

Satellite Executive BRIEFING

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Industry Trends, News Analysis, Market Intelligence and Opportunities

The Satellite Industry in the Time of COVID-19

by Virgil Labrador

In the classic novel “Love in the Time of Cholera” by Nobel-prize winning author Gabriel Garcia Marquez, the protagonist uses the imposed isolation of a purported cholera epidemic to consummate a life-long passion for the one he loves.

The global COVID-19 pandemic that is making shockwaves through every industry in the world will have a significant impact on the satellite industry as well. There is no doubt that those who work in the industry are filled with passion for this vital industry we all love but with more than half of the world and over 80 percent of the US and Europe in lockdown, it will take more than just passion to surmount the challenges ahead



as the very strength and resilience of the industry will be put to the ultimate test.

Even the most optimistic projections indicate that the restrictions on movement, travel and public events will continue to be in place for at least the next two months in most of the world. This is a major shift in how we do business with more people working remotely from homes and business and social interactions practicing physical distancing will migrate into the digital realm.

Amid the devastating economic impact of the global lockdown will have on certain industries like

Continued on page 4

What's Inside

From the Editor.....3



Show Report
Satellite 2020.....8

OTT via Satellite Market
by Omkar Nikam.....15

Executive View:
Satellite Industry Trends from a
User's Perspective.....19

Better Satellite World:
When Disaster strikes.....22

Will Connecting with LEO and
MEO Be a Viable Business?
by Robert Bell.....25

Responding to the COVID-19
Pandemic
by Martin Jarrold.....28

Executive Moves.....31

Mergers and Acquisitions.....34

Market Trends.....37

Stock Index.....39

Advertisers' Index.....40



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Staying Connected in a Crisis



What a difference a month makes. Last month in this column, we were eagerly anticipating the upcoming slate of key trade shows. Only three weeks ago, the industry's premier event, the Satellite show in Washington, D.C. was underway. The keynote address was delivered to a packed audience by SpaceX' Elon Musk and there seems to be cautious optimism among those brave enough to come to D.C. about the challenging times ahead. There was beautiful spring weather in the district and with only one confirmed case of the coronavirus, the city was buzzing along normally.

It has not been smooth sailing for the industry for some time and the Satellite conference addressed some of the key issues. Then the proverbial other shoe dropped. On the penultimate day of the show, the World Health Organization (WHO) declared a global pandemic and the Washington D.C. authorities banned any large event leading the organizers to cancel the last day of the show. Since then, over half of the world is in lockdown, including 80 percent of the US and most of Europe, as the coronavirus and the disease it causes called COVID-19 claims over one million cases. The satellite industry, already facing some serious headwinds before the crisis escalated is now confronted with daunting challenges during this unprecedented times.

When a crisis hits, it's easy to blame most of the problems on the crisis itself. However an objective view of the industry, will show that the industry has some internal problems going into the crisis, which the crisis only serve to exacerbate those problems. While these are indeed, challenging times, this can also be an opportunity for corrective action and finding new opportunities that would put companies in better stead for the future. To get some clarity on the actual situation would be a good start and getting the right information and analysis is vital.

To stem the tide of infections, "social distancing" has been the norm suggested by authorities worldwide. "Social distancing," however can be a misnomer in the digital age. I prefer the term "physical distancing" which does not mean disconnecting. Staying connected is an absolute necessity while working remotely and living through imposed self-isolation and quarantines. During prolonged crisis, there is a natural need for reliable information and social engagement. With limitations on movement, travel and physical contact, these needs are fulfilled through various digital means. For our part, having been founded and established our footing during the great global recession of 2008-2010, we have developed a number of digital vehicles to help you navigate this crisis. Watch this space and your inboxes, we'll get you through this.

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COVID-19

from page 1

travel, leisure, retail and various services, some industries are projected to fare better than others. Among those that are expected to be in a better position to weather the crisis is the space and satellite sector, according to a report by Quilty Analytics. The report said that they expect the space and satellite industry to “fare somewhat better from a demand perspective than the economy at-large.” The report cited factors such as size-

“...Quilty Analytics said that they expect the space and satellite industry to fare somewhat better from a demand perspective than the economy at-large...”

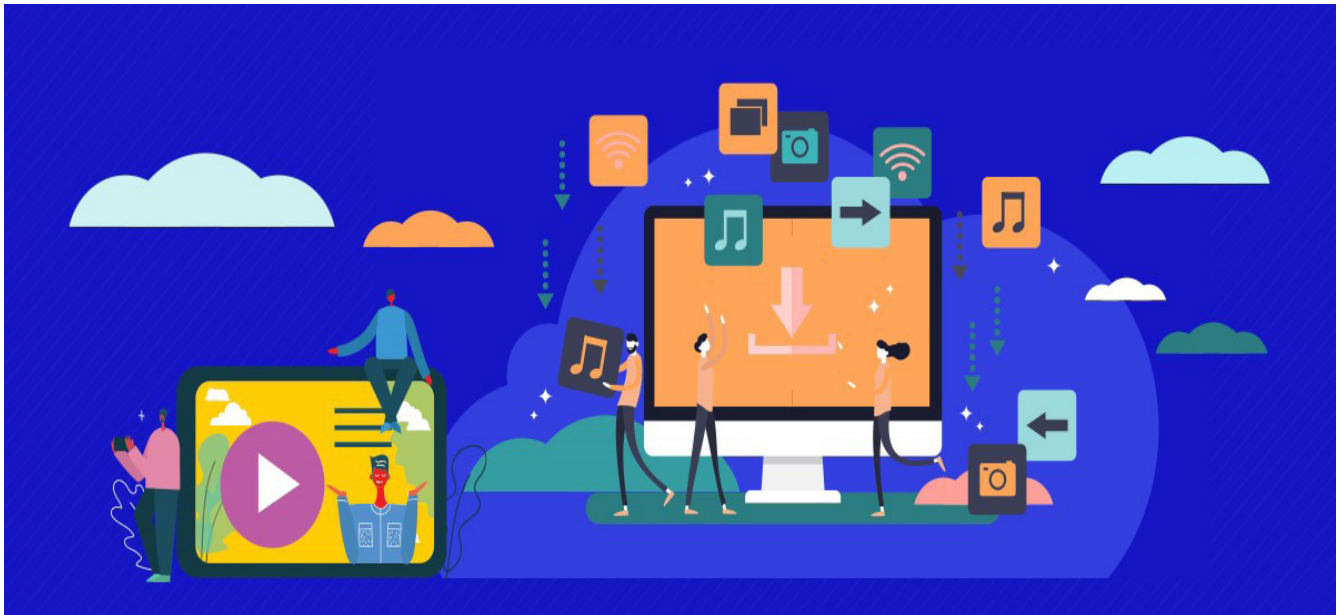
back-up services, insulates the industry from some of the more severe impacts of the global pandemic, according to Quilty Analytics.

In addition, the consumer market for satellite and related services are unlikely to be cut during a time of stay-at-home orders. Already we have seen a spike in demand for streaming services in

previous two weeks and nearly 15% as opposed to the previous week.

U.S. ratings agency Nielsen predicts that stay-at-home orders could lead to a massive 60% increase in the amount of content watched.

As remote operations become more widely used in broadcast and other applications, there is a



As remote operations become more widely used in broadcast and other applications, there is a unique opportunity for satellite cloud-based services. (image courtesy of Amagi)

able government dependency; support for first responders and resilient consumer exposure.

The industry’s dependence on government contracts where up to 70% of the market in some areas such as Earth Observation, plus the highly reliable and survivable nature of satellite communications services which are essential for disaster communications and

the second half of March when the pandemic kicked into high gear and more stringent lockdowns were put in place. Conviva analyzed global streaming data from the 21-day period between 3–23 March comparing the last seven-day period (March 16–23) to the previous two (March 3–16). It found that on a global scale, streaming jumped more than 20% as compared with the

unique opportunity for satellite cloud-based services. Transitioning broadcast operations from hardware and manually intensive on-premises set up to a virtualized playout and operations model gives more flexibility and cost-savings for clients.

An Essential Industry

Another important factor that puts the industry in good stead

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during this crisis is that it is universally classified as an “essential industry” so operations continue despite lockdown orders. The Satellite Industry Association (SIA) emphasized the essential role of the industry in statement stating:

“Satellite internet services are

just a few of the vital services that satellites are providing to help keep Americans who are sheltering in place, safe, connected, informed and entertained.”

“During a crisis such as the pandemic, satellites also provide government customers including the Department of Defense (DoD)

er industries to face this global pandemic, certain segments of the industry will be impacted harder than others. Among the highly vulnerable verticals include the Aeronautical/In Flight Connectivity, Maritime/Cruise, Energy/ Oil and Gas markets. Overleveraged companies and start-ups with strained liquidity are also in po-

Impact of COVID-19: Five Key Areas to Watch

Sensitivity Impact on Each Vertical	DTH/Cable	Enterprise/ Maritime	Aero	Backhaul	Broadband
Price	Yellow	Yellow	Green	Red	Red
Bandwidth	Green	Red	Red	Red	Red
Contracts	Green	Red	Yellow	Red	Green
Business Models	Red	Yellow	Red	Yellow	Red
External Factors	Red	Red	Yellow	Red	Green

Source: NSR



providing millions of businesses and families with essential broadband access to online education, business collaboration and communication tools, telehealth and critical government updates. Satellite-powered internet is keeping people everywhere connected with their teachers, doctors, employers, customers, friends and families. Satellites are enabling GPS navigation and timing – helping to power America’s mobile cellular phone industry and report on the spread of the epidemic worldwide. Satellite imagery and remote sensing companies are providing users with safe and remote ways to collect global onsite information while satellite television news and entertainment services are proving to be invaluable for the millions who are homebound. These are

and the Department of Homeland Security (DHS), with a wide variety of critical crises communications, remote sensing and other services vital for use both in the United States and around the world. DHS named satellite operations as an essential part of functioning critical infrastructure that is imperative during the response to the COVID-19 emergency for both public health and safety as well as community well-being,” the SIA added.

The same could be said for any country in the world as the satellite industry is a vital component of the global economy.

Impact on Industry Segments

While analysts seem to agree that the satellite industry as a whole is in better shape than oth-

tential peril according to Quilty Analytics. On a positive note, the government/defense, enterprise, telecom and broadband sectors should be stable and might even post modest increases during the crisis.

Research firm NSR said that demand erosion will be felt in the aeronautical, cruise and oil and gas markets in the next two to three quarters. NSR outlines five key areas to focus on to build a long-term go to market (GTM) strategy such as price, bandwidth, contracts business models and external factors.

“The diverse nature of our industry — from Fortune 500s primarily dependent on the federal government to a mix of entrepreneurial ventures dependent on

domestic and foreign commercial customers — may help mitigate some of the devastating effects being witnessed in other more vulnerable sectors such as travel/leisure,” said Courtney Stadd of Capital Alliance Solutions in a report published by the Space Foundation.

“Many space companies offer communications and imaging services that contribute to our national security, while providing critical communication connectivity that is of paramount importance to a society in a safe harboring mode — and therefore may warrant additional support from government,” Stadd added.

The Industry Response

In addition to ensuring that networks operate continually at high reliability during the crisis, space and satellite companies are stepping up to the plate to offer various assistance and new services to help mitigate the impact of the crisis.

To prevent any disruption in supply chains, Lockheed Martin will advance more than US\$ 50 million to their small- and medium-sized business partners so that the companies can continue to operate and sustain jobs during the COVID-19 crisis.

Lockheed Martin’s Chairman, President and CEO Marillyn Hewson also announced that the company will donate US\$ 10 million to non-profit organizations involved in COVID-19 related relief and assistance, with emphasis on veterans and military families, and that the company has activated a US\$ 6.5 million employee disaster relief fund. In addition, the company will also donate the use

of its corporate aircraft and vehicle fleet for COVID-19 relief logistical support and medical supply delivery, and the use of its facilities for crisis-related activities where “needed and practical,” said Hewson.

When the International Telecommunications Union (ITU) announced in March the launch of a global platform to help protect telecommunication networks during the COVID-19 crisis, the satellite industry welcomed the initiative. The new platform will assist governments and the private sector in ensuring that networks are kept resilient and telecommunication services are available to all during the crisis.

Among the companies responding to the challenge is mobile satellite service operator Thuraya. Thuraya has a standing agreement with the ITU to deploy its terminals for immediate assistance during emergencies and natural disasters. Its mobile satellite phones and broadband devices enable solutions that can help relief workers achieve maximum impact, while limiting their exposure to COVID-19. Thuraya can augment relief work in remote locations through telemedicine solutions such as teleconferencing kits and connected ambulances. The ambulance-to-hospital telemedicine system works over Thuraya’s



Virgin Orbit has developed a mass-producible bridge ventilator for COVID-19 patients.

IP broadband terminals and satellite network, connecting on-board wired and wireless medical devices to hospitals and diagnosing physicians. Moreover, relief agencies can use the solution to collect data on the spread of virus and visualize the pandemic, trace contacts and collect information to support health surveillance. It can also assist in coordinated efforts to deliver necessities such as vaccines and other medical supplies, or even satellite communications equipment.

“Reliable communications are urgently required where the threat from COVID-19 is greatest. The social distancing strategies introduced by governments across whole populations are expected to place severe strain on cellular networks and internet traffic. By increasing capacity over hotspots, Thuraya will ensure service continuity, even when there is a sudden surge in demand from remote medical setups, healthcare institutions and NGOs,” said Sulaiman Al Ali, Deputy CEO of Thuraya.

Other companies such as SpaceX and Virgin Orbit, among others are repurposing their companies’ manufacturing facilities

to meet demands for emergency medical equipment. SpaceX' Elon Musk has helped procure some much needed ventilators for the medical community and also directed his company to product hand sanitizers and face shields which are in short supply. Launch services provider Virgin Orbit has developed a mass-producible bridge ventilator prototype for COVID-19 patients. Virgin Orbit worked with the Bridge Ventilator Consortium on the ventilator design. High-end, ICU-capable ventilators are in short supply as the pandemic worsened in recent weeks. The bridge ventilators can be used to help free up the more advanced ventilators for the most critical patients.

Satellite companies have a consistent history of contributing to relief efforts and providing much needed communication services during natural disasters and various emergencies. The COVID-19 pandemic is no exception and we will continue to see how satellite service providers will respond to the to meet the myriad communications requirements needed to mitigate this crisis.

Changes

Inevitably, as stringent measures are taken, the COVID-19 pandemic will flatten out and businesses will start to recover as we have seen in China, the country where the epidemic started, and promising signs in South Korea and other countries that the curve is on a downward trajectory. As people start returning to work, however, it will be a very different environment they'll have to face. The pandemic will

have made a lasting impact on how we work and how we conduct business.

For one, telecommuting might catch on as teleworkers prove to be as productive as those who work from offices. There will be a permanent shift to move work from offices to the home and this will present an opportunity for enterprise and home networks.

Another impact of the crisis will be on supply chains as companies review how they source materials and possibly work with companies closer to them geographically and order more materials than the typical just-in-time delivery. This will ensure that they have inventories that can withstand longer-term disruptions in the supply chain. This could prove to be a short-term boon for some suppliers during the recovery period when companies start ordering more to boost their stockpiles to make them more resilient in the event of another breakdown in the supply chain.

Finally, a crisis of this unprecedented proportions will likely result in investments by governments and international organizations to combat future pandemics. This certainly won't be the

last pandemic we will face and to prevent another major disruption would require putting in place a sophisticated organizational and network infrastructure that will be able to respond more quickly and more effectively against any future outbreaks. Such investments would require critical communications components that the satellite industry can provide.

This is not the first global crisis that the satellite industry has faced. In just the last 20 years, the industry has withstood the Asian Financial crisis in 1998, the dot-com bust of the early 2000s and the great global recession of 2008-2010, among others. Throughout those crises, the SIA actually reported that the satellite industry as a whole grew consistently every year since it started tracking the industry 20 years ago.

Having covered the satellite industry through all those previous crises, I have a feeling that this one will show how resilient the industry is and how well-poised it is in surmounting the challenges ahead and finding opportunities during the time of COVID-19 and the inevitable global recovery. 🌍



Virgil Labrador is the Editor-in-Chief of Los Angeles, California-based Satellite Markets and Research which publishes a web portal on the satellite industry www.satellitemarkets.com, the monthly Satellite Executive Briefing magazine and occasional industry reports called MarketBriefs. Virgil is one of the few trade journalists who has a proven track record working in the commercial satellite industry. He worked as a senior executive for a teleport in Singapore, the Asia Broadcast Center, then-owned by the US broadcasting company CBS. He has co-authored two books on the history of satellite communications and satellite technology. He holds a Master's in Communications Management from the University of Southern California (USC). He can be reached at virgil@satellitemarkets.com

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A Truncated Satellite 2020 Portends of Turbulent Times for the Satellite Industry

by **Elisabeth Tweedie**

The industry's premier show, Satellite 2020 held in Washington D.C. from March 9-11, was almost a surreal experience. I don't know the precise numbers, but from walking around the show floor, I would guess that attendance was down by 30-50%. There were large gaps where booths should have been.

Tuesday, the opening day for exhibits, had the same feeling and volume of foot traffic as a usual last day of a show. Although this year, there really wasn't a last day. The show and conference sessions were due to close on Thursday, but early on Wednesday afternoon, the Washington D.C. Health Department issued an order banning events of more than 1,000 people, so the organisers cancelled the last day of the show and advised attendees that they had to be out of the convention center by 17.30 that day.

Attendance at the sessions, which started on Monday, varied tremendously. Some were nearly full, others devoid of both audience and speakers. Most were missing one or more speakers. For attendees, it was also a mixed experience. Some reported so many cancelled meetings, that the whole experience was a waste of time. Others felt that the meetings that they did have were much more productive, due to all the extra time available.

SpaceX CEO Elon Musk was the keynote speaker on the first day, and the question and answer session hosted by Jeffrey Hill just added to the surreal feeling. The session started with Musk asserting, that as he's said before, he wants to establish a base on Mars. Then he went on to explain that unless things were to change to speed up progress, it wasn't going to happen in his lifetime. Most of the blame

apparently lies with software: "There is an awful lot of software out there, and most of it was written by people who are dead." He then went on to talk about his new philosophy, management by rhymes: "if the schedule is long, the design is wrong." In response to a question from the audience, he also asserted that you don't go to college to learn, "You can learn anything you want for free. You go to college to have fun, hang around with a bunch of people your age, and prove that you can do your homework."



SpaceX CEO Elon Musk was the keynote speaker on the first day of the Satellite 2020 conference.

SpaceX has received a lot of negative comments from astronomers, complaining that the Starlink satellites are so numerous and bright (and only 2% of the full constellation has been launched) that they are blotting out distant stars. In re-

sponse to this Musk, said that future satellites would be black and would have a small sunshade so that there would be no reflection. Explaining why he decided to get into the communications business, he stated that the revenue potential of launching satellite, tops out around US\$3 Billion, whereas the revenue potential of the Starlink constellation is about 10x more. The target market, remains the 3-4% of hardest to reach customers.

Contrary to what SpaceX COO and President Gwynne Shotwell, was reported to say at an investor conference last month, Musk asserted that there was "zero" chance of spinning off Starlink via an Initial Public Offering (IPO). Musk noted that all previous low earth orbit (LEO) constellations have all gone bankrupt. He emphasized that his single goal was "to avoid going bankrupt."

LEOs

As would be expected conversations about the



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LEOs, were a recurring theme throughout the sessions. Note was made that both Telesat and OneWeb were now behind schedule, and LeoSat of course, exited the market. Peter de Selding, Co-founder and Editor at Space Intel Report, during a panel on Satellite Financing, commented that he did not see this as a red flag. On the same panel, Mark Rigolle, CEO at KLEO Connect and former CEO of LeoSat, commented that “startups never perform on time.”

During the opening general session with the Global Satellite Operators, which this year had only three representatives: SES, Eutelsat and Hughes, the panel was asked how it felt about Amazon and SpaceX getting into the satellite business, as these new competitors could afford to make losses for many years. Steve Collar, CEO SES, was very positive about this: “We need continuous innovation and new services, and newcomers bring these in.” Pradman Kaul,

President of Hughes agreed: “Competition is good. It forces us to move at a faster pace, so we welcome it.” The operators were also asked how

they felt about SpaceX essentially getting into their business with the launch of Starlink. Both Steve and Pradman, said that they still felt good about their relationship with SpaceX. Michel Azibert, Deputy CEO, Eutelsat, was more cautious: “We work with Blue Origin, SpaceX and Arianespace. If SpaceX becomes a completely integrated company that may change.” They all agreed, however, that the future of the industry lies in multiple orbits, although Michel, cautioned that he didn’t believe in LEO for consumer broadband. The audience was asked which orbits their companies were investing or planning to invest in; 57% responded “all of them.”

ST Engineering iDirect Provides a Glimpse of the Merged Company’s Vision and Direction

ST Engineering iDirect took the opportunity of Satellite 2020 to have a briefing for the press, to

talk about the vision for the combined company, (Newtec and iDirect). Kevin Steen, CEO opened by stating that right now, there is an unprecedented amount of money going into the satellite industry, and as a ground service provider ST Engineering intends to be at the center of this. He pointed out that satellite is a key segment for the parent company, and the intention is to integrate satellite into its other activities, namely Smart Connectivity, Mobility and Security. He also mentioned that this is an opportunity for the company to “move up the value chain.”

Thomas Van den Driessche, President of the Executive Strategic Board and Chief Commercial Officer (CCO) continued on to say that through the merger, the company now had access to capital at a lower rate than previously, so is now able to be a financial partner, and become the ground system inte-

grator for LEOs and MEOs. The company will also move into an OPEX model, offering Platform as a Service (PaaS). Since the new combined (Newtec and iDirect) platform will be software defined, it will be

flexible enough to serve all the new LEOs, so the company will not be dependent on the success of one operator over another.

Bart Van Poucke, VP Product Management explained how the combined company is in the process of rationalizing the product portfolio progressing towards a converged technology platform. This is now being tested with a few customers to make sure that nothing has been missed. The modems are software defined but will not be interchangeable between sectors, for example an aeronautical modem will be different to a maritime one. For the last three or four years Newtec has been working on waveform convergence, and this will be integrated into the new platform. Mx-DMA for its spectral efficiency combined with scalability (up to 5,000 terminals on a single demodulator) and agility (to cover bursty applications). The combined technol-



ST Engineering iDirect CEO Kevin Steen (on left) and President of the Executive Strategic Board and Chief Commercial Officer (CCO) Thomas Van den Driessche presented their merged company’s vision and direction.

ogy is known as Mx-DMA MRC (Multi-resolution coding) and according to Van Poucke, is the optimal converged waveform for all applications and VSAT services, providing a common self-organizing forward and return path. This will first be launched on Dialog platforms, but will obviously be included on all Datapath platforms in the future. Van den Driessche added that this is “the most efficient, most advanced return technology that you can imagine.....the efficiencies are incredible, the overhead is very low and it scales 10,000-100,000 sites, it’s the most advanced VSAT return technology ever built.”

The Looming COVID-19 Pandemic

The satellite industry, like the rest of the world is facing uncertain times. On March 9th, the first day of the conference, there were 108,000 confirmed cases of the novel coronavirus or what’s officially called COVID-19 around the world, with 3,800 deaths. Despite these alarming numbers, it wasn’t considered severe enough to cancel the conference, although as already mentioned many companies decided to put the welfare of their staff first, and not attend. By March 11th, the penultimate day of the conference, the World Health Organization (WHO) declared a global pandemic. At the time of writing (March 19th), those figures have grown to 210,000 cases and 8,800 deaths, and the most of the world as we knew it, has shut-down. As we are all aware, in some countries, there is a shortage of test kits, so it is likely that the actual number of cases is far higher and sadly will continue to grow at the same exponential rate.

Th economic impact has been swift and drastic, and the fall out continues to escalate, as many people around the world are facing a major decrease in disposable income, either due to job losses or the stock market crashing. Although the impact on the industry will vary by sector, overall, the satellite industry may come through this, better than many sectors.

Usually in times of recession, video suffers less than many industries, as people stay home and watch TV, rather than going out. In this pandemic people around the world are being advised, or forced to stay home. In spite of the increase in streaming services, video still remains a significant revenue generator for the satellite industry. In the

opening session, Michel Azibert pointed out that it still accounts for 60% of Eutelsat’s revenue. Provided that households still have enough money to pay subscription fees, and advertising supported free-to-air (FTA) services keep going, this side of the satellite business should suffer less than many sectors. It may in fact experience an uptake in direct to home (DTH) and content distribution services. This is likely, if terrestrial broadband is unable to cope with increased demand for streaming services, prompting customers to return to satellite and cable TV. Broadband to the home should also weather the storm, as people are being urged to work from home, and of course will also be watching more streaming video. The government sector should also do well, as in times of crisis there is usually more demand for services.

In recent years broadband to the maritime and aeronautical industries has been a rapidly growing niche, and one that is unlikely to fare well during the pandemic. Many cruise lines have suspended operations and travel both domestic and international is experiencing a huge decline, so this sector of the satellite business is likely to be hit hard. Depending on where it is located, satellite and equipment manufacturing may also suffer, as countries, states and regions issue “stay at home” orders, supply chains, of course, may also be severely disrupted.

As John Finney, Founder of Isotropic Systems, said in a session entitled “The Great Satellite Financing Debate”: “This is a test of leadership for the industry. There is no book on how to lead during a global pandemic, we’re writing it. The welfare of our staff is our highest priority.”

Let’s hope that we write it well, and we all survive and prevail in these challenging times. 



Elisabeth Tweedie is Associate Editor of the *Satellite Executive Briefing* 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), a consultancy that focuses on researching and evaluating the long-term potential for new ventures, initiating their development, and identifying and developing appropriate alliances. She can be reached at: etweedie@definitivedirection.com

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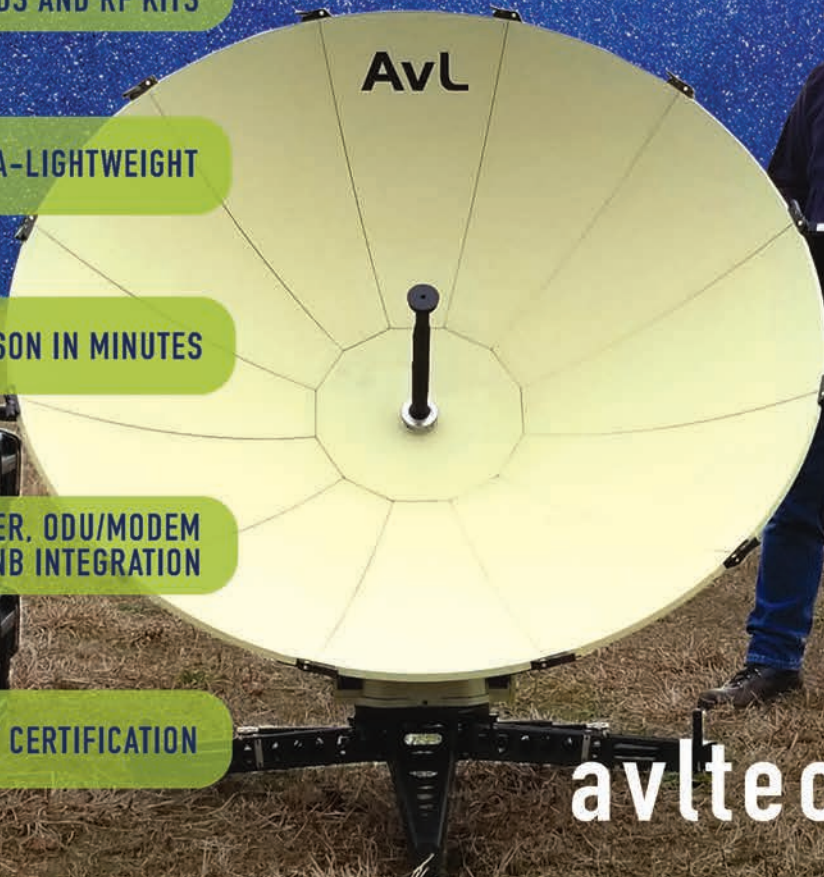
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Prospects in the OTT via Satellite Market

by **Omkar Nikam**

The transition of the video industry from traditional TV to OTT and IPTV is impacting on satellite service providers' video revenues. At the same time, it has also created opportunities for the satellite companies to innovate and experiment by integrating satellite solutions in various video market verticals.

These changing dynamics of the satellite video industry is paving the way for hybrid technology to take over the video market, and satellite solutions will play a crucial role in deploying services where video content reach is still at a minimum level. For

instance, when it comes to deploying services in remote areas, satellite backend solutions are the game changers in terms of overcoming the complications of terrestrial infrastructure. Though the future of OTT services looks competitive, the transition of the global audience from satellite TV to OTT is consistent but at a slow pace in many parts of the world. Therefore, both satellite operators and service providers have

received this opportunity during this transition phase to experiment and reincarnate satellite solutions for the emerging video market.

OTT Content Delivery via Satellite

SES, Eutelsat, Quadrille, and Broadpeak, among others, are some of the current companies

Quadrille, a company specializing in content delivery over satellite, partnered with Anevia, an OTT and IPTV software solution provider, in March 2019 to serve the live-TV market with sophisticated streaming content quality.

The satellite industry is evolving and entering a new era of the video industry, but one thing that keeps the clock ticking is that

whether it is viable to compete with the terrestrial players to take over the OTT market?

As far as the competitive scale of OTT platforms is concerned, there are some empty spaces where satellite solutions will be the game-changer. Though the future

remains uncertain, satellite broadcasting and broadband have started converging to give rise to new and innovative video market solutions.

Importance of Satellite Cloud Services for The OTT Market

Cloud technology is making the content distribution process less hectic and more efficient. That being said, satellite cloud services for the OTT market will



providing satellite solutions for the OTT market. Both SES and Eutelsat provide satellite solutions for OTT and IPTV market segments. Eutelsat's CIRBUS, a hybrid satellite OTT solution, consists of SmartBEAM technology. This SmartBEAM technology allows Eutelsat to extend its OTT content reach via Content Delivery Network (CDN) in the regions where the internet connection is at the lowest rate.

be the cherry on top for the content distribution companies as it will remove the barriers of complex infrastructure for content delivery on a global scale. Mirantis is one such cloud service provider that was chosen in 2018 by an unnamed US satellite operator to deliver end-to-end OTT solutions cloud technology platform, OpenStack. The cloud technology has the ability to accelerate satellite business models by filling the gaps of the unexplored video market segments such as the remote or urban areas, where satellite TV is still the dominant business vertical. By integrating OTT, content via satellite cloud technology will pave the way for the satellite industry to monetize on its current technology and keep a stronghold on its years-long satellite TV customers.

Hybrid Technology

The recent advancements in satellite communication technologies, such as high throughput satellites (HTS), are changing the dynamics of the satellite services in terms of both coverage and bandwidth. On the other hand, as the demand for OTT content is rising, the end consumers will be consuming higher amounts of data due to the incoming HD, UHD, and 4K content services on platforms like Netflix, Amazon Prime, Disney+, etc. Moreover, the increase in multi-streaming capabilities by companies like Disney+ will also be requiring a good amount of backend technology to capture the traditional video market, especially in rural areas. And this is the segment where hybrid technology-- satellite and

“...Combining both satellite and terrestrial solutions will create value for the end consumer business, and this will also help the video market to unlock the potential of hybrid broadband technology....”

terrestrial, will be playing a crucial role in delivering the 4K and the upcoming 8K content both on a local and regional scale. Providing high-quality video content over terrestrial infrastructure limits the reach of the content over wider zones. But the entry of satellite solutions will help the content distributors to expand their services both in terms of content reach and revenue sphere.

Conclusion

Combining both satellite and terrestrial solutions will create value for the end consumer business, and this will also help the video market to unlock the potential of hybrid broadband technology. The future outlook of satellite technology for the OTT market also depends on how well the industry can navigate itself to find lucrative business opportunities. While

considering the growth and competition in the OTT market, the satellite industry should also keep an eye on the ground for overcoming certain regulatory restrictions on both OTT and IPTV services. Though not many countries are stepping ahead to regulate OTT content, the regulation of OTT content might bend the curve on the subscriber side, which may ultimately lead to the loss of both satellite and terrestrial companies. Therefore, a collaborative approach towards OTT service expansion, such as hybrid technology, might be the best solution for satellite and companies. 🌐

Omkar Nikam is a correspondent of the Satellite Executive Briefing magazine based in Strasbourg, France. He completed his Master in Space Studies from the International Space University and had over three years of experience in the Indian media and marketing industry. Apart from the academic and professional engagement in space activities, Omkar actively volunteers for the Space Generation Advisory Council (SGAC). He can be reached at: omkar@satellitemarkets.com



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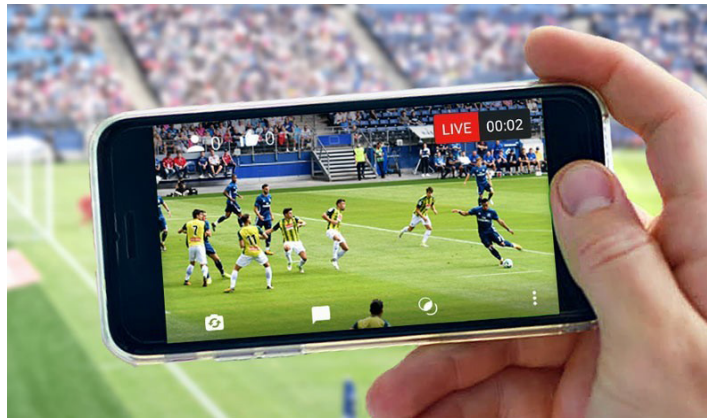
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Trends in the Satellite Industry: A User's Perspective

by Krasimir Terziev

This month Satellite Executive Briefing welcomes the views of Krasimir Terziev, Head of International Sales for Satellite services at VIVACOM--Bulgaria's largest telecommunications company. He is also a member of the Board of Directors of Trakia University where is spearheading innovative training and educational initiatives in the telecommunications and satellite field.

Some people would say that the satellite business is declining. However, the facts present a very different picture. The satellite industry has achieved sustained growth every year and the approximate increase for 2018-2019 is 6% according to a report from the leading market research company, NSR. The largest segment of the industry is Satellite Services has a minor decrease of 1.7% due to the competitive satellite transponders market. Satellite Manufacturing revenues increased by 26%, Launch Services and the Ground Equipment segment also has a positive upsurge of 26% and 5% respectively. The overall turnover is expected to skyrocket up to US 1\$ trillion in 2040.



who will succeed first. One of the most popular topics in 2019 was the LEO / Low Earth Orbit / satellites which will provide affordable Internet connectivity to everybody across the globe. Space X has announced the plan for the mega constellation of 12 000 satellites. Elon Musk has already proved that he can change the industry, cutting the prices of the satellites launches and providing a reliable service. On

May 23, 2019 Space X has successfully launched the first 60 Starlink satellites in orbit. One Web has sent also in February the first 6 satellites and registered the start of the project. Telesat and Kuiper of Amazon are in addition some of the significant names in

Talking about the trends and foreseeing the future, we must mention the new revenue stream - the non-satellite space industry which include the Government space projects and the commercial human spaceflights. This should not be underestimated because the potential market presented revenues of US\$ 2.5\$ billion in 2018 according to a report by the Satellite Industry Association (SIA) report. Any growth in this non-satellite segment of the space industry will usually have a multiplier effect on the satellite industry.

Revolutionizing the space industry- I believe that is the right sentence that describes the impact of "New Space" players. The three billionaires, Elon Musk, Jeff Bezos and Richard Branson want to lead humans in space and they are in fierce race

this market and they will be definitely part of the major players. One thing is sure - the end customer will win from this competition and at the end will receive a service on better priced service.

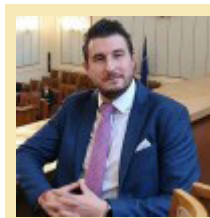
Consolidation of the Teleport facilities continues as well. Smaller operators became part of larger companies in order to provide a wider portfolio of services and to be more competitive on the market. However the revenue of the services increased from 2016-2018 according a report of WTA. The Teleport providers also faced a lot of challenges - they had to provide more services in existing hardware-fewer antennas and less capacity and invest in new hardware or in cloud/virtualization services for better operational capabilities and competitiveness. They also tried to dodge the process of migration

OPINION

to terrestrial connectivity which is in some cases the cheaper solution for the customer but still not the best option because of lower reliability of the service.

The most fertile business direction this year remains the VSAT market. The average expected growth for the period 2019-2023 is 10%. In 2018 the Maritime connectivity market reached US\$ 1 billion. The VSAT market is growing rapidly because of higher capacity demand of the passengers or the crew. The number of terminals will rise up to 65 000 by 2028. The satellite operators provide also a better pricing squeezed from the hard competitors and in addition the High Throughput Satellites (HTS) deployments ensure better throughput and better efficiency in the link budgets (MHz converted to Mbps). The on-board applications which deliver different optimization of the vessels also require more capacity. There is also a raised interest for additional services on board like Video on Demand

services, TV solutions, Voice over IP, 3G/4G services close to the shore, vouchers for the crew and IP network management. This supposed automatically the purchase of additional capacity from the VSAT providers. The total GEO HTS capacity is expected to grow up to 680Gbps by 2023. Finally it should be mentioned that the biggest players in this market Newtec and iDirect have merged aiming to provide more sophisticated service to the customer. 🌐



Krasimir Terziev is Head of International Sales for Satellite services at VIVACOM--Bulgaria's largest telecommunications company. He is also a member of the Board of Directors of Trakia University. He can be reached at

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When Disaster Strikes

In life, it's the connections that count. It's the phone call and the text message. The emails for work. The online shopping and the credit card in the store. The visit to the ATM, the airplane trip, the medical emergency.

Without those connections, life grinds to a halt.

When disaster strikes, the connections fail. To family and friends. To vital services. To rescue those in danger.

Without connections, how do you start responding?

Starting with Satellite

You start with satellite. In the heart of disaster, satellite communication keeps working. It lets emergency managers see a complete picture of the disaster and gives them the tools to respond. It lets them do their jobs when nothing else can.

Knight Sky is a company that has brought emergency communications to government agencies and businesses for years. They know disasters – and what it takes to meet them.

It takes emergency response to bring help to the injured and hungry, and to protect their property from more harm. It takes recovery and restoration to bring connections back online, so that life and work can begin again.

What Emergency Managers Need

That's why Knight Sky created SkyMAX. It gives emergency managers what they need most. Satellite connections ready to go – and to scale up as far as needed. Communications technology on the ground. People to make it work and train others to use it.



It lets emergency managers send first responders to the right places. It lets them coordinate equipment, supplies, vehicles and services to meet the need. Hospitals and local businesses get up and running. Government agencies bring medical care, assess damage and guard against the diseases or pollution that can follow in disaster's wake.

Preparing for the Worst

It takes one more thing to deal with disaster. Being prepared. It's too late to start planning for bad weather when a hurricane is at your door.

That's why Knight Sky helps agencies and businesses plan for the next disaster and pre-set the satellite capacity and technology needed for response, recovery and restoral.



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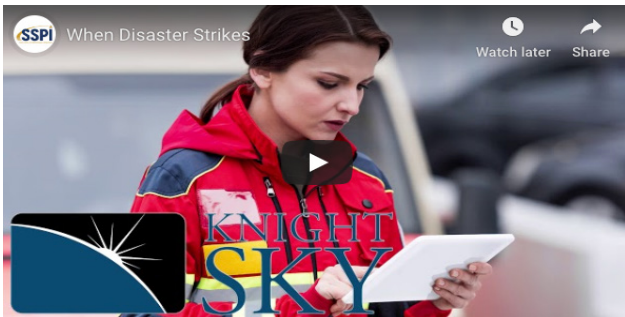
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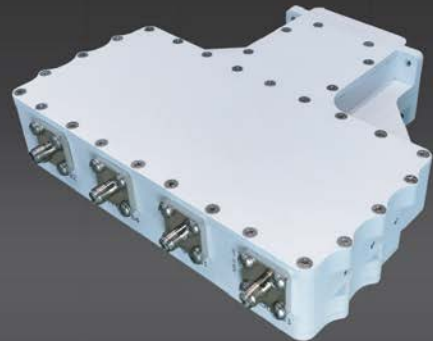
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Advance the future

Will Connecting with LEO and MEO be a Viable Business?

by Robert Bell

Most of the attention surrounding the early success of the SES Networks' MEO constellation and the pending arrival of LEO constellations has focused skyward. It is all about the satellites and their orbits, interference with GEO and the economic potential and risks of delivering global coverage to a planet that is 70% covered by water.

An equally vital question, however, is how the established ground services industry – aka, teleports – will interface with this new capacity. It reminds me of a joke a friend once made about the legalization of marijuana. When it finally happens, we will have ready-made distribution platforms ready to go in every city and town.

They're called drug stores.

For a variety of reasons, it isn't working out that way. So, for MEO and LEO, the question is whether they will take proper advantage of a network of facilities already in place or try to re-invent the wheel?

LEO/MEO Constellations and the Teleport

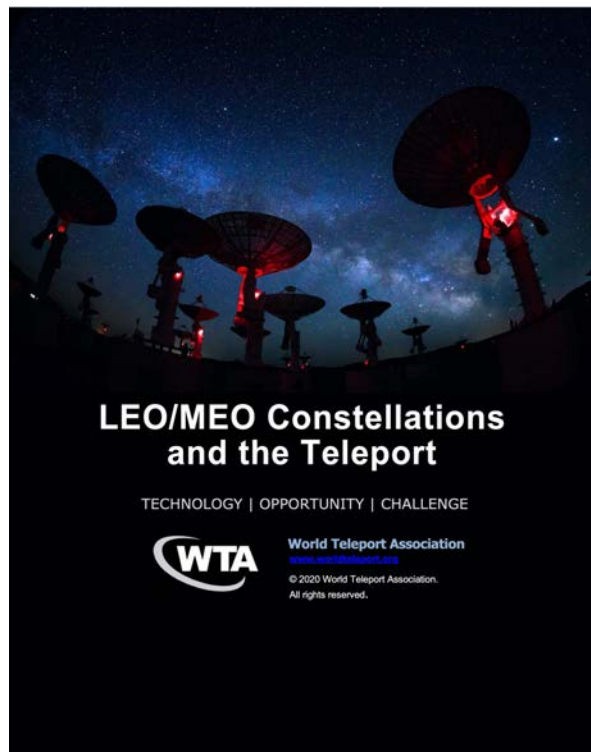
In January, World Teleport Association published *LEO/MEO Constellations and the Teleport*, based on interviews with satellite operators, teleport operators and technology vendors. In public, most of the planned LEO constellations have been tight-lipped about their go-to-market strategies. Of the five systems covered in the report, only two have

revealed their plans. One is a negative example: Kepler Communications operates the single teleport required to start its store-and-forward service and also sells the service directly. The positive example is OneWeb, which is deeply engaged with teleport operators, seeking gateways for its network and resale partners for its service. As a GEO operator, SES has worked with teleports for decades and there are occasional press reports of companies like Speedcast integrating MEO services into customer solutions. SES is also launching discussions with teleport operators about support for testing the new mPOWER spacecraft and establishing gateways able to handle their enormous data volumes.

Physically, a teleport supporting a LEO constellation will look very different. Instead of focusing on the equatorial arc, it must cover the full sky with many more antennas. Other requirements include frequency

clearance, particularly anywhere near a 5G transmitter. In the case of Ka-band constellations, climate becomes an issue, because torrential rain is a non-starter for gateways.

Antennas are the most visible part of the infrastructure, but the most critical element is the data center. Meeting the requirement means having the rack space available for all the incoming equipment and the power and cooling needed to support it. That can demand significant upgrades to power and cooling, which may involve considerable investment.



One LEO executive predicted that his spacecraft will not be able to deliver bandwidth for a lower price than GEOs, but that the lower latency of LEOs will command a higher price point for the right applications. It will also be several years before the LEO constellations are fully deployed, which means that they will depend for a time on roaming between LEO and GEO. Once those complex relationships are in place, they may prove enduring because the combination delivers the best price/performance to customers. It is already central to the SES Networks MEO business model.

Technology executives were unanimous in seeing strong business opportunities from the new constellations, whether it is for more antennas, power systems, monitoring technology or connectivity. One tech company has 40 to 50 engineers at work on designs – but is still unsure exactly who the buyer will be and how many units they are likely to buy.

Opportunities and Risks

From the limited information available so far, it appears that the LEO and MEO constellations will offer teleport operators the following opportunities:

1. Teleports are already acting as “landlords,” selling the collocation of ground segment to the LEO operator, based on geographic location, antenna space with the right look angles and high-quality infrastructure.

2. With collocated technology on premise, teleport operators will provide first-line trouble-shooting and maintenance on that technology.

3. As LEO constellations develop major customers for their services, teleport operators could become their regional installation and service organizations.

4. Where the constellation’s business model permits, teleport operators will resell capacity and bundle it into value-added solutions, just as they do with GEO capacity today.

Every opportunity, however, comes with risk. If the NGSO constellations prove enormously successful, it may jeopardize the GEO constellations that

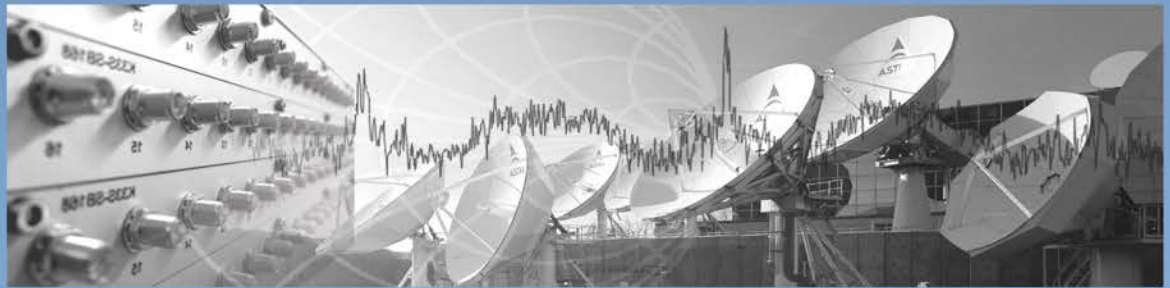
have long been the foundation of satellite communications. The risk is difficult to quantify and almost impossible to defend against. On the other hand, it is clear that not every LEO constellation will succeed. Teleport operators that co-invest in ground station infrastructure for new constellations risk seeing that investment stranded by the failure of one or more LEO operators. Teleport operators need to consider carefully the financial soundness of the operators they support and negotiate contracts that provide them with the maximum protection against downside risk.

One of the technology providers we interviewed was particularly enthusiastic about the changing landscape: “Our team has been in hundreds of teleports around the world and over the years we’ve watched signal quality change. We’ve watched the number of signals coming in change and the frequencies and bandwidth change. We’ve seen new designs in redundancy and use of RF over fiber. We have responded to it all with solutions. This won’t be the end of the teleport as we know it – it will just be a paradigm shift. It’s great to have the LEOs remind us that satellite remains a powerful and effective way to communicate around the world!”

The LEO/MEO Constellations and the Teleport report is available for free to members and for sale to non-members at <https://www.worldteleport.org/store/ViewProduct.aspx?id=15527493>.

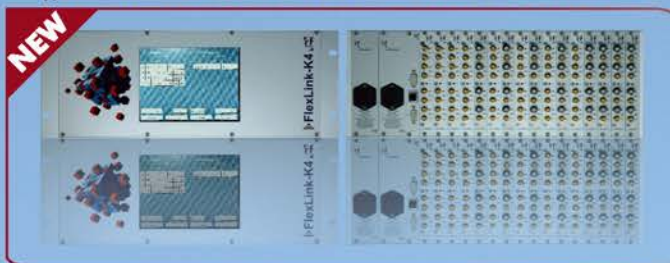


Robert Bell is Executive Director of the World Teleport Association, which which conducts research into the teleport and satellite industry and offers a Teleport Certification program to service providers. He can be reached at: rbell@worldteleport.org

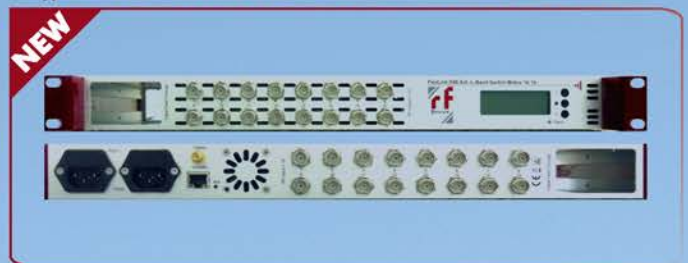


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Responding to the COVID-19 Pandemic: GVF Member Services

by **Martin Jarrold**

The global spread of coronavirus, and the impact of the COVID-19 disease it causes, is changing our world. GVF is acutely sensitive to this impact. As the global association of the satellite industry, we are responding to the effects the virus is having on our Members' operations by exploring ways to increase the digital exposure of our Members' news, products and services, while also creating

sequence, many of the world's governments have introduced quite unprecedented measures which have become described as "lockdown" for around one-third of the Earth's population. Much global business and commerce is now, quite suddenly, being conducted on a very different operational basis and "Social Distancing" is now one of two drivers affecting the scale and scope of human interaction. "So-

industry came with news of the cancellation of the Mobile World Congress. In terms of impact on the GVF's events schedule, this was followed by announcement of the postponement to later in the year – 26-28 October – of CABSAT and of our embedded SATEXPO Summit which we, as a key supporting partner of the Dubai World Trade Centre event, had once again organized. Following that announcement,



digital learning opportunities that add to our already existing suite of online training courses and certifications.

As I sit in my home office writing this column, 199 countries and territories have reported cases of Coronavirus. To state the obvious, this public health emergency is affecting all facets of life and very sadly causing so many premature deaths – approaching 25,000 at time of writing. In con-

sequence, many of the world's governments have introduced quite unprecedented measures which have become described as "lockdown" for around one-third of the Earth's population. Much global business and commerce is now, quite suddenly, being conducted on a very different operational basis and "Social Distancing" is now one of two drivers affecting the scale and scope of human interaction. "So-

cial Distancing" on its own can be very limiting, but the second of these drivers, realized through today's digital connectivity infrastructures and telecommunications applications, is quite the opposite. It is enabling, and it has, more than at any other time, really come into its own.

the list of event cancellations and postponements has had many, many additions. SATELLITE 2020 in Washington DC was not unaffected, closing a day earlier than scheduled with the result that three GVF organized panels were canceled.

Like all industries, much of the business of the telecommunications sector has traditionally relied, at least in part, on the signif-



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SATELLITES FOR DIGITAL ECONOMY



icant traction achieved through personal and physical interaction. Promotion and selling of technology and service solutions; developing new, and maintaining existing, customer relationships; etc., has often relied on meeting people in exhibition halls and conference rooms.

This partial reliance is despite the sector – that is, the satellite, fixed and mobile terrestrial/wireless, cable/fiber segments – continuing to develop, and provide, technology platforms, services and applications which render much of this physical communication somewhat unnecessary. As I write, the pandemic means that the only truly safe way to meet “face-to-face” is via video – using applications like Microsoft Teams, PowWowNow, Skype, Zoom, etc. – augmented by other sharing features of a range of social media platforms. The facilitation of people coming together to exchange ideas and extend industry knowledge is, at least for now, solely a digital experience.

No doubt the current crisis will foster an even greater and more accelerated process of innovation in the functionality and delivery of these digital platforms, whilst at the very same time there is innovation and heightened investment in the scientific endeavor devoted to development and deployment of a Coronavirus vaccine.

When the latter succeeds, the abrupt interruption to the global events calendar may be reversed, but possibly only in part. With circumstances having dictated that for human interaction to occur reliance on digital platforms

“...Like all industries, much of the business of the telecommunications sector has traditionally relied, at least in part, on the significant traction achieved through personal and physical interaction...”

had to be 100 per cent, organizations may in the future decide to significantly review their policy towards returning to the old events paradigm. Things are unlikely to be as they were.

Whatever transpires in the medium-term ahead, the impact of the cancellation and postponement of conferences and exhibitions, of associated travel restrictions, and the necessary imposition of working-from-home models, in the shorter-term GVF will be re-focusing its energies into the expansion of our digital services for our Members. GVF will do so by providing additional platforms for the promotion of Members’ services and products and extending learning opportunities about the latest developments affecting their business.

For our Members, we are exploring the organization of video panels of experts and related podcasts to discuss latest ongoing developments in areas of industry interest. We are also encouraging Members to make greater use of the GVF eBulletin to post their releases on new products, services, and corporate developments, paralleling the existing opportunities to post on GVF.org,

through our LinkedIn page, and Twitter account. Additionally, we are discussing with Members the formation of a cross-industry Marketing Working Group where members can share ideas on how to maintain promotional activities during the current period of travel restrictions and event postponements.

This expansion of online membership benefits will complement the long-standing provision from GVF Training/SatProf of specialized online training to our Members’ employees at discounted rates. GVF is known globally for its portfolio of training courses and some 17,000 installation technicians worldwide have benefitted from GVF certification. Online self-paced training is fully operational 24/7 and queries, enrollments, and student services remain fully available so that staff who are working from home have the option of using their time for certification training. Additional information is available at www.gvftraining.org and Members can email gvfsupport@satprof.com with inquires. If your organization is not yet a Member of GVF you can explore the entire range of membership benefits by visiting <https://gvf.org/members/>.



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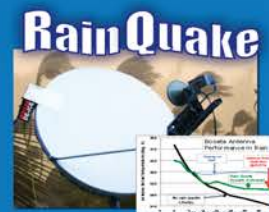
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EXEC MOVES

Key Executive Moves at Comtech

Melville, NY, March 31, 2020--Comtech Telecommunications Corp. announced the promotion of Mark Toppenberg and Jeff Harig, each to Co-President of Comtech's Tempe, Arizona-based subsidiary, Comtech EF Data Corp., the promotion of Mark Schmeichel to President of its Santa Clara, California-based subsidiary, Comtech Xicom Technology, Inc. and the appointment of Michael Plourde as Comtech's Vice President Global Engineering and Programs.

These changes are intended to strengthen the leadership and drive long-term revenue growth of Comtech's satellite earth station solution product lines according to the company.

Jeff Harig has been with Comtech EF Data Corp. since 1994 and most recently was Senior Vice President of Government Systems since 2015. Harig holds a MSEE degree from the University of Missouri-Rolla and a BSEE from Michigan Technological University.

Mark Toppenberg has been with Comtech EF Data Corp. since 1997 and most recently was Senior Vice President of Global Sales since 2015. Toppenberg holds a BSBA degree from Northern Arizona University and an MBA from the Thunderbird School of Global Management at Arizona State University.

Mark Schmeichel has been with Comtech Xicom Technology, Inc. since 2014 and held the title of Senior Vice President and General Manager. Schmeichel holds a BS degree in Mechanical Engineering from

Northern Illinois University. Michael Plourde has 30 years of experience in the satellite ground station systems industry. Most recently, Plourde was a member of Globecom Systems' executive leadership team, responsible for the global engineering and operations functions of that company. Plourde holds a BSEE from Worcester Polytechnic Institute in Worcester, Massachusetts.

In connection with these changes, the company also announced that John Branscum, Senior Vice President of Comtech, will be leaving the Company effective April 8, 2020.

Spacecom Appoints New CEO

Tel Aviv, Israel, March 19, 2020--Spacecom), operator of the AMOS satellite fleet, announced that Dan Zajicek has been appointed by the



Dan Zajicek

board of director's as the company's new Chief Executive Officer. His appointment officially begins on April 1, 2020.

Itzik Shnaiberg, who has served as Acting CEO since January 1, 2020, will return to his Deputy CEO position at that time. The board of directors wishes to thank Shnaiberg for filling the CEO position during this transition period.

Zajicek comes to Spacecom from Satcom Systems, owner of Gilat Satcom, where he served as CEO from 2012, after fulfilling

senior management positions in the international satellite services industry. At Bezeq International he served as VP responsible for Regulatory Affairs, International Business Development and HR as well as VP of its Business Development unit and CFO. Holding an BA with Honors in Economics and Business Administration and an MBA from the Hebrew University in Jerusalem,

ILS Hires New President

Reston, Va., March 12, 2020--International Launch Services (ILS) has hired a longtime United Launch Alliance executive as its new president. ILS announced that Tiphaine



Louradour

Louradour is the company's new president, effective immediately. ILS had been without a full-time president since the departure of Kirk Pysner last October.

Louradour said she was excited about taking the reins of a company that has struggled in recent years to win business for the Proton rocket. ILS's last Proton launch was in October 2019, which was the first commercial flight of that rocket since 2017.

Louradour comes to ILS from ULA, where she worked for 13 years, most recently as head of global commercial sales for the launch company. She said her experience helping build up ULA's commercial business, at a time when the company was exclusively focused on the U.S. government, will help at ILS.



Radeus Labs Closes Acquisition of Satellite Systems Corporation Product Line

Poway, Calif., March 9, 2020--Radeus Labs announced the closing of its acquisition of the company product line of SSC, formerly Satellite Systems Corporation.

"This acquisition supports the strategic expansion of our product line and further strengthens our ability to deliver comprehensive control system solutions for our business partners and customers," said Radeus Labs' CEO, Juliet Correnti.

With this acquisition, Radeus Labs will manufacture and provide support for its new SSC product line as part of its SATCOM line of business. The new Radeus SSC product line consists of Beacon Tracking Re-

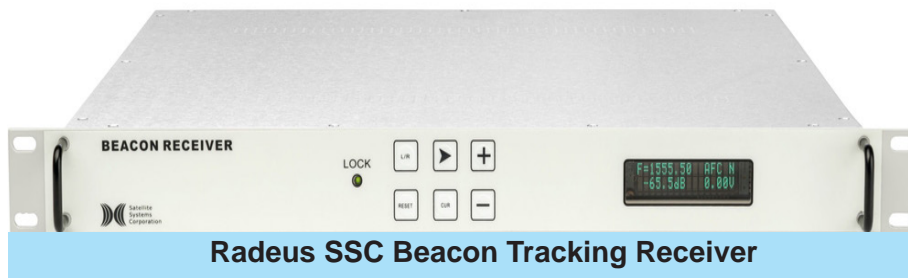
ceivers (BTR), Frequency Converters, Block Down Converters (BDCs) and Low Noise Block Converters (LNBs).

The SSC Beacon Tracking Receiver (now Radeus SSC BTR) product line, which has been a mainstay of earth stations worldwide for near-

says the CTO of Radeus Labs, Ken Cone. "Available immediately, it is also going to be an effective starting platform for our new monopulse tracking receiver."

The BTR expands the existing satcom product offerings of the 8200, 2200 and 2300 Antenna Control Systems and also provides the option of an external tracking receiver from Radeus Labs.

Radeus Labs, Inc., with headquarters and manufacturing facilities in Poway, CA, specializes in the design, manufacturing, and marketing of leading-edge hardware and software systems for the defense and SATCOM markets.



ly 40 years, is the first product line that Radeus Labs is placing into production at their facilities in Southern California.

"We are really excited to be able to provide the Radeus SSC BTR."

Rocket Lab to Acquire Sinclair Interplanetary

Long Beach, Calif., March 16, 2020--Rocket Lab, a dedicated small satellite launchservice provider, has reached an agreement to acquire Sinclair Interplanetary, a provider of high-quality, flight-proven satellite hardware. Financial terms of the acquisition have not been disclosed.

The acquisition strengthens the satellite division of Rocket Lab, which produces the Photon spacecraft line, and will enable Sinclair to tap into Rocket Lab's resources, scale, manufacturing capability and innovative technology according to the company.

Founded in 2001 by Doug Sinclair, Toronto-based Sinclair Interplanetary develops spacecraft hardware, including reaction wheels and star trackers that support rapid-schedule small satellite programs. More than 90 satellites incorporating Sinclair hardware have been launched to orbit, including Rocket Lab-launched satel-

lites from AstroDigital, ALE, and BlackSky. The Sinclair team has been entrusted with developing hardware for world-first missions: BRITE, the world's smallest space telescope; and The Planetary Society's LightSail 2, the first satellite in Earth orbit to be propelled solely by sunlight. Satellite communications company, Kepler Communications, has also selected Sinclair reaction wheels for its constellation of 140 Internet of Things satellites currently in development.

Rocket Lab will look to leverage Sinclair Interplanetary's strong brand and equally impressive heritage of innovation, quality, and execution. Sinclair products will be key features of Rocket Lab's in-house designed and built Photon satellite platforms, and Rocket Lab will bring additional resources to grow Sinclair's already strong merchant spacecraft components business.

Rocket Lab Founder and Chief Executive, Peter

MERGERS & ACQUISITIONS

Beck, said that “by combining the experience and capabilities of both companies, Rocket Lab will deliver reliable and flexible satellite and launch solutions that enable customers to do more, spend less and reach orbit faster.” Mr. Beck added that “Doug Sinclair and his team at Sinclair Interplanetary are recognized as industry leaders and, like Rocket Lab, they produce best-in-class solutions that satellite operators know they can count on. Sinclair’s dedication to quality and reliability aligns perfectly with Rocket Lab’s commitment to mission success. We’re thrilled to welcome Doug and the entire Sinclair team to the Rocket Lab family, and we look forward to working with them on Sinclair’s continued growth and success.”

Doug Sinclair added “Rocket Lab has played a pivot-



al role in making it easy for small satellites to access space. By operating as one company, we now have the opportunity to do the same for satellite manufacturing and make our hardware available to more customers globally. We will be able to supply larger constellations than before, and take our hardware out to the Moon and beyond.”

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SATELLITE COMMUNICATIONS

Comscore Sees Notable Rise in US Streaming Due to COVID-19 Restrictions

Reston, Va., Month 27, 2020—The latest research from Comscore finds that OTT streaming has significantly increased across Connected TVs and streaming boxes/sticks in recent weeks. The higher utilization rates are the latest example of how media consumption shifts are rapidly occurring amid the COVID-19 pandemic.

the three most recent days of available data, this growth is even more pronounced vs. the same days in 2019. “Comscore’s latest information shows that the millions of Americans who are remaining indoors to comply with Coronavirus public health measures are hungry for news and entertainment, and streaming options are an increasingly important piece of the consumption pie along with traditional

Growth in OTT Streaming on Connected TVs and Streaming Boxes/Sticks

MARCH 15-18, 2019 VS. MARCH 13-16, 2020

	OTT HOUSEHOLDS (YOY)	TOTAL OTT HOURS (YOY)
CONNECTED TV	39%	34%
STREAMING BOX/STICK	47%	20%



Source: Comscore Total Home Panel Custom Reporting

In looking at OTT streaming behavior thus far in March 2020, Comscore information reveals there has been notable year-over-year growth in both the number of households and time spent with OTT content on both connected TVs and streaming boxes/sticks.

Among the findings:

Connected TV and streaming boxes/sticks have registered significant year-over-year growth. Overall, streaming boxes and sticks make up 56% of to-date OTT streaming hours in March 2020 and connected TVs account for 32%.

When comparing

TV,” said Bill Livek, CEO, Comscore. “Advertisers who are looking to pivot their planning to match the rapidly-changing media consumption landscape can benefit from engaging with these growing audiences.”

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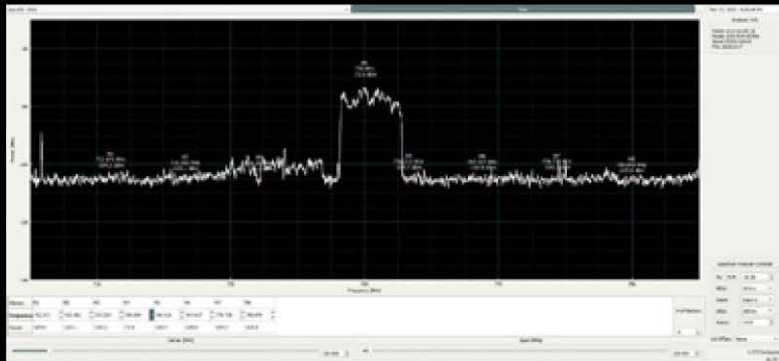
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The Satellite Markets 20 Index™

Company Name	Symbol	Price			Price Change	
		April 1	52-wk Range		Last Month	Jan. 2
Satellite Operators						
Thaicom Public Company Limited	THCOM.BK	2.30	2.14	7.55	-25%	-42%
Eutelsat Communications S.A.	ETL.PA	9.21	8.00	18.67	-20%	-36%
APT Satellite Holdings Limited	1045.HK	2.39	2.35	3.94	-36%	-19%
Echostar	SATS	30.55	25.23	45.13	-13%	-29%
SES S.A.	SES.F	5.16	4.88	18.03	-34%	-58%
Satellite Manufacturers						
The Boeing Company	BA	130.7	89.00	398.66	-53%	-58%
Maxar Technologies	MAXR	9.29	4.47	21.45	-40%	-55%
Lockheed Martin Corporation	LMT	338.52	266.11	442.53	-10%	-21%
OHB SE	OHB.DE	32.4	25.65	48.65	-10%	-24%
Honeywell International Inc.	HON	129.71	101.08	184.06	-20%	-28%
Equipment Manufacturers						
C-Com Satellite Systems Inc.	CML.V	1.98	1.36	2.18	-6%	10%
Comtech Telecommunications Corp.	CMTL	11.70	11.63	38.00	-58%	-68%
KVH Industries Inc.	KVHI	4.49	6.36	11.64	-56%	-59%
ViaSat Inc.	VSAT	32.89	25.10	97.31	-44%	-54%
Gilat Satellite Networks Ltd.	GILT	7.15	4.70	10.76	-24%	-11%
Service Providers						
DISH Network Corporation	DISH	18.70	17.09	44.66	-43%	-49%
Globalstar Inc.	GSAT	0.29	0.23	0.69	-33%	-40%
Orbcomm Inc.	ORBC	2.05	1.24	8.44	-35%	-50%
Sirius XM Holdings Inc.	SIRI	4.64	5.23	7.40	-28%	-35%
RigNet Inc.	RNET	1.40	1.02	11.34	-59%	-77%

The Satellite Markets 20 Index™ is a composite of 20 publicly-traded satellite companies worldwide with five companies representing each major market segment of the industry: satellite operators; satellite manufacturers; equipment manufacturers; and service providers. The base data for the Satellite Markets Index is January 2, 2008 - the first day of operation for Satellite Markets and Research. The Index equals 1,000. The Satellite Markets Index™ provides an investment benchmark to gauge the overall health of the satellite industry.

INDEX	Index Value April 1, 2020	Percentage Change Last Month	Percentage Change Jan. 2, 2020
Satellite Markets 20 Index™	1,792.90	-29%	-38%
S & P 500	2,522.75	-18%	-23%

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CABSAT 202018 www.cabsat.com	Terrasat Communications5 www.terrasatinc.com
Comtech Xicom35 www.xicomtech.com	The Spaceconnectioncover and page 11 www.thespaceconnection.com
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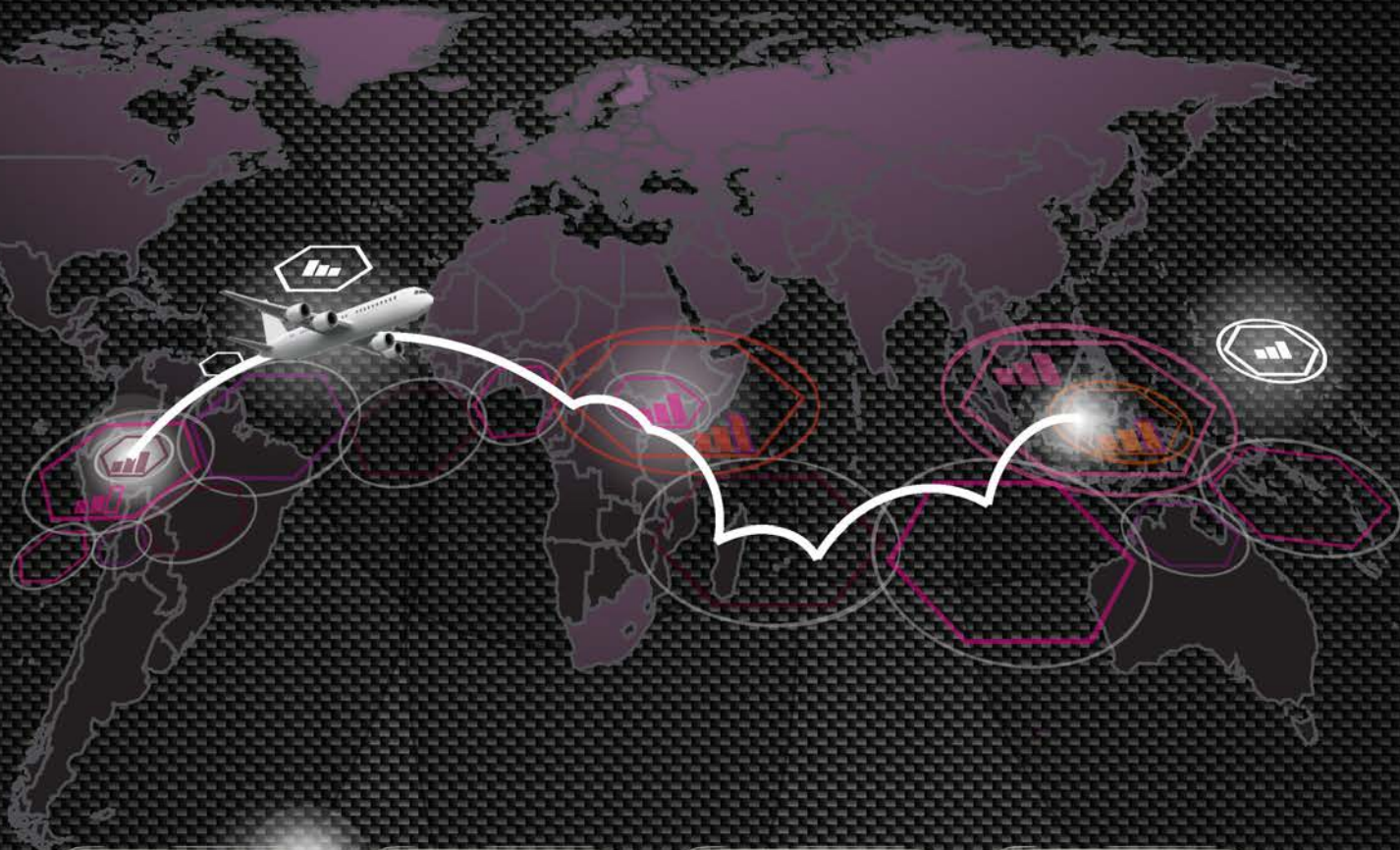
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- ▲ Type-4 - Two on-line amplifiers phase-combined with dedicated back-up (Single Pol)