency licensing challenge. Once those are solved, however, it looks like the second wave of new-space IoT could play an important role in the further growth of the global satellite IoT market. However, the involved networks will need a couple of more years for these developments before a full commercial service will be available.

### Medium band satellite IoT

The article above focused on narrow-band SatIoT networks to establish low-cost / low-power connectivity, and we looked at the first and second waves of these networks. The SatIoT market has not been standing still, however. Incumbent sat IoT operators have steadily extended their SatIoT subscriber numbers over the last few years. In addition, operators like Iridium have introduced new IoT-centric services that leverage their existing satellite network.

With the growing number of IoT applications that use



**This article highlights some results from the Satellite IoT Network Monitor report (3rd revision, 2023) from Satellite IoT Lab. Unlike the usual quantitative market reports, this report provides an in-depth qualitative view of the satellite IoT market supply side.**

**The content of the report is an integral part of the Satellite IoT Strategic Workshops.**

**So if you or your team are looking for a deep-dive into the satellite IoT market, contact us at [strategic.satiot.workshop@m2sat.com](mailto:strategic.satiot.workshop@m2sat.com)**

diverse data types, capacity bandwidth, latency and speed requirements, we also see other satellite IoT networks coming to the market. Apart from the arrival of the broadband LEO constellations, the last year also saw the arrival of several medium-band satellite IoT Networks on the market. Although we will not go into these operators deeply, we just wanted to point out two new players at this place.

U.S. operator EchoStar, one of the major satellite operators in broadcasting, launched a LoRa connectivity network across Europe and parts of Africa and the Middle East using S-band from one of its existing satellites in geostationary orbit (GEO), EchoStar 21. Over time they plan to expand to global coverage with a to-be-launched LEO constellation.

HiSky is providing another new commercial medium-band Sat IoT service with a high potential impact. The HiSky platform runs over existing (GEO) satellites and has made an important partnership with i-Direct. An upgrade of the existing i-Direct platforms (used by hundreds of teleports worldwide) with HiSky technology is enough to start offering medium-band IoT connectivity using Ku- or

Ka-band satellite capacity. The HiSky/iDirect partnership brings higher bandwidth SatIoT and a whole ecosystem of seasoned satellite service providers and system integrators to the SatIoT market.

Also, at this point, a short remark on the plans and latest hype for cell-to-satellite networks. We do not see cell-to-satellite systems as part of the SatIoT industry as they mainly concern (emergency) text messaging from individuals. However, the technology is very similar, with cross-overs from satellite IoT. So we will undoubtedly watch how this market develops, particularly as market research agencies produce nice hockey sticks for their revenues.

### In Conclusion

A complete overview of all satellite IoT market supply-side developments would take too long for an article. The market is still very turbulent, with more than 40 operators competing for their share of the fast-growing satellite IoT market, with new networks arriving on the market constantly.

This article focused on the new generation of narrow-band satellite IoT operators, the Low Power Global

Area Networks. Their progress does not seem too bad. Although some early players did not make it, we now have three networks commercially available and several other players expected on the market in the coming years. Behind them comes a second wave of networks that aims to integrate terrestrial and satellite communication in one complementary solution. Although they need more time to meet their technical and regulatory challenges, progress is steady, and in time they will complement existing SatIoT services.

We conclude that we can confirm that the LPGAN generation has brought commercial low-cost, low-power IoT connectivity to the market. Focus now will shift to marketing, and the development of sales and distribution channels, to grow the total SatIoT subscriber numbers and open up new market segments. All we need is patience and stamina from investors.

However, there is more to come in satellite IoT in the coming time as medium, and broadband IoT applications develop in our digital world, pushing existing and new satellite operators to provide global connectivity for them.



**Hub Urlings** was one of the pioneers of Satellite M2M/IOT as Product Manager Inmarsat-C at the famous KPN Station 12. This "small data" satellite service's success, global coverage, and reliability made Inm-C the service of choice for many applications: from sending messages to truck fleet management to pipeline monitoring and bringing back data from all types of sensors. Now, 25 years later, he is still involved in developing new generations of small-sat-based SatIoT services.

In the upstream as ESA Innovation Manager at Hiber and as a consultant, and in the downstream via his company M2sat developing satellite IoT applications for environmental monitoring and Hydro-Met observation networks.

To meet the complexity of the SatIoT value chain, in 2020 he founded SatIoT lab.com as a research, education and co-creation platform for global sat-IoT applications. SatIoTLab runs a continuous satellite IoT supply chain research program and testbench. The results are published in the Satellite IoT Monitor 2023 (3rd edition), an integral part of the Strategic Satellite IoT Workshops. He can be reached at: [urlings@m2sat.com](mailto:urlings@m2sat.com)





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# “Hello CABSAT!”

## GVF @ SatExpo Summit 2023

**by Martin Jarrold**

Had it not been for pandemic travel restrictions earlier in this decade my tally of annual trips to Dubai in the UAE would this year have hit the 20-mark as once again, this May, GVF will be providing content support for the CABSAT SatExpo Summit over the first two show days. The first and second days of CABSAT will feature a program of panel sessions exploring a range of themes high on the agenda of the space and satellite sector.

From a listing of provisional panel discussion themes – Satellite Antennas; Space Sustainability; Satellites and the Cloud; Satellite-to-Device Communications; Mobility Markets; Satellite Industry Disruption; the Digital Divide; New Space; Humanitarian Assistance and Disaster Response; and S.T.E.M. – GVF and Dubai World Trade Center will confirm a selection of sessions for the Summit program based on popular demand.

Only recently have antenna innovations in terms of performance, cost, operation, and other parameters grabbed the same sort of headlines as space segment advances. Ground segment has too-often been an afterthought because satellite operators focused on building the most capable satellites with the choice of ground segment technology made completely independent of satellite design. ‘Antenna Wars? The Flat Panel and Parabolic Evolving Paradigms’ will examine the changing antenna environment asking, if antenna innovation is now at its own transformational cutting-edge, what exactly does this mean? Also under consideration, will be the technologies addressing NGSO constellation rollout, and increasing demand for satellite services to mobile platforms; and the future of the parabolic paradigm as flat panel technology innovations are marketed.

‘Securing Sustainability in Space Business’ will analyze the many dimensions of space sustainability, from the increasing risk of orbital collisions and resultant

debris, to the militarization of space. With the background of collision risk being partially mitigated through

satellite operator coordination, the adoption of ‘good practice’ principles, and improved space situational awareness, this panel will assess the scale of the orbital debris problem, and examine the principles of good practice. Asking, “Are there dimensions to sustainability not currently being addressed?”, this session will look at what more needs to be done in terms of managing an increasingly crowded and limited economic and security resource.

In exploring the advantages of incorporating the Cloud – plus its logical extensions of virtualization and edge-computing – into satellite businesses ‘The Digital Cloud in Orbit’ will investigate maximizing the full potential of satellite’s interoperability with telcos and MNOs, with satellites as switches in the greater telecommunications ‘network of networks’. With increasingly widespread adoption of Cloud-native platforms and methodologies the question is whether this is adoption of something monolithic or is something manifest as a series of fragmented, siloed, and differentiated Cloud infrastructures that don’t readily scale.

Various direct satellite-to-device services have now emerged based on technologies that have attracted a lot of attention and the panel session entitled ‘The Satellite and Cellular New Communications Paradigm’ will look beyond the early direct satellite-to-device services typically only offering SOS-type alerts and text messaging. Early-stage services have transitioned, developing into more widely attractive offerings of internet access and video. This panel will examine what the different technologies have in common and ask if we are witnessing



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moves towards some form of standardization, or a countervailing, off-trend, movement favoring proprietary solutions. Questions to be covered include: “Is advancing standardization in satcoms now just a question of time and an inevitability?” and “How does the direct satellite-to-device environment build upon 3GPP Release 17?” and “To what extent does the direct satellite-to-device environment mean that satcoms is now center-stage in telecoms?”

The ‘Into the Blue: Flying and Sailing with Satcoms’ panel begins from the premise that crews and passengers on aircraft, ships, and railways, and in cars, all share the expectation that, no matter their location, there should be no limitations to broadband access to the internet, with uninterrupted service capable of supporting streaming, social media, and bandwidth hungry work applications. In assessing how airlines are leveraging new satcoms technologies to serve passenger and commercial operational needs, why shipping lines need satcoms for developing their use of operational technologies, and offering a prognosis for satcoms/cellular connectivity for the private car, this session will analyze the likely future of these mobility markets for a technologically fast-evolving satellite sector, both in the space and ground segment.

The term disruptive evolution is now central to the space and satellite industry lexicon and will be central to the panel discussion on the theme of ‘Transformational Technology Disruption, Service Resilience’. A rapidly transformational technology dynamic has brought forth terabit GEOs, more powerful MEOs, and mega-LEOs; NGSO space is being tested by GSO operators, and multi-orbit strategies and HAPS technology have gain attention. And ground segment change is accelerating too. This session will explore new space and ground segment disruption, posing such questions as “Is technology disruptive evolution always good?” and “What advantages will the multi-orbit/multi-system/multi-network GSO-NGSO environment bring?” and “Why are HAPS an important part of the service resilience equation?”

Bridging the digital divide has been a long-standing satellite industry objective, and serving the underserved – encompassing both the digital divide between developed nations and countries with a poorly developed capacity to secure reliable internet broadband access; and,

***“...Bridging the digital divide has been a long-standing satellite industry objective, and serving the underserved – encompassing both the digital divide between developed nations and countries with a poorly developed capacity to secure reliable internet broadband access; and, the digital divide between well-served urban and suburban areas and underserved rural and remote regions ...”***

the digital divide between well-served urban and suburban areas and underserved rural and remote regions – is what the session ‘Connectivity: What the Underserved Want, What the Underserved Get’ will be all about. “How is our understanding of the digital divide changing and thereby driving fresh initiatives to effectively, and finally, reach a solution?” and “Will NGSO platforms make a real difference?” and “How important will be the role of direct satellite-to-cellular device services in resolving the needs of the underserved?” These are just some of the questions which will aid understanding of the principal barriers to serving the underserved, whether it is connectivity, or affordability, or regulatory. Additionally, what is the role of Universal Service Funds? All are questions vexing providers, governments, and those on the other side of the divide.

As will be explored in ‘New Space: The Re-invention Constant?’, the satellite domain is in a constant state of re-invention. Inflexion point follows upon inflexion point in a rapid growth ecosystem of private sector-led growth; a space business incubation culture comprising hundreds of new entrepreneurial units and innovations leapfrogging over established technologies, with solutions matching more wide-ranging demand for satellite-based services. HTS, NGSOs and HAPS; 5G and IoT; AI and ML; software-definition and virtualization; and the blurring of the divide between satellite communications and Earth observation. Where is all this New Space is taking us and what is it doing for us? Some further important questions are “Has New Space become Now Space?” and “How important has the space domain become for new economic opportunity, and for preparedness for dealing with an array of chronic, systemic, and existential Earth-bound threats?” and “What can we expect the patterns of more wide-ranging demand for satellite-based services to look like?”



## MARKET INTELLIGENCE

The development of the United Nations Crisis Connectivity Charter (UNCCC) was an important humanitarian assistance and disaster response milestone achievement of the satellite industry. 'Earth's Disaster Preparedness and Response: The Satellite Imperative' will look at the imperative role of satellite networks in preparing for, and responding to, disasters. This role, often under-appreciated, is exemplified not only by the UNCCC but also in the industry having a voice – through GVF – in the United Nations Emergency Telecommunications Cluster, as well as the industry supporting – again through GVF – the United States Department of Defense Multinational Communications Interoperability Program 'Pacific Endeavor'. This panel will explore satellite's essential contribution to disaster preparedness and response and look at what more can satellite can do to ensure better recovery from disasters and how Covid-19 has changed our views on the meaning of disaster preparedness.

The space sector has the most highly skilled workforce of any industry, with 75% of workers holding at least a first degree, but it competes with many other industries, including those with a higher profile and higher average pay, which are winning in the competition for talent. The objective of the panel session 'The S.T.E.M. Imperative of the Space Industries' is to explore the human resource needs of the sector and what the industry is doing to inform, and attract and train, young recruits, and to retain a pool of diverse talent. Given that many people are seemingly unaware that the space economy offers work that's challenging, exhilarating, well compensat-

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## Mastering the Business of Space

The SSPI 'Making Leaders – How to Bring New Hires on Board' publication provides some valuable insights and observations on the question of space companies onboarding new employees. It observes that "Onboarding, according to the [US-based] Society for Human Resource Management (SHRM), is the process of integrating a new employee into the company and its culture, as well as getting a new hire the tools and information needed to become productive. Also, according to SHRM, it is crucial to ensuring high retention."

"Onboarding" is a process; it is about developing competence. An HR expert contributing to the publication notes that to get a new employee from zero to 70-90% competence at their job and in navigating the organization what is needed is a successful, meaningful onboarding process; without it, an employer will have future retention issues.

Moreover, 'Making Leaders – How to Bring New Hires on Board' points to one HR executive's view that personnel turnover typically happens in the early part of a career, noting that "The usual reason is that [the employee] didn't really understand what they were getting into."

This is where SBQ comes into its own because it enables mastery of the fundamentals of the business of space, filling a critical gap for people who are new to the space and satellite industry. Evaluation feedback received from students around the world illustrates this; and the customer is always right:

- "SBQ offers a wider scope of learning that can enhance the knowledge gained on the GVF course catalogue. Also offers opportunities for non-technical roles to gain knowledge in the satellite business."
- "Provides an opportunity to new employees to understand their role in the space industry."
- "I believe the SBQ program is most valuable for new employees who want to join the satellite business." 



# Teleport Awards Luncheon 2023 Where Good Jokes Go to Die and...

By Lou Zacharilla

...great companies are given awards.

I thought that my best joke at this year's Teleport Awards Luncheon would be this line:

"Hello everyone. Welcome to the 28th Annual Teleport Awards for Excellence Luncheon. I promise you that NONE of the jokes you hear today have a zoonotic origin. They are ALL gain of function humor."

Crickets. Nothing. Blank stares.

I replied, "And I appreciate the devotion of those of you who gave up laughing for Lent." The sold out room at Satellite 2023 broke out laughing. We were off to a good start and a fine time.

Go figure.

The World Teleport Association's 2023 Awards recipients are definitely no joke. The recipients and the finalists are seriously outstanding companies, two of which had won awards at this event in the past. Spain's Integrasys S.A., which picked-up the 2023 Teleport Technology of the Year Award for its interference cancelling technology called "CLEAN RF, was a recipient in 2018 for its Alusat technology. CEO Alvaro Sanchez, flanked by

his team members who looked like power forwards. I felt like the coach of an NBA team during a timeout! These guys have powered their way to developing a technology that enables secure and robust communications which protects a teleport network's terminals from common interference sources. In a world where there is more

some recalled that his long-winded, rambling, charming acceptance speech had been memorable and poignant. This year, as he accepted the Independent Teleport Operator of the Year award for his U.S. Electrodynamics (USEI) teleports, he humorously began, "After last year, I am not going to speak!"



The 2023 Teleport Technology of the Year Award was awarded to Integrasys for its interference cancelling technology called "CLEAN RF." CEO Alvaro Sanchez, second from right next to the author, poses with his team.

He then spoke. Eloquently.

Like the leader he is he called-out his great team from Brewster, Washington and Vernon Valley, New Jersey and noted how LEO services are a growing part of his business. USEI was designated a primary site by the U.S. Federal Communications Commission for interference-free C-band operation. Jim spoke about the importance of the teleport industry in keeping communications flowing worldwide. And

he ended dramatically and properly with the words, "God bless Ukraine."

Of note: after the Luncheon concluded a representative from a Ukrainian teleport which WTA, through its Certification Director Randall Barney, had given a membership to after the

congested spectrum than there are bad Machine Kelly tweets, CLEAN RF is a fundamental tool now for teleport operators. In fact, it is the only tool capable of cancelling 5G over C-band interference, which is on the rise.

Jim Veeder, 75 years young, was named Teleport Executive of the Year last year. Before this year's luncheon

start of the Russian invasion, thanked the industry for its support.

This was the 28th time I had presented these awards and once again the words “for excellence” applied. We recognized companies headed by seasoned leaders who represented the traditional sector of the industry, the technology changes that came at us fast and the future of ground segment design.

Jim Veeder was on stage again to present the Teleport Executive of the Year award to Bulgaria’s Vladimir Rangelov, the Director of Broadcasting Services at Vivacom. Rangelov had been announced earlier as the industry’s executive of the year. WTA said that Vivacom is an example of a regional teleport operator achieving strong growth through agility and flexibility to adapt to the needs of the industry’s most traditional customers, the broadcast industry. Rangelov’s skill at refining value for the industry was cited.

Rangelov has produced a 24% increase in revenues over the past two years for Vivacom.

Maybe it is the old advertising copywriter training I had long ago that makes me prone to the sound byte or snippet. The more meaningful remarks or phrases stick with me, and I use them. Speaking with Vladimir and his wife, who flew to Washington from Bulgaria for the awards program, he said that in his 21 years in the business he never had a day, or an hour in fact, where he didn’t get up with enthusiasm for the day’s work ahead.

Take that testimony any way you want. But you know that without that



**2023 Teleport Executive of the Year awardee Vladimir Rangelov, the Director of Broadcasting Services at Vivacom with his spouse at the awards dinner.**

kind of passion, excellence is an empty exercise reduced to simply showing up, “punching the clock” and grinding it out.

For me, this event is like the Rangelov experience. I am nearing my third decade hosting the annual WTA Teleport Awards for Excellence Luncheon at Satellite. Next year will be #29 for an event I started when GEO was king and LEO was a guy’s name. Back then Mark Dankburg and Mark Miller were talking-up their high-throughput vision as “DSL in the sky” and people were rolling their eyes when teleport operators said that they days of the “bent pipe” were

numbered. Fragmented aperture, open space platforms, software-defined infrastructure and a “multi-orbit world” were confined to theories and notebooks in engineering classes.

But as Aldous Huxley knew, “Consistency is contrary to nature and contrary to life. The only completely consistent people are the dead.”

Things change. Next year will be my 29th year hosting the luncheon. What won’t change is the level of excellence on display and the jokes.

They will still suck. 🇺🇸



**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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## Gilat Signs Definitive Agreement to Acquire DataPath

Petah Tikva, Israel, March 9, 2023 - Gilat Satellite Networks Ltd. (Nasdaq: GILT, TASE: GILT), announced today that it has signed a definitive agreement to acquire DataPath, Inc. (DPI), which will be a core component of Gilat's Defense growth strategy. DataPath is a provider of trusted communications for the US DoD Military and Government sectors. The acquisition is another step in Gilat's initiative to increase its presence in the growing Defense market. Gilat expects its annual revenues in the Defense sector to increase by approximately US\$ 50 Million following the closing of the acquisition, according to the company.

The transaction has been approved by the Gilat board of directors and by DataPath's board of directors and stockholder. The closing of the transaction is subject to certain regulatory approvals, including the receipt of clearance of the Committee on Foreign Investment in the United States (CFIUS), and other customary closing conditions. The acquisition is expected to close in the third quarter of 2023.

DataPath has more than 25 years of experience in integrated communications and information technology and is a market leader in trusted communications systems, services, and end-to-end solutions for mission-critical operations. DataPath is a US based

expert systems integrator with a strong focus on the DoD and US government sectors, bringing leading competencies in systems engineering, software development and mechanical engineering. These attributes have enabled DataPath to secure and maintain their continual presence in the provision and sustainment of SatCom systems, such as portable ground stations, and related services.

Needham & Company LLC and Quilty Analytics LLC are serving as financial advisors to Gilat. Naschitz Brandes Amir & Co. and Foley and Lardner LLP are acting as Gilat's legal counsel. RCBG is serving as an exclusive financial advisor to DataPath. DLA Piper LLP and Greenberg Traurig are acting as DataPath's legal counsel.


## Voyager Space Acquires ZIN Technologies

London, UK, March 15, 2023 - Voyager Space, an American space technology company announced the acquisition of ZIN technologies Inc. (ZIN), an engineering, design and integration company providing human-related space-flight systems and monitoring solutions. This acquisition is part of Voyager Space's expansion of

space infrastructure and technology capabilities to further its Starlab development efforts.

ZIN provides systems and highly engineered solutions to multiple launch vehicles, low-Earth orbit infrastructure projects, and spacecraft, including the U.S. Space Shuttle, the MIR space station, the International Space Station (ISS), Dream Chaser, and Starlab. ZIN has participated in over 400 research activities on the ISS – including the development of microgravity research equipment, and supporting the human-rated structural monitoring systems for the Lunar Gateway under NASA's Artemis program.

ZIN has experience in the integration of complex space-rated hardware and the development of rendezvous, docking, and related capabilities. These solutions have direct applications to the Starlab space station and complement Voyager Space's portfolio of space infrastructure and technology capabilities.

"ZIN's aerospace expertise, strong reputation in the industry, and legacy working with NASA and the ISS, makes them a perfect fit for Starlab and the growing Voyager Space technology ecosystem," said Matthew Kuta, President and COO of Voyager Space. "ZIN has already played a crucial role as a capability provider to Starlab and as a founding leadership team member of the George Washington Carver (GWC) Science Park. We look forward to working with them further as part of the Voyager Space family." 

## Kayhan Space Appoints New Chief Commercial Officer

Lafayette, CO. February 23, 2023

-- Kayhan Space



**Matthew Shoupe**

announced that it has named **Matthew Shoupe** as **Chief Commercial Officer** to lead sales, marketing and product strategy for the company.

The announcement comes as Kayhan Space prepares to expand its product offerings in response to an increasingly congested space operating environment.

Shoupe brings more than 13 years of industry experience in the highly specialized area of sales and product development for astrodynamics-based software and software-as-a-service (SaaS) applications supporting satellite owner-operators. He joins Kayhan Space direct from LeoLabs, where he served as Senior Director of Commercial Space and gained industry-unique expertise leading sales and product strategy for the company's services for constellation operators, including tracking a growing database of satellites and space debris in Low Earth Orbit.

Prior to LeoLabs, Shoupe led sales for a.i. solutions' commercial FreeFlyer software for space mission design, analysis, and operations, where he worked with commercial and government customers including NASA and the US Air Force.

Shoupe will play an integral role

in the product development, sales, and successful customer adoption of Kayhan Space's cloud-based software solutions, including its flagship Pathfinder™ space traffic management platform, which is already utilized by hundreds of satellites in space. Pathfinder collects and fuses space object data from various sources, leverages precise orbit prediction algorithms to determine upcoming conjunction events or potential collisions with high accuracy.

Shoupe will be expanding the Kayhan Space team and product set to meet the urgent needs of satellite operators and the space economy by reducing the risks associated with operating and orbiting key assets in congested space.

## AvL Technologies Appoints Guy Clerici as CEO and David Bowne as President

Asheville, N.C., March 7, 2023 –

AvL Technologies owner and founder **Jim Oliver** has appointed **Guy Clerici** as Chief Executive Officer (CEO) and **David Bowne** as President.



**Guy Clerici**

Oliver is moving toward full retirement this year. Clerici brings more than 20 years' experience as AvL's general counsel and business consultant, plus a lifetime of business experience having grown up in a family of product manufacturing leaders to his new role

as AvL's CEO.

After earning degrees in finance, law and corporate tax law, Mr. Clerici was responsible early in his career for guiding owners in the successful growth of their businesses. With first-hand experience assisting hundreds of closely held businesses to succeed,



**David Bowne**

Mr. Clerici returned to North Carolina in the early 1990s to join in the purchase and management of several national market, Charlotte-based product manufacturing operations.

Clerici met Oliver soon after moving to Asheville in 2001 and has been an integral part of AvL's development and success as the company grew from 8 to 200+ employees today. Mr. Clerici fully and energetically shares Jim Oliver's vision and core values of providing industry and government with extraordinary service, great products, and continuous improvements, while maintaining an excellent work environment for all in the AvL family.

Bowne is President of AvL and brings more than 35 years of experience in SATCOM and related industries, most recently as CEO of I.F. Engineering Corporation/CrossPoint Technologies in Dudley, MA. Mr. Bowne also has served as Vice President of Sales and Business Development for ND Satcom, Vice President of North American Sales for General Dynamics SATCOM Technologies, and Director of the Small Antenna Group (Worldwide).





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“I’m excited to formally bring Guy Clerici to the AvL team and have him lead the company into the future. He brings the right mix of expertise in legal matters, finance, manufacturing and business management. David Bowne brings the incredible depth of experience in SATCOM and manufacturing that ensures AvL will continue to lead the industry with the rugged and reliable SATCOM products our customers expect,” said Jim Oliver.

“There’s a reason Jim Oliver is in the Space & Satellite Hall of Fame – he is an innovative engineer and entrepreneur, and an engaging business leader. I’m honored to take the reins from Jim to lead this great company and the seasoned team he has assembled over the years. I know my background will bring new insights to the business,” said Clerici. “Together with David and our experienced team of more than 30 engineers, AvL will continue to invest in research and development and work with customers to bring exciting new products to market. With unprecedented technological development in all aspects of the SATCOM marketplace this is an exciting time for AvL and for our industry,” he added.

AvL Technologies, Inc. specializes in the design, development and production of mobile satellite communication antenna systems and terminals. AvL’s visionary approach to mobile satellite antennas and positioners has established the company as a global leader in innovation and reliability. The industry leading AvL product line features a full range of rugged, rapidly deployable, mobile antenna systems and terminals, including multi-band and multi-orbit configurations. AvL antenna systems enable efficient and

cost-effective voice, video, and data connectivity to be established quickly, without the need for specialized training.

## WTA Names Vivacom’s Vladimir Rangelov as Teleport Executive of the Year 2023

**New York, NY, March 6, 2023** - The **World Teleport Association (WTA)** named **Vladimir Rangelov**, Director of Broadcasting Services at **Vivacom**, as the 2023 Teleport Executive of the Year.

Rangelov accepted the award at the 2023 Teleport Awards for Excellence Luncheon on March 14 during the SATELLITE 2023 conference in Washington, DC. The Teleport Executive of the Year award is presented to an individual for demonstrated entrepreneurship, leadership and innovation in the development or operation of a teleport-based business.

“Vivacom is a fine example of a small, regional teleport operator achieving strong growth through agility and flexibility to adapt to the new needs of broadcasters,” said executive director Robert Bell. “Despite the occasional prediction that consolidation will doom smaller companies in this market, smart innovators continue to grow their companies and refine their value to customers.”

Rangelov has served as Director of Broadcasting Services at Vivacom, based in Sofia, Bulgaria, for over 6 years. He previously held two senior manager roles at the company beginning in 2008. His leadership has resulted in more than 10% year-over-year teleport services growth for Vivacom



**Vladimir Rangelov**

in 2021 and a 24% increase in revenues over the past two years. Before joining Vivacom, Rangelov served in various managerial roles at tower company NURTS as commercial director, board member and CEO, ALCOMTECH JSC and ELTA-R.

Rangelov also supports local educational institutions by sharing his knowledge and experience with students interested in the telecommunications industry. He also serves as a consultant and provides connectivity solutions for different astronomy projects conducted by Sofia University and scientific research missions for the Bulgarian Antarctic base.

The WTA ([www.worldteleport.org](http://www.worldteleport.org)) has been helping its members aim higher since our founding in 1985. Today, WTA is the leading partner in growth for teleport operators, advocating for their commercial interests and promoting excellence in their business practices, technology and operations. The association publishes best-practice reports and presents webinars on technology changes and their business and market impacts. 

## Embedded Beacon Receiver and Spectrum Analyzer Modules Featuring BR-MOD-1-9 and SA-MOD-1-9

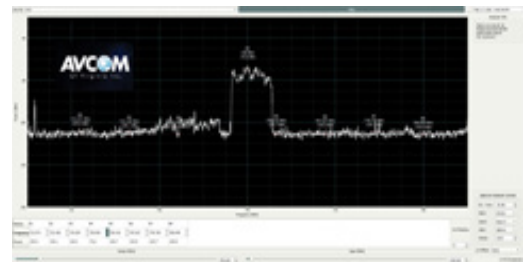
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# Capacity Pricing Continues to Decrease in line with the expansion of HTS Supply and Services

**Paris, France, February 23, 2023**-In their latest edition of the FSS Capacity Pricing Trends report, Euroconsult reported that fixed-satellite service (FSS) capacity pricing is decreasing at a rapid rate due to services supported by next-generation geostationary (GEO) and non-geostationary orbit (NGSO) HTS systems such as Starlink undercutting the market. At the highest industry level, FSS capacity pricing continued to erode in 2022, as the global volume of leased and used capacity increased at a rate that far outpaced the growth in satellite operator revenues.

Over the past five years, global averages for capacity pricing in video and data markets have fallen by approximately -20% (-4% CAGR) and -67% (-20% CAGR) respectively. For data markets, Euroconsult's newly introduced forecasts anticipate this general trend continuing over the next two years with annual declines of -8% to -15% projected across most regions. For most data and broadband markets, this sharp downward trend has brought significant disruptions to the industry, largely due to the abundance and ever-falling cost base of new HTS capacity which supporting aggressive pricing levels.

The influence of both GEO-HTS and NGSO-HTS capacity is expanding both regionally and vertically in terms of market reach. However, while the coverage of NGSO broadband constellations is inherently

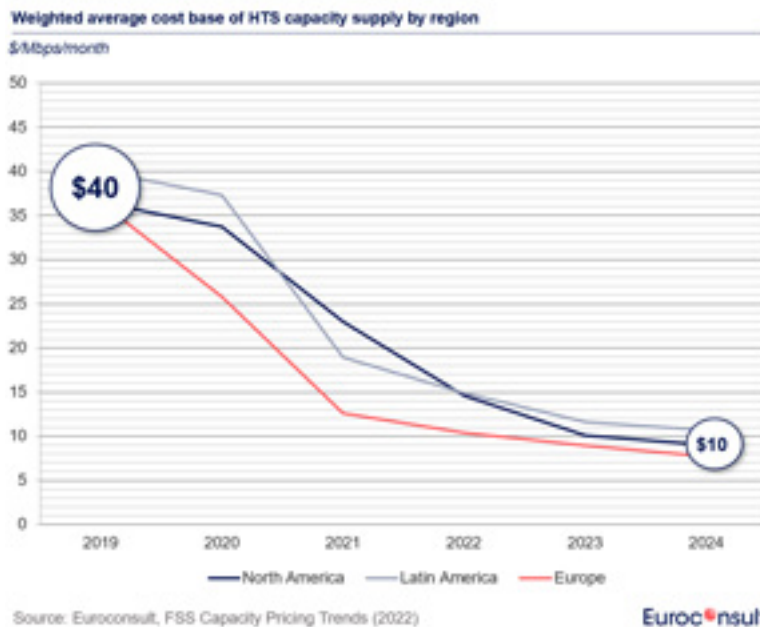
near-global, regional HTS capacity pricing dislocations are likely to become further pronounced over the next several years, notably in regions such as Russia and South Asia where national regulatory and import substitution policies are likely to limit near-term impacts of new, lower-cost HTS capacity supply.

The dynamics laid out in the report highlight drastic changes for the industry, which had previously thrived for decades on revenue-maximization strategies underpinned by relatively limited competition and

a well-maintained equilibrium between supply and demand that often contributed to situations of capacity scarcity. The scale, compelling value and capability offered by Starlink and other next-generation GEO-HTS systems and NGSO-HTS constellations may mark the onset of a structural shift away from the traditional model of wholesale leasing of dedicated (uncontended) bandwidth by service providers

towards the resale of best-effort (contended) managed broadband offerings supplemented by value-added service add-ons.

Compared to traditional satellite broadband services, the low latency, high-data rates, and high priority data allowances supported by next generation NGSO-HTS capacity, alongside its compelling pricing and high value for money, have been the biggest cause for waves in the market. To illustrate, based on a global analysis of over







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1,000 consumer and business satellite broadband service plans, Starlink’s equivalent price per GB of priority data was found to be 10 to 50 times lower than the vast majority of competing legacy offerings on the market today, and at a similar or lower total monthly cost.

For granular forecasts of reference pricing levels across major regions, applications, and frequencies for 2023 and 2024, as well as an in-depth insight of the previous year, the FSS Capacity Pricing Trends report leverages an extensive database of over 2,000 capacity pricing contracts and quotes, with new features such as detailed analyses on the evolution of the capacity supply cost base over time, as well as specific analyses of NGSO constellations.

**About the Report**

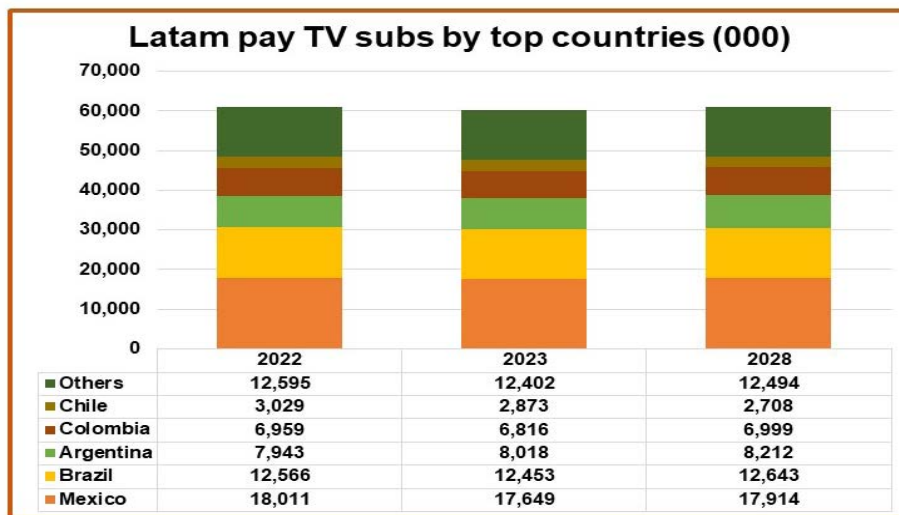
The FSS Capacity Pricing Trends report provides an assessment of the current dynamics for the pricing of satellite capacity in the capacity of sustained technology innovation and the additional satellite capacity associated with new generation satellites. The report includes coverage of nine regional markets, together with a specific review of the mobility and government vertical markets. The publication presents an analysis of how pricing parameters have evolved over the past 12 to 18 months and documents the average and specific pricing

data points. The report also reviews the evolving cost of building and launching FSS, HTS, and NGSO satellites, and provides granular forecasts of pricing levels across the various frequency bands, applications and regions for the upcoming years.

**About Euroconsult**

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**VITAL STATS**



Latin America’s pay TV subscriber base will stay steady at 61 million, although this is down from the peak of 73 million in 2017 according to new research from Digital TV Research.



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## Speakers Highlight



**Roger Tong**  
CEO  
**ASIASAT**



**Rachelle Radpour**  
CTO  
**BOEING**



**Cyril Dujardin**  
GM of the Connectivity  
Business Unit  
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**Robert Suber**  
Director  
Asia Pacific Sales  
**INTELSAT**



**Brandon Seir**  
CCO  
**KACIFIC**



**Brian Holz**  
CEO  
**MANGATA NETWORKS**



**John Turnbull**  
Director, AU, PNG and  
the Pacific  
**SES**



**Patompob Suwansiri**  
CEO  
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- Regional Operators' Roundtable: Where Do They Fit In This New World of Satellite?
- Satellite-Cellular Convergence: Is This the Next Big Leap for the Telco Industry?
- Is There a Big Future for Combining GEO and NGSO?
- Will Satellite Technology be a Game Changer in the Philippines?
- Beyond the Blue Continent – Creating More Affordable and High-Speed Satellite Connectivity



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