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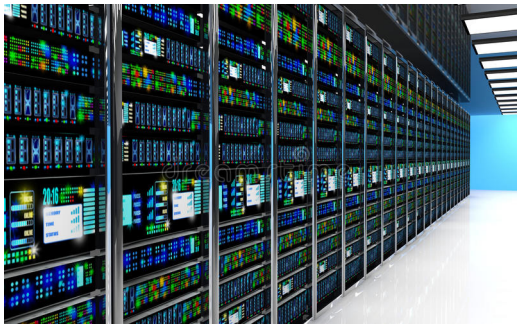
SATELLITE Markets & Research

Industry Trends, News Analysis, Market Intelligence and Opportunities

Standards, Interoperability and Cooperation

By Helen Weedon

For the latest workshop of the Satcoms Innovation Group (SIG), we headed to SES, Luxembourg-headquartered leader in global content connectivity solutions. As with all of our workshops, it was a great opportunity to bring together the technical people working at the heart of satellite operations to discuss the current challenges and the tools and processes. While we covered a number of topics, including the flat panel antennas, interference, transition to the cloud, and 5G, a few key themes emerged that were applicable to all of these.



In fact, when SES's Chief Technology Officer Ruy Pinto kicked off the workshop, he epitomized the entire theme for the workshop in a few words by saying: "We need to work together with various operators, develop standards and jointly foster multi-orbit approach."

Interoperability

Working with different types of technology and providers means that we need to find ways to ensure that the systems are interoperable. This is true across a range of different use cases. This was clear from the start of the discussions where Christian Wahsweiler of SES, Andreas Voigt of Eutelsat, and Martin Coleman of Netview, and all members of the SIG board, posed the question of whether 5G interference is a problem. Working together as part of our 5G working group, they have analysed a large amount of data and reports relating to 5G and found that actual interference cases are not always being talked about, and often resolved on a case-by-case basis. As pointed out by Wahsweiler, we should be thinking of 5G as an opportunity for both satellite and ter-

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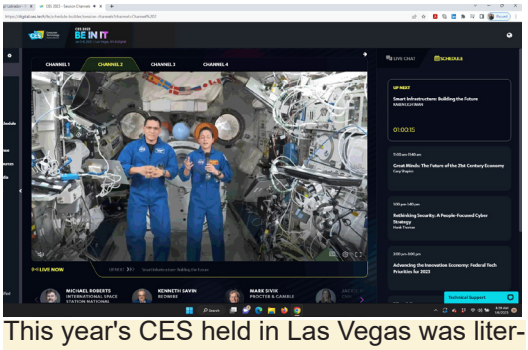
EDITORIAL

Off to a Flying Start

One resarch report released at the start of the year that caught my attention was a Euroconsult study that revealed that the global space market grew by 8% last year and is expected to reach over US$ 737 Billion within a decade, up from US $ 424 Billion in 2022 (http://www.satellitemarkets.com/value-space-economy-reaches-424-billion-2022-despite-new-unforeseen-investment-concerns). The report did raise some new investment concerns in the sector brought about by rising geopolitical tensions and operational challenges caused by inflation, high interest rates and the after-effects of previous years' pandemic lockdowns on supply chains, but the outlook is definitely on the more positive side.



This year's CES held in Las Vegas was literally "out of this world" as it featured a live link-up with astronauts from the International Space Station.

The increasing importance of the space economy was highlighted at the Consumer Electronics Show (CES) in Las Vegas that was held from January 5-7 to kick off the year. Space was a popular topic at the conference and even featured a session with a live link-up with astronauts from the International Space Station.

The year is indeed off to a flying start.

Virgil Labrador

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Satellite Executive Briefing
Industry Trends, News Analysis, Market Intelligence and Opportunities

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restrial sectors, and also ensure smooth integration to enable 5G everywhere it is needed. This means a need for various services to be interoperable as well as better communication between the mobile and satellite industries.

The Digital IF Interoperability (DIFI) consortium is aiming to ensure the wide adoption of an interoperable Digital IF standard. As discussed by Marke Clinger and Paul Isaac of Kratos, together with Marc Ashton of ETL Systems, the DIFI standard is going to be vital if we are to ensure a smooth transition to a more cloud-based environment. While there is still some resistance to cloud-based networks, it is clear that the satellite industry will need to move in this direction to remain competitive in an evolving landscape. As Ashton highlighted: "the ground station will look very different in ten years." Ensuring that same interoperability that is native to analog IFs will be key to enabling that.

Interoperability was also the topic for Paul Mattear of Amazon Web Services who discussed the need for interoperability for the multi-orbit environment enabling interaction between GEO, MEO and LEO. In his view, satellite operator customers can achieve development and test resiliency for non-critical workloads by using separate connections that terminate on separate devices in one location. At the same time, he signalled a number of remaining concerns, including the ambitious launch schedules from many of the LEO operators and the fact that while new satellites are software defined, teleports are not. Interoperability will therefore be a challenge, but one we need to overcome in order to remain relevant.

The Digital IF Interoperability (DIFI) consortium is aiming to ensure the wide adoption of an interoperable Digital IF standard

Standards

Mattear also talked about the need for standards, something he said was important to enable growth. Standards were mentioned across many of the other discussions. Of course, DIFI is all about creating a standard. This word was echoed throughout the workshop relating to a whole host of other areas, including around 5G, where standards and legislation have already been prevalent for ensuring mobile and satellite can co-exist. It was generally agreed that further standards will be important here.

Another area where we need a standardised approach is flat panel antennas. Anja Ellerbrock of SES, who is also leading the Satellite Operators Minimum Antenna Performance (SOMAP) group, set out that flat panel antennas need to meet both the cost and performance requirements of satellite operators. She was joined by Angela Wheeler of Intelsat and Mark Steel of Micro-Ant, both board members of SIG, as they discussed how we can approach this challenge and come to some agreement about the set of requirements specifically for these types of antennas. As Steel highlighted, testing will be an absolutely critical part of this and needs to be carried

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out on a large scale, using innovative approaches, and antennas need to be tested by manufacturers before leaving the premises.

Cosme Culotta-López of QuadSAT discussed the challenges associated with testing steerable antennas, making the point that antennas rarely behave the way they are expected to making in-situ testing all-the-more important. The company has developed a way to do this with high accuracy using a drone-based solution.

At the same time however, it is clear that Flat Panel Antennas will be crucial for enabling future satellite applications as pointed out by Integrasys' Sergio Encabo. While he commented on the need, he did also wave the flag for automation to reduce the risk of human error in these kinds of applications. Integrasys highlighted the tools designed to automate many of the otherwise manual tasks associated with ground station implementation and monitoring.

Working Together

The other standout theme was the need to work together, something that we as a group have been banging the drum about for a number of years now. It was brought up in the opening speech by Ruy Pinto and repeated throughout the entire workshop. Of course, the whole premise of SIG is bringing the various companies and technical professionals together so they can work together so this is hardly surprising.

We saw it in real sense with a case study on an issue of radar interference delivered by Justin Miles of SES, Andreas Voigt of Eutelsat, and Erik Otto Evenstad of Telenor. The trio explained how they had collaborated to find the source of interference and resolved it, something that is frequently done with a coordinated approach among many of the satellite operators in GEO. There was some discussion as to whether this same approach might work in LEO, where there is currently much less coordination.

Again, pretty much everything discussed came back to this need to work together, from engaging with 5G, resolving the issues around flat panel antennas, to finding a way for operators across various orbits to engage with each other. This, to me, is one of the main reasons why SIG is so important as it provides a common environment in which these companies can work together without politics or competition having to feature.

The next SIG workshop is scheduled to to take place just after Satellite 2023 on 16th and 17th March at Intelsat's offices in Washington D.C. For more informatio go to: **https://satig.space/eventlist/march-23-sig-workshop/**

Preparing for the Next Workshop

Thanks to Angela Wheeler of Intelsat, we were able to end the workshop with news of the next one which is scheduled to take place just after Satellite 2023 on 16th and 17th March at Intelsat in Washington D.C. While the agenda is yet to be set, it is likely many of these themes will be common again across these discussions. If you would like to attend, please make sure you register – **https://satig.space/eventlist/march-23-sig-workshop/**.

Helen Weedon is the Managing Director of the Satellite Innovation Group (SIG). She can be reached at helen@radicalmoves.co.uk For more information on SIG, go to: https://satig.space

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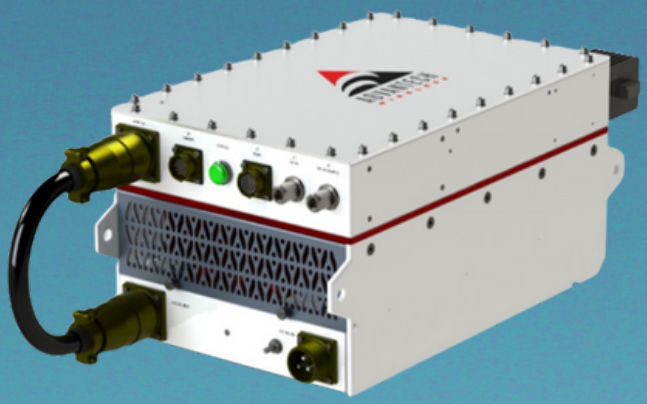

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Interview with Doreen Bogdan-Martin Secretary-General, ITU

by Roxana Dunnette

At the Plenipotentiary Conference (PP-22) of the International Telecommunications Union (ITU) held in Bucharest, Romania in September 2022, Doreen Bogdan-Martin was elected as the first woman to be the Secretary-General of the ITU (see conference report on the PP-22 on page 12). The ITU is one of the oldest multilateral international organizations founded in 1865 and based in Geneva, Switzerland.

Bogdan-Martin was the the Director of the ITU Telecommunication Development Bureau (BDT) since January 2019. Bogdan-Martin has executed extensive reforms at the BDT, building a refocused, impact-driven Bureau. This includes upskilling BDT's staff and adapting BDT's technical assistance, tools, and expertise for the challenges of bridging the digital divide. She has put in place a Results-Based Management (RBM) system, improved internal accountability, and initiated a comprehensive review of reporting across BDT's global network of offices.

Prior to her directorship of the BDT, she headed the ITU's Strategic Planning & Membership Department from 2008-2018, where she directed global conferences, led member relations and communications, and oversaw the ITU's relations with the UN. She was instrumental in creating the Broadband Commission for Sustainable Development, which she continues to manage as its Executive Director. She pioneered and oversees ITU's ongoing contribution to the EQUALS Global Partnership for Gender Equality in the Digital Age, created the #BYND Youth Summit, and is leading ITU's collaboration with UNICEF on the Giga project to connect all the world's schools.

Before assuming her position as ITU Secretary--General in January 1st this year, Bogdan-Martin sat down with our Geneva-based correspondent, Roxana Dunnette and looked back on her distinguised civil service career and shared her views on the key issues facing the telecommunications sector and her plans as ITU Secretary-General.

Excepts of the interview follows:

Doreen Bogdan-Martin

Roxana Dunnette (RD): *As the first woman leading one of the oldest UN agencies, I think everybody would like to know how do you feel and what is going to be different and new at ITU under your leadership?*

Doreen Bogdan-Martin (DBM): I am excited, honored, humbled and I am really looking forward for the 1st of January. Under my leadership, I expect an inclusive, innovative ITU, with more creativity, and team spirit more impact on the ground with more projects and initiatives implemented.

RD: *Your credo for years has been'connect the unconnected'--some 2.7 billon people. Do you think is possible before 2030 to achieve the UN's Sustainable Development Goals?*

DBM: I sure hope so. The achievements of the development goals will require connectivity, each of the goal has a better chance to be met if we connect 2.7 billion people. It is technologically possible, we have the technology to do it, knowledge to do it, but there are challenges around cost, skills development, languages, security, etc. So we have to address these challenges to make it happen before 2030.

RD: *Youth and Gender equality in the digital age is again one of your initiatives. In Bucharest at the Plenipotentiary conference there were young delegates from 'Connect Generation.' What is the ITU agenda to shape the next generation of experts and delegates?*

DBM: It is important to have intergenerational discussions. We need to learn from young people and they need to learn from us. I look forward to implement ITU's Youth Strategy to bring young people into our work force, straightening the internship program. We need to have young people part of our deliberations with Member States and Sector Members.

I think this Plenipotentiary Conference having young delegates was great, we learned a lot and I hope to have more of them. We will continue to mentor them to understand how to prepare for PP, how to negotiate, how to take the microphone. That's our future especially for our digital future. They are early adopters, they understand the technology better then we do. They are the future and they embrace the technologies faster.

You need women in ITU and you need women in design of applications, services and equipment.

We need to have that perspective.

In terms of how devices are created many women have differences. We need to bring them to the table also when it comes to policies and deliberations.

RD: *What will be the ITU's role in shaping new international issues related with cyber security, artificial intelligence, environment, digital transformation and more?*

DBM: Yes, it is very interesting and I think what's terrific for ITU is that we have some good outcomes from this conference.

For the first time we have a resolution on artificial intelligence. We have a continuous strong mandate on cyber security having countries develop cyber strategies and we have two new resolutions on space one to look at geostationary and non –geostationary orbit satellites equitable access and one on UNSPACE 2030 launched last year.

The ITU has a clear role now as recognized by the plenipotentiary conference in implementing SPACE 2030 agenda and to make sure that the data collected by space satellites are used for peace, environment, early warning, monitoring.

It is positioned very well.

RD: *No technology other then satellites can deliver content and provide connectivity to all locations .We are witnessing how we can rely on it in case of conflicts, natural disasters, displaced populations, etc. How is the ITU going to reinforce the use of satellites for peace, climate change impact, reduce space pollution, sustainable development?*

DBM: First of all we have a close collaboration with the UN and outer space agencies. So when it comes to space debris they have more scope and mandate in that respect. The whole new fleet of satellites to be launched and existing systems provide tremendous opportunities for connectivity to unconnected and for helping when it comes to early warning, disaster risk reduction and much more.

We have just deployed people and equipment to Nicaragua. When disasters strike ITU and satellite community respond and provide equipment. We have a number of satellite entities that provide free satellite capacity in those situations.

We have signed the UN Crisis Connectivity Charter in 2019. The U.N Charter on Crisis Connectivity is a mechanism developed by EMEA Satellite Operators Association, and Global VSAT Forum in coordination with the UN office for the coordination of humanitarian affairs and the World Food Program. Emergency telecommunications cluster which improves the availability of satellite–based communications for humanitarians efforts and

communities in times of crisis.

RD: *What is the role of the ITU in data and information sharing, in building partnerships, in reinforcing the international cooperation in global governance of all Telecom/ICT activities?*

DBM: We have with our new partner, the UN High Commissioner for Refugees (UNHCR), a program for the exchange of letters on refugees connectivity and of course with UNICEF on school connectivity so it's a lot to do with mapping when it come to data because ITU is the agency that collect ICT data.

We also have a broadband infrastructure mapping program to identify existing infrastructures. We are using Artificial Intelligence (A.I.) and other machine learning techniques to identify schools and see which ones are connected or are not connected and the ones not connected are the focus of our data program.

RD: *Broadband Commission is also you!*

DBM: Of course, I was heavily involved in the Broadband Commission. The Commission has recently come out with a new report on smart phones and devices and affordability.

I think it is going to be a good contribution to countries which are trying to figure out how to make smart phones more affordable either through recycling used phones, local manufacturing, reducing import duties and taxation. A lot of innovative work is done in the space of smart phones.

So the Commission will continue to follow up that report and we have a new group on small and medium enterprises in connectivity.

"...the ITU has a clear role now as recognized by the plenipotentiary conference in implementing SPACE 2030 agenda and to make sure that the data collected by space satellites are used for peace, environment, early warning, monitoring..."

RD: *A question to satisfy our 'Generation Connect' readers about the Metaverse and sustainability. A fully working virtual world or just in real time will require a far more capacity to transmit data between customers and networks that is currently available. A.I. functionality to combine different type of networks will be necessary. Who will pay for such a multilayered in infrastructure ant will it be available to everybody?*

DBM: The World Economic Forum (WEF) in Davos has set up a Metaverse Group and we work in between sessions. Some people are crazy about this and things are moving.

(Note: Defining and building the Metaverse is a WEF initiative working to define the parameters of an economically, viable, interoperable, safe and inclusive Metaverse focusing on two areas, governance and economic and social value creation. Ms. Bogdan-Martin is in the governace group.)

RD: *Your wish?*

DBM: That we build an inclusive trusted connected world.

Roxana Dunnette is a correspondent of Satellite Executive Briefing based in Geneva, Switzerland. She is Executive Director, R&D MEDIA, Switzerland. She has had an extensive career in broadcasting and media including senior management positions at Worldspace, CBS and PBS in New York and international telecommunications regulatory work at the UN in New York and ITU in Geneva as US government representative. She accomplished many development projects in Africa based on satellite technologies, broadcasting, Internet and accessibility. She can be reached at: **roxanadunnette@gmail.com**

SHOW REPORT

ITU Plenipotentiary Conference 2022

By Roxana Dunnette

The International Telecommunications Union (ITU) Plenipotentiary Conference 2022 (PP- 22) was held from 26 September to 14 October 2022 in Bucharest, Romania.

It was hosted in the actual Parliament House--a palace built by former Romanian President Nikolai Ceausescu. The Parliament House is bigger then the Pentagon and decorated like Versailles, a very comfortable venue. Over 3000 delegates from 183 of ITU's 193 Member States, international organizations and private sector representatives gathered for three weeks to elect ITU's top executives and bring consensus on the role of ITU in the future global ICT digital inclusive society and to ensure that the benefits of digital technology reaches out everywhere in order to help achieve the UN's Sustainable Development Goals for 2030.

Sabin Samras, Head of the host's country Romania's Parliamentary Information Technology and Communication Commission was the excellent conference chair.

Elections for key positions of ITU took place and history was made with the election of Doreen Bogdan-Martin, USA, as Secretary-General--the first woman to lead the ITU, the oldest UN specialized agency established in 1865. Bogdan-Martin won the position with 139 votes out of 172 casted. In her 30 years of extensive leadership experience in telecommunications Bogdan-Martin has a proven track record in bringing innovative and visionary ideas and creating strategic partnerships to deliver high quality results for digital connectivity and inclusion.

Thomas Lamanauskas from Lithuania was elected Deputy Secretary General with 105 votes.

Mario Maniewicz from Uruguay was re-elected for the second term as the Director of ITU's Radiocomunication Bureau with 174 votes.

Dr. Cosmas Zavazawa from Zimbabwe is the Director -elect of ITU's Telecommunications Development Bureau. The conference also elected the 48 members of ITU Council Member States and 12 members of the Radio Regulation Board in 5 regionally allocated seats.

The Council overseas all ITU activities, policies and strategies, manage the activity of the working groups and prepares draft strategic and financial plans for the next Plenipotentiary Conference.

The Radio Regulation Board is a body of experts that approves the Rules of Procedures for applying the Radio Regulations – the only international treaty governing the assignment and use of radiofrequencies and satellite orbits. The Board has also the mission of settling disputes and provides background and advice to the World Radiocommunications Conference (WRC). The next WRC will be held from 20 November to 15 December 2023 in Dubai, UAE and it will update the radio regulations, among others.

The PP-22 conference accomplished its work through various committees and one Working Group of the Plenary, ncluding the follwing:

Committee 1 – Steering Committee. Coordinate all matters related with the smooth execution of the work, plan the order and number of meetings.

Committee 2 –Credential Committee. Verify the credentials of delegations

Committee 3 – Budget Control. Determine the organization and the facilities available to the delegates, approves expenditure for the duration of the conference.

Committee 4 – Editorial Commit-

One of the highlights of the ITU PP-22 conference was the election of key officials of the ITU including from left: Doreen Bogdan-Martin (USA), Secretary-General; Thomas Lamanauskas (Lithuania), Deputy Secretary General; Mario Maniewicz (Uruguay), Director, Radiocomunication Bureau; Seizo Onoe (Japan), Director, Telecommunication Standardization Bureau and Dr. Cosmas Zavazawa (Zimbabwe), Director,Telecommunications Development Bureau.

tee. Finalize the texts to be included in the Final Act.

Committee 5–Policy and Legal Matters. Consider reports and proposals related to policy of the ITU, recommend appropriate decisions with respect to activities of General Secretariat and the three Sectors. Recommend appropriate actions to the plenary and oversees any legal matters raised during the conference.

Committee 6–Administration and Management. Consider the draft Strategic Plan reports and proposals on financial and human resources submitted by other committees and prepare the next draft policy and financial plan for 2024-2027.

Working Group of the Plenary consider reports and recommend actions on issues related to public policies, Internet, and general matters. All committees report to the plenary.

The PP 22 updated 21 resolutions and adopted new ones. The new resolutions included decisions on:

- Applying Artificial Intelligence (A.I.) for Good;
- Confidence-Building and sustainable development in outer space;
- Empowering women and girls through digital transformation.

Some revised resolutions deal with actual issues: Internet, Satellites, Youth and Gender equality, role of ITU in mitigation of conflicts, pandemics, natural disasters, in international issues like cyber security, use of Telecom /ICT to bridge the digital divide and bring inclusion, space sustainability, environmental actions and the path to a connected and united digital future.

For the first time at a PP conference, satellite issues were discussed in detail as we approach the 50th anniversary of the United Nations Conference on Exploration and Peaceful uses of outer space (UNISPACE+50).

Among the subjects deliberated were the needs of developing countries for technical assistance, the rational and efficient allocation of financial and technical resources, strategic partnerships and international cooperation to ensure peaceful uses of outer space and the good governance of space activities. The ITU is well positioned to help implement the UN SPACE 2030 agenda and it affirmed that space is a key driver for sustainable development and peace.

The conference issued the Final Act that brings together all resolutions adopted at the Plenipotentiary and signed by 157 Member States. It also adopted the ITU's Strategic and Financial plan for 2024-2027 with the accomplishment of UN's Sustainable Development Goals in focus. To read the full text of the Final Act, go to: https://www.itu.int/pub/S-CONF-ACTF-2022

The conference ended in a very festive way, all women receiving beautiful embroidered Romanian blouses. The ITU's next Plenipotentiary Conference will take place in Doha, Qatar in 2026.

OPINION

"Ambition is a Dream with a V8 Engine"

By Robert Bell

The title is a quote from Elvis Presley. It is how he described his drive to shape the world to his ends, which was one component of his stunning success. Today, we might say "an electric motor on every wheel," but you get the idea.

The business of satellite communications has long been held back by a distinct lack of that propulsive force. Not technically or operationally – the satellite business has done and continues to do the hardest things in the technology space. But in business terms, it has been more of a Ford Pinto than a Lexus GX.

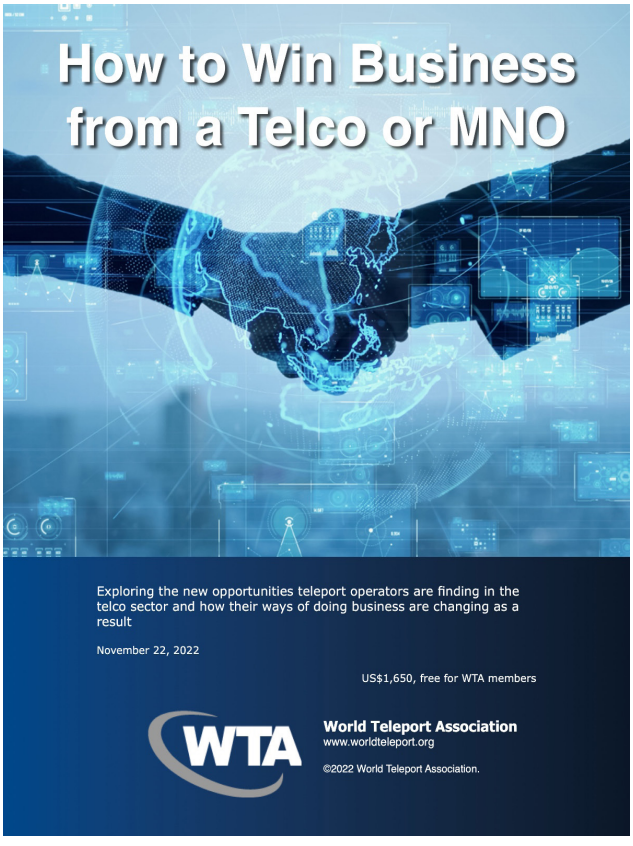
One percent of global telecom spending? Fine with us. A secure niche with high barriers to entry keeping competition to a minimum? Perfect.

In orbit, those days have been fading for more than a decade, with HTS and VHTS satellites, LEO constellations and now the real prospect of direct access to mobile phones. But in 2022 and 2023, the most exciting changes are taking place on the ground, where an entire sector of the industry is aiming at the 99% of telecom revenue that currently hugs the ground.

The New Technology Stack

Driving that change is an explosive mix of advances in technology and standards. None of them are new to the world – they are just relatively new to the satellite and teleport industries.

Virtualization is one. This is software or firmware that creates virtual machines within the operating system of the physical computer, allowing one server to run dozens of applications and thousands of servers in a cloud data center to form a single virtual processing environment. Closely related to network virtualization is software-defined networking (SDN), which refers to the ability to dynamically reconfigure networks using software in response to shifting demand or other conditions. SDN creates a virtual layer above the physical assets of the network that allows optimization of network resources and promotes interoperability across suppliers and network elements. It's a lot harder to do on satellites than a bunch of fiber circuits, but it can be done.



SDN is an example of powerful automation, which is old hat for IT and telecom but is revolutionizing satcom operations. Orchestration, the intelligent coordination of multiple automations, extends their power. Orchestration software delivers service improvements that can be directly felt by the customer, such as improving the efficiency of capacity reservation systems. Greater levels of automation and orchestration can also help ensure high levels of quality and uptime, as well as make it easier to extend the reach of a network using other platforms, like the cloud. It can automate beam-switching, traffic-balancing and a dozen other aspects critical to quality of service. It can also make it simpler to incorporate security aspects and automated time policies into operations, such as allowing certain flows to run on a switch at certain moments in time.

Standards are the third. You are almost certainly

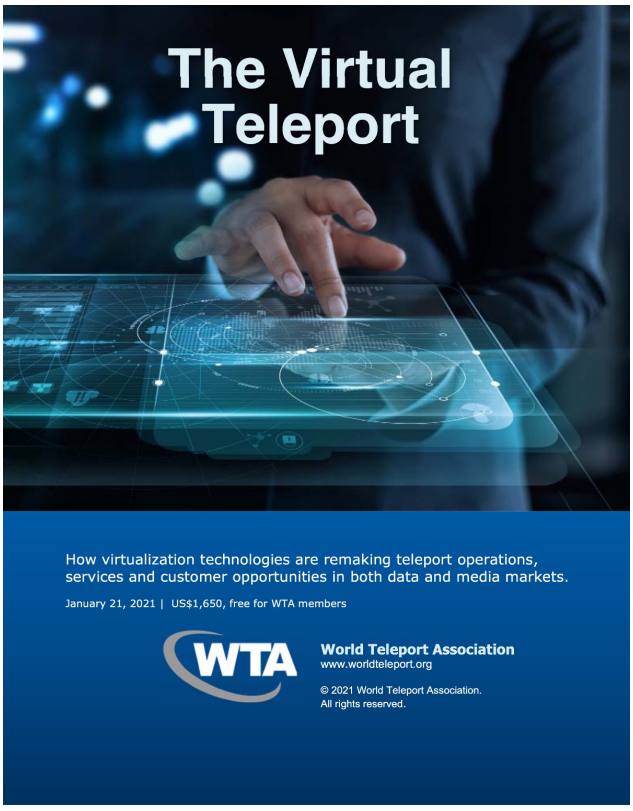
familiar with the excitement caused by the work of the 3GPP standards body, which is making non-terrestrial (aka satellite) networks a native part of the 5G standard. But there are many other standards that core to the rest of the telecom world – CE 3.0 from the Metro Ethernet Forum, Lifecycle Service Orchestration, operations and business support systems (OSS and BSS – and they are table stakes for getting into the terrestrial game and tapping that tempting 99%.

The Increasingly Virtual Teleport

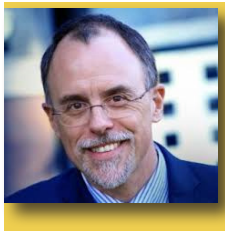
In 2023, the World Teleport Association and its Technology Advisory Board (www.worldteleport.org/page/TAB) will be advising members on how to seize opportunities created by this accelerating race so they can catch up with how the rest of the communications industry does business.

We are entering a market for multi-layer connectivity that has never been available before. Starlink has made headlines in the industry by offering its consumer-grade satellite broadband service for maritime, enterprise, energy and mining applications. Customer interest is high because of the drastically lower price of the service, despite the fact that only one-quarter of the Starlink constellation has been launched. With SES mPOWER scheduled to start service in Q1 2023 and OneWeb by the end of the year, multi-orbit networks are rapidly become a practical reality. But how will ground-based service providers integrate LEO and MEO in a package that meets the QOS and SLA needs of their customers? What essential technologies are making it possible and how are they operating in practice?

Multiple layers will also apply in ground segment, thanks to the rise of ground-segment-as-a-service (GSaaS) providers. GSaaS can sound like a contradiction in terms. No one has yet invented the data system that can exchange RF with orbiting satellites on its own. Physical communications infrastructure, from antennas and HPAs to modems and digitizers, are required to close the links, not to mention the staffing, expertise and management systems to make it happen. But GSaaS is a reality, and traditional ground segment service providers risk finding themselves in the place of taxi drivers who kept driving around looking for fares while rideshare companies were giving their customers the power to book a ride on their smartphones. What are the GSaaS business models? What are the benefits and potential risks of integrating a teleport's physical and data systems with this new class of service providers?



One thing is certain. In the space and on the ground, service providers must increase their agility. Avoiding bankruptcy in this industry has usually rested on not overinvesting in the future, such that you misjudge what customers may need. But once the business case becomes clear, we need to move with speed and agility to bring new technology on board and deploy it successfully. Gentlefolk, start your engines.



Robert Bell is Executive Director of the World Teleport Association, which conducts research into the teleport and satellite industry and offers a Teleport Certification program to service providers. . He can be reached at: rbell@worldteleport.org

2023:Opening GVF's Next Quarter Century

by Martin Jarrold

GVF's Silver Anniversary year has come to a close and 2023 marks the beginning of the Association's second quarter century. Reflecting GVF's unique status among satellite industry associations – combining a globally comprehensive geographic membership reach with an entire satellite industry ecosystem remit encompassing both space and ground segments – is the broad nature of the subject span of the GVF Webinar Series, which began 32 months ago.

Of course, the Webinar Series is itself set within the context of the aforementioned broad organizational remit which, having grown over the 25-year history of the Association, features:

- A regulatory agenda which, of course, is currently addressing itself to WRC-23 preparations.

Particularly focused on policy and regulatory matters across the national administrations of the Americas and the Caribbean.

- Promotion of satellite connectivity solutions and the interests of the industry as a whole through all forms of events and media representation.

GVF has an active presence representing the space and satellite ecosystem across traditional print publications, online platforms and social media. The Association also partners with, and contributes to, events both in-person and virtual.

- A well-established global standard in technical training which has helped to advance the satellite industry careers of approximately 21,000 technicians worldwide.

Covering operation, installation and maintenance of VSAT, marine, and mobile/SNG satellite terminals, and specialized satcom theory.

- A program of non-technical training called Space Business Qualified (SBQ).

Jointly developed with SatProf and SSPI, SBQ provides a broad introduction to all business aspects of key space industry sectors, including launch, spacecraft, communications, broadcast, earth observation, navigation, and exploration, and fills a critical gap in online training for people in the space and satellite industry, many of whom are new to the industry or looking to deepen their knowledge to increase their productivity and advance their career.

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- Development of a consensus-based framework to improve the efficiency of satellite operators' terminals type-approval procedures.

Using this framework, once a type approval is provided to a manufacturer by any one of the participating satellite operators, other operators may mutually recognize the results of the tests conducted during the first operator's type-approval process, so that the tests aren't repeated unnecessarily.

- Collaboration with the satellite operators comprising the SOMAP Group.

AsiaSat, Eutelsat, Inmarsat, Intelsat and SES, with GVF, have collaborated to produce updated guidance to antenna manufacturers regarding satellite operators' expectations for new antenna products and how to demonstrate compliance with the SOMAP Specifications. The SOMAP requirements and initiative have been undertaken to improve the Quality of Service and to minimize interference. The SOMAP satellite operator group has the final authority for resolving questions regarding the compliance of particular products. The SOMAP objective is to offer consistency across the industry

for customers and antenna manufacturers. It does not replace the formal type approval procedures for each of the operators, but rather establishes minimum performance that each of the operators expect when deploying equipment which has not been formally type approved.

- Partnering with various members to work on European Space Agency's Advanced Research in Telecommunications Systems (ARTES) programs.

These partnerships have particularly involved developing an appropriate test methodology for qualifying communications-on-the move (COTM) terminals, and most recently developing a novel approach for conducting on-site antenna verification using Unmanned Aerial Systems (UAS), or drones. In the latter case, GVF provided its member company with extensive technical support, significantly aiding its technology development process, meeting requirements set out by ESA on validatation and certification, and progressing to availability of a productized version of the technology that can be operated directly by users.

Adding New Members

The nature of GVF's long-standing support for the satellite industry's ground segment (as well as for the space segment) has recently been additionally augmented by expansion in membership, exemplified by a new Full Member which takes part in planning and promoting public policies related to information industry, specifically serving as a government think tank and 'Digital Transformation Enabler' which, in the satellite industry context, means:

- The accelerated development and commercialization of end devices.
- Collaboration with OEM/ODM companies to increase the market.
- Creation of an industrial value chain and ecosystem.
- The accelerated user terminal deployment.
- The execution of a communications value-added services development and promotion program.

This organization's agenda fits with GVF's existing ground segment-focused remit in addressing both 'De-

"...The NewSpace era has seen the emergence of widely-held and deep-rooted concerns about just how unsustainable is the filling of low Earth orbit with our space junk – existing and potential future debris..."

velopment of a consensus-based framework to improve the efficiency of satellite operators' terminals type-approval procedures', and collaboration with the satellite operators in the SOMAP Group (see above). The chairman of GVF's Mutual Recognition Arrangement Working Group – which coordinates GVF's work on terminal type approvals, liaises with the SOMAP Group, and leads GVF's ESA ARTES joint projects – gave a presentation to the aforementioned new member's recent online symposium. Entitled 'User Terminal Requirements of LEO Satellite Operators', the presentation dealt with themes including:

- Technical support for type approvals.
- Avoiding duplicate antenna testing through GVF processes.
- Requirements for antenna pattern measurements.
- Essential features of an antenna range test facility.
- Common antenna test range design configurations.
- Emerging technologies for conducting precise on-site VSAT terminal measurements in the field (i.e., the novel approach using Unmanned Aerial Systems, or drones, as cited above).

Similarly, another GVF new member is a research company shaping ideas from early development stages to market, and bringing change in the way that academia and industry form partnerships.

LEOs and Ground Segment Change

As the satellite industry continues to build-out the infrastructures of the LEO era the ground segment is

GVF Webinar Series 2023

- **Innovation and the Ground Segment** (26 May 2022)
- **Ground Segment: All Change for a New Satcoms Era** (18 Nov 2021)
- **Antenna Innovations: Keeping Up with the Rest of the Industry?** (24 Jun 2021)
- **Terminal Innovation: Leveraging Satellite's Mobility Sweet Spot** (13 May 2021)
- **Satellite Networks Solutions: Development & Evolution of Capability & Performance** (25 Mar 21)
- **Satellite Systems Optimization: The Next Frontier in Size, Weight, and Power** (4 Mar 2021)
- **Trends and Innovations in Transportable SATCOM Ground Terminals** (18 Feb 2021)
- **Satellite's Disruptive Evolution | In Orbit, On Earth** (9 Nov 2020)
- **Transformational Antennas II – Will Terminals Realize the Promised LEO Connectivity Revolution?** (13 Aug 2020)
- **Transformational Antennas I – End of the Parabolic Paradigm?** (30 July 2020)
- ***All the above can be accessed at https://gvf.org/webinars/***

changing, with the crucial role antenna and gateway technology focusing on integration, industrialization, and cost reduction.

Since May 2020, the GVF Webinar Series – which has attracted an audience of more than 27,000 viewers from 155 countries – has covered several ground segment related themes, as seen in the table above.

The next GVF-CBN Webinar, the first in the Series for 2023, 'LEO Terminals: Pointing the Way Forward' will explore the technical, financial, and operational challenges and opportunities faced by LEO operators, terminal manufacturers and others as LEO constellations are increasingly deployed. Their success is heavily dependent on the technology of ground systems offering simpler, more integrated, easy to install and manage, and cost-effective solutions to connect satellites to ground users. User terminals serving the constellations must accommodate high levels of switching from beam to beam, satellite to satellite, and ground system providers have different approaches to this.

One approach is the adoption of mechanically steerable antenna solutions; another, the adoption of established electronically scanned aperture (ESA) technology. Another still, aims for full connectivity across operators, frequencies, and orbits with a technologically disruptive approach employing software-defined smart terminals with flat-panel antennas and capabilities to converge intelligent routing, edge computing, integrated modems and software generated waveforms, as well as cellular access.

ESAs can be designed for modular assembly, allowing manufacturers to produce large numbers of basic parts for use in both constellation ground stations and consumer equipment, thereby improving economies of scale. The LEO constellations will require hundreds of ground stations and thousands of gateways to maximize throughput. Ground segment will differ from the current paradigm which includes teleports featuring dozens of large dishes. Instead, they may be placed in multiple locations (akin to cell-phone towers), with a large number in remote areas. This configuration will require highly automated management systems.

The GVF 'LEO Terminals: Pointing the Way Forward' webinar will take place "live" on Zoom on 26 January 2023 at 3:00pm (UK time), 10:00am (US East Coast time). Register now at https://gvf.org/webinar/leo-terminals-pointing-the-way-forward/.

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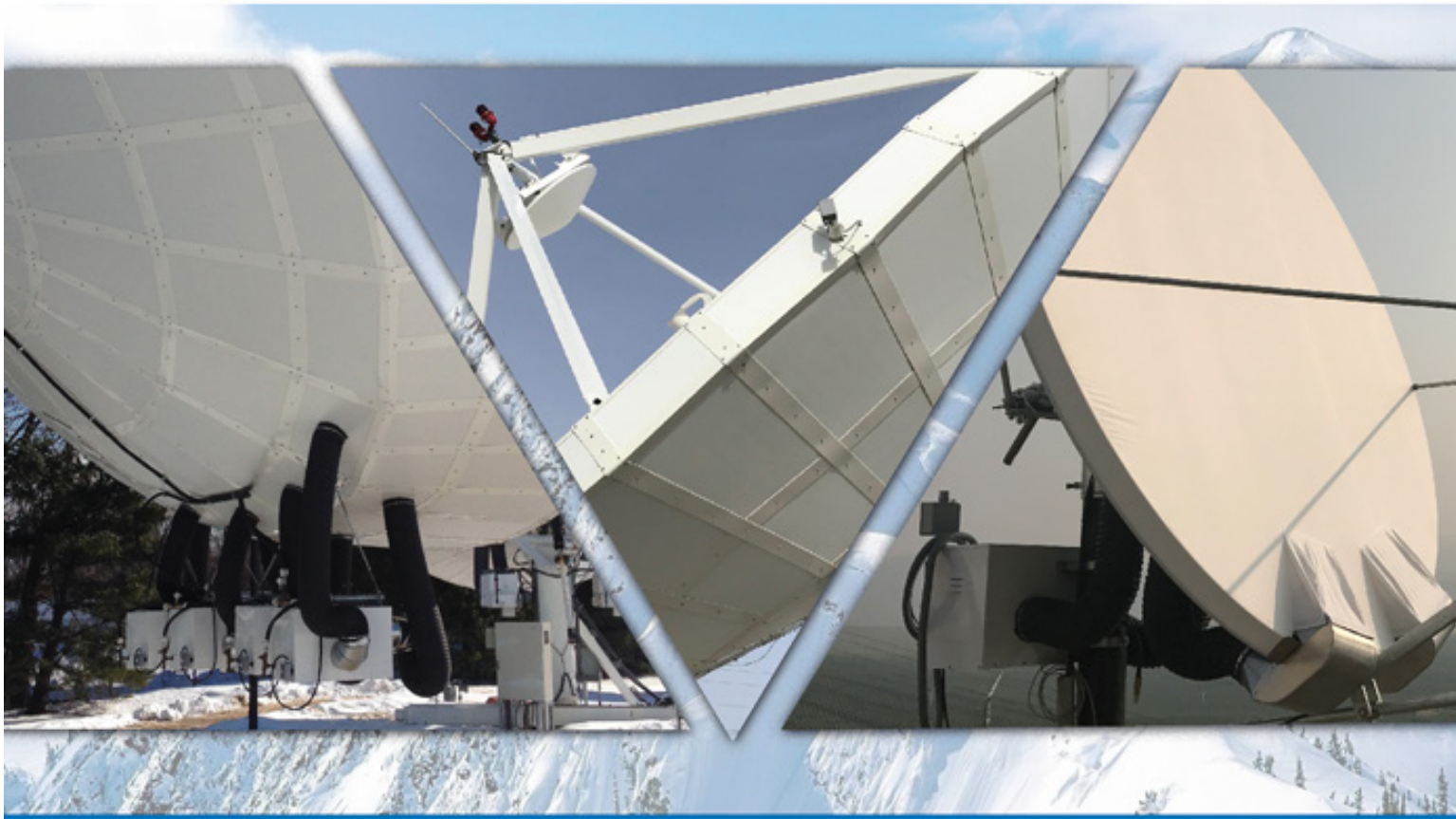

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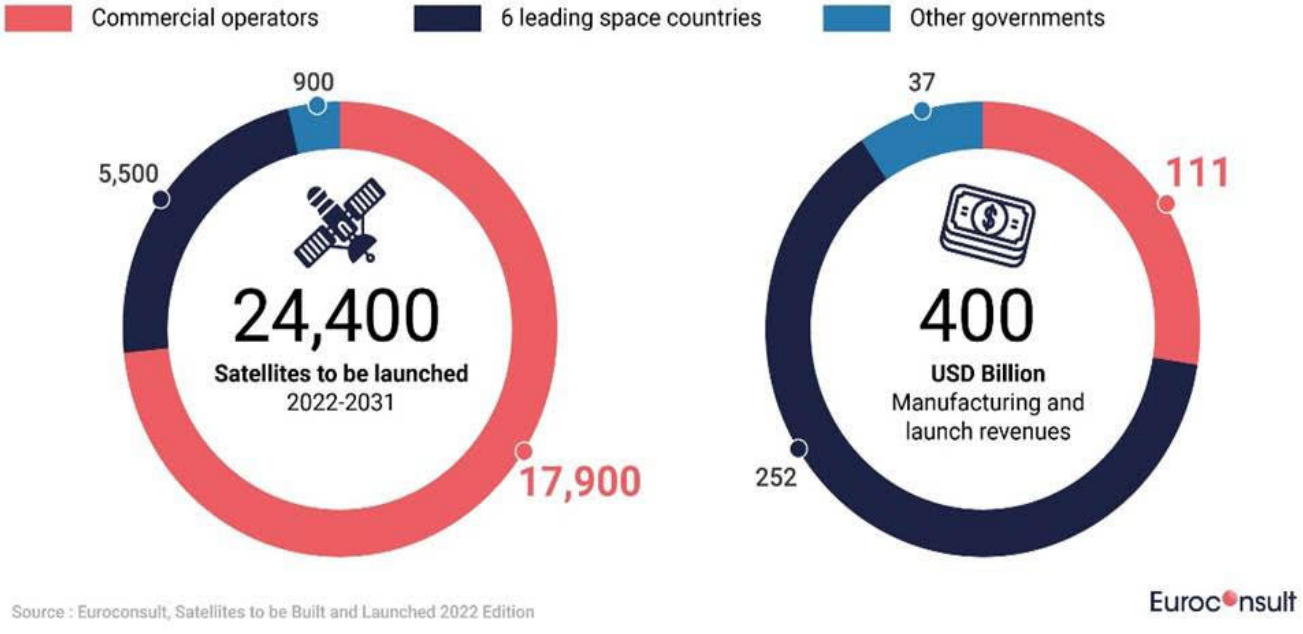

Source : Euroconsult, Satellites to be Built and Launched 2022 Edition