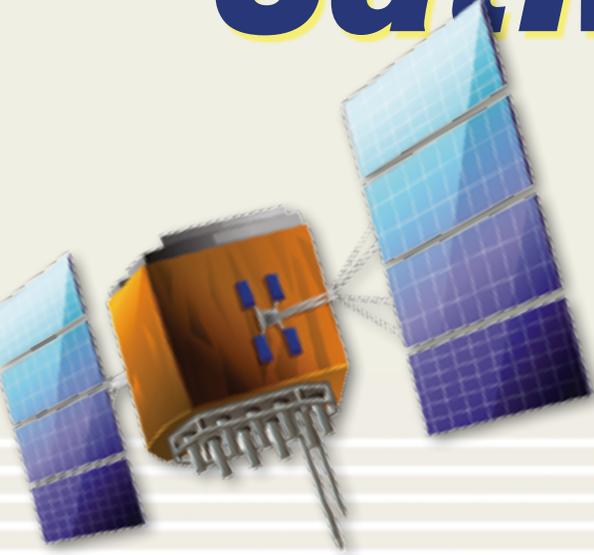


*Worldwide Satellite Magazine*

*September 2014*

# **SatMagazine**



## **European Expertise**

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Visiting With STN Teleport...  
Forrester + the 4K stampede...  
NSR looks at European merger ambitions...  
Dr. Slaney of Ultra Electronics GigaSat...  
Sadler + performance pay...

Executive Spotlights:  
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The iDirect Executive Team  
Christian Allred, ORBCOMM Europe  
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# SatMagazine

September 2014

## **Publishing Operations**

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Hartley G. Lesser, Editorial Director  
Pattie Waldt, Executive Editor  
Jill Durfee, Sales Director, Editorial Assistant  
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## **Senior Contributors**

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Jos Heyman, TIROS Space Information  
Carlos Placido, Placido Consulting  
Giles Peeters, Track24 Defence  
Bert Sadtler, Boxwood Executive Search  
Koen Willems, Newtec

## **Authors**

Emily Constance  
Blaine Curcio  
Brian Donnelly  
Werner Drew  
Chris Forrester  
Simen K. Frostad  
Dan Freyer  
Jacob Keret  
John Kerkamp  
Jean-Louis Lamor  
Hartley Lesser  
Miranda Mills  
Matthew O'Connor  
Sally-Anne Ray  
Bert Sadtler  
Dr. Andrew Slaney  
David Vaccaro  
Michael Ulbricht  
Pattie Waldt

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## Surrey Satellite Technology Limited (SSTL): Dazzling Footage From TechDemoSat-1



**Surrey Satellite Technology Ltd (SSTL) has released a video from a camera mounted on an exterior panel of TechDemoSat-1, which shows the satellite moments after separation from the Fregat upper stage of its Soyuz-2 launcher, and as it begins its first orbit in Space.**

TechDemoSat-1 was launched on July 8, 2014, and is an in-orbit technology demonstration mission, carrying innovative payloads for British academia and industry.

The video is approximately one minute in duration and may be viewed on SSTL's YouTube channel at this page: <http://www.youtube.com/watch?v=Oaq0Ctesltg&feature=youtu.be>.

The video capture starts rolling approximately 30 seconds after TechDemoSat-1 is injected into orbit by the launcher, and was taken by an inspection camera mounted on the exterior of the spacecraft, with the lens trained on the satellite's Antenna Pointing Mechanism.

As the video rolls the camera lens captures the first moments of TechDemoSat-1's mission, starting with a view into the darkness of free space.

After 6 seconds of play, the Sun appears at the top of the frame as a bright white flare, with a black dot at the center where the image is saturated by the intensity of the light.



As the Sun disappears from view, the satellite's rotation reveals a spectacular vista of "blue marble" Earth (to the right), with the lens capturing cloudy skies over the Pacific, south of French Polynesia.

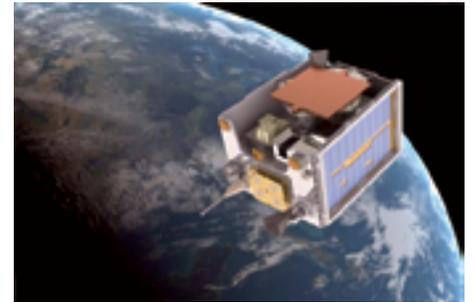
At 25 seconds into the video, the Fregat upper stage of the Soyuz-2 rocket appears as a gold object passing away from the satellite left to right at a distance of approximately 60 meters (see photo above).

At 34 seconds, a white "dot" crosses the frame left to right—this is almost certainly one of the other satellites that shared the ride into orbit with TechDemoSat-1. The video finishes with the rotation of the spacecraft bringing the Earth back into view.

Sir Martin Sweeting, SSTL's Executive Chairman, said, "It is very rare to see actual footage of our satellites in orbit, and so viewing the video taken from TechDemoSat-1 moments after separation from the rocket has been a hugely rewarding and exciting experience for everyone at SSTL.

"We are delighted with the progress of commissioning the TechDemoSat-1 platform, and are looking forward to the next phase—the demonstration of a range of new technologies being flown on this innovative mission."

SSTL's Operations team have now completed the commissioning of TechDemoSat-1's systems as well as the commissioning of the payloads on-board this technology demonstration spacecraft. TechDemoSat-1 is the first satellite to be controlled from SSTL's Operations Center at the Satellite Applications Catapult in Harwell.



*Artistic rendition of TechDemoSat-1. Image courtesy of SSTL.*

The inspection camera on-board the satellite will monitor the behavior of key mechanical payloads, including the Antenna Pointing Mechanism, which is in view for the duration of this video.

The camera was manufactured by SSTL's optics experts from COTS (Commercial-Off-The-Shelf) technologies and combines a color CMOS camera with a high performance machine vision lens. Both the camera and lens were stripped down and ruggedized to survive the vibration and shock loads experienced during launch.

The camera system was optimized to give a depth of field capable of delivering an in-focus image of the Antenna Pointing Mechanism and also the Earth in the background.

The camera is connected to the spacecraft's High Speed Data Recorder which captures the data as well as allowing control over the camera settings.

For additional information regarding the company, please visit <http://www.sstl.co.uk>



## Euroconsult: Revenues Report For FSS Now Published



**According to Euroconsult's newly released report, Company Profiles —FSS Operators: The Complete Analysis, the FSS industry generated \$12.2 billion in revenues in 2013, corresponding to 2 percent growth over revenues in 2012.**

Sixty percent of revenue-generating FSS operators experienced a revenue growth slowdown in 2013 after years of robust growth; 10 operators reported a revenue decrease in 2013, compared to only six operators in 2012.

"In order to re-energize revenue growth, satellite operators are increasingly exploring new revenue streams; in recent years the focus has primarily been on launching new satellites over emerging markets and investments in HTS systems or payloads," said Nathan de Ruyter, Senior Consultant at Euroconsult and Editor of the report. "Eleven FSS operators offered HTS capacity to the market in 2013, while nine operators will launch their first HTS satellite or payload within the next four years. Further, we have seen a growing number of regional operators such as ABS, APT Satellite, Arabsat, RSCC and Gazprom Satellite Systems with international expansion plans by launching new satellites outside of their region of origin."

While M&A activity picked up in 2013 and more industry consolidation could occur in the near term, inorganic growth opportunities are understood to be limited and often complex for the majority of operators. As a result, they must increasingly pursue strategic partnerships in order to grow organically while mitigating financial and market risks. The nature of these partnerships varies widely; they include the joint use of satellites (e.g., ABS/SingTel and Measat/Azercosmos), the joint use of orbital positions (e.g., Arabsat/Es'hailSat), bulk capacity lease deals (e.g. Eutelsat/Nilesat, Measat/Thaicom), as well as joint satellite procurement (ABS/Satmex).

While the market structure of the FSS industry remains concentrated at the top, it has become increasingly fragmented at the bottom. At least three operators (Mexsat, Boliviasat and O3b) should report their first FSS revenues in 2014, while 12 operators should launch their first satellite within the next four years. The majority of these emerging satellite operators are backed by national governments that either want to boost the national telecom market or decrease dependence on foreign satellite operators.

Based on our industry benchmark, the average FSS operator in 2013 had \$237 million in revenue; 186 transponders leased of which 55 percent are used for video applications; 238 regular transponders and 16 Gbps of HTS capacity available for lease; 952 TV channels and 4 DTH pay-TV platforms broadcast over satellites; seven satellites in orbit with an average fleet age of six years; and two satellites under construction.

Other report findings include:

- **20 operators had revenue of more than \$100 million, while Measat and Gazprom reached this milestone for the first time in 2013**
- **More than 85 percent of all FSS operators increased the number of transponders leased throughout 2013**

- **17 operators had fill rates of 80 percent or more, seven of which had fill rates of 90 percent or more**

- **32,500 TV channels and 146 DTH pay-TV platforms were broadcast by satellite operators in 2013**

Company Profiles is a unique survey of all active and pre-operational FSS operators. The report includes publicly-listed and privately-held companies, global and regional operators.

Now in its 7th edition, Company Profiles is the only report available providing in-depth profiles of all 39 active, or soon-to-launch FSS satellite operators', summaries on 12 companies that will launch commercial satellites in the near future, and a global FSS operator ranking by revenues.

In this year's edition, Euroconsult has expanded the introduction section into a benchmark analysis to provide a better view of the competitive positioning of each FSS operator. Also expanded is the comprehensive satellite supply table with information on primary usage or anchor customer of each individual satellite.

Euroconsult now offers users the ability to purchase individual operator profiles for his report.

For more information on pricing, please visit <http://www.euroconsult-ec.com/shop>



## Harmonic—Satellite Delivery Of Live + VOD To European Subscribers + IBC2014 Solutions Demos



**Harmonic has announced that TTcomm, a supplier of teleport satellite services in Central and Eastern Europe, has selected an integrated video processing solution from Harmonic to support its satellite television services.**

Leveraging Harmonic's high-density, scalable video infrastructure solutions, TTcomm customers can now affordably deliver high-quality live and VOD channels to subscribers throughout Europe.

The Harmonic solution was purchased from JBD S.A., a major TV equipment supplier in Poland.

"We needed a reliable, proven video infrastructure solution that could scale up easily, allowing our customers to quickly roll out additional channels and services without impacting the integrity of the video content," said Tomasz Chalimoniuk, CEO at TTcomm. "Through a robust, scalable, high-density design, Harmonic's integrated solution enables us to cost-effectively deliver more channels and services with amazing video quality."

The solution leverages Harmonic's market-leading Electra™ universal encoder, integrated with FLEX® dual decoder module, to provide MPEG-2 and MPEG-4 AVC encoding for up to four statistically multiplexed SD and HD services within a single chassis.

The high-density Electra encoders lower TTcomm's capital and operating expenses,



simplifying the launch of additional television services while providing excellent video quality. In addition, the encoder features a scalable architecture that will grow as TTcomm's market requirements change.

The solution integrates Electra encoders with Harmonic's award-winning ProStream® stream processor for statistical multiplexing of MPEG-2 and MPEG-4 streams to increase bandwidth efficiency without impairing video quality.

Using the ProStream processor, the operator can support up to 64 services per statistically multiplexed pool, 16 pools per platform, and three pools within a single transport stream.

The robust, extensible, and scalable ProStream processor supports multiplexing and scrambling of DVB Simulcrypt as well as AES scrambling applications. With a range of widely implemented industry protocols, the ProStream solution's scrambling technology guarantees the protection of TTcomm's video content.

The solution of Electra encoders and ProStream processors is controlled by Harmonic's NMXTM Digital Service Manager video network management solution, which provides mass configuring, monitoring, and automated redundancy in centralized or distributed architectures.

"Time and time again, Harmonic's award-winning video infrastructure solutions have enabled operators around the world to launch additional revenue-generating services with a much shorter time to market," said Ian Graham, vice president, sales EMEA, Harmonic. "Relying on an integrated solution from Harmonic, operators like TTcomm can seamlessly scale their services to accommodate new subscribers, increase subscriber satisfaction, and maximize their revenue streams."



*Harmonic's ProStream processor.*

Harmonic will showcase its comprehensive line of market-leading solutions that optimize the production and delivery of high-value video services in the broadcast, payTV, and new media environments at stand 1.B20 during IBC2014 in Amsterdam, September 12-16.

Additional featured demonstrations at Harmonic's booth will include:

- **A virtualized video infrastructure featuring the new Harmonic VOS™ architecture.**
- **Contribution and distribution solutions including the expanded Ellipse® 3000 family of contribution encoders.**
- **A unique range of Ultra HD demonstrations, including a real-time Ultra HD encoding and streaming workflow demonstration, powered by Harmonic's HEVC-ready VOS platform.**
- **IP video innovation with ProMedia® Origin stream packager/server, highlighting simplified delivery of live, VOD and time-shift TV services to all screens.**
- **Production and playout with collaborative editing and 4K editing on the Harmonic MediaGrid shared storage system, as well as new developments in the Spectrum™ media server product line.**

Further information about Harmonic:  
<http://www.harmonicinc.com/>

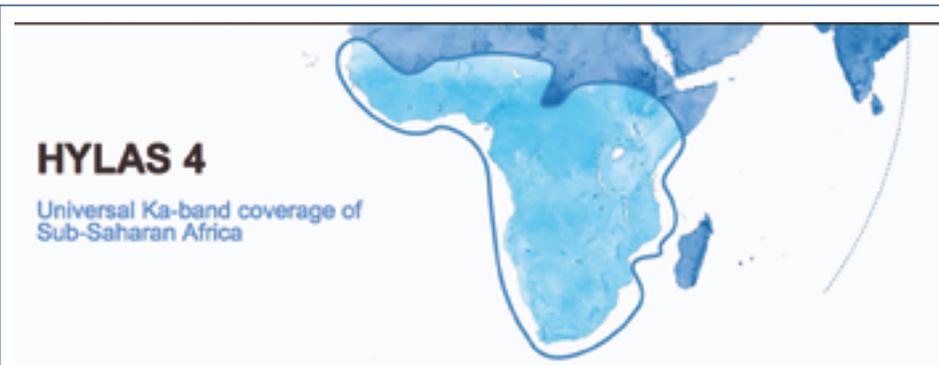
For information regarding TTcomm, visit  
<http://www.ttcomm.net/>



*Harmonic's Electra encoder.*



## Avanti Communications, Orbital Sciences Corp. + Arianespace: HYLAS 4 Creation To Start



"This satellite is designed based on the requirements those customers have given us. The investment sends a powerful signal to our customers about our commitment to serve them throughout the entire continent of Africa."

David Thomson, Chief Executive of Orbital Science Corporation said, "This high-throughput/light-weight satellite will set a new standard for affordability and flexibility in its class, while also providing the high quality and dependability of Orbital's reliable GEOStar product line of over 45 geosynchronous spacecraft built or in production for many of the world's leading operators. We look forward to contributing to Avanti's future growth with the HYLAS 4 project."

Stéphane Israël, Chief Executive of Arianespace, said, "After HYLAS 1 and HYLAS 2 were launched by Ariane 5 in November 2010 and August 2012, respectively, we are now ready to launch HYLAS 4 early in 2017. I want to personally thank David Williams for Avanti's trust in Arianespace; this is a true recognition of the quality and competitiveness of our launch solutions, which we continuously improve to boost our leadership position on the market. We are also pleased to work with Orbital again; HYLAS 4 will indeed be the 27th satellite manufactured by Orbital and launched by Arianespace."

### Avanti Communications Group plc. has signed contracts to purchase and launch the HYLAS 4 satellite.

The satellite will be built by Orbital Science Corporation, who built the HYLAS 2 spacecraft, which is currently outperforming its technical specification. The satellite will deliver up to 28GHz of capacity in 66 fixed beams positioned over Africa and Europe. Some capacity provides growth for existing markets, some provides brand new coverage and we retain the flexibility to move capacity between different markets.

The satellite will also have four steerable beams, which could serve markets in Latin America or Africa. The system represents a continuation of Avanti's strategy to prioritize Quality and Flexibility, and to ensure that customers receive World beating services at low prices.

The satellite is scheduled for launch in the three month period ending April 2017. HYLAS 4 will be launched by Arianespace, with whom Avanti has enjoyed a strong relationship through the launch of its first two satellites.

The total cost to build, launch and insure the satellite is expected to be 15-20 percent below market expectations.

Avanti conservatively estimated a budget of \$350m when it issued the first of two tranches of a bond earlier in the year to commence the project and now that all costs except for insurance are contracted with firm fixed prices we are able to announce this saving. The company has also managed to secure a more favorable and flexible payment profile.

David Williams, Chief Executive of Avanti, said, "I am pleased to announce a continuation of a trusted and successful partnership with Orbital and Arianespace. The project is well financed and low risk. With commercial services expected to launch in 2017, Avanti has overwhelmingly the most powerful, broad and resilient Ka band coverage of Europe Middle East and Africa.

"Now that we are successfully selling services to the biggest telecommunications and media companies in our region, we have improving visibility over how we will continue to activate the underlying market demand on a large scale," Williams continued.

The Avanti Communications Group infosite may be accessed for more information at <http://www.avantiplc.com/>

For more Orbital Sciences information, visit <http://www.orbital.com/SatelliteSpaceSystems/>

Details at <http://www.arianespace.com/> for more launch information.



Artistic rendition of Avanti's on orbit HYLAS 2 satellite, launched in 2012.

## Northrop Grumman + Cyber Security Challenge U.K.: Talent Pool To Be Built



**Northrop Grumman Corporation has entered into a collaborative partnership with Cyber Security Challenge U.K. under which it will bring the proven U.S. national youth cyber education program, CyberPatriot, to the U.K. for the first time as part of the company's commitment to promoting science,**

**technology, engineering and mathematics (STEM) education, and to help build the U.K.'s pool of talent in cyber security.**

The partnership brings together Northrop Grumman's industry leading expertise in cyber security with the experience of Cyber Security Challenge in how to build new ways to inspire and nurture cyber talent at all ages. The competition program will be known in the U.K. as CyberCenturion and will enable young people interested in the world of cyber security to get their first real experience of the scenarios and challenges that existing professionals have to grapple with on a daily basis.

CyberCenturion starts in October with two tester competitions and the fully fledged game begins later in the year. It is played by teams of between four and six participants and involves downloading a virtual computer

image full of vulnerabilities that could present opportunities for a cyber criminal. The teams have approximately six hours within a two-day window to identify and fix these vulnerabilities. The top six teams will advance to a face-to-face final in April 2015.

CyberPatriot, created by the U.S. Air Force Association (AFA) and sponsored by the Northrop Grumman Foundation, is a cyber security competition that has been designed to inspire future professionals towards careers in cyber security and STEM.

To find out more about CyberCenturion go to: <http://cybersecuritychallenge.org.uk/>

## RigNet: Going Deep Into The Cold Of The Barents Sea



**RigNet, Inc. has signed a renewal contract to serve a major global offshore drilling contractor, on an ultra-deepwater semi-submersible drilling rig operating in the Barents Sea.**

The Barents Sea is a marginal sea of the Arctic Ocean, located off the northern coasts of Norway and Russia.

Oyvind Folge, RigNet's Region Vice President, Scandinavia and Europe, said, "With this latest contract renewal and bandwidth upgrade, RigNet has shown the ability to accommodate the communication needs for expanding offshore rig operations in the Barents Sea." RigNet has successfully upgraded the VSAT bandwidth for the rig to 8Mbps full duplex



for operations in the Barents Sea close to 74 degrees north latitude.

RigNet has demonstrated the capability to provide cost efficient, high quality VSAT solutions with high uptime in the Barents Sea for several years.

RigNet provides solutions ranging from fully-managed voice and data networks to more advanced applications that include video conferencing and real-time data services to over 1,100 remote sites in over 45 countries on six continents, effectively spanning the drilling and production industry.

A high-performance and secure network is a high priority for the oil and gas community, ensuring effective and reliable communications, both offshore and onshore, and access to business-critical IT applications.

Through this contract, RigNet is delivering a fully-managed end-to-end IP network solution using VSAT technology for last-mile connectivity.

RigNet's fully managed network solutions ensures that the rig derives greater value from network services through increased standardization and innovation. The solution includes VoIP, enterprise data and Internet access services supported by 24/7 network monitoring and support from RigNet's Network Operations Center and, if required, local field technician support, with backhaul to the company's offices via MPLS connection.

RigNet is a global provider of managed remote communications, telecoms systems integration and collaborative applications dedicated to the oil and gas industry, focusing on offshore and onshore drilling rigs, energy production facilities and energy maritime vessels.

For more information, please visit <http://www.rig.net/>



## Cobham SATCOM: Brazil OK's Connectivity For King Air



**U.K. firm Cobham SATCOM has announced that its AVIATOR 200 SwiftBroadband solution has received Administración Nacional de Aviación Civil (ANAC) Brazil Supplemental Type Certificate (STC) approval for installation by King Air operators.**

The new certification was developed in cooperation with Cobham SATCOM partner Pro Star Aviation and includes the activation of the AVIATOR 200's built-in Wi-Fi option, offering access to an extensive range of communication capabilities aboard King Air models B200, B200C and B300 (Super King Air 350).

The approval of the STC for use of the innovative Cobham system on Brazilian-registered aircraft adds to the FAA (Federal Aviation Authority) and EASA (European Aviation Safety Agency) STCs already confirmed for King Air aircraft, which were also developed with Pro Star.

Cobham's AVIATOR 200 is an exceptionally compact, lightweight system that offers reliable, affordable connectivity to provide users with a range of services including data, video and voice. With built-in Wi-Fi capability, the AVIATOR 200 allows aircraft operators



*Cobham SATCOM's AVIATOR 200.*

to offer wireless connectivity on board, supporting the use of Wi-Fi-enabled devices such as laptops, tablets and smartphones.

The AVIATOR 200 is the smallest and lightest system in Cobham SATCOM's cutting-edge SwiftBroadband product portfolio and uses Inmarsat's SwiftBroadband 200 service.

AVIATOR 200 simultaneously provides data speeds of up to 200 kbps and a single AMBE 2 channel for voice calls, providing a complete airborne communications solution previously unavailable to aircraft below a certain size.

The AVIATOR 200 certification for its King Air line is the latest certification developed by Pro Star Aviation, which holds various STCs for retrofit upgrades on all types of business aircraft.

Pro Star also has an STC for the AVIATOR 200 on the Pilatus PC-12 aircraft. The full Cobham SATCOM AVIATOR range includes

the revolutionary AVIATOR S series, AVIATOR 700 and 700D, AVIATOR 350 with High Gain Antenna (HGA), AVIATOR 300 with Intermediate Gain Antenna as well as the AVIATOR 200 with LGA.

Kevin Harriman, Pro Star Aviation General Manager, said, "The AVIATOR 200 is the perfect choice for King Air operators as it offers the ideal broadband and voice solution and is small and lighter than other solutions. It is practical and affordable, and, with reduced hardware and installation costs, the AVIATOR 200 is everything you need to stay connected."

Kim Gram, Vice President Aeronautical Business Unit, Cobham SATCOM said, "The AVIATOR 200 offers in-flight broadband communication to aircraft of virtually any size as it utilizes a low gain antenna. We are particularly pleased to add the Brazilian approval to the FAA and EASA STCs already developed with Pro Star for King Air. This is a world-wide solution which can now benefit many more people. It represents another key step forward in enabling more users to take advantage of modern in-flight communications in the South America region."

For further information about Cobham SATCOM's AVIATOR portfolio, please visit <http://www.cobham.com/satcom>

## Signalhorn—A Stronger Executive Team

**Signalhorn has strengthened its Executive Team with the appointments of Andy Frost as Chief Commercial Officer and Tom Wright as Vice President of Sales for North America.**

Frost has been with Signalhorn since 2003, initially as Account Director and subsequently Vice President, Marketing and Business Development. He was promoted to Vice President Strategic Business Development in 2012, applying a wide range of skills to a number of complex business and government negotiations and customer issues. He also

retooled the company's sales department and built a strong administrative structure. Before joining Signalhorn, Frost served in a number of executive marketing and product management positions at leading telecommunications firms, Tiscali SpA in Italy, and BT in the UK.

Wright's previous executive positions include Vice President for NewSat of Australia; Vice President of United Networks in Kuwait; and Sales Director for Comstream of San Diego, CA. He has spent 38 years in the satellite communications industry, experience that

includes designing and selling satellite systems in 69 countries. At NewSat, Wright closed over \$200 million in new business and was named Sales Person of the Year. He will be based in Dallas, Texas.

Signalhorn is a global provider of network services and communications solutions using terrestrial, satellite, and wireless technologies, with a 40-year history of continuous operations.

Signalhorn infosite:  
<http://www.signalhorn.com/>

## Tyvak + Kongsberg Satellite Services (KSAT): A One-Stop, All Encompassing Shop



**Tyvak, a producer of nanosatellites and turnkey smallsat solutions, has formed a strategic alliance with Kongsberg Satellite Services (KSAT), a leading provider of polar orbiting satellite ground station services.**

This alliance, finalized during the 2014 Small Satellite conference in Logan, Utah, leverages KSAT's recently announced KSAT Light Network of ground stations with Tyvak's technical capabilities and innovative approaches to satisfy the entire service chain required by satellite operators: satellite design, production, launch support, and ground station and operations services.

"This alliance with KSAT continues Tyvak's efforts toward providing a one-stop shop for customers looking for complete end-to-end smallsat services," said Marco Villa, Tyvak's President and Chief Operating Officer.

"An extensive network of cost-effective ground stations to send and receive data to and from satellites is, without doubt, one of the key pieces to maximizing the capabilities of the new generation of small satellites." Villa added.

Rolf Skatteboe, KSAT's Chief Executive Officer, said, "Tyvak offers innovative designs and out-of-the-box service solutions for this rapidly evolving market. Partnering with Tyvak allows KSAT unparalleled access to this market for our ground station network services, particularly the recently launched KSAT Light, low cost network."

KSAT networks can handle and support X- and Ka-, and as well as S-band and UHF frequencies.

For further information regarding Tyvak, please visit <http://tyvak.com/>

For more iKongsberg Satellite Services, view <http://www.ksat.no/>

## C-COM Satellite Systems: Aims For Maximum Coverage @ IBC2014



The iNetVu@ FLY-98G antenna.

**Ramped up for IBC2014, C-COM Satellite Systems will be demo'ing new satellite antennas as well as offering free classes to ensure those investing in the company's equipment are obtaining the best service and reception.**

C-COM Satellite Systems will be displaying the nexgen, one-button auto-acquire antennas at IBC 2014. C-COM engineers have been

busy developing smaller, lighter, more robust products that are built to endure in the most challenging environments. Preview the Next Gen iNetVu@ FLY-98 and the 981 antennas and controllers at their booth, #4.C55.

The iNetVu@ FLY-98G Flyaway Antenna is a 98cm satellite antenna system, which is a highly portable, self-pointing, auto-acquire unit that is configurable with the iNetVu@ 7710 Controller. This antenna provides fast satellite acquisition within minutes, anytime, anywhere. The antenna can be assembled in 10 minutes by one person. The antenna is convertible from Ka- to Ku-band, and vice versa.

- **Yahsat and Avanti Approved**
- **ViaSat and Eutelsat Approved**
- **Generic (Avanti Approved, using Gilat and iDirect modems)**
- **Fits into 3 rugged cases under 32kg each**
- **10-minute tool-less assembly**
- **Hot Swappable between Ka- and Ku-bands**

- **Ideal for applications such as Broadcasting, Emergency Response and many others.**

The versatile and compact iNetVu@ 981 Driveaway Antenna is built either in Ku- or Ka- and is upgradeable and swappable to either band.

This 98cm Ku-band auto-acquire system can be mounted on the roof of a vehicle for direct broadband access over any configured satellite and works seamlessly with the iNetVu@7024C Controller and provides fast satellite acquisition within minutes, anytime anywhere.

The C-COM training at IBC will occur on September 15 and 16th. Seats are limited and are available on a first come first paid basis. The 2 day training session includes a catered lunch on both days as well as a iNetVu@ Official Integrator Certificate following wcompletion of the class.

Further information at  
<http://www.c-comsat.com/>

## SES—Capacity + Slots Cemented Into Place

**SES will be delivering DTH broadcast television across French-speaking countries in Sub-Saharan Africa for the Lomé-based consortium of West African broadcasters led by Africable and Media Plus.**

The multi-year contract for two transponders will allow the new platform to deliver DTH television from its Bamako Teleport to member countries of the West African Economic and Monetary Union (also known by its French acronym UEMOA). The roll-out start is on October 1, 2014, across Mali, Burkina Faso, Ivory Coast and Niger. SES will provide the satellite capacity on its SES-4 satellite located at 22 degrees West, the company's prime orbital slot for Francophone sub-Saharan Africa, providing 100 percent audience reach from urban to non-urban areas.

The service will offer a bouquet of 80 channels, free-to-air (FTA) and encrypted, and will allow member countries to meet the global digital migration deadline of June 2015. Audiences will be able to connect to the existing national Digital Terrestrial Television (DTT) networks and to receive content via satellite using a Dual Tuner receiver (MPEG4 and DVBS2/T2) included in the offer.

Additionally, SES has announced that its subsidiary SES DTH do Brasil has signed with Anatel (the Brazilian National Telecommunications Agency) for the Satellite Exploitation rights terms for two Brazilian orbital positions (48 degrees West and 64 degrees West).

The Anatel auction occurred in May of this year and the execution plan documents were

under review and were the driver, for the time being, for the auction and the signature. SES will have four years to make definitive capacity available at 48 degrees West and six years to make definitive capacity available at 64 degrees. At the 48 degrees West orbital position, SES will focus on multiple uses (FSS model, Fixed Satellite Services) and will operate in C-, Ku- and Ka-bands. The 64 degrees West orbital position will be exclusive for DTH use (BSS, Broadcasting Satellite Services). The exploitation rights are valid for 15 years, renewable once during the same period. SES invested a total of R\$ 59.8 million (approximately EUR 19.65 million) for these positions.

SES infosite: <http://www.ses.com>



## Arianespace, Optus + MEASAT—The Return Of MEASAT-3b



**The return of Optus 10 to French Guiana has set the stage for a new phase of payload preparations at the Spaceport with Arianespace's next Ariane 5 mission, which is scheduled for a September liftoff carrying this multi-mission satellite and its MEASAT-3b co-passenger.**

Optus 10's delivery occurred as the Space Systems/Loral-built spacecraft landed at Félix Eboué Airport near the capital city of Cayenne, where it was unloaded from a



*Artistic rendition of the MEASAT-3b satellite.*

chartered Antonov An-124 cargo jetliner for transfer by road to the Spaceport.

To be operated by Australia's Optus telecommunications service provider, Optus 10 is outfitted for direct TV broadcast, Internet connectivity, telephone and data transmission services across Australia and New Zealand.

Joining it on Arianespace's Ariane 5 mission in September is the Airbus Defence and Space-built MEASAT-3b relay platform, designed to expand Malaysian-based MEASAT's direct-to-home broadcasting as well as VSAT services to small terminals across Malaysia, India, Indonesia and Australia.

MEASAT-3b was placed into storage at the Spaceport awaiting the availability of Optus 10 for the upcoming dual-passenger launch—designated Flight VA218 in Arianespace's launcher family numbering system.

The mission's Ariane 5 was moved earlier in August into the Final Assembly Building at the Spaceport, where it is being readied for the integration of Optus 10 and MEASAT-3b.

Follow Arianespace's launch activity at <http://www.arianespace.com/>

## LiveWire Digital Technology—Bringing M-Link Live X + Newscaster To IBC2014



**LiveWire Digital is showcasing enhanced versions of M-Link Live X for live video transmission, and Newscaster, the professional solution for the delivery of HD and SD store and forward video at IBC2014 in Amsterdam at stand 4.C83.**

LiveWire Digital will be sharing the stand with its global reseller, Network Innovations, a satellite communications integrator, who is focused on the provision and support of solutions that enable customers to communicate anytime, anywhere on the planet.

Also featured at this event is a new, smaller footprint M-Link Exchange video receiver that is designed to help broadcasters better

use space in their server rooms. Ideal for reporters on the move, M-Link Live X and Newscaster now come complete with fully integrated BGAN HDR Control enabling users to control their Cobham Explorer 710 satellite streaming terminal directly from their laptops and to choose from a range of guaranteed Streaming IP rates to meet all their data, voice and video needs.

M-Link Live X automatically brings up and tears down the connection, enabling users faced with high call charges to make the most effective use of budgets. Live video is encoded at the maximum bit rate possible, making the best use of the variable bandwidth provided by BGAN HDR and maximizing the quality of the video delivered regardless of the link conditions. Dynamic feedback from the network provides real time information on the available bandwidth and is used to manage the Adaptive Bit Rate encoder.

M-Link Live-X will work equally well with Ka-band satellite technology, 4G, 3G, DSL, other broadband connections. Full frame profiles are also available for use with the Inmarsat HDR connections; offering enhanced video quality

and making the best use of the service. Reporters using M-Link Newscaster, the professional solution for the delivery of HD and SD store and forward video, can make use of the new background encoding feature. Files saved into the watch folder are automatically encoded, helping reporters pressed for time to work more efficiently.

A quarter of the size of its predecessor, the M-Link Exchange Server is designed to operate on the Windows Server 2012 platform and occupies just one unit of rack space, helping broadcasters better use space within their server rooms. With considerably more processing power, the new 1U Exchange server will provide the backbone of future M-Link receiver systems utilizing HEVC encoding and handling multiple live calls.

The new M-Link Exchange server allows users to simultaneously ingest live video streams and to play out files on the same piece of equipment.

For further information, visit <http://www.livewire.co.uk/>



## DigitalGlobe, United Launch Alliance, ATK + Ball Aerospace—All Fired Up + Somewhere To Go



*The launch of WorldView-3.  
Photo courtesy of Lockheed Martin + United Launch Alliance.*

**A United Launch Alliance (ULA) Atlas V rocket carrying the WorldView-3 satellite for DigitalGlobe launched at 11:30 a.m. PDT on August 13th from Space Launch Complex-3—Lockheed Martin Commercial Launch Services procured the Atlas V for this mission.**

This was the fourth successful launch in six weeks and the 87th successful mission since ULA was formed in December 2006.

This mission was launched aboard an Atlas V 401 configuration vehicle, which includes a

4-meter-diameter payload fairing. The Atlas booster for this mission was powered by the RD AMROSS RD-180 engine, and the Centaur upper stage was powered by a single Aerojet Rocketdyne RL10A engine.

WorldView-3 is the first multi-payload super-spectral, high resolution commercial satellite for earth observations and advanced geospatial solutions. This high spatial resolution multispectral satellite imagery is used for civil government mapping, land use planning,

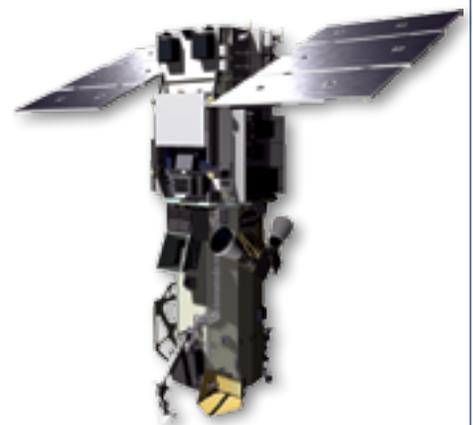
disaster relief, exploration, defense, intelligence, visualization and simulation environments.

“Congratulations to our commercial mission partners Lockheed Martin Commercial Launch Services and Digital Globe for today’s spectacular launch of the Atlas V carrying the WorldView-3 satellite,” said Jim Spornick, ULA vice president, Atlas and Delta Programs. “The team’s dedication to mission success, one launch at a time, brought us to today’s successful launch, delivering WorldView-3 to provide the next generation in earth imaging capabilities for DigitalGlobe.

“This launch marks ULA’s tenth successful launch of fifteen planned this year,” added Spornick. “The ULA team remains focused mission success and on-time deliveries for our customer’s most valuable payloads.”

ULA’s next launch is the Atlas V CLIO mission for the U.S. Government from Space Launch Complex-41 at Cape Canaveral Air Force Station, Florida. ULA has successfully delivered more than 80 satellites to orbit that provide critical capabilities for troops in the field, aid meteorologists in tracking severe weather, enable personal device-based GPS navigation and unlock the mysteries of our solar system.

ATK provided critical launch vehicle and payload hardware for the Lockheed Martin Commercial Launch Services launch of DigitalGlobe’s WorldView-3 satellite aboard an Atlas V.



*Artistic rendition of the WorldView-3 satellite.  
Image courtesy of DigitalGlobe.*

Operating at an expected altitude of 617km, the WorldView-3 satellite will capture data-rich imagery that will enable customers to search for new sources of minerals and fuels, manage forests and farms and accelerate DigitalGlobe's living digital inventory of the surface of the earth. Ball Aerospace designed and built the WorldView-3 satellite for DigitalGlobe.

"The highly engineered ATK products supporting both the Atlas V rocket and the WorldView-3 satellite are a testament to our portfolio of products and their integration capability," said Blake Larson, president of ATK's Aerospace Group. "They demonstrate not only ATK's continued affordable innovation and execution excellence, but our leadership in the aerospace market."

ATK's contributions to the Atlas V and WorldView satellite include cutting-edge

technologies from across the company. Contributions include a large composite faring and retro motors for the rocket, and critical components on the satellite.

For the Atlas V rocket, ATK produced the 10-foot diameter composite heat shield, which provides higher performance with lower weight, and essential protection for the first stage of the launch vehicle from engine exhaust temperatures in excess of 4,000 degrees Fahrenheit. The assembly was fabricated using advanced fiber placement manufacturing techniques at ATK's luka, Mississippi facility. This is the 46th Atlas V launch using ATK-built composite structures.

This launch also marked the 13th successful flight of ATK produced retro motors. Eight of these solid motors supported separation of the spent first stage. The Atlas retrorocket is

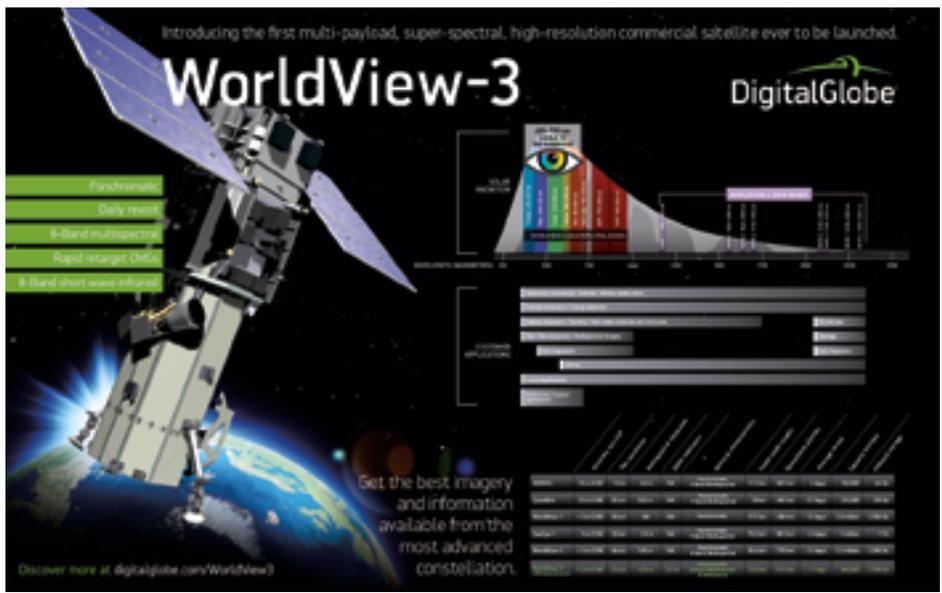
built at ATK's Missile Defense and Controls facility in Elkton, Maryland.

For the WorldView satellite, ATK's Beltsville, Maryland facility provided the heat pipe and thermal strap assembly to provide temperature control. As a leader in space thermal control technology, ATK has delivered over 50,000 heat pipes to the space industry with 100 percent on-orbit mission success.

Lockheed Martin Commercial Launch Services (LMCLS) is the exclusive provider of Atlas rockets to all non-U.S. government customers.

Lockheed Martin:

<http://www.lockheedmartin.com/>



With dedicated launch sites, unparalleled orbital insertion accuracy, and 116 consecutive successful launches to date, Atlas is unmatched for performance, reliability and schedule assurance.

Ball Aerospace provided the spacecraft and an atmospheric correction instrument, integrated the remote sensing instrument and tested the entire system.

The Ball Commercial Platform (BCP) 5000 spacecraft bus accommodates next-generation optical and Synthetic Aperture Radar (SAR) remote sensing payloads, and is designed to be a flexible, stable, and highly accurate Earth remote sensing platform.

WorldView-3 builds upon WorldView-2 and WorldView-1 technology by carrying forward the satellites' advanced Control Moment Gyroscopes (CMGs). CMGs reorient a satellite over a desired collection area in 4-5 seconds,

compared to 30-45 seconds needed for traditional reaction wheels.

WorldView-3 also features the first atmospheric sounder DigitalGlobe will fly in space. The Ball-built Cloud, Aerosol, Water Vapor, Ice, Snow (CAVIS) atmospheric instrument will enable WorldView-3 to collect scientific data based on ground reflection by correcting images for atmospheric interference.

Ball was able to provide the CAVIS instrument at substantial cost savings by using the electronics design, focal plane detectors and spectral filter manufacturing methods developed for its Operational Land Imager (OLI) instrument on NASA's Landsat 8 mission. The Ball team was also able to reuse OLI's ground support equipment for the CAVIS instrument.

WorldView-3's direct tasking capability allows select DigitalGlobe customers around the world to load imaging profiles directly up to the spacecraft and execute delivery of the data directly down to their own ground stations.

Additional information:  
<http://www.digitalglobe.com/about-us/content-collection#worldview-2>



WorldView 3 under construction. Photo courtesy of Ball Aerospace.



# InfoBeam

## Optus + ITC Global—Capacity Assured



*Artistic rendition of the Optus 10 satellite.*

**Optus has announced a new two-year agreement with global satellite network services provider, ITC Global.**

Under the agreement, Optus will provide ITC Global with expanded satellite capacity, equipment hosting, up-linking and downloading services via its major satellite facility, located in the northern Perth suburb of Lockridge, Western Australia.

Optus' Lockridge facility is both a domestic and international gateway for satellite services across Australia and regions to the west, around the Indian Ocean and into Europe.

ITC Global specializes in satellite-based communications for industrial operations in extreme environments, including deep water energy exploration, remote mining and transoceanic shipping and is the world's market leader in SATCOM networks to the mining industry, and the fastest growing provider to the oil and gas industries.

The expanded agreement, which uses one of Optus' 16-meter C-band antennas, will enable ITC Global to offer communication services to remote and harsh locations within these industries.

Paul Sheridan, Vice President, Optus Satellite, said, "The alliance highlights how Optus Satellite is making a difference within the region through vital C-band communication links."

Chris Hill, ITC Global CTO and MD Asia Pacific, said, "The Optus Satellite team and the Lockridge Earth station continue to provide us with the levels of reliability and redundancy we absolutely require to satisfy the needs of our customers."

The Optus infosite:  
<http://www.optus.com.au/>

ITC Global's infosite:  
<http://www.itcglobal.com/>

# InfoBeam

## AsiaSat, SpaceX + Space Systems/Loral (SSL)—AsiaSat 8 Launch Success



**AsiaSat 8, aboard a SpaceX Falcon 9 launch vehicle, successfully lifted off from the Cape Canaveral Air Force Station in Florida, U.S.A. at Hong Kong Time 4:00 p.m. (4:00 a.m. EDT or Cape Canaveral local time) on August 5th.**

The spacecraft successfully separated from the launch vehicle 32 minutes after liftoff. AsiaSat

has acquired the first signals from the satellite in Hong Kong 54 minutes after launch. AsiaSat was moved into the geostationary orbit, some 36,000km above the equator.

AsiaSat 8 is a Space Systems/Loral 1300 series satellite and has a design life of 15 years. With 24 Ku-band transponders and a Ka-band



*Artistic rendition of the AsiaSat 8 satellite. Image courtesy of MDA.*

payload, AsiaSat 8 will co-locate with AsiaSat 7, where AsiaSat has established networks for service since 1990. AsiaSat 8's powerful Ku-band beams cover China, India, the Middle East and South East Asia, with inter-beam switching capability to provide flexibility to address market requirements.

AsiaSat 8 is designed to provide direct-to-home (DTH) television service, data broadcasting, and telecommunications services in Asia and the Middle East where it will help meet growing market demand and ensure the delivery of exceptionally high power and quality service to its customers.

"This is our first launch with SpaceX, we would like to thank them for their excellent work and effort in making today's launch a success. In the coming weeks, we will work closely with Space Systems/Loral, our long-term partner, on the post-launch maneuvers and in-orbit testing of AsiaSat 8," said William Wade, President and Chief Executive Officer of AsiaSat. The addition of AsiaSat 8 to our existing fleet of four in-orbit satellites will expand our fleet capacity and enable us to serve a wider range of customers for advanced satellite services, from DTH, data broadcasting to broadband services."

The AsiaSat infosite:  
<http://www.asiasat.com/>

The SpaceX infosite:  
<http://www.spacex.com/>





## Russia + Peru: A Hand Launch From ISS For Chasqui-1

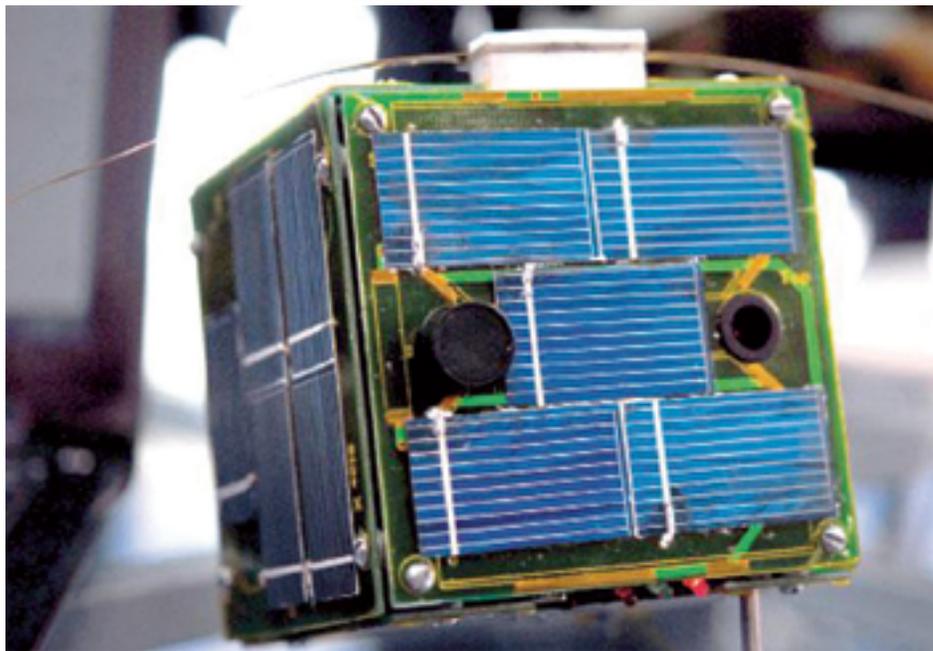


Photo of the Casqui-1 CubeSat.

nanosat weighs in at 2.2 pounds (1kg) and is a 4-inch (10cm) CubeSat.

“Chasqui” means “ messenger” in the language of Peruvian Indians. The spacecraft was developed by the students of the (Russian) city of Kursk and Peru over a period of three years.

Various information has been threaded into the satellite’s memory. The CubeSat includes children’s drawings which, as a message to extraterrestrial civilizations, will be broadcast into open space.

The launch of the satellite was tracked from the ground and a special antenna will be receiving telemetry data fed into the memory of the Chasqui-1.

The satellite will have four monitoring sessions per day for a period of six months.

**Oleg Artemyev and Aleksandr Skvortsov, flight engineers of the International Space Station (ISS) crew, took a spacewalk and launched a Russo-Peruvian CubeSat, the Chasqui-1.**

During the outside excursion, Artemyev launched the Russo-Peruvian Chasqui-1 CubeSat while standing on the ladder leading to and from the Pirs airlock on the ISS. The

This time, the ISS crew members’ extravehicular activities are of a scientific nature—Russian cosmonauts Artemyev and Skvortsov assembled the scientific instrumentation for the Expose-R experiment, took a swab from a porthole under the Test experiment, removed panels of the Endurance experiment and the third container of Biorisk one, and photographed the shield vacuum insulation on the surface of the orbital station.

The cosmonauts completed a number of additional technical projects in a spacewalk that lasted 45 minutes.



Concept illustration of Chasqui-1 on orbit.



The hand launch of the Chasqui-1 CubeSat by Cosmonaut Artemyev from the ISS. Photo courtesy of NASA.

## NSSLGlobal—A New Outlet For Services



**NSSLGlobal Ltd, the independent service provider of satellite communications, has opened a new U.S. teleport in Southbury, Connecticut.**

The additional hub supports the company's ongoing commitment to expand its VSAT Ku-band network when the opportunity arises.

This latest teleport, NSSLGlobal's seventh, will also help deliver improved connectivity for customers in the Americas, North Atlantic and the Mediterranean. The teleport, which will work in tandem with NSSLGlobal's Jacksonville teleport, will be integrated into NSSLGlobal's DVBS2-RCS2 network and operate beams such as the Intelsat T11 USA.

The new site at Southbury will also offer different opportunities to extend the current VSAT network and enhance NSSLGlobal's Cruise-IP and Broad-IP services.

Sally-Anne Ray, Managing Director, NSSLGlobal commented: "As a company

we are steadfastly growing our international presence to provide customers with seamless and continuous connectivity. This year alone, we have opened an office in New Orleans, our teleport in Perth, Australia has gone live and with the addition of the Connecticut teleport, we are truly growing our global reach. The Americas are a strategic area for us and we are committed to providing outstanding service in the region. The new teleport will help us to deliver this and will support our ever-growing customer base."

The Southbury, Connecticut teleport officially went live on July 1st, and is available to existing and new customers.

The NSSLGlobal infosite:  
<http://www.nssglobal.com>

## Advantech Wireless—Taking A-SAT™ To The Floor With CAPEX + OPEX Savings



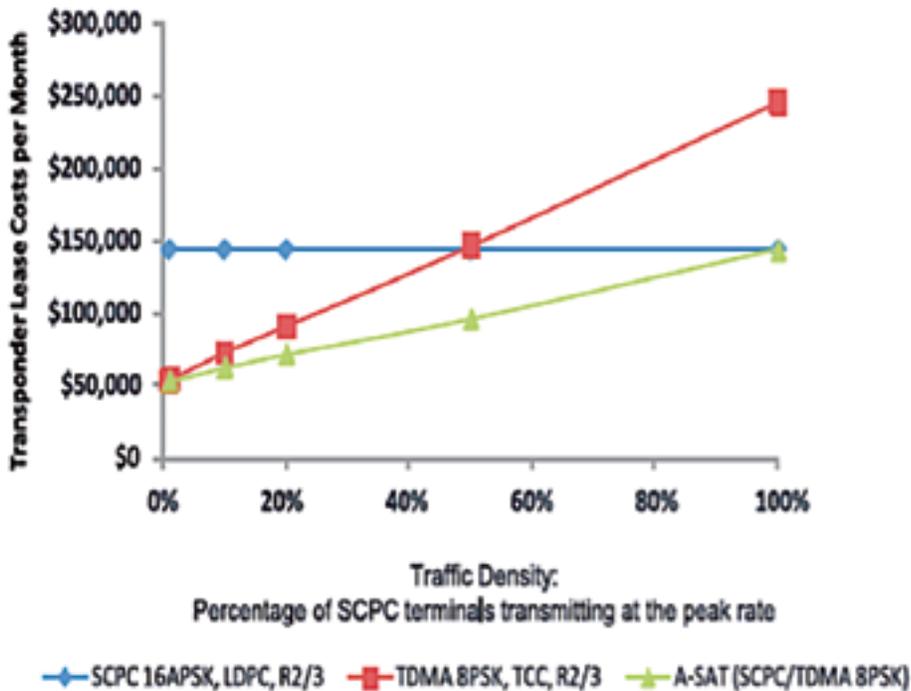
Advantech Wireless Inc. is offering a live demo of the nexgen Discovery Adaptive Satellite Access Technology (A-SAT™) platform at IBC 2014 taking place at the Amsterdam RAI center in Amsterdam.

At the Advantech Wireless stand 1.A74, visitors will experience Advantech Wireless' technologies and products.

Maximizing satellite bandwidth efficiency, A-SAT™ is beyond dual mode DVB-RCS/ TDMA-SCPC—the product monitors channel use and switches the satellite access method and MODCOD seamlessly for the return channel to dynamically maximize the space segment utilization efficiency.

Additionally, by having TDMA and true SCPC technologies in a single platform, the switch between traffic patterns is efficiently supported and all risks of equipment obsolescence are mitigated.

### 36 MHz Transponder lease costs per month (\$4000/MHz)



*Minimize your OPEX  
Potential savings of \$1M/year*

“We just love to innovate, and our A-SAT™ technology is a great example of that. We saw customers struggling to predict how to dimension their system in the face of constantly changing usage, so we solved it for them and optimized the efficiency,” explained Mark Lambert, VP Sales & Marketing, Managing Director EMEA Region at Advantech Wireless.

During this event, Advantech Wireless will show multiple VoIP calls, a classic TDMA application that is suddenly joined by streaming video (notoriously inefficient over TDMA).

Visitors will see the VoIP calls being sustained as the Discovery Hub switches between TDMA and SCPC (and between SCPC and TDMA) satellite access techniques to deliver maximum efficiency for the new situation.

The Advantech Wireless infosite: <http://www.advantechwireless.com/>



## Space Foundation—An Open Book For The Global Space Economy



**The Space Foundation's The Space Report reveals that the global space economy grew to \$314.17 billion in commercial revenue and government budgets in 2013, reflecting growth of 4 percent from the 2012 total of \$302.22 billion.**

Commercial activity—space products and services and commercial infrastructure—drove much of this increase. From 2008 through 2013, the total has grown by 27 percent.

Commercial space products and services revenue increased 7 percent since 2012, and commercial infrastructure and support industries increased by 4.6 percent.

Government spending decreased by 1.7 percent in 2013, although changes varied significantly from country to country. Substantial space budget cuts in the United States outweighed gains in Canada, India, Russia, South Korea and the United Kingdom, all of which increased budgets by 25 percent or more.

These new global space economic numbers come from the Space Foundation's publication, *The Space Report 2014: The Authoritative Guide to Global Space Activity*, which was released today. Data was compiled from original research and a wide variety of public

and private sources, and analyzed by Space Foundation researchers.

The 160-page book contains worldwide space facts and figures and is illustrated with photographs, charts and graphs. Within are myriad examples of the benefits of space exploration and utilization, the challenges facing the space sector, the opportunities for future growth and the major factors that shape the industry. In addition, *The Space Report* includes an overview of each sector, easy-to-understand definitions and up-to-date information on space infrastructure, facilities, launches and programs. Some of the many interesting facts and analyses found in *The Space Report 2014: The Authoritative Guide to Global Space Activity*:

### • Launches and satellites

- » 81 launch attempts took place in 2013, an increase of 4 percent from the 78 launches in 2012 (and above the five-year average of 79 launches per year).
- » The majority of these launches were conducted by Russia (32 launches), the United States (19), China (15), and Europe (7).
- » After two years of conducting fewer launches than China, the United States rose again to second place, partly due to an increased operational tempo as U.S. commercial providers launched cargo resupply missions to the International Space Station.
- » New launch vehicles made their first flights (or first successful flights) in five countries—the Antares and Minotaur V in the United States, Soyuz 2.1v in Russia, Kuaizhou in China, Epsilon in Japan and KSLV-1 (also called Naro-1) in Korea.
- » The number of satellites launched during 2013 increased by nearly two-thirds compared to 2012. This was largely due to a significant uptick in the number of satellites with masses below 91 kilograms (200 pounds). These microsatellites constituted more than half of the 197 satellites launched in 2013.
- » Many of the microsatellites were short-lived technology demonstrations, but there is a considerable degree of interest in future possibilities for constellations of small satellites that provide valuable services on an ongoing basis.

### • Workforce

- » According to U.S. Bureau of Labor Statistics (BLS) data, the size of the U.S. space workforce declined for the sixth year in a row, dropping 3.5 percent, from 242,724 in 2011 to 234,173 in 2012 (the most recent full year for which data is available), a decrease of about 8,500 workers. However, the changes varied by sector, with some portions of the space industry growing while others contracted.
- » The United States' National Aeronautics and Space Administration (NASA)'s civil servant workforce remained essentially flat, declining by less than 1 percent to reach 18,068 in FY 2014. Although the workforce continues to become more concentrated at higher ages, NASA has experienced moderate success in recruiting and retaining young workers below the age of 35 during the past five years.
- » Both Europe and Japan saw increases in space workforces; the European industry workforce grew by 1.5 percent in 2012, adding approximately 500 employees; in Japan, the overall workforce grew by 11 percent, while employment at the Japan Aerospace Exploration Agency (JAXA), Japan's government space agency, dropped.

As of December 2013, the Space Foundation Index was 94.22 percent above its value at inception in June 2005. The Space Foundation Infrastructure Index outperformed the S&P 500 and the NASDAQ during 2013, while the main Space Foundation Index and Space Foundation Services Index did not perform as well as the NASDAQ, but substantially better than the S&P 500. These indexes, which are updated daily on the Space Foundation website, are easy-to-understand mechanisms for gauging the financial performance of space industry companies listed on U.S. stock exchanges.

The Space Report is published annually by the Space Foundation, which works with a leading aerospace consulting firm, Futron Corporation, to research and analyze government and industry trends in space activity.

Learn more:

<http://www.spacefoundation.org/programs/research-and-analysis/space-report>



## Northrop Grumman's Astro Aerospace + MDA—Stored Energy Monopoles For RADARSAT



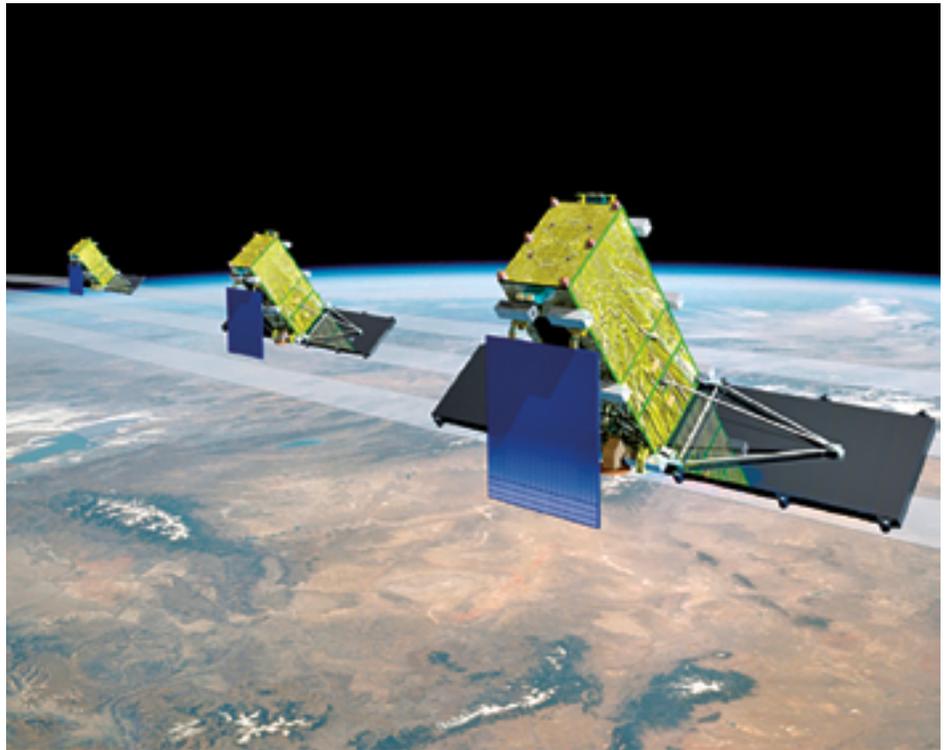
Northrop Grumman's RADARSAT Constellation Mission antenna unit in deployed state.

Photo courtesy of Northrop Grumman.

**Thirteen lightweight antennas that self-deploy in 200 milliseconds have been delivered to support Canada's RADARSAT Constellation Mission (RCM) by Astro Aerospace, a strategic business unit of Northrop Grumman Corporation.**

The highly configurable antennas are stored energy monopoles that deploy quickly and will be a critical part of the RCM Earth Observation satellites.

The antennas will be integrated into the Automatic Identification System payload that will be used to provide an advanced maritime identification capability; enabling ship identification, position, course and speed data.



Artistic rendition of RADARSAT Constellation Mission satellites.

Image is courtesy of MacDonald, Dettwiler and Associates Ltd. (MDA).

The antennas were delivered to prime contractor, MacDonald, Dettwiler and Associates Ltd. (MDA).

The antennas have an adaptable and reliable design that can be easily tailored to specific applications and have been used in the Gemini and Apollo missions and in the most recent U.S. Air Force GPS satellites.

The stowed package is one of the smallest available and most compact for a deployable antenna of a given size. For example, the 13 antennas used in the RCM stow in a low mass and compact 4-inch by 4-inch by 2.5-inch canister.

The versatile antennas are available in monopole diameters from one-half inch to 1-3/8 inches and any length up to 25 feet.

Dan Johansen, RCM program manager, Northrop Grumman Astro Aerospace, said, "Our continued emphasis on breakthrough engineering has resulted in a 100 percent success rate on more than 1,000 units on satellite missions."

For more information about Astro Aerospace products, please visit

<http://www.northropgrumman.com/BusinessVentures/AstroAerospace/Pages/default.aspx>

## Satellite Interference Reduction Group (IRG) + Inmarsat—London HQ Set For The Next Workshop



**The Satellite Interference Reduction Group (IRG) has announced that its next workshop will be hosted by Inmarsat at its London Headquarters from October 21st through October 22nd.**

The workshop will focus on the next steps in interference mitigation, such as using commercial interference initiatives applied to the military environment; VSAT Interference from TDMA/Burst Mode Systems, Geolocation and the “spin-off” technology ideas derived from the detection developments of Carrier ID.

Participants will gain valuable insight into the current initiatives and the next steps, as well as having the opportunity to input into the discussion around new technology and what else the industry and IRG, in particular, should be doing to reduce satellite interference.

“We are pleased to be holding our next workshop at Inmarsat’s HQ,” said Martin Coleman, Executive Director; the Satellite Interference Reduction Group. “Inmarsat has been, and continues to be, a valuable supporter and contributor to all interference initiatives.”

“Interference is an issue that affects the entire industry,” said Mark Steel, Director, User Terminal Development, GX, Inmarsat. “We are pleased to be hosting this important workshop, which we are certain will once again be filled with positive

and interesting discussions, helping us, as an industry, to progress those initiatives further.”

IRG is currently seeking speaking proposals for the workshop, which can be emailed to [http://press@satirg.org](mailto:press@satirg.org).

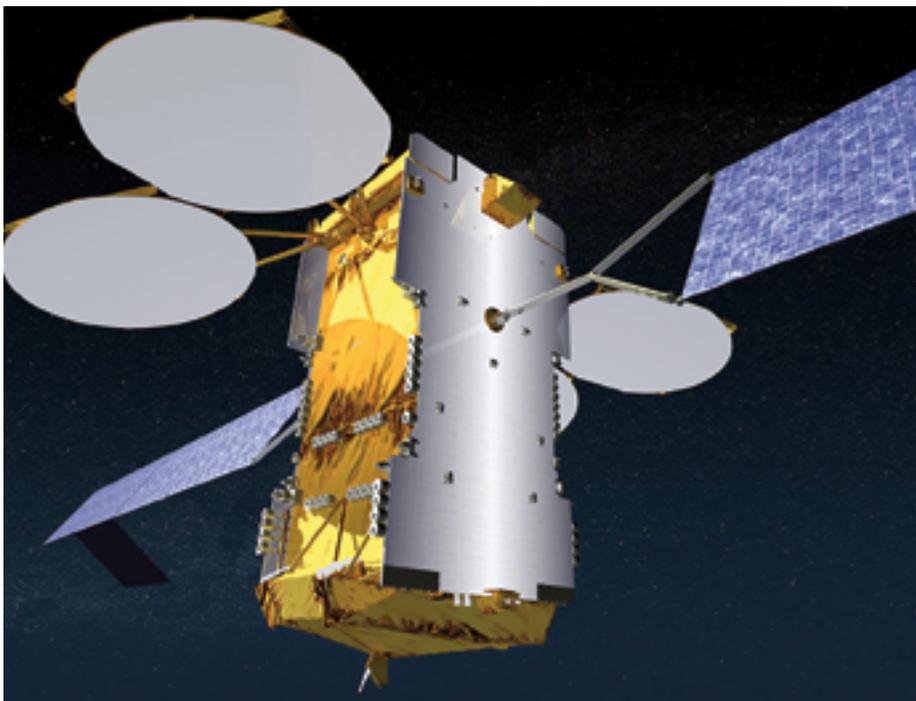
For further information or to register, please visit <http://satirg.org/irg-workshop-inmarsat-london/>

## Russian Satellite Communications Company (RSCC)—Customers Climb To 5,000 Plus



**The number of Ka-band satellite Internet subscribers in Russia now exceeds five thousand as a new domestic mass market of satellite broadband Internet services in Ka-band is emerging, offering users affordable communications services via geostationary orbit spacecraft**

The satellite network provides Ka-band Internet access and has just received their five thousandth active subscriber. Currently services are available in the European part of Russia using the KA-SAT satellite (9 degrees East).



*Artistic rendition of the KA-SAT satellite.*

Commencing as of the first quarter of 2015, the service will be extended to residents in the Far East and Siberia. From the second half of 2015, the Ka-band Internet access will be provided in the Central and South Ural Regions of Russia.

The network operation will be supported by the two Russian two spacecraft—Express-AM5 that is already operating in the orbit at 140 degrees East and Express-AM6, which is due to be launched later this year.



*Artistic rendition of Russia's Express-AM5 satellite.*

This project is giving rise to a new market for Ka-band services to satisfy the growing demand for affordable satellite Internet services from individuals and businesses. The average speed of user access to information resources is 6Mbit/s. The monthly average

Internet traffic per terminal is more than 8GB, with the total monthly traffic exceeding 40Tb.

Services will be provided by the following partners (distributors) of RSCC:

- **Ka-Internet ZAO**
- **Billing Solutions OOO (Raduga Internet brand)**
- **Web Media Services ZAO (HeliosNet brand)**
- **StarBlazer (StarBlazer brand)**

According to Deputy Director General for Innovative Development at RSCC Evgeny Buydinov, "Ka-band satellite Internet is currently seen as a fairly high potential service, even in countries with well-developed ground infrastructure. According to our estimates, about 20-23 thousand users annually subscribe to this service in Russia.

"Once all the network segments have been brought on line, users will be granted satellite broadband access to information resources at any location across Russia from Kaliningrad to Kamchatka, at very attractive prices, absolutely regardless whether there are any cable connections available in a household.

"For us making contribution to this project is exciting and critically important. The latest Ka-band technologies improved consumer quality, i.e. network access speed and reduced the cost of equipment and traffic exposing VSAT services to more and more people," said CEO of Ka-Internet, Vitaly Vashkevich.

"We appreciate colleagues from RSCC for the opportunity to start operating in the Ka-band long before the first Russian satellite with Ka-transponders was put into service. Now we don't have a shadow of doubt about its operability in Russia's environment, and we are looking forward to the RSCC Ka-band satellite network being launched by the Express-AM5 spacecraft," he added.

The RSCC infosite may be reached at <http://eng.rsccl.ru/>

## China—Gaofen-2 Climbs To Orbit

**China has successfully launched its most advanced Earth Observation (EO) satellite, the Gaofen-2, on Tuesday, August 19.**

The Gaofen-2, the country's second high-definition satellite in orbit, was launched from the Taiyuan Satellite Launch Center in north China's Shanxi Province at 11:15 a.m. Beijing Time.

The one meter long satellite was boosted by a Long March-4B carrier rocket. A small satellite from Poland was also carried aloft by the rocket, according to the State Administration of Science, Technology and Industry for National Defense (SASTIND).

The satellite will be used for geographic and resources surveillance, environment and climate change monitoring, precision agriculture, disaster relief and city planning.

The primary users of the satellite will be the Ministry of Land and Resources, the Ministry of Housing and Urban-Rural Development, the Ministry of Transport, and the State Forestry Administration, according to the SASTIND.

The Gaofen-2 is the second of seven satellites to be launched for China's indigenous high-definition observation project Gaofen before 2020. The project was initiated in May of 2010.

Gaofen-1, the first satellite of the project, was launched in April 2013, and provides service for more than ten Chinese

government departments including the ministries of land and resources, environmental protection and agriculture.

Gaofen-1 also assisted China with the nation's search for the missing Malaysian airliner MH370 and played an important role in city development in Beijing, Hebei Province and Xinjiang Uygur Autonomous Region, according to the SASTIND.

## Orbital's Cygnus™ Travels To 'There' And Back + Takes Out The Garbage... Successful Cargo Delivery To ISS

**Orbital Sciences Corporation has successfully completed their third cargo delivery mission to the International Space Station in the past 10 months, including the initial demonstration flight for the Cygnus™ spacecraft that was completed in October 2013, as well as the first two operational missions under the company's \$1.9 billion Commercial Resupply Services (CRS) contract with NASA.**

The company also noted that it is nearing the launch of its third CRS mission of 2014, which is currently scheduled to take place in mid-October.

The Cygnus™ spacecraft that carried out the cargo delivery mission for the second CRS mission was launched on July 13th. This mission, known as "Orb-2," unberthed from the ISS on August 15th, completing a 31-day stay at the orbiting laboratory.

Yesterday, Cygnus reentered Earth's atmosphere over the Pacific Ocean east of New Zealand at approximately 9:15 a.m. (EDT) marking the successful conclusion of the Orb-2 mission.

Orbital originally developed the Cygnus cargo spacecraft as part of a joint research and development initiative with NASA. Cygnus consists of a common Service Module (SM) and a Pressurized Cargo Module (PCM).

"Orbital's third cargo delivery mission to the International Space Station concluded with the controlled reentry of Cygnus over the unpopulated expanses of the Pacific Ocean," said Mr. Frank Culbertson, Executive Vice President and General Manager of Orbital's Advanced Programs Group. "From start to finish, we are very pleased with the results of this mission. With three fully successful cargo delivery missions now complete, it is clear our public-private partnership with NASA is proving to be a positive asset to the productivity of the ISS."

The Orb-2 mission began on July 13th when Orbital's Antares™ rocket launched Cygnus into orbit from the Mid-Atlantic Regional Spaceport (MARS) located at NASA's Wallops Flight Facility in Eastern Virginia.



**The Orbital Sciences Corporation Antares rocket launches from Pad-0A with the Cygnus spacecraft onboard, Sunday, July 13, 2014, at NASA's Wallops Flight Facility in Virginia. Photo is courtesy of NASA.**

Cygnus, which carried 3,669 pounds (1,664 kilograms) of cargo and science payloads, berthed with the ISS three days later on July 16. Prior to its departure from the station, the astronauts loaded the cargo module with approximately 3,550 pounds (1,615 kilograms) of items for disposal. Under the CRS contract with NASA, Orbital is using Antares and Cygnus to deliver up to 44,000 pounds (20,000 kilograms) of cargo to the ISS over eight missions through late 2016.

For these missions, NASA will manifest a variety of essential items based on ISS program needs, including food, clothing, crew supplies, spare parts and equipment, and scientific experiments.

Preparations are already well advanced for the next Cygnus cargo delivery flight, the Orb-3 mission, which is scheduled to take place this coming October.

The Antares rocket is now undergoing final assembly and testing at Wallops Island, while the Cygnus spacecraft is being prepared for shipment from Orbital's Dulles, VA production facilities to the Wallops launch site in September.

The Orb-3 flight is expected to deliver its heaviest cargo manifest yet, with 5,050 pounds (2,290 kilograms) of cargo and payloads to be sent to the ISS.

The Antares medium-class launch vehicle represents a major increase in the payload launch capability that Orbital can provide to NASA, the U.S. Air Force and commercial

customers compared to its heritage small-class space launch vehicles such as Pegasus, Taurus and Minotaur. The Antares rocket can launch spacecraft weighing up to 14,000 pounds (6,400 kilograms) into Low Earth Orbit (LEO), as well as lighter-weight payloads into higher-energy orbits.

Orbital's newest launcher has completed four successful missions and is currently on-ramped to both the NASA Launch Services-2 and the U.S. Air Force's Orbital/Suborbital Program-3 contracts, enabling the two largest U.S. government space launch customers to order Antares for "right-size and right-price" launch services for medium-class spacecraft.

For more information on Antares, please visit <http://www.orbital.com/>

## Arianespace, SSTL, OHB Systems + European Space Agency—Galileos Have Gone Astray

**On August 22, 2014, at 9:27 am local time in French Guiana, an Arianespace Soyuz ST rocket lifted off with the first two satellites in the Galileo constellation.**

The liftoff and first part of the mission proceeded nominally, leading to release of the satellites according to the planned timetable, and reception of signals from the satellites. It was only a certain time after the separation of the satellites that the ongoing analysis of the data provided by the telemetry stations operated by the European Space Agency (ESA) and the French space agency CNES revealed that the satellites were not in their expected orbit.

The targeted orbit was circular, inclined at 55 degrees with a semi major axis of 29,900 kilometers. The satellites are now in an elliptical orbit, with eccentricity of 0.23, a semi major axis of 26,200km and inclined at 49.8 degrees.

Both the Fregat upper stage and the two satellites are in a stable condition and position that entails absolutely no risk for people on the

ground. The residual propellants on the Fregat stage have been purged and the stage was depressurized normally. According to the initial analyses, an anomaly is thought to have occurred during the flight phase involving the Fregat upper stage, causing the satellites to be injected into a non-compliant orbit.

Studies and data analyses are continuing in Kourou, French Guiana, and at Arianespace headquarters in Evry, near Paris, as of this writing, all under the direction of Stéphane Israël, Chairman and CEO of Arianespace, in conjunction with the Russian partners in the Soyuz in French Guiana program (Russian space agency Roscosmos and the manufacturers RKTs-Progress and NPO Lavotchkine), as well as Arianespace's customer ESA and its industrial partners, to determine the scope of the anomaly and its impact on the mission.

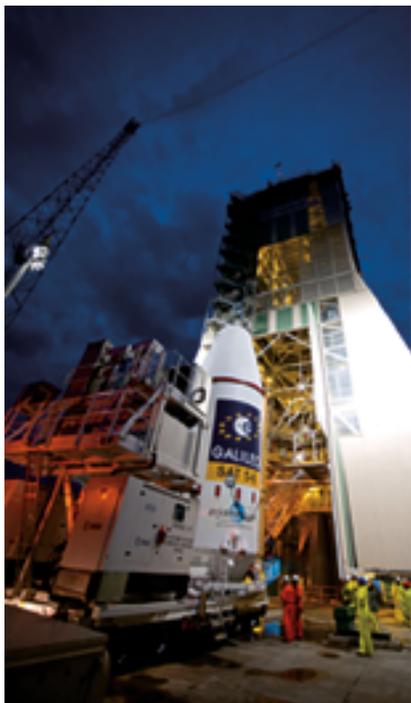
"Our aim is of course to fully understand this anomaly," said Stéphane Israël, Chairman and CEO of Arianespace. "Everybody at Arianespace is totally focused on meeting this objective.



*The fueling of the two satellites, enabling them to fine-tune their orbits and maintain their altitude over the course of their 12-year lifetimes, took place on August 7th + 8th. Engineers donned protective SCAPE (Self Contained Atmospheric Protective Ensemble) suits to fill the satellites with hydrazine propellant.*

*Photo is courtesy of ESA/Arianespace*

Arianespace, in association with ESA and the European Commission, will designate an independent inquiry board to determine the exact causes of this anomaly and to draw conclusions and develop corrective actions that will allow us to resume launches of Soyuz from the Guiana Space Center (CSG) in complete safety and as quickly as possible. The board



*The Galileo satellites' integration with Soyuz is shown in this series of photos, beginning with the upper composite's transfer to the dedicated launch complex in French Guiana for this medium-lift launcher (left). At center, the upper composite is hoisted inside the mobile gantry, where it is integrated with Soyuz (right) to complete the launcher build-up for Arianespace's Flight VS09, now delayed as of this writing.*

*Photos are courtesy of Arianespace.*

will coordinate its work with Russian partners in the Soyuz at CSG program. Arianespace is determined to help meet the European Union's goals for the Galileo program without undue delay. We would like to thank ESA, the European Commission and CNES for the very productive discussions since becoming aware of the occurrence of the anomaly. While it is too early to determine the exact causes, we would like to offer our sincere excuses to ESA and the European Commission for this orbital injection that did not meet expectations."

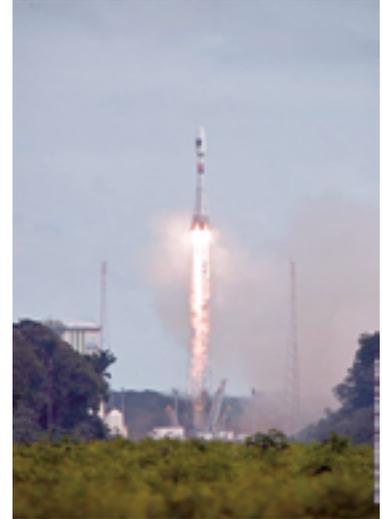
Galileo's FOC phase is being funded and executed by the European Union, which has designated the European Space Agency as the system's development and sourcing agent.

"Doresa" and "Milena" were built in Bremen, Germany by FOC prime contractor OHB System and are named for children who were among those winning a European

Commission-organized painting competition in 2011. That flight was followed by four Galileo satellites used for the system's In-Orbit Validation (IOV) phase, launched in pairs on Soyuz flights performed by Arianespace from French Guiana in October 2011 and October 2012. These four IOV spacecraft, launched on their historic first and third flights, enabled testing of the full Galileo system, clearing the way for the FOC phase.

The complete Galileo constellation is to be composed of 27 operational satellites and three reserves, distributed along three circular Medium Earth Orbit (MEO) planes at an altitude of 23,222km., inclined 56 degrees to the equator. By being interoperable with the existing U.S. GPS and Russian Glonass navigation systems, Galileo will become another cornerstone in global satellite navigation.

The Arianespace infosite:  
<http://www.arianespace.com>.



Europe's fifth and sixth Galileo satellites are pushed off by Arianespace aboard a Soyuz launch vehicle.

# AVASCENT Analysis—Dual Trends In The European Space Industry: Consolidation + Dispersion

By David Vaccaro, Manager, International Initiatives, Avascent's Space Practice

**In 2014, one era of European space activity is drawing to a close, with a new era on the horizon. The future of the flagship Ariane launch vehicle is driving this transition; it is Europe's single most critical space decision, upon which myriad developments hinge—from Europe's share of the commercial launch market, to next-generation satellite designs, to multinational civil space collaboration activities.**

The European launch sector, challenged to become more cost-competitive, is consolidating—and likely upending geographically dispersed vehicle production patterns in the process. Yet a less obvious countervailing trend is also at work: a proliferation of national and even sub-national space initiatives that has been subtly reshaping the European space landscape since the turn of the century.

These two trends, consolidation and dispersion, are interacting in nuanced ways; while they may offset each other in particular countries or regions, they are not necessarily in opposition. Rather, they reflect a European market that is mature from a technological perspective, but more variegated and less predictable from a commercial or

government stakeholder standpoint. The dynamic interplay between these two trends means that enterprises working in the European space sector will need

to update their business models, of actors and market forces on the new

take this much broader range into account, and capitalize on opportunities they enable.

## A Fateful Moment

In December, the European Space Agency (ESA) Ministerial Council will meet in Luxembourg, where it is expected to commit to a roadmap for the next-generation Ariane vehicle. Development of the Ariane 5 Mid-Life Evolution (ME), approved at the 2012 ESA Ministerial Council, is already underway. Designed by Airbus Defence and Space (formerly Astrium), the Ariane 5ME will yield a 20 percent increase over current payload capacity, lifting up to 11 metric tonnes to geosynchronous transfer orbit (GTO), and thereby replacing the Ariane 5 ECA





and ES versions by 2018. The question before this year's ESA Ministerial Council is whether, and to what extent, to fund continued development of the Ariane 5ME in balance with (or opposed to) an alternative configuration, the Ariane 6, which would differ markedly from the Ariane 5 legacy design.

Whatever ESA's decision, it will turn the page from one chapter of European space activity to the next. Versions of the Ariane 5 have been in operation since 1996. The Ariane 5 ECA configuration (see *the artistic rendition to the right, courtesy of ESA*), able to deploy two geosynchronous (GEO) satellites in one launch, has flown since 2002. Despite its reputation for quality and reliability, however, the Ariane 5, like all vehicles, has faced price competition from SpaceX's Falcon 9. In response, European planners are considering next-generation designs to maintain or expand market share while increasing cost-competitiveness.

### European Launch Sector Consolidation

This challenge is already prompting significant realignment in the European space industry. In June, Airbus and Safran—the two largest industry shareholders in Arianespace, owning a combined 39 percent of that company—agreed to a 50-50 joint venture. The partnership seeks to integrate the launch system design capabilities of Airbus with the propulsion expertise of Safran.

The goal is to simplify organization within the Ariane production process, and create an integrated entity responsible for development through commercialization. Together, Airbus, Safran, and Arianespace seek to optimize their cost structures, both for continued development of the Ariane 5ME and future design and production of the Ariane 6.

To that end, the Airbus-Safran joint venture has already proposed two new concepts for the Ariane 6 vehicle: the Ariane 6.1, a heavier-lift version capable of deploying up to 8.5 metric tonnes to GTO (enough to carry either one massive telecommunications satellite or two smaller ones); and the smaller Ariane 6.2, designed mainly to place Earth observation spacecraft into Low Earth Orbit (LEO), replacing Arianespace's current usage of Russian Soyuz rockets for this purpose.

While the Airbus-Safran joint venture will create new efficiencies, fundamental reductions in European launch development costs will require significant changes to Europe's longstanding policy of geographic return, or *juste retour*, whereby industrial contracts are distributed based on proportional investment by European member countries in the institution awarding those contracts. The impact of geographic return on ESA has been to spread space production among multiple countries, which shares the wealth but can also increase costs. Changes to this approach would likely result in consolidation of vehicle production at sites in France and Germany.

While disruptive, the pressure to increase European cost competitiveness appears to be creating political room for this change. "I have given industry total *carte blanche* on this," ESA Director General Jean-Jacques Dordain said in a press briefing on January 17, 2014. "I want them to tell me the best way of moving forward, with no constraints."

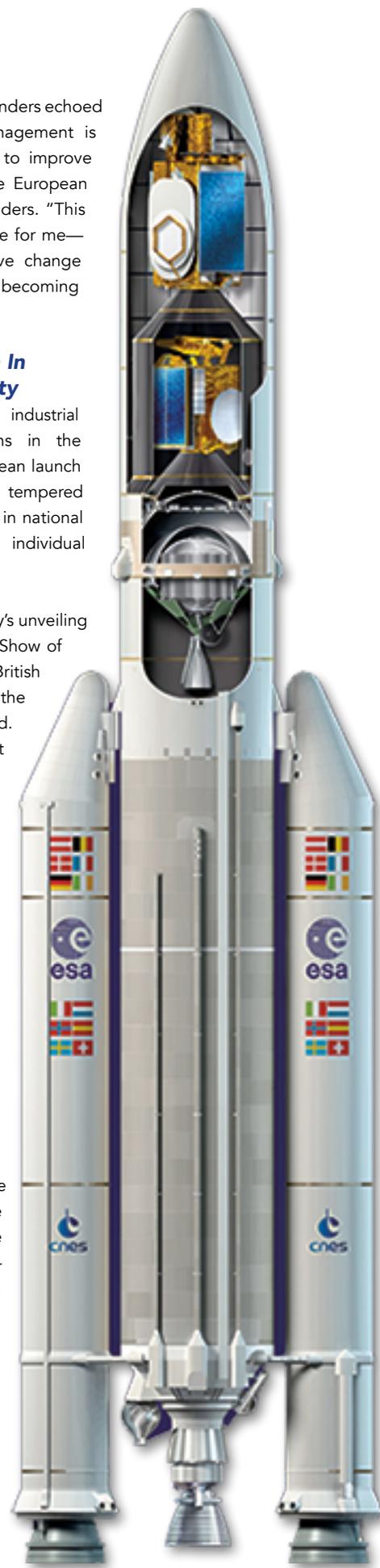
On July 30, Airbus CEO Tom Enders echoed those sentiments. "The management is tasked with a clear mission: to improve competitiveness of the future European launcher business," stated Enders. "This objective is without alternative for me—either we fundamentally drive change in this sector, or we risk becoming irrelevant very soon."

### Geographic Dispersion In European Space Activity

Notwithstanding this industrial consolidation, any reductions in the geographic expanse of European launch vehicle supply lines may be tempered by an alternate trend: growth in national space initiatives among individual European countries.

The UK Civil Aviation Authority's unveiling at the 2014 Farnborough Air Show of eight potential sites for a British commercial spaceport offered the latest illustration of this trend. This commercial spaceport initiative is one element of the broader Space Growth Action Plan unveiled in April by the UK Space Agency. The plan names space as one of Britain's "8 Great Technologies," and aims to position the UK to capture 10 percent of the global space market by 2030, increasing the contribution of space activity to the British economy from an estimated £9 billion today to £40 billion by 2030.

Although investments in the Space Growth Action Plan are largely channeled through the UK's ESA budget contribution—noteworthy given British euro-scepticism—its focus is squarely on fostering space business within the UK through de-regulation and "smart" investment in core space industries, such as launch and Earth observation.





New European National Space Office or Authority	Year Introduced
Croatian Space Agency (CSA)	2002
Czech Space Office (CSO)	2003
Danish Space Research Institute (DRKI)	2005
Estonian Space Office (ESO)	2007
Lithuanian Space Association (LSA)	2007
Latvian Space Technology Cluster (VHTP)	2009
Slovak Organization for Space Activities (SOSA)	2009
Portuguese Space Cabinet Office (FCT Space Office)	2009
Slovenian Centre of Excellence for Space Sciences and Technologies (SPACE-SI)	2010
United Kingdom Space Agency (UKSA)	2010

Figure 1. European National Space Entities Introduced Since 2000

While Britain has been active in space for decades, its creation of a dedicated space agency in 2010 was designed to raise the profile of space within the UK government, showcase links between space investment and technological advancement, and orient human capital development toward a high-skills economic cluster.

The UK Space Agency is only the most recent example of European countries investing in their own national space initiatives for similar reasons. At least 10 such entities have been created across Europe since 2000, several of them in Central and Eastern Europe. Beyond national authorities, certain jurisdictions within European countries have also created localized space initiatives.

In Belgium, for instance, the Walloon region has created Skywin, which has funded more than \$100 million in aerospace projects and regional export promotion. Walloon is also one of 27 member regions of the Network of European Regions Using Space Technologies (NEREUS), a multinational group whose mission is to assist in the development of regional European space clusters. Against this backdrop, the July rollout of the UK commercial spaceport initiative might be viewed as an exclamation mark on a European space trend that has been gathering momentum for the past 15 years. (Please see Figure 1 above.)

This multiplication of national and regional initiatives also reflects some tension in European space governance. The majority of European national space spending still flows through ESA, reflecting a broadly shared consensus that individual European countries achieve more in space through pooling their resources for collective action. However, European nations are also hedging their bets: investing in their own national capabilities, or re-evaluating ESA space spending through the prism of their domestic interests.

For instance, although the UK Space Growth Action Plan highlights increased British funding of ESA, its clear priority is leveraging that investment to enhance the British national space economy. This suggests a desire to set the ESA agenda as a founding member, and perhaps also to preserve ESA as the primary locus of European space decision-making, rather than ceding influence to Brussels institutions, notably the European Commission.

Conversely, six of the ten European national space authorities created since 2000—Croatia, Estonia, Latvia, Lithuania, Slovakia, and Slovenia—are members of the EU, but not of ESA (although several aspire to membership as “ESA cooperating states”). Rather than waiting for ESA to grant membership, or bowing to the priorities of France, Germany, Italy, and the UK, the largest ESA contributors, these small countries are formulating their own space

futures. All are eager to join ESA and support its initiatives, but each is developing a distinctly national space approach as well, with emphasis on public-private partnerships, capital attraction, and workforce development.

While some of these governance questions, along with the broader relationship between ESA and the EU, are agenda items at the 2014 ESA Ministerial Meeting, their resolution will be an ongoing process. Meanwhile, European national and regional space initiatives appear poised to proceed, and possibly increase, even as ESA continues as the primary driver of European space activity.

### **The Reshaping Of The European Space Landscape**

While the future of the Ariane launch vehicle is of decisive importance, consequential transitions are already underway throughout the European space sector, irrespective of ESA's decision. Europe's space industry is simultaneously consolidating and shrinking its geographic base to cut costs while also undergoing a geographic proliferation of space activity at national and regional levels.

The interplay between these dual forces of consolidation and dispersion is creating a more dynamic but less predictable—and multiplying—set of market actors and forces. Companies will need to tailor their medium- and long-term strategies to changes in longstanding launch vehicle production

and supply chain models, as well as a diversification of European space activity among a larger patchwork of actors. While the multinational ESA space model is well-established, the multiplication and depth of national space initiatives—and the opportunities they present—have not yet been fully grasped by businesses in Europe or internationally.

In this moment of change for European space activity, it is important for companies to understand the implications of the looming Ariane decision on the horizon as well as the business possibilities presented by the cumulative effect of the many decentralized national and regional decisions that are combining to reshape the European space landscape in 2014.

For additional information regarding AVASCENT, please visit  
<http://avascent.com/>

#### **About the author**

*David Vaccaro specializes in international initiatives at Avascent's Space Practice. Avascent is a strategy and management consulting firm serving clients in government-driven industries.*

# STN Teleport: A Decade Of History + A Castle Celebration

By Emily Constance, SatNews Reporter

**W**hen the family-owned and operated Satellite Telecommunications Network (STN), based in Slovenia, celebrated their 10th year of successful business in the SATCOM industry, the occasion certainly did not pass quietly... the decade of service celebration included a gathering in a castle on an island as well as SatNews' Publisher Silvano Payne, who was one of the invited guests.

Rewind 14 years and one can see just how much the Lovsin family has to celebrate. Their careers started not in the satellite industry, rather... as documentarians. Several of their award-winning films garnered much attention after they were broadcast on a local television station. The station

acquired so many of the Lovsins' films that the family eventually became co-owners of the station. As viewership grew throughout Slovenia and beyond, the family decided to start broadcasting their content via satellite.

As the lack of services in their region didn't offer such satellite broadcast services, the family quickly determined they needed to build their own uplink facility. The first step was taken when an antenna was purchased and the initial 24/7 broadcasting services were initiated, using their first distribution satellite, according to STN CEO Andrej Lovsin.

Two years after their first broadcast, the Lovsins made the crucial decision to focus on becoming a full service teleport. In 2004, Satellite





Telecommunications Network was born—with only two employees, four Antennas (3RX + 1TX) for uplink/downlink reception, and 50 m<sup>2</sup> (538.20 sq. ft.) of space in Slovenia's capital, Ljubljana.

STN quickly outgrew their surroundings and the teleport's capacities had to be increased—play-out, turnaround and uplink expanded by more than 100 percent. STN then began to broadcast over four satellites, recruited new employees, provided technical infrastructure based on the latest available technology, and ensured services for 50 clients.

Relocation of the teleport became crucial in 2006, when their premises reached full capacity. STN purchased its first plot of prime land that covered 5,000 m<sup>2</sup> (53,819.55 sq. ft.) in 2008 and, few years later, an additional 5,000 m<sup>2</sup> (53,819.55 sq. ft.). In 2013, STN increased its space once again with the purchase of another 10,000 m<sup>2</sup> (107,639.10 sq. ft.) of land that is adjacent to the company's current headquarters location. Over 10 years, STN has increased its premises four-hundredfold and now provides services for more than 450 TV channels and 300 radio channels.

Fast forward to June 2014 and the well deserved party for the STN team. A real celebration ensued, certainly an event all will remember.

"The most impressive thing to me was the cohesiveness and vision of the family," said Silvano Payne, of his time with the STN team. "They work together as a family and all seem to be aligned with the same goals and objectives and how wonderful it is that they all contribute different talents and strengths."

"A major highlight of the trip was the visit to Bled, the island. It was fascinating, interesting and beautiful," added Payne regarding the celebration. "It was quite the experience. The lake, the castle, the island and the natural beauty of the surroundings were extraordinary; plus, the entertainment was excellent."

Guests were rowed to Bled Island and also visited Bled Castle, a medieval structure located six hundred feet above sea level atop a steep stone wall, where they were greeted by entertainers.



*Photo of Bled Island + Bled Castle, Slovenia.*





*Left to right. Managing Director Tomaz Lovsin; Operations Manager Janja Lovsin; CEO Andrej Lovsin; Sales Valerie Lovsin and Sales Director Mitja Lovsin.*

The existing facility has a capacity for 900 channels and the planned construction of EQC2 in the coming years will provide the ability to broadcast an additional 400 to 500 TV channels. Due to the long-term focus of the management team and their drive for further company growth, the aforementioned additional land (10,000 m<sup>2</sup>) (10,7639.10 sq. ft.) was a crucial step and a strategic decision for the future—the foundation for offering capacities for more than 20 new antennas, which range in size from six to 15 meters.

Also popular with customers at STN is their equipment hosting. “STN has an extensive Rack Center and boasts one of the largest in the entire region, with more than one hundred-and-sixty 42U racks for client use, which supply’s a reliable solution for hosting equipment,” said Sales and Marketing Director, Mitja Lovsin. “The racks are all equipped with dual power supply within the secure rack room, with a cooling system that operates with triple redundancy. This ensures our customers a constant room temperature of 16 to 18 degrees Celsius at all times. Each rack is also equipped with three temperature sensors, which are connected to the control panel in our 24/7/365 MCR/NOC center. The reliable fiber and IP networks have virtually unlimited capacities and enable our customers to enjoy uninterrupted access to their equipment, every day of the year.

“With such rapid growth, STN has brought in new technologies to ensure viability today and in the future. This includes full facility monitoring and automation in order to minimize human error. This is managed by centralizing the monitoring system. Centralization must encompass all of the components, all the paths from the entry point to off-air, into one user friendly system, followed by the addition of an automatic system control with the option of manual intervention, if necessary.

“I feel that, today, you really can have a near perfect monitoring and control system that is intuitive and user friendly without the need to sacrifice superficial control of the system,” Managing Director Tomaz Lovsin said.

“If I concentrate only on broadcasting, then the three, big, future potential drivers that the industry is talking about are UHD TV (or 4k), h.265 and DVB-S2X. However, what will happen is hard to predict.

“I think there are two scenarios: either UHD TV will pick up and be the next gen HDTV, in which case the transition will take much longer than currently predicted, or; if the industry will really press forward with 8k, UHD TV will be a transitional standard used by a few premium channels to enhance their portfolio until 8k is adopted and crowned as the HDTV successor.

“In the last few years, STN has been concentrating on the large areas of the world where there is still a huge increase in demand for Satellite TV (satTV) and Direct-To-Home (DTH) services. Conventional satTV is essentially the only option; especially in areas where the OTT/IPTV trend is almost nonexistent. That said, OTT/IPTV services are becoming increasingly popular with the younger consumer and is an observable trend throughout Europe and North America.

“It appears this trend will continue. I think, at the end, it is all about flexibility and how the company can adjust to the new markets and trends to divert the business resources where there is a growing demand. STN is particularly strong and has the agility to adjust to offer the services necessary to satisfy such increasing demand,” Tomaz said.

“Apart from their mission to always provide the highest standard of quality, that flexibility paired with STN’s focus on looking at the market potential on a global scale is integral to company success,” added Mitja Lovsin. “The operators who are working and concentrating only on certain geographical areas are more vulnerable and less flexible to reorganize themselves, if they are required to move to these areas where new potentials arise. It would seem that most of the operators in our line of business are like that—there are only a handful of companies that offer a global service, and STN is one of them.

“The other global players are all great companies offering, like STN, a first class service. However, all of them don’t have the one little, but extremely important, element that STN possesses—flexibility. They have lost this resilience, due to their size, while STN can move and deliver services much faster than other competitors and this is extremely important for the customer(s) in today’s fast moving world.”

When asked to reflect on past challenges and success, Andrej remembers one of the more satisfying events in STN history—the first installation of the Ka-band system, an implementation that was highly successful and beneficial to the company. “This was yet another confirmation of the future development plans we follow—constant technological innovation.

“Some projects have been more challenging than others, but we have always had a superb feeling of satisfaction with our successful results,” said Andrej. “The general rule of STN is that every client, large or small, is equally important, equally valuable and all highly respected. In principle, STN does not distinguish between clients. We strive to provide quality services to all. Our pursuit is to ensure the highest possible success to all projects and to have satisfied clients, who will put their trust and confidence in us in just the short term, but also in the future.”



# SatBroadcasting™: The 4K Rush Has Become A Stampede

By Chris Forrester, Senior Contributor



**In July of this year, two of India's DTH giants (Videocon d2h, and TataSky) promised they'd be adding 4K/Ultra HDTV services sooner, rather than later. Videod2h talked about such services being added later this year, while TataSky already has a huge set-top box (STB) order in place with Technicolor for delivery to them early in 2015.**

Videocon's d2h payTV service is determined to be the first in the India market and wants to be ahead of TataSky, Dish TV and other DTH suppliers. Videocon d2h has approximately 11 million subscribers and the market is anticipating the company mounting an IPO later this year.

Videocon d2h currently supplies 22 HDTV channels to subscribers and the company promises Ultra HD "very soon," although no more specific than that statement. The 4K Ultra HD DTH services will be available commercially very soon. The live preview of the 4K technology by Videocon d2h is the first step toward ushering in a new era of DTH industry in India, the company said at a press event in Mumbai. "4K Ultra HD is the latest innovation in viewing technology. We have successfully previewed the service today and demonstrated our capabilities," said Saurabh Dhoot, a director at Videocon d2h.

Videocon d2h CEO Anil Khera said, "After many firsts in the DTH sector by Videocon d2h, once again we have taken the lead with 4k Ultra HD services. 4K services previewed today will revolutionize viewing in this country. The service will provide images with much more clarity, finer detailing and other nuances that the viewing differences will be unbelievable."

However, Videocon might well be in something of a local race, given that TataSky already has a volume STB order in place, as stated earlier in my column. TataSky used a live 4K demonstration event in Mumbai on Friday, July 4th, to showcase the FIFA World Cup quarter-final (France vs. Germany) soccer game, transmitted in 4K around the world to various VIPs.

TataSky CCO Vikrem Mehra reminded guests, "When we launched HD in 2010, people doubted us, saying it won't work. As you keep enhancing the TV experience, the viewer will appreciate the efforts. So, Ultra HD is our endeavor in that area. A technology becomes popular when mainline payTV adopts it." TataSky has some 2.9m subscribers for its premium HDTV service out of a total subscription base of a claimed 13.5m.

The FIFA World Cup quarter-final and the July 13th final were captured in 4K, beamed to VIP showcase events, cinemas and, in some fortunate cases (notably South Korea, Brazil, Japan and some Gulf cities), even direct-to-viewers. Most of the major satellite operators had a hand in moving the 4K signals around the world, including Intelsat, SES and Eutelsat.

Moreover, the predictions for 4K/UHD-1 take-up continue to be robust. A fresh forecast said high-quality Ultra HDTV/4K TVs will grow to represent 26.6 percent of all TVs shipped in three years, according to Digitimes Research. They believe that from 2013 to 2017, the number of UHD TV displays in use will grow from today's 1.5m units to 68.2m.

Despite the higher retail prices, apparently consumers are buying into the technology, notwithstanding that some displays will not handle 60fps without a separate STB. Americans are increasingly replacing their once-enviable 50-inch TVs with even bigger screens; sized 65-inches and upwards.

Buyers generally are opting for giant screens—pushing sales of them up 50 percent in the past year while overall TV sales have faltered, according to current research from NPD Group. As prices fall, hardcore TV watchers and video gamers are finding sets affordable that a few years ago would have only been playthings for wealthier people.



Vue Cinema's 4K Direct, by Eutelsat.



"TVs are more affordable than they've ever been, so a 'supersized' TV today is still far less expensive than smaller screens were three or four years ago," said Jamie Bastian, a spokeswoman for U.S. retail chain Target which expanded its selection of big-screen TVs to include 70-inch versions this year, up from last year's 60-inches.

In Europe, two in five TVs in German homes are now smart devices and flat screens are present in the living rooms of 86 percent of German homes, according to trade body GFU, although awareness of 4K/UHD is still low.

Only 13 percent recognized the term 4K, and just nine percent were aware of the term "UHDTV". Clearly, more consumer education is needed.

### Data Out Of Germany

Globally, Ultra HD TV shipments will see a compound annual growth rate (CAGR) of 160 percent from 2013 to 2017, soaring from 1.5m units to 68.2m, according to Digitimes Research. Digitimes Research also states that 26.6 percent of all TVs shipped in 2017 will be Ultra HD models, and in the 55-inch segment, more than 90 percent of the LCD TVs to be shipped in 2017 will deliver Ultra HD or even higher resolutions.

As with other new types of video services, Ultra HD adoption will rely on compatible content and TVs to drive the market, according to Digitimes Research. While the current video industry environment is not ideal for Ultra HD TV, Digitimes Research argues that the expected support of Blu-ray Disc for Ultra HD content and increased user-created content will help demand take off in 2015. However, the active engagement of TV manufacturers will be the primary driving force of Ultra HD TV growth.

Traditionally, new TV technologies, such as 3D and OLED, have been driven from the top end of the market, in terms of vendor support and pricing. Ultra HD technology, on the other hand, is being driven by panel makers in mainstream markets by a multitude of vendors, with the China market taking the lead. Based on this, leading global vendors such as Samsung and Sony may be forced to engage in Ultra HD TV price competition earlier than they would like. This means there is a chance for Ultra HD TV to quickly become widespread in the overall TV market. Digitimes Research forecasts that in

### 'Roll-Up' TV "in three years"

For some years, demonstration models of so-called 'roll up' TV screens have been shown at trade shows. Japan's NHK research and development laboratory has even shown a small roll-away color TV screen that is contained within a pen. Now, South Korea's LG says it has successfully created an 18 inch screen that rolls up into a package that's smaller than a paper roll (3cm). The backplane of the screen is made of a high-molecular substance-based polyimide, that is much more flexible than plastic.



LG adds that it is confident that by 2017 it will be able to produce a fully flexible, Ultra HD or OLED screen that measures 60 inches. One report suggests that even with a limit of 18 inches, it is likely that LG—and perhaps its rivals—will be producing computer screens and tablets that roll up when they are not being used.

Another major use would be in retail environments, wrapped around shop pillars, or on a circular stand. Not to be outdone, LG's South Korean rival Samsung is also working on the technology. Earlier this year at the giant CES show in Las Vegas, the company showcased a remote-control 'bendable screen, which could be curved by the user (within reasonable limits).

2015, the penetration rate of Ultra HD TVs in the overall TV market will exceed 10 percent for the first time, with shipments reaching 30m units.

The Digitimes Research Special Report also looks at opportunities in the Ultra HD TV market from various perspectives, including developing trends in supply chain dynamics and technology trends in the TV System-on-Chip (SoC) and LCD panel industries. In addition, the report provides analysis of the competitive strategies for Ultra HD TV deployment for vendors from South Korea, Japan, China, as well as regional TV vendors.

### **Agreeing Upon Standards**

July witnessed the important Digital Video Broadcasting group (DVB) publish their specification for UHD-1. The new DVB-UHDTV Phase 1 specification allows for the over-the-air transmission of 3840 x 2160 resolution pictures at 60Hz and promises much improved color depth, with 10 bits per pixel rather than 8. Once officially standardized, this specification will open the floodgates for 4K TV services to launch both on satellite and over-the-air platforms across Europe, and beyond.

This will be a huge step forward in TV picture quality, offering a whole new range of colors, higher frame rates, double the horizontal and vertical resolution and four times the number of pixels. As readers know, that's nine times as many pixels as an 'HD Ready' 720p picture.

The standard uses HEVC and offers about double the data compression ratio as compared to MPEG-4/H.264. This standard effectively means that, while the number of pixels quadruples, they'll only need double the bandwidth.

"HEVC is the most recently-developed compression technology and, among other uses, it is the key that will unlock UHDTV broadcasting," said Phil Laven, DVB Steering Board Chairman. "This new DVB-UHDTV Phase 1 specification not only opens the door to the age of UHDTV delivery but also potentially sets the stage for Phase 2, the next level of UHDTV quality, which will be considered in upcoming DVB work."

While this is fantastic news for 4K enthusiasts, there are some caveats, the main one being that the new specification is seemingly completely incompatible with any of today's TV tuners, even those using brand new 4K TVs with HEVC decoding built-in.

The new DVB-UHDTV Phase 1 specification has been delivered to the European Telecommunications Standards Institute, a not-for-profit body which is expected to formally standardize the specification in due course.



Samsung's 4K demo, "Boiling Eggs."

First up—the industry needs a SoC solution from companies such as Broadcom. These have been around now for some months in small production batches, and the sector is ramping up production (with companies such as Envivio and Elemental) to ensure volume production. Again, pre-production encoders and STBs were in use at Sochi, Brazil and other key sporting events this summer.

On July 1st Broadcom announced that its BCM-7445 SoC was being used for the FIFA World Cup 4K test transmissions, handling 60fps, demonstrating that production volumes were underway. Incidentally, this BCM-7445 was first discussed in January 2013 ahead of that year's CES. Hopefully, these developments will trickle down to the consumer electronics industry this coming winter in readiness for what many see as 4K/UHD-1 introductions during 2015-16.

#### About the author

Senior Contributor Chris Forrester is a well-known broadcasting journalist and industry consultant. He reports on all aspects of broadcasting, with special emphasis on content, the business of television and emerging applications. He founded Rapid TV News and has edited Interspace and its successor, Inside Satellite TV, since 1996. He also files for Advanced-Television.com. In November of 1998, Chris was appointed an Associate (professor) of the prestigious Adham Center for Television Journalism, part of the American University in Cairo (AUC), in recognition of his extensive coverage of the Arab media market.

## Who? And, When?

To date, the market has seen dozens of tests and trials. Public and commercial broadcasters, national networks and speciality payTV operators have experimented with 4K, and deem the new HEVC-encoded systems a success. The debate over 'better pixels' also seems to have been won with the DVB 'standard' recommending 10-bit depth, exceeding the Digital Europe (the renamed EICTA, European Information and Communications Technology Industry Association) 8-bit proposal as a bare minimum.

### Asia

- » South Korea is already there, along with Japan and Hong Kong. Akamai, for example, says that these three markets are "far more prepared" for 4K than the rest of the world. The situation (especially in South Korea and Japan) with DTH transmissions is every bit as strong, but needs suitably-equipped displays and/or STBs. South Korea's 'Homechoice' is currently offering 4K on its new UMAX channel using ATEME encoders and offers a mix of 40 films, documentaries and animation.
- » China is a huge fan of 4K and wants the technology to succeed in order to underpin its own, low-cost, display export business.
- » Japan said 4K would start with recent soccer games and will use a BS satellite as part of its government-backed NexTV-Forum—ahead of transmissions of 8K (which NHK is still testing) in 2016. Toshiaki Baba, from the Next Generation Television & Promotion Forum, explained in April that broadcasters NHK, Nippon TV, TV Asahi, TBS, Fuji TV, JSAT and WOWOW, have all come together with SkyPerfecTV to use their satellite capacity to beam 4K programming.

### North America

- » The USA (and Canada) is trailing, said Akamai, and few cable MSOs are truly ready, as has been proven repeatedly with Netflix-type downloads which have resulted in network near-collapse. Comcast says they can handle 15 Mbit/s comfortably and announced at January's CES that it would be transmitting in 4K "later this year." Of course, DirecTV could go with 4K tomorrow (as could Dish Network, but must first gauge the likely enthusiasm from consumers and their willingness to pay). Officially, DirecTV states that 4K will have a material impact by 2016, and certainly sees itself as being in the forefront.
- » DirecTV says it will provide 4K via Samsung 'Smart TVs.'

## **Latin America**

- » *The FIFA World Cup—notwithstanding the humiliating defeat for Brazil—nevertheless demonstrated a hunger for 4K from the continent’s soccer fans. The 2016 Olympic Games are but a heartbeat away for Brazil. Widespread test transmissions have taken place and most observers are quite happy with the results. Time will tell as to whether DTH or cable will take the lead.*

## **Europe**

- » *The assorted tests and trials carried out with the Brazilian futbol broadcasts are being digested and analyzed, but the fact is that a few major public broadcasters (the BBC and Italy’s RAI, as well as France Télévisions) have tested various 4K delivery methods. French music channel NRJ has just started a two-week 4K trial for Parisians, using DVB-T2 transmissions and handled by TDF.*

- » *Sky Deutschland is generally seen as being in the forefront of the Sky ‘family’ of channels and we might see announcements emerge at this coming August’s IFA show in Berlin, followed by IBC in September. Industry insiders do not, however, see much happening until later next year.*
- » *BSkyB is likely to be a slow-adopter of 4K. Their problem is that there are more than 10m STBs in the market (and about 3m remain in SD). However, a new quad-tuner box is under development with plenty of bells and whistles for the most gadget-hungry of the firm’s loyal fan base.*
- » *Canal Plus broadcast its first 4K tests almost a year ago in August 2013, and rumor is to expect something from C+ by the close of 2015.*
- » *Russia’s NTV-Plus might surprise us all and be an early adopter.*

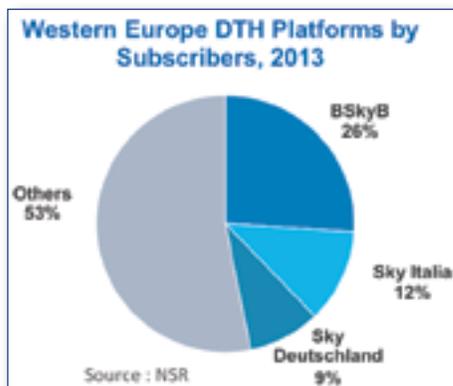
# NSR Analysis: A European Merger With Sky-High Ambitions

By Blaine Curcio, Senior Analyst, NSR Korea, South

**T**he European DTH market may be poised for a significant shakeup in the coming months, following a proposed merger between three of the continent's largest DTH platforms: British Sky Broadcasting (BSkyB), Sky Deutschland, and Sky Italia.

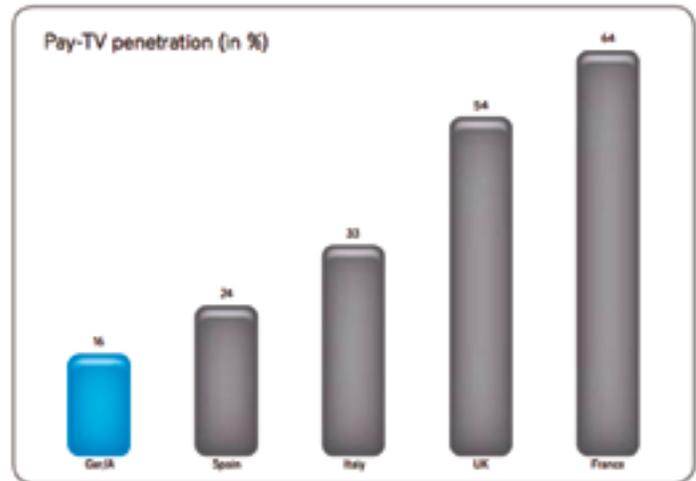
NSR has noted in previous reports that the Western European DTH market could benefit from such consolidation; however, issues such as language barriers and subsequent difficulty in standardizing content has made such a proposition difficult.

However, now due to a combination of factors (namely what appears to be a reasonable asking price for Sky Italia) there appears to be in the works the creation of a massive DTH platform in Western Europe, with the proposed merger creating a platform that would capture nearly 50 percent of all DTH subscribers in Western Europe by merging three of the five largest platforms into one.



This merger could lead to substantial changes in the Western European DTH market, most notably increasing bargaining power for this colossal platform when dealing with content providers, for example, the larger football leagues in Europe. This content is generally one of the largest components of operating costs for these platforms—for example, in 2013, BSkyB invested over £2.5 billion, or roughly 1/3 of overall revenues, into on-screen content. Therefore, by leveraging a subscriber base of almost 20 million, even a cost savings on content of 10 percent would translate to several hundred million pounds to their bottom line.

The merger would likely lead to other benefits for the platform as well. With a low payTV penetration rate of ~16 percent, Germany/Austria is likely the market that stands to present the largest opportunities by virtue of lower costs to subscribers, better content through synergies between the three platforms, or a combination of both. DTH does have an excellent foothold in the country, with >50 percent market penetration among payTV households; however, with 84 percent of households still on free-to-air (FTA), this merger will likely spell opportunities for differentiation and a subsequent increase in the value proposition of the Sky Deutschland



Source: VPRT: Pay-TV in Deutschland 2013, Ofcom International Communications Market Report, Dec. 2013

component of the company. If Sky Deutschland's payTV market share holds steady, and payTV penetration were to increase to 25 percent in Germany, this would translate to a subscriber boost of more than two million subs, or an increase of over 50 percent.

For years, the industry has discussed DirecTV and DISH Network in the U.S. as the two big players in the global DTH industry by customer numbers and revenues. However, it now appears that this duo will become a trifecta, with the proposed merger of BSkyB, Sky Deutschland and Sky Italia creating a platform with 5 percent fewer subs than DirecTV, and 25 percent higher revenues than DISH Network. This new platform will transform the Western European DTH market, with the cost synergies, better content, and substantial market penetration helping to stem a stagnant economy and, if executed properly, provide significant subscriber boosts in a region that many have left as an afterthought when assessing the global DTH growth picture moving forward.

The NSR infosite: <http://www.nsr.com/>

## About the author

Mr. Curcio joined NSR in 2012, following a position as a project manager in Shenzhen, China, and is the lead author for NSR's annual Global Direct-to-Home (DTH) Markets report, their Satellite Operator Financial Analysis report, as well as a contributing author of the Global Satellite Capacity Supply and Demand (GSCSD) report. As a member of NSR's FSS group, Mr. Curcio's areas of coverage also include general FSS market tendencies, development of HTS, and a focus on emerging markets, in particular East Asia. His prior industry experience includes a role at SES (Den Haag Office) as a strategic marketing intern during summer 2010, where he helped develop a strategy to increase their share-of-wallet with key Europe-based customers.



# The Challenges Of Micro-VSAT Design

By Dr. Andrew Slaney, Technical Director, Ultra-Electronics, GigaSat

**T**he High Throughput Satellite (HTS) market is expanding, particularly with plans to launch Ka-band satellite services well into 2016. Ka-band frequencies have much narrower beamwidths than other popular bands, such as Ku-band.

As a result, Ka-band lends itself well to spot beams and frequency re-use—the principal reasons this band is so popular for high data throughput satellites. Inmarsat launched the first of its fleet of Global Express Ka-band spacecraft last December, which incorporates steerable spot beams. Preliminary GX tests show that high data throughputs are achievable on very small aperture terminals (VSAT).

The modern marketplace sets some tough design requirements; seeking increased throughput from ever-smaller satellite terminals with reduced size, weight and power requirements; constant pressure to increase manufacturing efficiency; reduce costs; and meet ever more demanding customer requirements.

In this article, we attempt to highlight some of the various technical challenges within the Micro-VSAT design and offer solutions to those challenges.

## The Micro-VSAT

VSATs are typically defined as a full duplex satellite ground station with a parabolic antenna that is smaller than three meters in diameter. The Micro-VSAT is typically a terminal incorporating an antenna that has the equivalent parabolic size of less than 60cm.

Designing low power, rugged, light, and high throughput Micro-VSAT systems presents numerous technical challenges. The words “low power,” “light” yet “rugged” with “high data throughput” seem contradictory, and trade-offs are required among them. The high operating frequencies of Ka-band present further technical challenges, which can further compromise the size and weight of terminals.

Micro-VSAT terminals are often called “disadvantaged terminals.” This is because small terminals are limited in data throughput, due to the effective isotropic radiated power (EIRP) limitations at a system level and due to EIRP spectral density limitations defined by the various standards for operational use over the satellite. These limitations become more severe if the terminal does not meet the sidelobe requirements of the satellite operator. The reason for these imposed limitations is clear, it is important not to illuminate adjacent satellites and interfere with other users.

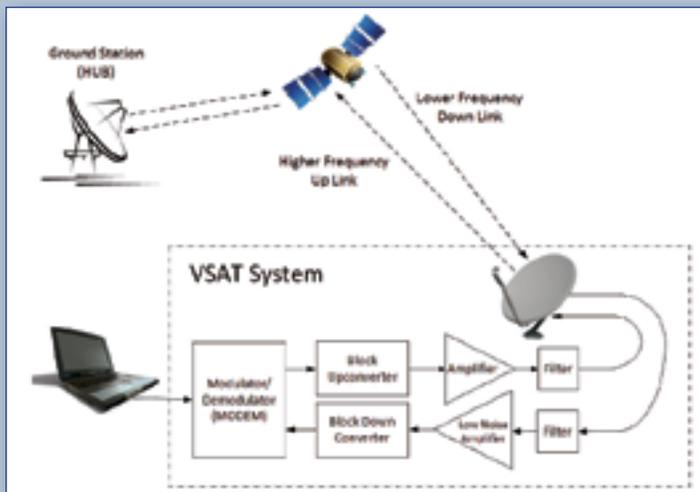


Figure 1. Typical VSAT system block diagram

## Link Budget

A link budget should be established for an operational scenario prior to the design of the terminals. A link budget is the accounting of all of the gains and losses from the transmitter, through free space to the receiver. The link budget accounts for the attenuation of the transmitted signal due to propagation, as well as the antenna gains, satellite transponder statistics, feedline and miscellaneous losses. From the link budget, two key figures for the Micro-VSAT system need to be determined:

1. **The minimum EIRP required**
2. **The minimum G/T required**

The EIRP is given via the following equations:

- **$EIRP(W) = \text{Power given out by an amplifier (W)} \times \text{Gain of the antenna or,}$**
- **$EIRP(dBW) = \text{Power given out by an amplifier (dBW)} + \text{Gain of the antenna (dB)}$**

The antenna gain-to-noise-temperature (G/T) is a figure of merit in the characterization of antenna performance, where G is the antenna gain at the receive frequency and T is the equivalent noise temperature of the receiving system in kelvins.

- **$G/T = \text{Antenna Gain (dB)} - \text{System Noise Temperature (dB)}$**

The noise temperature of the system is the summation of the antenna noise temperature and the RF chain noise temperature from the antenna terminal to the receiver output. Components such as the Low Noise Amplifier (LNA), Block Down Converter (BDC), waveguide and cables all contribute to the system noise temperature and negatively affect the G/T value. Minimizing the noise factor of the LNA and BDC blocks and any system insertion losses in order to maximize EIRP and G/T is important to accomplish.

The terminal EIRP and G/T should be selected that yields a Signal to Noise Ratio (SNR) on the remote receiver (Hub) or terminal receiver side respectively, which is greater than threshold for the chosen modulation and coding scheme to decode the signal error free in the worst of atmospheric conditions.

Reaching the desired EIRP is a trade-off between antenna size and the output power capability of the solid state power amplifier (SSPA). This leads to the first challenge when faced with designing the Micro-VSAT. Which antenna to choose?

## The Choice Of Antenna Technology

There are two broad categories for micro-wave antennas used in VSAT systems:

1. **Parabolic**
2. **Flat Panel**

### Parabolic Antennas

A parabolic antenna uses a parabolic reflector, a curved surface with the cross-sectional shape of a parabola, to direct the radio waves resulting in high directivity. There are essentially five main types of parabolic antennas:

- **Axial or Front Feed**
- **Offset Feed**
- **Cassegrain**
- **Gregorian**
- **Center Feed**

In the axial feed antenna system, the feed is located in front of the dish at the focal point. The energy from the radiating element is arranged so that it illuminates the reflecting surface. Once the energy is reflected, it leaves the antenna system in a narrow beam, resulting in high gain. This type of antenna is a widely used feed system for larger parabolic reflector antennas

as it is easy to implement. However, the feed and its supports do block some of the beam, which limits the aperture efficiency to between 55–60 percent. The feed is directed backwards, so spill over sidelobes caused by the portions of the beam that miss the reflector are directed downwards to warm Earth. This results in higher antenna noise temperatures (lower G/T).



Figure 2 – Various GigaSat VSAT systems. From left to right; front feed antenna, offset feed antenna and centre fed antenna.

With the offset feed antenna, the reflector is an asymmetrical segment of a paraboloid—the focus and feed are located to one side of the dish. The purpose of this design is to move the feed structure out of the beam path so it does not block the beam. The feed horn should be optimized for the focal point to dish diameter ratio (F/D), otherwise it either won't fully illuminate the entire dish, or in receive will "see" around the edges of the dish and pickup terrestrial interference. This type of antenna offers superior sidelobe performance and enhanced aperture efficiencies.

In the Cassegrain antenna design, the feed is located on or behind the dish and radiates forward, illuminating a convex hyperboloidal secondary reflector at the focus of the dish. The radio waves from the feed reflect back off the secondary reflector to the dish, which forms the outgoing beam.



Figure 3. From left to right, Cassegrain and Gregorian antenna.

This has the advantage that the waveguides and "front end" electronics do not have to be suspended in front of the dish. The feed is directed forward, so spill over sidelobes caused by the portions of the beam that miss the reflector are directed upward toward cold sky, rather than downwards to warm earth. This results in lower antenna noise temperatures (better G/T). The second reflecting surface allows for opportunities to tailor the radiation pattern for superior sidelobe performance. The aperture efficiency is of the order of 65–70 percent, however, the feed horns must have a narrower beamwidth (higher gain) and, hence, are longer.

The Gregorian design is similar to the Cassegrain design except that the secondary reflector is concave, (ellipsoidal) in shape. An aperture efficiency of more than 70 percent can be achieved because the system is able to provide a better illumination of the entire reflector surface. Both the Gregorian and Cassegrain antenna architectures present packaging challenges on smaller VSAT designs.

The center-fed design is commonly used in Micro-VSAT designs due to the ease of design and packaging. However, this design often results in poorer sidelobe performance, particularly for small antennas (<65cm) and the aperture efficiency can be as low as 50 percent.

### Flat Panels

Flat panels consist of an array of radiating elements. The individual transducer elements can each be independently driven. These probes or apertures are connected to specially adapted drive units that enable independent, simultaneous emission and reception along each channel. These units should also be able to affect, during emission and reception, the different electronic time delays for each channel.

Electronic pointing is based on the use of these electronic delays along the feed network to each of the apertures. Varying the delays or 'phasing' results in the user's ability to point the beam in different directions without physically moving the antenna. Tactical terminals that are positioned remote from the operator may require this type of Electronic Steerable Array (ESA) capability to point to multiple satellites. (See Figure 4 on the next page.)

Although the variety of types of radiating elements can be quite high, some of the most typical are:

- **Printed on substrate (Microstrip and Stripline)**
- **Horns**
- **Opened waveguides**
- **Metal plates**
- **Slotted waveguides**
- **Metamaterials**

Micro-Strip antennas are good for low frequency applications. They are thin, small and cheaper to manufacture. However, at high frequencies, the losses become greater.



Figure 5. From left to right: Microstrip antenna and complex multi-layer strip-line distribution.

Strip-Line antennas are less lossy at higher frequencies and are common in antennas up to 15GHz (Ku-band). They are still relatively thin and incorporate multilayer systems.

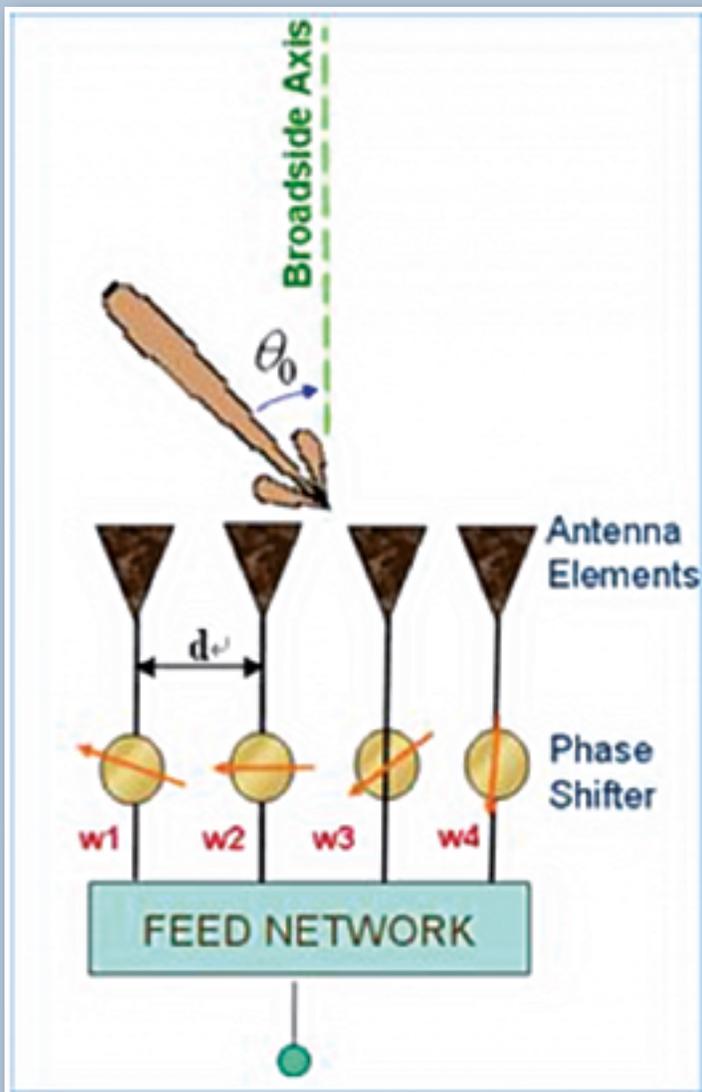


Figure 4. Flat array of radiating elements

Waveguide distribution of power yields ultra-low loss at high frequencies (Ka-band). However, they tend to be thick and expensive to manufacture due to the tight tolerances required. Large investments need to be made to find suitable production plastics and metallization processes to make the antennas light, rugged and to meet the tight tolerances required for suitable RF performance.

Metamaterials are man-made materials that defy conventional wisdom as to how radio waves behave when moving from one medium to another. In normal convention, when electromagnetic waves move from a less dense to a more dense material, they will be refracted towards the normal. A metamaterial can have a negative refractive index. Using this concept, an antenna made from hundreds of tiny metamaterial elements can be individually excited and phased together to focus the radio waves that hit it. Thus, an ESA is formed by using software to control the phasing of its component parts, bending the transmit and receive beams as required.

### Parabolic vs Flat Panel

Flat panels are a good option when considering Micro-VSAT designs where the antenna size is less than 60cm. Superior side-lobe performance can be obtained with flat panel technologies by adjusting the way each of the transducer elements are driven. Flat panels are easier to package but are more costly to manufacture and are band specific. Different antennas would be required to cover different frequency bands and the incorporated technology may also differ considerably. Consequently, RF mounting to the desired power amplifier and LNB could differ between bands.



Figure 6. GigaSat Ka-band terminals using waveguide flat panels, with 20cm and 40cm antennas designed and manufactured by Micro-Ant LLC.

Parabolic antennas are cheaper to produce and can be multi-band by simply changing the feed, orthomode transducer (OMT) and RF chain. However, it is difficult to guarantee good performance over multiple and wide ranging frequency bands.

For superior performance the parabolic antennas are often tuned for a specific band. The mounting and packaging structure can remain the same. For a small and lightweight pack down, as required in a Micro-VSAT design, the antenna would need to be segmented into smaller assemblies. The segmentation process can affect the shape of the parabola, particularly if the dish is not assembled correctly and will, therefore, negatively affect the side lobe performance. The equally obvious disadvantage is the requirement to assemble the system prior to use.

### Solid State Power Amplifiers

The Solid State Power Amplifier (SSPA) is the most power inefficient component in the system. Micro-VSATs will typically use SSPAs at powers up to 30W. There are two types of semiconductor technology used within the SSPAs; Gallium Arsenide (GaS) and Gallium Nitride (GaN). Power efficiency is defined as the conversion of input power to usable output power. GaN devices are more power efficient (please refer to Table 1) and are able to withstand much higher baseplate operating temperatures and so lessening the heatsink requirement. They are becoming more prevalent

Technology	Efficiency		
	X Band	Ku Band	Ka Band
GaS	12.5%	10%	9%
GaN	Up to 21%	15%	10%

Table 1. Efficiency table of SSPAs

in low power X- and Ku-band systems. GaN semiconductor technology is starting to become available in low power Ka-band systems, albeit at a much higher cost to the user

	0.1M	0.2M	0.4M	0.6M
Gain (30GHz)	27.5dBi	33.5dBi	39.5dBi	43dBi
3dB Beamwidth (30GHz)	7.28°	3.64°	1.82°	1.21°

Table 2. The gain of various different antenna sizes and associated beam-width at Ka-band

Due to the SSPA power inefficiencies, small increases in power can have dramatic effect on the size and weight of the amplifier in order to dissipate the extra heat generated. This will also have the impact of necessitating a larger DC power supply within the VSAT terminal which has its own power inefficiencies (typically 86 percent). This has the net effect of shorter battery life and the need for larger heatsinks to adequately cool the larger power supply unit (PSU).

### Sidelobe Performance + EIRP Limitations

Antenna design should be such that most of the radiated energy is formed in the direction of the target. Inevitably, some of the energy will spill into other directions around the antenna, forming what is known as sidelobes of energy. The job of the antenna designer is to minimize these sidelobe incursions. Antenna sidelobe performance is measured at a far-field range.

The smaller the antenna, the wider the beamwidth of the radiated energy in the direction of interest. Table 2 shows a table of the gain of various different antenna sizes and the associated beamwidths at Ka-band.

At Ka-band, there are two popular standards for defining the EIRP spectral density limitations; ETSI EN 303 978 for commercial frequencies and MIL-188-164B for Government frequencies. The graph shown in Figure 7 summarizes those limitations.

Figure 8 (on the following page) shows an indicative sidelobe performance of a 20cm flat panel antenna and its EIRP limitation according to MIL-188-164B.

It is clear to see from Figure 9 (following Figure 8, also on the next page) that the limitation with the 20cm antenna is not defined by its sidelobe performance, which is actually good, but by its beamwidth. With this antenna, it is possible to safely transmit 5W of power in a 100kHz bandwidth.

The commercial requirements for Ka-band define a further 20dB reduction, which will result in a required spreading of the signal across a bandwidth 100 times that of the 100kHz needed in the military band for the same power. This would also incur significant bandwidth costs from the satellite operator. Therefore, careful consideration must be given to the terminals EIRP limitations when considering antenna size and required SSPA power.

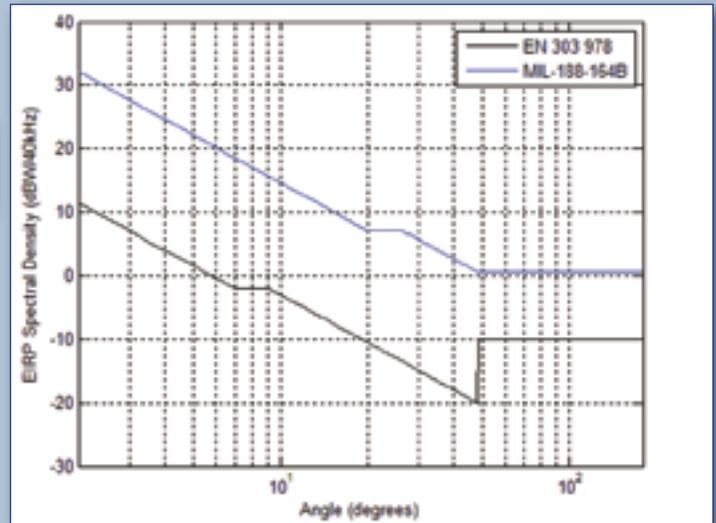


Figure 7. Ka-band EIRP spectral density limitations.

### System Features

Little has been said on the choice of a modem. This is because the modem selection can depend upon the target application, user requirement and customer base infrastructure. There are many board level modems that are suited to Micro-VSAT design and for a truly flexible terminal that can cover a wide range of applications and markets, the emphasis should be to allow adequate space for a wide range of modems and, more critically, a design that allows the modem to be adequately cooled. The latter statement should not be underestimated.

Another important aspect of Micro-VSAT design is to provide the user with assistance in pointing the antenna to the satellite. The primary aim is to get the user to acquire and fully peak onto the satellite in as little time as possible with minimal training or technical expertise. To facilitate this, it is necessary to have three primary sensors on board the system connecting to a central processing unit (CPU); that is a GPS, a Compass and Inclinometer.

With these three sensors, the CPU can know the current location, heading and inclination of the antenna and calculate where the user should point the terminal in order to acquire the satellite. This is done with the use of some simple trigonometry. The control card can incorporate an editable satellite data base in order to provide simple selection of the target satellite. A more detailed block diagram of a Micro-VSAT design can be seen in Figure 9 on the following page.

Careful consideration must be employed when selecting the control card, which should be powerful enough to add features such as web-servers, network management options and a colorful graphical interface (GUI). The software code should be portable to other control platforms to mitigate obsolescence. The control card should also contain a mixture of high and low level programming for complex code development and interface to low level peripheral devices respectively (i.e., keypad entry, various displays and general purpose IOs for additional flexibility). Of course, the card must be small, of rugged design, draw minimal power and cope with extended temperature ranges (-20 to +80). There are many platforms available on the market.

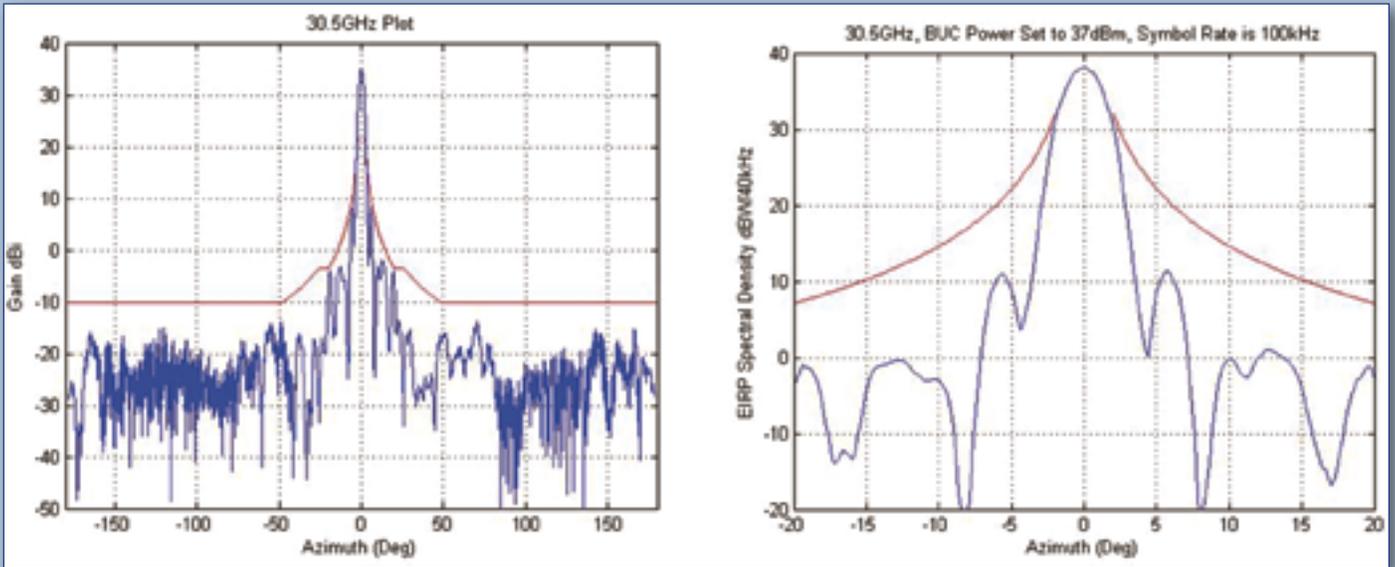


Figure 8. Indicative 20cm flat panel antenna sidelobe performance and its EIRP spectral density limitations.

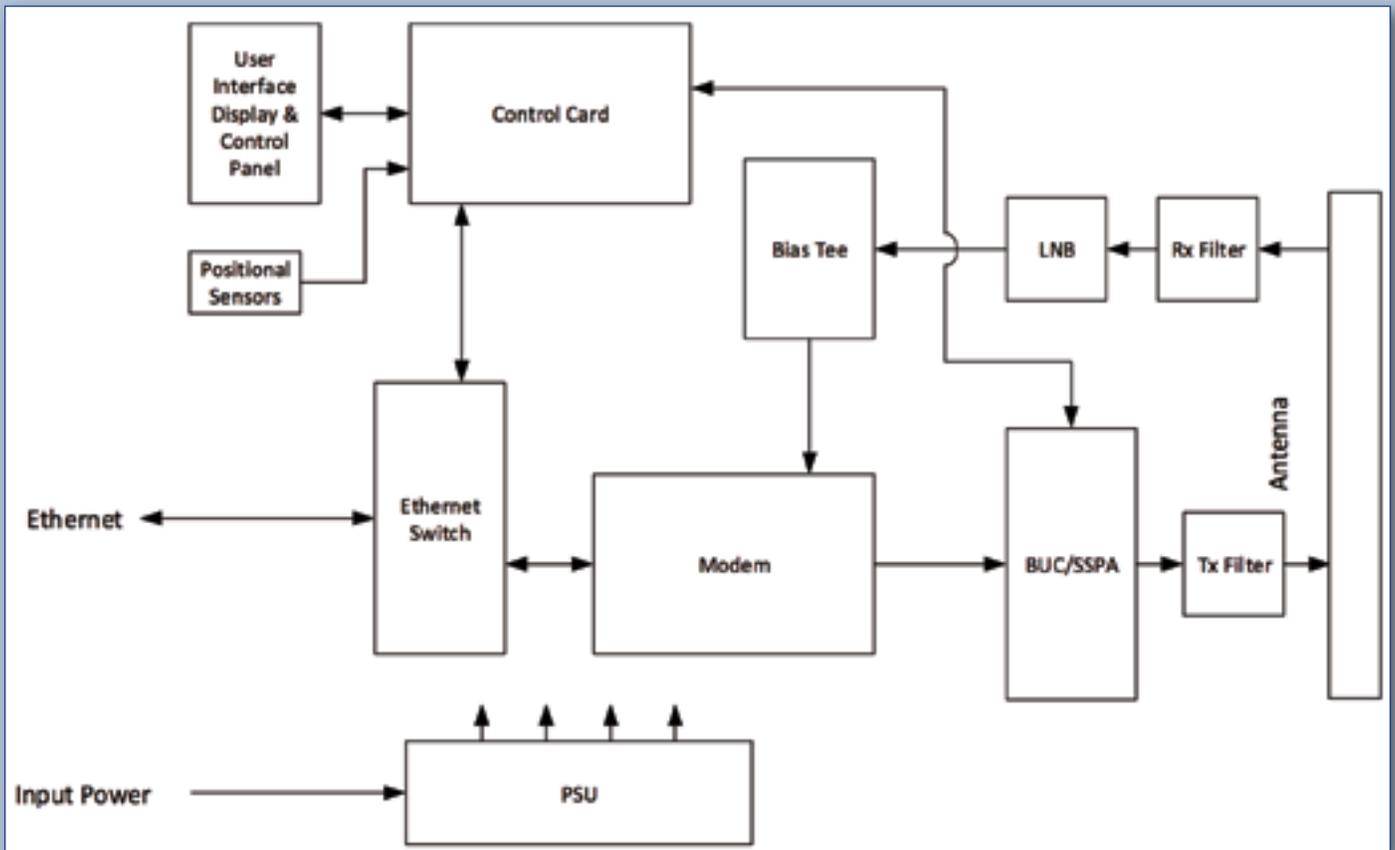


Figure 9. Micro-VSAT block diagram

### Tight Integration Vs. Modular

Tight integration of all of the electronics offers the lightest weight, most power efficient and smallest design. Commonalities within the system can be shared. The fully integrated module is less flexible in being able to change frequency bands and powers and less easy to service. In contrast, the modular approach is highly flexible, easy to service and allows the user

to change bands while in the field. However, this flexibility also results in a less efficient design in terms of power, weight and size.

### Material Properties

Material properties and processing play a large part in the design of Micro-VSAT antennas. Depending on the component part, there may be a number

of potentially conflicting requirements. Lightweight for easy manual handling, high stiffness for accurate antenna positioning and robustness for transit are common conflicts. Additional requirements include corrosion resistance, UV resistance, low friction (for gears and bearings), high friction (for brakes) and either RF transparent or reflective properties depending on the part. Common materials used may be grouped into metals, polymer and composite parts. Of the metals, aluminum and stainless steel are used for their light weight and corrosion resistance. Of the composites, popular choices are carbon fiber and glass fiber.

Carbon fibers can be molded into high stiffness, low weight parts but require tooling and skilled labor to manufacture the parts. Carbon Composites are RF reflective making them a good choice for parabolic reflectors. This composite material is also electrically conductive, which assists in meeting the various EMC regulations. Conversely, glass fiber is RF transparent while also being rugged, making it a good choice for a radome design.

Polymer parts are relatively low density and can have good bearing properties, but are generally not stiff, so care is needed when they are used in structural applications. Polymers are often a good choice for large volume manufacture. The general requirements can be broken down as follows:

- *Stiffness – antenna pointing*
- *Rugged/robust – operator handling, transit*
- *Weatherproof – corrosion/UV resistance*
- *EMC shielding*
- *Lightweight – airline and defence requirements*

### Conclusion

Many factors need to be considered when designing lightweight, highly portable, rugged Micro-VSAT systems. The link budget is key for determining the minimum required EIRP and G/T which set a lower limit on the size of the antenna and amplifier combination. An EIRP spectral density analysis should be performed which will also affect the choice of antenna size and type.

Every dB of performance counts within the system and so the choice of antenna technology and SSPA mounting position are crucial. The LNA and BDC and receive waveguide components have a crucial impact on the terminal G/T. The packaging challenges should also be factored into the design and often there is a trade-off between the “micro” packaging of the system and its performance.

System power inefficiencies are also a critical factor in determining the size and weight of the Micro-VSAT. Higher transmit powers from the SSPA result in higher input powers and cooling requirements. Fanned systems may not be an option in military applications and are often a common point of failure within a system.

Finally, the choice of materials is the next crucial deciding factor in the VSAT design. A composite solution can often present the lightest weight, most rugged solution but it is labor intensive to produce.

Material	Young's Modulus (Stiffness) (GN/m <sup>2</sup> )	Density (Mg/m <sup>3</sup> )	Tensile Strength (MN/m <sup>2</sup> )
Aluminium Alloys	69-79	2.6-2.9	300-700
Stainless Steels	190-200	7.5-8.1	760-1280
Titanium	116	4.3-5.1	300-1400
Carbon Fibre	70-200	1.5-1.6	670-640
Glass Fibre	7-45	1.4-2.2	100-300

Table 3. Table of material properties

There are many trade offs to consider, all of which make the Micro-VSAT design a complex one. Advances in semiconductor and metamaterial technology will, no doubt, aid in bringing the size and weight down of future terminals.

To produce a Micro-VSAT that fits all requirements is difficult, as user needs vary significantly. For some customers, size and weight are paramount (airline carry-on, or hold checkable); for others, the priority is extended battery life, or ease of use, modem flexibility, or a whole host of other specific requirements.

Flexibility of design and configuration are essential. Ultra-GigaSat Electronics has vast experience in producing terminals that are tailor-made to meet individual customer requirements, for commercial, broadcast, government and defence applications.

If you wish to discuss your specific requirements, please contact us at [satnewsinfo@ultra-gigasat.com](mailto:satnewsinfo@ultra-gigasat.com).

For additional details, please visit the company's infosite at <http://www.ultra-gigasat.com/>

### About the author

Andy Slaney is Technical Director at Ultra Electronics, GigaSat, specializing in the design and manufacture of satellite and terrestrial communication equipment. He has more than 20 years design experience in the communications industry with a proven track record for fast-tracking product growth and innovation within many organizations. Andy holds two degrees which include a Bachelor of Engineering (First Class) and a PhD in communication system design.





# Careers: Paying For Performance Vs. Large Base Salaries

By Bert Sadtler, Senior Contributor



**C**ompanies today must re-assess their talent needs in order to ensure they remain competitive and drive growth.

The satellite communications industry faces challenges but remains ripe with opportunities. Great talent can make a huge impact. Employers need to get it right and make a "great hire."

To assist with career and leadership issues, SatMagazine asked Bert Sadtler of Boxwood Advisors and Executive Search ([www.BoxwoodSearch.com](http://www.BoxwoodSearch.com)) to provide his insight to our readers.

We continue to see changes and transitions in business. One of the transitions is the migration from a salary based compensation model to a salary plus performance bonus compensation model.

Driving this migration are business forces that require more accountability and require measurable results. To encourage employees to make the extra effort and achieve results with a sense of urgency, pay for performance models are replacing the salary based compensation model. While there is a capitalistic component to paying for performance, such may have significant value to the marketplace.

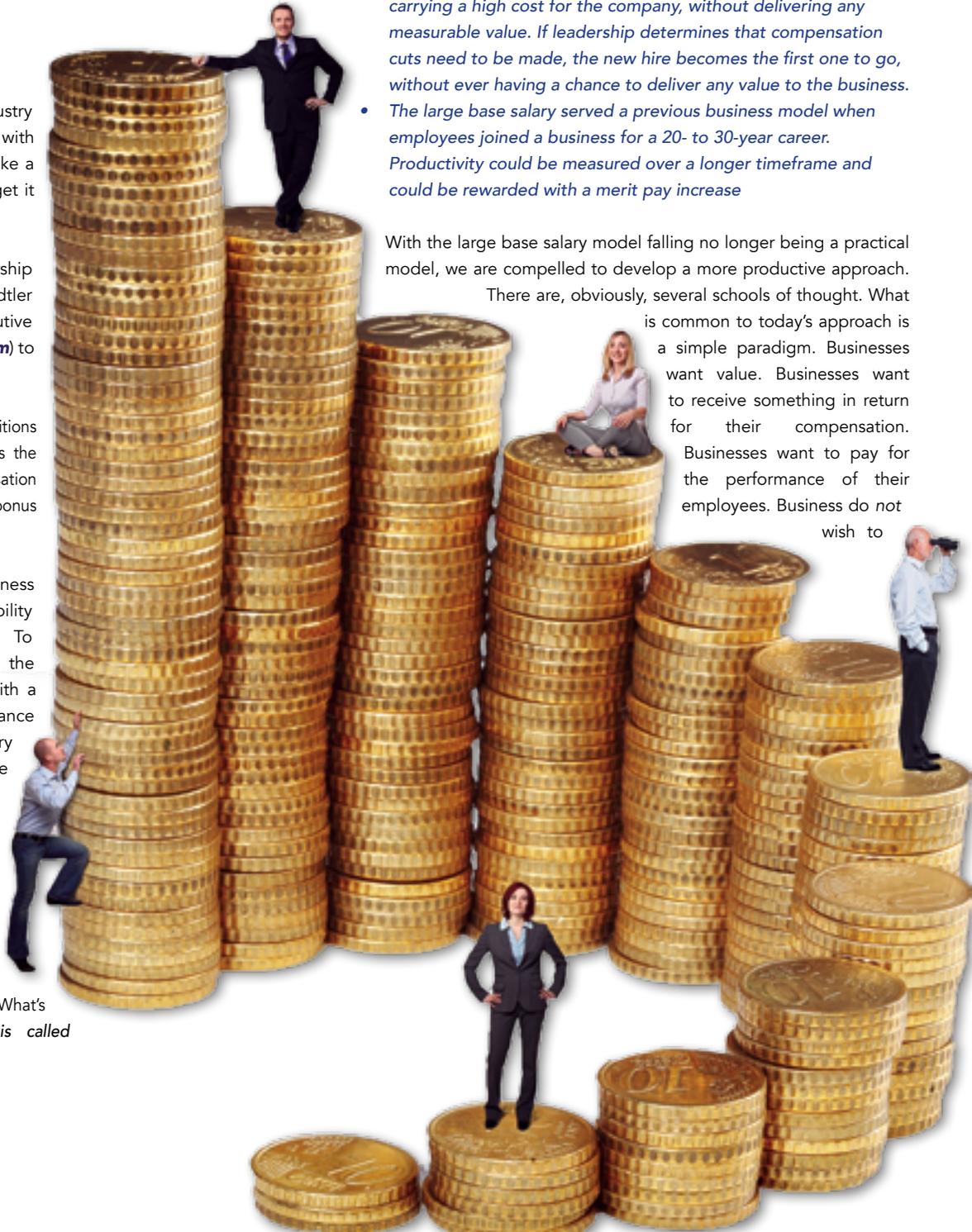
Isn't pay for performance really a good thing as an alternative to the large base salary for both the business and the employee? What's the alternative? *The alternative is called "Large Base Salary."*

What's wrong with the alternative? There is plenty wrong today with a "Large Base Salary."

- Starting a new job with a large base salary sets up a new hire carrying a high cost for the company, without delivering any measurable value. If leadership determines that compensation cuts need to be made, the new hire becomes the first one to go, without ever having a chance to deliver any value to the business.
- The large base salary served a previous business model when employees joined a business for a 20- to 30-year career. Productivity could be measured over a longer timeframe and could be rewarded with a merit pay increase

With the large base salary model falling no longer being a practical model, we are compelled to develop a more productive approach.

There are, obviously, several schools of thought. What is common to today's approach is a simple paradigm. Businesses want value. Businesses want to receive something in return for their compensation. Businesses want to pay for the performance of their employees. Business do not wish to



pay for employees who offer little or no performance. Businesses want their employees to perform for their compensation. Not all pay for performance programs are equal. The best ones include:

- *The goals to be accomplished aligned with the goals of the company*
- *If the goals are reached, the employee's manager has reached his or her goals as well*
- *The goals are clearly defined and ideally are the result of being developed through a collaborative effort between employee and manager*
- *The program and goals are simple for the employee to understand*
- *Once attained, the employee knows what bonus will be earned—and when*
- *The employee knows that when his or her goals are met the bonuses are paid. At the same time, if goals are not met, bonuses are not received, as they have not been earned*

In some cases, announcing a new pay for performance program without full evaluation can encourage unfavorable behavior.

As one example of a recently announced pay for performance program, a Washington DC Area, Tier-1 government contractor has announced the implementation of "The Bell Curve" bonus program. You may remember the bell curve from elementary school. Your teacher determined that the results from a test revealed that the test was too hard and everyone in the class failed. The teacher then assigned an A to the student who scored the highest grade. The majority of the students would then received B and C scores and the lowest score in the class received an F. For elementary school, this may have been a decent approach.

Here are two obvious flaws that are endemic of the bell curve for a bonus compensation program:

*If the team of employees being reviewed consists of all under achievers and under performers, some of them will receive an excellent rating.*

*If the team of employees being reviewed consists of over-achieving, over performers, some of them will receive a poor or failing score.*

Clearly the business community has some work ahead if the bell curve is being considered as a bonus compensation model today.

As for a Best Practices Approach, paying for performance should have no limitations. Encouraging employees to deliver incredible value should offer incredible rewards. Excellence is not limited to a predefined percentage of employees. Under performing employees should not be rewarded. All employees should be eligible for significant bonus rewards if they have each delivered incredible value.

Implementing this type of performance-based bonus compensation plan requires structure and each employee's involvement. Some businesses would regard this investment in time as unproductive and time consuming. We would counter with: How unproductive is rewarding under-achieving employees with a high rating and significant bonus if the evaluation program is weak?

I have found the MBO (Manage by Objectives) model to work well for Pay

for Performance bonus compensation. Similar to the bell curve, MBOs have been used as business models for years. The idea is not innovative. MBOs are designed to pay employees who perform and incentivize employees to perform to be paid. Implementing the MBO bonus compensation model requires that senior leadership understand the way forward and comprehend the specific responsibilities of each internal business group in order for the business to reach its goals.

Every business, to be successful, must generate more revenue than what is being spent. While it would be ideal to pay employees a bonus when the business achieves financial success, in reality, not every employee has direct visibility and direct accountability to the financial success of the business. Assuming there is proper alignment, if each employee excels in their respective role, the business can be expected to be successful.

The Pay for Performance MBO model works with small, medium and large businesses. Through a collaborative effort, employees and their manager develop four to six critical goals that must be completed within the next six months. The manager then assigns a range of bonus amounts to each of the goals. Higher priorities are assigned a higher bonus amount.

At the close of the six or 12 month cycle, measurements are taken against the goals, a bonus award is calculated and paid. Then, a new six or 12 month cycle begins with either new objectives or a continuation of the previous goals. Additionally, it is understood that an additional discretionary bonus exists for extraordinary accomplishments—this communicates to employees that there is no cap, or limit, to rewards and there should be no cap or limit for extraordinary efforts.

Today's marketplace seeks value. Large base salaries are viewed more as an expense and less as a value to a business. Paying for performance speaks about value. Rewarding for results speaks about value. Collaboration between employee and manager toward the development of goals results in a mutual investment in achieving the goals. This delivers value to the business with employee accountability as well as pay for performance.

**How much is the large base salary or ineffective bonus program costing your business?**

**Good hunting.**

#### **About the author**

*Bert Sadtler frequently is invited to speak and further discuss the shift in the employer's performance based compensation model as well as the shift in the recruitment paradigm toward acquiring critical senior level talent. Bert may be reached at: [BertSadtler@BoxwoodSearch.com](mailto:BertSadtler@BoxwoodSearch.com).*

#### **About Boxwood Search**

*Boxwood provides solutions for businesses seeking growth and is a management, consulting-recruiting firm with offices in The Greater Washington DC Region and The Tampa Bay, Florida, Region. As a dedicated, consulting resource to the employer, Boxwood develops strategy for organizational growth through the evaluation and acquisition of critical talent. Market sectors include: SATCOM, Government Contracting, Communications and Technology.*



## Executive Spotlight: Bruno Dupas, President, Kratos Integral Systems Europe

**T**he opportunity to discuss trends on the ground, from service quality to signal assurance, was recently afforded SatMagazine with the president of

Kratos Integral Systems Europe, Mr. Bruno Dupas.

### SatMagazine

*Kratos plays a significant role across the spectrum of ground-based solutions. What are the driving trends in the industry that are affecting the way we think about satellite ground systems?*

### Bruno Dupas

That's true. Kratos has quite a broad footprint on the ground, across both the satellite and terrestrial network segments. People may know us best for a particular product that they work with, such as our EPOCH IPS product for satellite command and control, but they sometimes aren't aware of the full range of solutions we offer, such as the industry's leading carrier monitoring

product, Monics, from our SAT subsidiary; signal processing solutions from our RT Logic unit; network monitoring and control from Kratos Networks; as well as ground station and antenna integration services.

Our goal is to be a trusted partner to help assure the complete availability, reliability, security and control of everything that happens between the satellite through the ground system, and between our customers and their customers.

"Completeness is important to us as one of the most important strategic trends we are hearing from customers, and that includes commercial satellite operators, governments, defense agencies, broadcasters, service providers and others around the globe—is a heightened interest in taking an end-to-end approach across systems in order to optimize performance and value.

Value is key, as the worst kept secret in the industry is the need to lower and control costs; to "do more with less" as our government customers are fond of saying. Now, when people say that, they are usually intending to emphasize the "with less" side. We are working equally hard on the "do more" side. It is a factor of a maturing market, that competitiveness in the ground segment will increasingly be about integration, architectures, flexibility and, of course, cost/benefit.

### SatMagazine

*How is that affecting the European and Middle Eastern markets in particular?*

### Bruno Dupas

As Europe is among the most mature markets, it's probably more true here than almost anywhere else. With no new satellite operators emerging, the commercial market has been flat, so, generally speaking, European satellite operators are adding capacity in other markets, including Africa, South East Asia and the Middle East. Some of the newer technologies, such as Ka-band, are getting slow starts.

On the government side, agencies continue to face budget constraints, and military spending is shrinking, despite the fact that some areas such as cybersecurity and communications are relatively safe.

While that sounds like a litany of problems, this is an environment that presents opportunity for companies such as Kratos if customers can be helped to meet their objectives. For example, on the military side, the pressure on prices is leading to growing interest in COTS products; and major SATCOM systems, such as Paradigm in the UK and Syracuse in France, are facing critical decisions as replacement of the fleet draws closer.





*Kratos provides a wide range of products and solutions across the ground segment, including command and control, RF interference mitigation and end-to-end satellite and terrestrial network management.*

In the Middle East things are a bit different, although many of the business objectives are the same. The markets there are not as affected by the budget constraints, and we see many commercial opportunities. The Gulf Council Countries, for example, have projects for sports events, such as the World Cup and the Dubai 2020 World expo.

There are also needs in the security arena: military networks, regulatory compliance and more. This is a dynamic area driven by long term investments. What both markets have in common is that they are looking for innovative solutions that add value or reduce costs, and both are taking an increasingly holistic approach to service delivery.

**SatMagazine**

*How are these needs being reflected in the ground station?*

**Bruno Dupas**

In many different ways, in part because there are so many pieces involved. I think that as the marketplace matures we are seeing a renaissance in innovations, and it isn't always in the obvious places we expect. People are questioning many of the traditional answers and looking for new ways to move the needle, not just incremental change.



Our *By mapping the network to the services being provided, Kratos' new NeuralStar SQM product helps improve service quality assurance and deliver visibility into customer impacting conditions.* This

customers who are satellite operators and service providers are battling terrestrial transport technologies such as fiber and seeking to capitalize on growth for services such as DTH and cellular backhaul. In many cases it's the ground system and network capabilities that can provide them with the competitive advantage. I'd say some of the most interesting areas our customers are talking to us about are signal assurance, virtualization and Service Quality Management (SQM).

### SatMagazine

*What do you mean by Service Quality Management?*

### Bruno Dupas

Satellite and teleport operators, whether commercial or government, work between two goal posts—improve service and control costs. In between, they are wrestling with an environment of increasing complexity, greater expectations and technology convergence. SQM is a different way of looking at network monitoring and assurance that shifts from a device-centric view to a service delivery orientation.

SQM focuses on understanding the customer experience and being able to provide real-time views that show how changing conditions impact customers, not just equipment. This is an approach that demands end-to-end visibility across transport vehicles, and once you have such, you have much finer control to manage how a device or connection impacts an SLA or user experience.

To address the needs of our customers, we recently introduced an SQM solution that combines our Compass Satellite Monitoring and Control products with NeuralStar enterprise management, and which can even read in data from Monics signal monitoring system.

solution maps the entire network to the services being provided and allows operators to see and understand the true business implications of their technical infrastructure, including which equipment supports specific services to particular customers. As a result, operators are able to do far more to maintain service levels, curb revenue leakage and head off problems before they affect customers.

NeuralStar SQM is united by an architecture that incorporates distributed data collection, abstraction, integration, analysis and correlation for end-to-end management of the IP, RF and space environments.

### SatMagazine

*You mentioned signal monitoring. How is this connected to Service Quality Management?*

### Bruno Dupas

This is a factor of how broadly you can define the end points in an "end-to-end" strategy. When you can integrate the M&C system with the Carrier Monitoring solution, it enables signal assurance as an integral part of system management, including greater control over SLA commitments.

You can take it even further if you wish—for example, we have worked with leading planning system vendors to streamline and automate the process of allocating bandwidth and scheduling non-essential services during peak times. When a new service request is added into the planning system, data automatically flows to Monics which immediately adds the new carrier to the plan and begins monitoring the new service.

Compass automatically sets up the RF equipment needed for the service. Together, Monics and Compass automate the uplink power control and related processes. Operators immediately receive validation that the service has been properly set up and NeuralStar automatically begins collecting data from both, and from applicable VSAT management systems for overall reporting and a real time picture of service availability.

At the end of the day, SQM is about getting the most value from the entire system, and that includes signal integrity. With RF interference (RFI), for example, the new frontier is not just about identifying and locating interference, it's about canceling it as well. About 95 percent of interference is inadvertent and non-malicious. In those scenarios, techniques such as carrier-under-carrier signal analysis, geolocation, and Carrier ID (CID) help tremendously with a low cost, high value solution.

Our Monics product employs a powerful approach to CID using Binary Phase Shift Keying (BPSK) spread spectrum modulation, differential encoding, scrambling and an error protection strategy to quickly and accurately help operators detect, identify the source of the problem.

We are also working on new cancellation technologies that will enable carriers to stay one step ahead of the interferers, even when intentional. The military often refers to these sorts of challenges as "protected comms" and they are looking for even more rigorous solutions, some of which can also be fielded onto commercial systems.

You can go even further with this concept. Consider how much management data is flowing through all of those monitoring systems, plus the flight control and payload management data in a C2 system such as EPOCH IPS. One of the other important areas we are working on is helping our customers use Big Data analysis techniques to maximize operational efficiencies across systems.

For example, combining telemetry data with satellite RF behavior information allows operators to more accurately trend the performance of a transponder and predict end of life for amplifiers and other key components. Similarly, as teleport equipment failures can cause changes in satellite transponder telemetry data, setting up alarms in the M&C system for correlation in the C2 system can save time and effort wasted chasing down false problems.

### **SatMagazine**

*Several times you've mentioned the desire of operators to drive down costs. How does this play into these paths of innovation?*

### **Bruno Dupas**

Frankly, any way you can reduce costs without compromising quality and security is good. In terms of ground systems, one element many people are looking at is virtualization and cloud applications. With virtual systems, all software can reside in a central processing center accessed via thin clients.

This greatly reduces O&M costs by eliminating software on end-user computers, lowering maintenance and support expenses and making systems upgrades far easier. As systems can be run in the cloud on dedicated servers—whether a secure environment at the operator's facility or a third-party server farm—reliability can be increased through automated redundancy and the ability to easily add processing power as needed. Some of our customers have already implemented fully virtualized facilities.

At Kratos, we have been working to support virtualization across our product lines, such as providing anywhere access through our Webic product, a thin client specifically designed for satellite C2, as well as the ability to manage virtual systems in our network products. In addition, we are moving to virtualize many hardware-based ground station functions such as telemetry signal processing, interference monitoring and antenna assets by separating the signal processing from the RF/antenna systems.

Solutions such as these help drive more bandwidth through less equipment, enable better planning of the spectrum and support faster deployment of new services, thereby reducing costs and increasing margin on bandwidth. Any tool that can help customers manage their capacity in a more optimized way will increase the revenue they get from that capacity.

### **SatMagazine**

*Many people look at the small satellite movement as part of this larger trend to control costs. Do you see it that way?*

### **Bruno Dupas**

Partially. We are quite excited about small satellites (smallsats) for a variety of reasons. The jury is still out of course—many of the efforts are still education or research driven, such as the UK's UB50 project. Many are demonstration projects or startups looking for funding and have yet to prove a market need.

However, there is no doubt that smallsats represent a hotbed of innovation for certain applications and are bringing new players and business models into our industry—that can't help but lead to new ideas. Just look at how Google's acquisition of Skybox has had people talking.

Certainly, reduced cost is the primary driving factor. More than just the on orbit hardware, smallsat manufacturing and launch costs are orders of magnitude lower than the larger satellites. The implications for ground systems are commensurate—you can't spend a million dollars or more on a C2 system when the whole satellite only cost US\$500,000, not to mention the rest of the ground station equipment. However, you still need the same level of robustness, reliability and security.

We recently introduced our new small satellite C2 product, quantumCMD, that is designed to fit the mission needs and price points of small satellite operators. Our first customer, Tyvak Nano-Satellite Systems, Inc., is working with quantumCMD on a NASA project. We are also developing small satellite-friendly solutions in other areas, such as telemetry RF signal processing.

To answer your original question, yes, we see cost reduction as a driver. Yet, we also see the smallsat community as a laboratory that will test ideas on a smaller scale. This will, in turn, enable more innovation and faster adoption of new techniques and technologies among larger systems.

For example, we are seeing ConOps for smallsat missions that include full “lights out” operations. That’s something you’d never attempt with a billion dollar satellite, but this technology will help us learn more about, and improve, automation capabilities that can be applied safely to large satellites in the future.

**SatMagazine**

*You sound remarkably bullish despite the cost pressures you keep mentioning.*

**Bruno Dupas**

Absolutely. Look, providing more performance at lower cost is the story of all high technology industries, whether you’re Apple or Google or Eutelsat or Kratos. It’s the business we’re in and it’s where we look to innovate for our customers.

When we imagine what the ground station of the future looks like, we see an underlying architecture that maximizes integration across all system components, optimizing each piece for performance and value and maximizing the intelligence that can be applied to help our customers serve their customers.

Sometimes that may be a small, targeted solution, such as StreamMon, a new product we just announced that supports low-cost SLA validation for video service providers, up to a strategic solution to enhance end-to-end service management across global operations with NeuralStar SQM.

At the end of the day, we see our solutions as a way to help our customers achieve competitive advantage.

For further information regarding Integral Systems Europe, please visit <http://www.integ-europe.com/>



*Kratos recently introduced quantumCMD, the first COTS solution for command and control of smallsats and smallsat fleets.*





# SatBroadcasting™: Exchanging Complexity For Simplicity

By Simen K. Frostad, Chairman, Bridge Technologies

In the 1890s, electric power was seen as the coming technology, expected by many to be a replacement for the steam engine as a source of motive power.

The electric motor had many advantages—compactness, smooth power delivery, few moving parts, almost silent operation, and no need for ancillary mechanisms. Pollution was rarely thought about in those days. However, another advantage of electric power became

evident—electricity was clean at the point of delivery. The future King Edward VII of England benefited from these qualities when he used his electric-powered launch (the largest electric boat ever built) as a state-of-the-art platform for discreet romantic trysts on the River Thames.

However, as we all know, the appealing simplicity of electric motive power was quickly sidelined by a noisy, dirty, foul-smelling and complicated rival: the internal combustion engine—and we've been living with that beast ever since those days. Consider the comparison between the simple, mechanically elegant electric motor—often not much larger than a watermelon—and the ridiculously complex internal combustion engine, with its ignition systems, radiators and cooling pumps, oil pumps, crankshaft, camshafts, exhaust systems, turbochargers, flywheel, gearbox, battery and electric supply... all to support the essentially simple act of igniting hydrocarbons within a confined space.

No wonder car manufacturers today hide this engine under a sleek black cover that says to the car owner: don't even think about tinkering with this stuff—modern car maintenance is just too complex for anyone but an expert mechanic armed with computerized diagnostic systems.

All of us need to remain confident that this complexity is being monitored and managed, so that we are to remain on the road and are able to travel from A to B. Car manufacturers have had more than 100 years to perfect their complicated creations. The best of today's cars do so much self-maintenance, self-monitoring and routine decision-making that the driver has much more 'bandwidth' left over for the task of driving—or playing with their smartphone.

Car makers have done a good job of taking the potentially distracting effects of complexity away from the driver and providing a driving environment that aids good decision-making. In an even more complex machine—the aircraft—manufacturers have long understood that the design of instrumentation systems and the ergonomics of the cockpit are critical to flight safety. With so many complicated systems for the pilots to

monitor, any undue complexity in the way information is presented can be life-threatening.

I'm not about to suggest that lives could be lost in digital media provisioning if monitoring systems don't keep decision-making simple for those who maintain them. However, a lot of revenue, and, ultimately, business success or failure, hangs on the efficient and timely diagnosis and correction of errors. The digital media delivery chain is not, unfortunately, like an electric motor: the chain is more like the internal combustion engine, with a lot of heterogeneous parts bolted together and interacting more or less successfully.

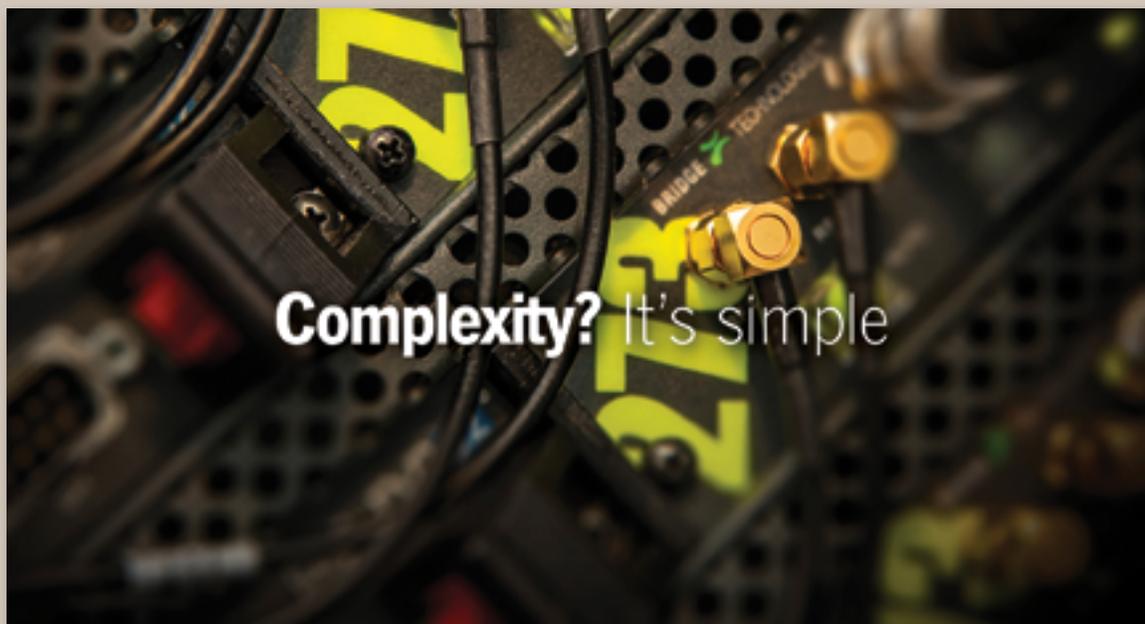
If digital media engineers have to 'lift the lid,' peer into all the complexity and grope about with a torch and spanners whenever there's any problem, such is not a good recipe for keeping the show on the road. Similar to today's car owners, engineers need complexity to be intelligently mediated so that the really important, decision-supporting, information is directly where they can access the data at all times.

There are many ways in which media businesses are looking to exchange complexity for simplicity. For satellite operators, one way that has emerged in the last year is decentralization. This entails a more distributed infrastructure that offers the benefits of greater resilience, flexibility, and lower operating costs through energy savings and standardization of equipment.

The more or less universal model for operators, until now, has been to have uplink production chains consisting of primary and secondary circuits running in parallel with virtually identical configurations. A failure on the primary circuit prompts the operator to switch to the backup, either using a switch in a semi-manual process, or with limited automation via NMS triggers. Production is all done in a central facility and the modulated content is then transported to transmitter sites via RF on fiber.

Operators are now looking at distributed architectures in which the

modulation and some of the multiplexing is done close to the antennae. More sophisticated automated redundancy switching is also done at the antenna site, just before the transmit booster. This infrastructure model is possible as a result of greater intelligence in switching hardware and the confidence such engenders in the viability of a distributed, hands-off, automated redundancy strategy.



The autonomous or semi-autonomous intelligence at each decentralized antenna site can operate independently from the central facility if required. This is a key aspect of the strategy, increasing the flexibility of redundancy in the system as a whole. Any failure in the central system is now survivable and will not affect data elsewhere in the production pipeline.

We launched the Bridge Technologies VB273 Intelligent Switch to provide exactly this kind of capability, to meet the requirements of a major European provider. The VB273 employs a combination of full-blown ETR290 analysis, a high-performance RF monitoring capability, and a decision engine that compares error condition results against user-defined rules. The greater scope and subtlety of the analysis available allows a much more nuanced and flexible automated assessment of operating status and conditions. Whereas previous generations of redundancy switches were designed to intervene on a limited set of conditions, such as complete loss of signal, the VB273 can detect a wide range of errors and act accordingly. This capacity allows operators to bring switching rules more into line with current operating realities.



*The Bridge Technologies VB273 Intelligent Switch.*

For example, if CAS (conditional access) verification is lost on one of the production chains, the redundancy switch can automatically check the redundant chains to see if the problem exists there as well and switch to one of them if CAS is intact. Switching is therefore available on the basis of services (such as CAS) as well as on simple hardware operation. Further redundancy can be built into the decentralized model by transporting data from the central production system to the antennae via gigabit fiber, using redundant IP chains.

Redundancy is a benefit everyone wants to have, but operators also see the decentralized model as a way of delivering operational cost benefits. The modular structure makes it easier for the operator to change configuration when required. Changes can be implemented in a modular fashion and remotely, without the need to send engineers to swap out equipment units or patch in hardwired changes. This means lower costs and less reliance on specialized skills. Changes can also be made remotely at any time and to any part of the infrastructure, simply by uploading new configurations.

A variable degree of autonomy can be useful. Intervention may be necessary to override the default settings for autonomous operation in certain situations, to make changes to the way individual antenna sites or groups of sites work. To achieve this, the decentralized infrastructure can be designed to allow control of switching from the central NMS, or by intelligent automated switching, or by a completely manual override at the transmitter site if an engineer is present.

By allowing a much more flexible approach to satellite infrastructure design, more intelligent switching opens up the possibility of a new decentralized model for satellite operations using better standardization of hardware. Operators can now design lower maintenance and more resilience into their systems, together with a greater flexibility to evolve in response to changing requirements and conditions while maintaining uninterrupted service.

Simplicity is a state of mind, a way of reducing the load and minimizing distractions that make us less productive. You can apply the idea of simplicity in many ways: from streamlining complex infrastructure and using intelligent hardware with autonomous decision-making capability, to streamlining the profit and loss statement. In this respect we applaud the recent announcement of the 'Energy 2020' initiative by SCTE and a group of cable operators, aimed at reducing energy consumption through better resource efficiency.

We're happy to say 'hear, hear,' to announcement as energy efficiency has always been a key design goal for us: for example, our high-performance hardware probes consume just 35W, compared to the hundreds of watts required to run an equivalent server-based product and keep it cooled.

KISS—*Keep It Simple, Stupid*—used to be a maxim for anyone presenting information or making a speech. There's nothing stupid about dealing with complexity—for most of us, it's unavoidable, but it's smart to keep the complexity simple if you know how to accomplish that task.

For additional information regarding Bridge Technologies, please visit <http://www.bridgetech.tv/>

#### **About the author**

*Simen K. Frostad is Chairman and co-founder of Bridge Technologies. With 22 years of industry experience, Simen founded Bridge Technologies in 2004, after creating the world's first IP/MPLS contribution network for Scandinavian sports coverage. Simen had previously built the first multi-camera hard disk recording system for episodic drama production in 1998, and the first nonlinear sports editing facility during the 1994 Winter Olympics.*





## **Executive Spotlights: The iDirect Executive Team**

**Mary Cotton, Chief Executive Officer**

**Kevin Steen, Chief Operating Officer**

**Toni Lee Rudnicki, Chief Marketing Officer**

**Greg Quiggle, Vice President, Product Management**



**M**ary Cotton, the CEO of iDirect, possesses more than 25 years of technology leadership, creating and driving growth in her previous roles as a Chief Executive Officer (CEO), Chief Operating Officer (COO) and as a Chief Financial Officer (CFO) in various organizations.

Prior to joining iDirect, she served as Senior Vice President for SAP, one of the world's largest business application software companies. Cotton joined SAP in 2005 after she orchestrated the sale of Frictionless Commerce, a provider of supplier relationship management software, where she served as CEO.

Prior to SAP, Cotton held several top management positions, including COO and CFO, at Aspen Technology Inc. (AspenTech), a provider of software and services that helps companies improve their manufacturing processes. There she executed a growth strategy that built AspenTech from a \$6M private company to a \$320M publicly traded, international solutions provider. The strategy focused on continued product development and innovation, international market expansion and the acquisition of more than 20 software and services firms.

### **SatMagazine (SM)**

*Seven years have passed since you took the reins at iDirect, which has experienced strong revenue growth and dominance in several key vertical markets and HTS leadership. What is the key to iDirect's success?*

### **Mary Cotton**

When I joined iDirect in 2007, the company had established a remarkable track record of innovation. The introduction of an IP-based satellite platform enabled enterprise-quality applications for the first time in the industry. And this helped transform satellite from a "technology of last resort" to a powerful solution that can handle core network applications and take broadband into the heart of critical enterprise, military and public sector operations.

That was a major game changer for service providers, as they now had the technology to generate new demand for satellite connectivity. However, we understood that success would not be possible if we didn't also address long-standing barriers to cost. As a result, iDirect designed its platform in a way that delivers high-quality service as well as enables service providers to do so affordably.

I stepped into a company that had tremendous momentum and we focused on the next area of innovation to create the widest possible market for our partners. We expanded the capabilities of our platform through the development of unique industry-specific features. And that has led to iDirect's clear leadership in military, aero, mobile backhaul, maritime, and oil and gas—all of which are high-value markets for our partners.

Today, there's no question that innovation is the lifeblood of iDirect. We've built a thriving company on iDirect's original vision, and we have shaped the industry by breaking down long-standing quality and cost barriers. Where we're focused now is on taking satellite mainstream. Part of that involves capitalizing on the HTS opportunity before us today—to open markets and lower costs even further. This plan also involves advancing satellite technology to become an integral part of the end-to-end network. We believe that, given its unique capabilities, satellite will provide a missing piece to building a truly connected world.

Another key to iDirect's success is our loyal customer base. Understanding iDirect means understanding our unique relationship with our partners. We are 100 percent focused on developing the ground infrastructure technology that allows our partners to build the most optimized satellite networks, differentiate their services, seize new revenue opportunities and lower their TCO. There's no doubt that our customer service mindset is a prime differentiator and a big competitive advantage for iDirect.

Of course, we owe a great deal of iDirect's success to our people. We have extremely talented people across the organization who drive our development, our product portfolio and market expansion going forward.

### SatMagazine

*A comment on one or two of the most challenging business needs that have presented themselves over the past year or two, and how iDirect addressed and successfully overcame. Lessons learned?*

### Mary Cotton

Hands down, the biggest challenge that this industry—not just iDirect—faces is HTS. HTS is redefining how the satellite industry does business today, and five, ten years down the road. More than a challenge, we see this technology as one of the biggest opportunities to come along in quite some time.

Internally, we knew that this would have a huge impact on our partners. We made some pretty aggressive moves early on to scale and support our partners through the HTS transition. We doubled the size of our engineering team. We introduced a major redesign of the core technology that powers our platform to scale to higher throughputs and larger deployments. We became a multi-product line organization, expanding our platform and enabling major HTS operators with Velocity™. Plus, we're investing heavily in the capabilities of our Network Management System. This enables our partners to reach new levels of business and network performance, while giving them innovative tools to continually deliver new, differentiated value to their customers.



As far as lessons learned, this is not business as usual. Bulking up so quickly and transforming into a multi-product organization was no easy feat. But at the end of the day, we're executing a very exciting and ambitious game plan to ensure HTS is an opportunity for iDirect partners. The payoff is well worth the growing pains, being able to diversify and expand the market on a whole different level.

There's a lot at stake. Our partners tell me personally that they're literally building their business on iDirect technology. We work hard to continually provide more value, more services, more training, and more enhancements to help partners expand their business and get the most from their investment in iDirect.

### SatMagazine

*Kevin, as the company's Chief Operating Officer (COO), you've been tasked with expanding iDirect's market position and creating new value for satellite communications services. What are your priorities?*

### Kevin Steen

Our focus is capitalizing on the market opportunity in front of us. And putting the right people, processes and products in place is critical to achieving this goal. When I look at necessary priorities for ensuring we execute on a higher level, I see it impacting the company on multiple levels.

First and foremost, we are investing in capabilities to bring products to market more rapidly. We want to open new doors of revenue opportunity for our partners and ensure they are in the best position to deliver the differentiated high-value services the market demands. This requires identifying gaps in the total solution and finding ways to fill those gaps. We are accomplishing that through technology partnerships and licensing agreements, as well as through our own internal rapid development.

Refining our supply chain is another top priority. This includes engaging with third party technology providers to embed their solution within ours in addition to leveraging our buying power to drive down our internal costs. Both of these lower the total cost of our solution and speed our time to market, which is absolutely critical today.

My team is also focused on increasing our level of customer support and technical expertise. As our partners continue to expand their operations, we must never miss a beat in being able to provide the level of support they need to reach that next level. Our customers are at critical stages in their growth cycles, and if we cannot provide the level of service necessary to support such growth, everything else simply doesn't matter.

### SatMagazine

*Let's build on that last point about customer service. What are iDirect's plans for improved customer support? If there are new and improved products, how does one continue to satisfy legacy products already out? How can the legacy small to medium customers access newer and technologically improved products without breaking the bank?*

### Kevin Steen

We talk a lot about the changing connectivity landscape and how it is becoming more complex. We must scale as an organization in order to support this complexity for our customers. That means strategically leveraging resources and being more proactive in problem solving—being ahead of the game, if you will. In addition, we are focused on implementing strategies to support a larger customer base without the need to increase headcount.

When you talk about legacy customers, our products have always been backwards compatible, so that path to growth is always present. But I should point out that roughly 80 percent of our customer base is operating on Evolution. That speaks volumes to the fact that our customers see the value in upgrading and leveraging added business capabilities of next-generation technology.

### **SatMagazine**

*Another one of the priorities you mentioned was business development. Business and product development certainly go hand-in-hand. How do you ensure one does not get ahead of the other? Or does one of these goals have precedence?*

### **Kevin Steen**

iDirect's business development team identifies opportunities in the market and works with product development to create products that match those opportunities. But it never even gets to that point if the business case has not been clearly identified and articulated. At the end of the day, it's the fundamental business questions that gauge our success. Are we helping our partners grow? Achieve greater operational excellence? Better serve their customers? I can say with great confidence that both business development and product development are conscious of that notion and help guide iDirect to the most effective decisions that solve real business needs for our customers.

### **SatMagazine**

*There's so much growth across the industry and within iDirect—however, as you look at more mainstream opportunities, how do you reposition satellite?*

### **Kevin Steen**

The satellite industry has long espoused its role as part of this truly integrated network. But never before has our fulfillment on that promise been more crucial. The role of the service provider is changing. Every end user expects to pick up any device and perform any function in any region or situation around the globe. That means the service provider no longer runs a network—they provide global IP connectivity. And satellite has a critical role to play.

Things such as global reach, immediacy, resiliency and security—satellite makes this all happen—and has made it all happen. We need to be talking up the stories related to satellite's growth and development, satellite's use cases and future opportunities. We need to relay the message that these aren't just good ideas, but rather real life success stories that only satellite can meet.

### **SatMagazine**

*Toni Lee, you've led iDirect's marketing efforts as the Chief Marketing Officer (CMO) since 2006. You've really seen the industry undergo major transformations. Given all of the momentum in the market today, please discuss your overall goals, how you plan to expand business opportunities for your partners and continue to advance your leadership position in the market.*

### **Toni Lee Rudnicki**

As Mary said, HTS is changing every facet of how the satellite industry does business. That means a shift in the value chain, business models and the overall landscape for satellite. An important goal for marketing at iDirect is to help lead this transformation from a technology and an education standpoint. We want to be a leading voice on issues such as how to get HTS right, how to enable global service roaming for mobility applications and how to identify and capture emerging opportunities.

On a larger scale, HTS is a springboard to take satellite mainstream. Satellite is poised to expand beyond niche status and play a more vital role in global communications. Again, technology and education are critical here. We need to examine satellite's unique advantages with fresh eyes and then convey a new narrative around satellite's strategic value to reach a broader audience.

### **SatMagazine**

*Where are some of the most promising market opportunities you see on the horizon?*

### **Toni Lee Rudnicki**

What is really exciting to think about is the explosion of mobile growth that is expected to occur worldwide. When Ericsson comes out with projections that the total number of mobile subscriptions will grow from 6.8 billion to 9.2 billion by 2019, you begin to realize that satellite must play a role in growing this connected landscape.

Take emerging areas like Asia Pacific, Africa and the Middle East. Looking specifically at Asia Pacific, the increase in mobile subscriptions in this region remains significant, with Ericsson projecting 1.4 billion net mobile additions by the end of 2019. Now match that growth with numbers for HTS and markets for small cell for backhaul, and you see the bright spots clearly illuminate.

Beyond that, in two years we are expected to see 26,000 maritime vessels relying on VSAT as their primary means for connectivity, according to COMSYS. Five years after that, satellite services in the military could reach \$10 billion globally, which is projected by NSR. And another five years after that, aeronautical satellite services will hit \$3.4 billion, again a projection by NSR.

### **SatMagazine**

*How will iDirect garner the presence necessary to promote its products as more and more companies bring their technologies into the marketplace? The noise can be deafening, and what will make iDirect's products stand out?*

### **Toni Lee Rudnicki**

Confidence. By that I mean our customers having the confidence to pursue any opportunity in any market they desire to enter. The element that routinely inhibits business growth is uncertainty—there is simply no place for uncertainty in a market that is exploding with opportunity. Any moments you spend wondering whether or not your technology will allow you to pursue an opportunity could end up costing you that opportunity.

We take great pride in our history of working with customers, listening to their needs, and providing them with technology that helps grow their business by any means necessary. That type of assurance will always rise above the noise in the market.

### **SatMagazine**

*Greg, as the Vice President of Product Management, you have a critically important role in the company. Where are you focusing iDirect's development efforts to help your partners capture the exciting opportunities ahead?*

### **Greg Quiggle**

As Toni Lee mentioned, we are experiencing a market exploding with diverse opportunity. With such diverse opportunity comes a much broader set of customer requirements. iDirect knows our customers cannot leave any opportunity on the table, and therefore we have formulated a dual product line strategy to ensure that never happens—not today, not 10 years from now.

Velocity is for satellite operators deploying HTS, while Evolution remains the core platform for the majority our network operator partners—and we continue to make enhancements to the platform. Both product lines are managed by a new Network Management System, Pulse. What is so exciting are the ways in which Pulse can enable greater scale, provide more resilient networks, expand our partners' capabilities for developing unique customer value, and integrate with the broader telecom ecosystem.

### **SatMagazine**

*Long-term goals must shift every now and then to accommodate new demand and interest cycles for various technologies (i.e., HTS, HPA, Mobility). How do you manage to juggle the necessity of maintaining development cycles with razor sharp focus when priorities can change on a dime?*

### **Greg Quiggle**

I would argue that it isn't so much that priorities are changing on a dime, but that they are diversifying at a new pace. The industry is changing and new innovations are coming, and with this we need to be laser focused on enabling our customers to succeed.

That speaks to the dual product line strategy I mentioned earlier—two product lines designed to help our customers adapt to the changing demands happening in the market. Rather than tying our customers' hands with one solution that may inhibit their ability to move quickly, we are able to help them keep their options open. And that's what it's about: to have options at whatever pace the market might be changing.

### **SatMagazine**

*What are the biggest challenges facing the industry and how can the industry best address them?*

### **Greg Quiggle**

The biggest challenge is the satellite industry's overall image. The stigma has always been that satellite is too costly, too niche and doesn't provide a good user experience. While these all are statements that may have been true, to some degree, in the past, if you take a close look at what is happening in this industry today, you quickly realize the future will look far different.

Take cost, for example. We've long heard that the price of satellite capacity is simply too expensive. HTS is lowering that cost substantially. We will continue to target cost—with ground-space integration measures being the next phase. When it comes to user experience, we are enabling satellite technology to integrate seamlessly into the core end-to-end network and operate in the same ways as every access technology, from provision to fulfillment to management.

These are extremely exciting times. Overall, satellite is ready for prime time. The idea of satellite playing a role in the global IP communications network can no longer be just talking points in a sales pitch. The time is now that the broader communications landscape must realize this fact.

For additional information regarding iDirect, please visit

<http://www.idirect.net>



*iDirect's X7 satellite router.*

# Combating The Challenges Of Ka-Band Signal Degradation

By Dan Freyer, AdWavez Marketing

**K**a-band satellite systems are proliferating around the world, offering new bandwidth and business opportunities for commercializing the 20/30GHz frequency bands. However, as Earth stations expand beyond their traditional C- and Ku-band “comfort zone” into new Ka-band services, their designers and builders face challenges.

A large satellite dish antenna is shown from a low angle, looking up. The dish is made of many white panels. Behind the dish, there is a complex structure of white metal beams and supports. Several black, flexible, curved tubes are connected to white rectangular boxes, which are part of a hot-air de-icing system. The sky is a clear, bright blue.

*Pictured: A Plenum hot-air de-icing system from Walton De-Ice that consists of an environmentally controlled, hot-air heating system that is mounted behind the large antenna.*

Challenges with Ka-band links include much greater rain fade losses at Ka-band frequencies when compared to Ku-Band, as well as additional losses due to antenna wetting. Ka-band RF signals are far more sensitive to rain, ice and snow on the Earth station antenna. Ka-band Earth station design challenges include requirements for extreme reflector precision, optimized de-icing systems in cold climates, rain-shedding and rain diversion systems for antennas.

Ka-band uplink and downlink systems need all the help they can get to minimize link losses and to protect them against signal degradation and outages. Antenna de-icing and weather protection systems provide an important, practical and effective way to mitigate potential outages and signal loss and improve network performance and service quality.

### **Ka-Band Earth Station + Network Growth**

The deployment of numerous Ka-band satellite systems around the world, (e.g., Spaceway, ViaSat, KA-Sat, WildBlue, Inmarsat Global Express, Eutelsat, DIRECTV, O3b, and so on) has driven the construction of accompanying ground infrastructures of fixed Ka-band Earth stations, VSAT hubs, and the wide use of Ka-band remote terminals. Earth station manufacturers and integrators, such as ASC Signal, General Dynamics SATCOM Technology (formerly VertexRSI) and ViaSat, have enjoyed significant demand growth for Ka-band products. They have sold or installed several hundred new large Earth station antenna systems in recent years to support these new Ka-band commercial systems. These hub antennas now serve millions of DTH subscribers, broadband terminals, important military, government, and business networks.

Because many of these large antennas have been installed in locales where snow and ice is of concern, demand has also grown for antenna de-icing sub-systems from companies such as Walton De-Ice, ([www.de-ice.com](http://www.de-ice.com)) which leads the market with more than 125 Ka-band antenna de-icing systems delivered across the globe. The San Bernardino, California-based Walton De-Ice company has been in the de-icing business for satellite Earth station for more than 35 years.

### **Ka-band Challenges**

Demand for Ka-band systems has highlighted many “new” technical challenges from an Earth station and network design standpoint, as compared to traditional (C-, Ku- and MSS band) requirements. Suppliers indicate these challenges include:

- *Antenna surface and tracking accuracy: Ka-band Earth stations require high-accuracy tracking and a high accuracy reflector due to the narrower Ka-band beam width, compared to Ku-Band. The narrow beam width requires more precise antenna surface regularity, and wind loss compensation.*
- *Antenna Wetting / Wet Antenna Effect: A perhaps less well-known item is that in Ka-band communication systems an additional signal margin should be included to account for the wetness of the antenna system. (Dry snow has a minimal effect on Ka-band propagation.) Water on the main reflector, and even more critically, the feed aperture, is a major source of loss at 20 and 30 GHz.<sup>2</sup> The amount of water or snow on Earth station antennas (ESAs) can cause additional signal degradation above and beyond the expected propagation attenuation due to rain alone. Rain on a reflector can create a distorted reflector surface that reduces the antenna gain by several dB in the worst case. Water on the feed aperture distorts the electric field's distribution of the feed therefore creating a high perturbation on the feed standing wave ratio (SWR). One laboratory test measured and calculated the antenna attenuation due to surface wetting can reach 10 dB at Ka-band. The antenna attenuation during rain at any instant of time relates to the amount of water accumulated on the antenna surfaces at that instant. It is, however, largely independent of the instantaneous rain rate.*
- *Atmosphere and Rain: Atmospheric phenomena, rain, snow and ice absorb radio frequency signals at Ka-band so that a Ka-band signal suffers more degradation than a Ku-band signal. For example, rain attenuation at 31 GHz (Ka-band) is almost three times that of 12 GHz (Ku-Band). Since rain fades can be very large, at Ka-band, uplink power control and stability become more challenging.*

### **Boosting Reliability**

Uplink and downlink signal margins are precious resources at Ka-band, adding up to a simple point: Ka-band uplinks and downlink systems need to minimize link loss and gain outage protection.<sup>1</sup>

In cold climates, measures must be taken to remove wet snow and ice accumulation from the surfaces of antennas and feeds. For rainy climates, water-shedding and runoff performance requirements are beginning to appear in Ka-band system specifications. Technology providers, such as Walton De-Ice, have introduced new innovations such as the Rain Quake and Ice Quake systems that mitigate Ka-band antenna wetting.

### **Ka-band Uplink / Large Antennas**

Solutions to de-ice for large, uplink antennas 5 to 32 meters in size include:

- *Plenum systems, which recirculate hot air into an enclosure behind the antenna reflector*
- *Pad Heating and Heat Tape, which use heated elements attached to the rear of the reflector and do not affect the back structure*

Depending on the application, manufacturers may offer electric-powered, and/or gas (liquid propane, and/or natural gas) heaters. If not well designed, these units can produce high antenna gain losses (up to 6dB). Non-uniform heat applied to the antenna structure can cause defocussing and reflector degradation, as mentioned previously.

Walton De-Ice has refined its unique, field-proven, plenum, hot-air de-icing system, with a unique hot-air enclosure system that mounts behind the antenna. The Walton De-Ice plenum solution offers several advantages over electric pad or heat tap anti-ice systems—the circulation of hot air provides uniform surface heating of antennas resulting in a totally effective elimination of ice.

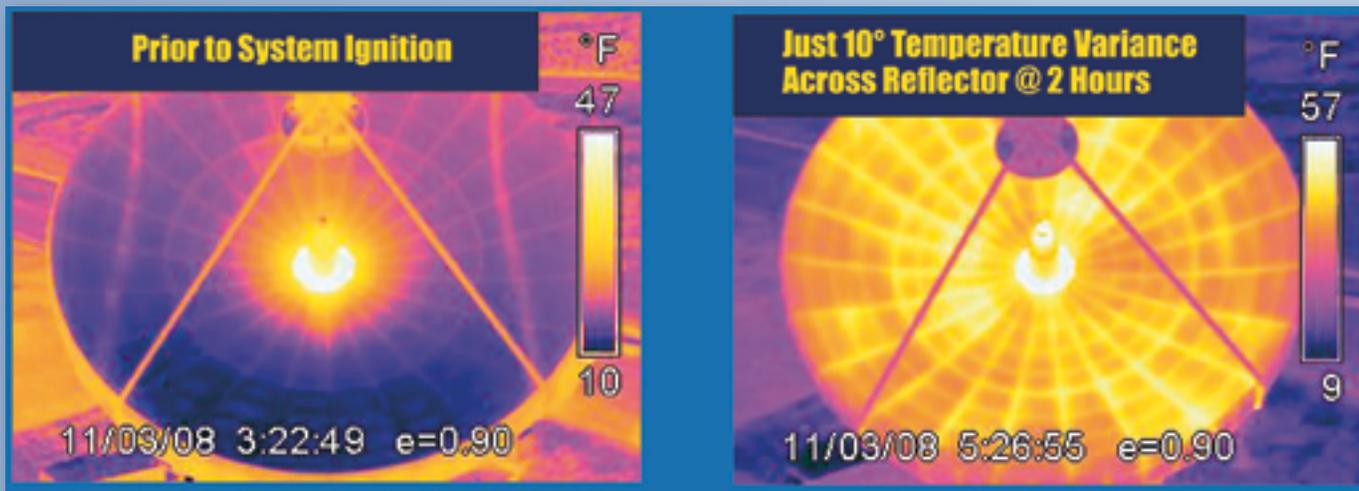
Automatic temperature sensing and integrated control of the Walton De-Ice Plenum ensures that sufficient heat is uniformly applied to the reflector surface to minimize the thermal effects on antenna gain. The design itself minimizes thermal expansion of an antenna structure. Temperature distribution is controlled with the use of circulation fans and heat distribution systems within the plenum. A Temperature Balance Controller is integrated into the standard automatic monitor and control units to measure, control, and optimize surface heat distribution in real-time.

Results show transmit and receive gain degradations at Ka-band reduced, for example, to the 0.6 to 0.75dB range for 9.2m-13.2m Ka-band antennas. That is a dramatic performance improvement when compared to the previously mentioned 6dB figure.

metal panels with pad-based anti-icing solutions, as they tend to leave a checkerboard footprint that creates cold and warm strips on the reflector surface. In contrast, Walton Plenum hot air de-icing encloses the entire back structure and uniformly distributes the heat.

### Solutions

Walton De Ice's systems are controlled by a Temperature Balance Controller (TBC) device that monitors four separate areas within the plenum and also incorporates a thermostat in which, once the reflector surface reaches a certain temperature (that occurs much faster than with a heat pad anti-ice system), heating is then activated only long enough to re-heat the space again.



This image depicts how uniform antenna surface heating minimizes distortion losses. In this example, infrared photo measurements of heat across a large antenna reveals the temperature variation before, and after, the Walton De-Ice system has been activated. Image courtesy of Walton De-Ice

### Boosting Energy Efficiency

One of the newer developments has been the introduction of more energy-efficient heating systems and options to help reduce Earth station operating expenses and to support corporate Green initiatives. For example, Walton De-Ice has added a new, higher level of CE (European Union)-certification to the gas heating units that are now available worldwide.

"Our new CE-certified gas heaters combine with the Walton De-Ice Plenum system to offer unparalleled performance and reliability and deliver the most rapid and cost-effective solution for preventing snow and ice buildup 24x7 at the lowest operational cost for an Earth station antenna," said David Walton of Walton De-Ice. "The new Gas Heater is easy to upgrade on existing antennas by using the same wiring and mounting configuration as Walton's original heaters," he added.

### Reflector Distortion Losses

Antennas have reflector panels that are mounted onto truss supports that are then tied together. Anti-icing solutions that only heat the individual reflector panels cause distortion losses by creating temperature differentials between the reflector panels and the truss supports. Metals expand at different rates when heated. Antenna panel thickness and size varies. This size difference can contribute to the uneven heating of a reflector's

A pad-based anti-icing system must maintain heating, even if it has a temperature threshold that turns the system on automatically when a cold weather threshold is present. This solution consumes far more energy dollars than, for example, a gas-heated, Walton Plenum solution, which detects the presence of moisture and temperature, and responds by rapidly and uniformly heating the antenna, thereby conserving power.

For antenna subreflector and feed de-icing, Walton De-Icing systems reuse the heated air from the Plenum, which is ducted to the feed horn and subreflector, using a blower. The same systems also perform rain diversion to clear the feed horn window of moisture, which can severely degrade Ka-band signals.

### When It Rains On Ka-Band, It Pours

As previously noted, rain fade is a significant challenge for Ka-band systems. Signal attenuation at Ka-band during heavy rainfall can be as much as four or five times that of a C- or Ku-Band antenna.

Antenna wetting, a function of rain in density, antenna type, frequency, and elevation angle, can contribute to a 2.7-3.9dB of link losses at the 20/30GHz Ka-band range. Rain-caused signal depolarization can add fade levels of more than 10dB.

Fortunately, there are solutions such as the one introduced by Walton De-Ice, which has developed an innovative new way to mitigate rain and antenna wetting effects. The Walton De-Ice Rain Quake system can significantly reduce the impact of rain fade on Ka-Band antennas and protect their antenna G/T performance. For warm and rainy climates, the system prevents rainwater from sheeting on an antenna surface and works on antennas that range in size from 0.6 meter VSATs to large antennas up to 6 meters in diameter. The system also prevents rain fade caused by sheeting on the antenna reflective surface for Ku-band antennas.

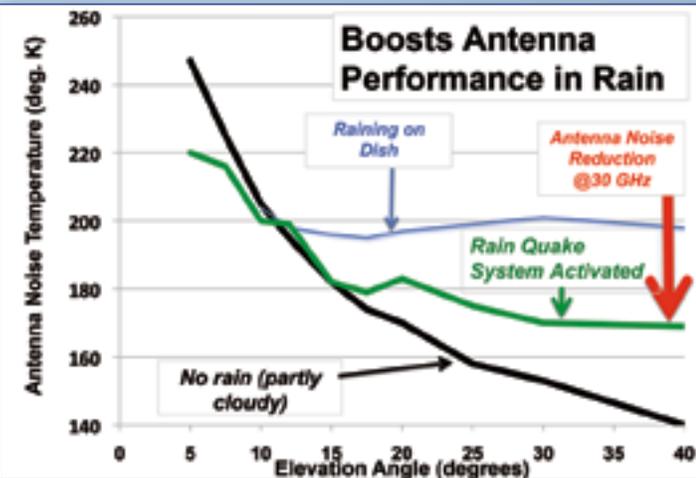
According to Walton De-Ice, the advantages of their modular Snow Shield / Solar Cover / Rain Quake / Ice Quake solution is that the antenna cover can remain in place on an antenna year-round. Other covers on the market typically need to be removed during summer months due to UV rays that cause the material to break down and absorb water, dirt and grime. A disadvantage with these kinds of covers is that the antenna user must replace such covers every few years. This translates to additional costs in manpower, downtime as well as the new covers cost.

The Ice Quake enhances the performance of the Snow Shield antenna cover by vibrating the cover fabric, shaking off snow and ice that degrade signals. According to David Walton, "The Ice Quake system offers huge savings—up to 100 times—on an electric bill versus competing anti-ice systems. An automatic moisture and temperature monitoring and control unit ensures 24/7 operation. By eliminating the need for a high power conduit, trenching, and electrical switch gear in a facility, the method also saves costs compared to the installation of conventional electric heating systems."

In addition to the energy-saving vibrating fabric, for the highest level of de-icing, a gas or electric heater may still be added as a post-install to the passive Snow Shield or Rain Shield. This is completed without removing the cover and avoiding antenna downtime

Ka-band Earth station design challenges are being met with tightened design and production tolerances, more advanced antennas, power amplifiers, and frequency converters, as well as improvements in weather protection systems. Healthy Ka-band market demand is pushing manufacturers, such as Walton De-Ice, to continue to innovate and expand their product line to provide customers with more solutions to ensure their VSAT and large satellite Earth station antennas are fully operational during the harshest environmental conditions.

Ka-band network operators and designers can better protect their critical satellite networks from signal loss and degradation due to ice, snow, rain, and sun by adding optimized de-icing and rain-shedding sub systems to their existing and planned earth station antennas. The correct Ka-band Earth station antenna de-icing, or rain cover sub-system, can yield excellent "bang for the buck," helping operators maximize Ka-band signal, service quality and reliability in the face of Ka-band link challenges.



Reduction in Ka-band Antenna Noise Temperature with Antenna Cover Image courtesy of Walton De-Ice.

The Rain Quake cover stretches over an antenna, keeping rain off with a water-shedding, architectural fabric material that is virtually invisible to RF. By vibrating the fabric, rain is rapidly shed off the antenna.

"Field testing has shown that during heavy rain conditions, Walton Rain Quake systems can reduce data loss by more than 20X when compared to Ka-band antennas without protection," said Walton. Tests show that the Rain Quake System helps to minimize bit error rates while antenna noise temperature increases, thereby improving Ka-band system link margins during a rainstorm.

### Innovations

For cold climates, the Rain Quake is referred to as an Ice Quake. The Ice Quake version of the product prevents snow and ice buildup on antennas from 0.6 to 6.3 meters in diameter.

The Walton antenna cover, called a Snow Shield, is made from extremely durable, architecturally coated, fabric material, again, virtually invisible to RF. The Snow Shield stretches over a satellite antenna and can be used as a Passive solution without a heater or as a heated solution. Walton De-Ice has patented the combination system of the antenna cover plus the active heating component. As the sun moves from east to west, an antenna reflector is susceptible to hot and cold spots that also result in reflector distortion losses. Earth station owners have discovered an additional benefit using the Snow Shield Cover—the product also acts as a Solar Cover, helping to evenly distribute warmth from the sun to minimize distortion losses.

For additional Walton De-Ice information, please visit <http://www.de-ice.com/kaband.html>

### References

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### About the author

Daniel Freyer is the Principal of AdWavez Marketing (<http://www.AdWavez.com>), an agency specifically serving the satellite industry.

# Providing For The European VSAT Market: A Norsat International Perspective

By Brian Donnelly, Vice President, Sales and Marketing, Norsat International

The success of Norsat International's satellite division started out when the company designed a custom small form factor satellite terminal for an offshore government in 2002. Norsat built upon the success of that delivery and founded the Satellite Division in 2004, where the portable terminals started selling into various militaries worldwide. These terminals were designed in consultation with the customer to achieve higher performance in a smaller form factor than was available on the market at the time.

Norsat's products and services have evolved since then and have become known globally for industry-leading ruggedness and reliability and have been used to provide critical communications for many international events. In Europe, the company is a leading provider of components for militaries and government organizations.

## Mission Specific Capabilities

Norsat offers an entire family of fly-away, vehicle mounted and maritime VSATs that range in size from .45m up to 3.8m in C-, X-, Ku- and Ka-bands. Some examples of products and capabilities offered to military organizations include:

- *The GLOBETrekker 2.0 is an auto-acquire terminal, which was engineered with the critical communications needed by various organizations to operate reliably within the world's harshest environments. This terminal has been upgraded with modular architecture for easy field customization and maintenance, a simple one-touch interface for rapid deployment and upgraded LinkControl™ software for easy, automatic, satellite acquisition and remote operation capabilities. The lightweight carbon fiber antenna and compact packaging allow the GLOBETrekker 2.0 to be easily transportable and airline checkable.*
- *NewsLink and Rover terminals are field proven, rugged and reliable. These units have been continuously operating for more than ten years in locations that include Afghanistan, Iraq and Haiti, to provide broadcast quality transmission during critical events.*

## The Newbies

- *ATOM BUCs and SSPAs: Just released are the ATOM series BUCs and SSPAs, which are up to 80 percent smaller, 68 percent lighter, and 60 percent more energy efficient than their alternatives, enabling a wide range of military applications that include portable VSAT, TWTA replacement, and UAV connectivity.*
- *SATCOM Baseband Kits: Norsat has recently introduced a series of SATCOM Baseband Kits that are specifically tailored for military customers. The kits support a wide variety of applications, and each kit includes the tools required to maintain satellite connectivity in remote locations or extreme environments. The CFK 100E Compact Flyaway Kit is designed*

*to support voice, video and data communications over classified and unclassified networks and includes a custom integrated power supply for diverse powering options. Several of these kits are used by National Guards, FEMA, US State Department locations and other military and government agencies for reliable, emergency communications worldwide.*

## Strategy + Development For Europe

While VSAT technology is not new, the challenge is to make all work in the harshest conditions imaginable. Norsat's extensive experience with harsh environment applications has given the firm a substantial piece of market share in this growing market. All of the products and systems are designed in-house and built to MIL STD 810 and WGS/DSCS certification.

NORSAT's major European customers, which have been served for more than eight years, include:

- *NATO (has been a customer since 2008 and has just signed a new contract for the refit of five terminals)*
- *The French Army*
- *Portuguese MoD*
- *Finish MoD*
- *Irish MoD*

Norsat's strategy is to continue to develop a strong partnership with key integrators, such as Orange, Airbus Defence, Ineo Defence and more. The company takes pride in being flexible and offering quick response times for specific customer needs, as well as customized designs which fit the unique requirements of each of our partners and customers. The aim is to continue to leverage the company's extensive experience in product development and manufacturing to ensure customers' long term product and service needs are met and exceeded.

### About the author

Brian Donnelly is the VP Sales and Marketing at Norsat International Inc. Mr. Donnelly is an experienced sales leader with a technical background, managing sales and marketing teams for high technology companies for over 20 years. He holds an honors degree in Electrical Engineering from Simon Fraser University in British Columbia, Canada.

### About Norsat International Inc.

Founded in 1977, Norsat International Inc. is a leading provider of communication solutions that enable the transmission of data, audio and video for remote and challenging applications. Norsat's products and services include leading-edge product design and development, production, distribution and in-field support and service of fly-away satellite terminals, microwave components, M2M Solutions, antennas, Radio Frequency (RF) conditioning products, maritime based satellite terminals and remote network connectivity solutions. More information is available at <http://www.norsat.com>.



# The Ka-Band Charge... An Avanti Perspective

By Matthew O'Connor, Chief Operating Officer, Avanti Communications

**T**he broadcasting industry continues to experience massive growth across the globe... the industry is now migrating from Ku-band to Ka-band in order to improve global news gathering capabilities.

## Ka- Versus Ku-

The acceleration of uptake in Ka-band satellite services across the broadcast sector in Europe, as well as the Middle East and Africa (EMEA), has been, in large part, due to the high-quality Ka- technology designed and operated by Avanti Communications.

Powering a diverse range of platforms, Avanti's satellite technology has been designed to deliver high speed data services which offer significant advantages over Ku-band capacity, including:

- **Value:** due to the efficiencies resulting from the use of small spot beams that concentrate power and re-use spectrum
- **Availability:** Ka- satellites often have 10 to 20 times more capacity than Ku- satellites providing room for a customer to grow their network

- **Portability:** efficiencies of operating at Ka-band mean that user terminals are smaller and cost less to install and maintain
- **Flexibility:** Ka-band operators are focused on data applications, which means a customer can purchase an entire end-to-end, managed service from a single source

## Selected By The Biggest Brands

In line with a surge in uptake of Ka-band in broadcast and satellite news gathering (SNG), Avanti was selected to deliver high-quality Ka-band services to the world's largest news organizations.

The evolution of global broadcasting presents a number of opportunities for the satellite industry. The demand for real-time news is at an all-time high, placing huge pressure on news organizations, their production teams and engineers. Even small transmission breaks during live broadcasting events (e.g., during football matches or in real-time news broadcasting) are simply not tolerated.

One example of today's SNG coverage responsibilities:  
The Sochi 2014 XXII Olympic Winter Games



'Downtime' when working in SNG is not an option. The industry demands seamless, reliable data services with always-on capacity. News gatherers need the freedom and flexibility to broadcast live feeds, often from the most remote locations. Avanti's Ka-band news gathering product has been developed hand-in-hand with the broadcast industry to address these broadcast demands.

The Avanti Ka-band provides the high throughput and availability essential for delivering reliable contribution for the IP generation of broadcasters. Powered by the Avanti Cloud, high-quality coverage of breaking news is provided seamlessly to the eyes and ears of the world.

### **Ka-band For The NexGen Of Broadcasters**

The innovation in technology and hardware in SNG has removed the need for news teams to use multiple carriers, huge amplifiers or large generators. This advancement is reflected in such products as Avanti's lightweight, easy-to-deploy terminals. The technology supports multiple hardware platforms and uses the industry's leading SNG hubs. For example, with deployment of the latest iDirect IDX 3.2 release, the company's network supports iDirect's new X7 modem for high quality broadcast.

Ka-band enables functionality, such as high quality SD feeds, HD and provision of comms, VoIP, IFB and Internet content delivery. Additionally, the comms unit can provide a high quality radio circuit and return cue feeds for dispatches and live inserts, instantly, into broadcasters' outputs.

Avanti works alongside SNG service providers to reach broadcasters across EMEA. The key benefits cited by partners, on a regular basis, include: the suitability of the band for IP transmission, increasingly adopted by broadcasters; small and lightweight easy-to-deploy terminals; and low power consumption.

### **Professional Output**

SNG services have been developed with the world's largest broadcasters for high-profile news and events, including coverage of the Sochi 2014 Winter Olympics, Nelson Mandela's funeral and the Oscar Pistorius trial. Despite hazardous weather conditions throughout events, Ka-band has proven to be agile, resilient and reliable for real-time news gathering and events coverage.

International news agency, Reuters, adopted Avanti services in South Africa for the ongoing Oscar Pistorius trial. Deployed via the HYLAS 2 satellite, which has 100 percent coverage over the country, Reuters successfully broadcast 24/7 live satellite news coverage of the trial to millions of viewers across the globe.

Speaking about the service and partnership, George Johnson, Technical Coordinator at Reuters, said, "In order to supply consistently high quality multimedia coverage to global audiences around the clock, our approach is to select leading providers who work with us hand-in-hand to achieve the best results. Avanti's leading service has enabled us to provide quality outputs during a live event of national importance in South Africa."



*The Pistorius trial in South Africa generated intense SNG coverage. Photo courtesy of Reuters.*

### **Redefining The SNG Marketplace Across EMEA**

Despite a compelling range of benefits, one misconception that is sometimes raised is Ka-band's susceptibility to rain fade. Through investment, meticulous design and implementation of the latest technologies, rain fade has been virtually eliminated for customers—this is, indeed, yesterday's problem.

Whereas Ka- systems have opened up a new era in satellite communications—enabling high speed, cost-effective service—the market is quickly learning that not all Ka-band satellite operators are equal. There are enormous differences between the performance standards of competing Ka- systems. Using the latest Ka-band technology, Avanti redefines the SNG marketplace across EMEA for the new generation of IP broadcasters.

The company recently announced plans for a brand new satellite to be added to their fleet—HYLAS 4. The satellite will launch in 2017 to serve new markets in Africa and also to provide expansion capacity for existing customers in areas of Europe and Africa covered by HYLAS 1 and 2. This latest fleet addition will certainly expand the SNG offerings by our company.

Avanti is exhibiting at IBC 2014 in Amsterdam, between September 12th and 16th. Please visit the team at stand 1.A50.

There's more to learn at <http://www.avantiplc.com>

#### **About the author**

Matthew O'Connor is the Chief Operating Officer at Avanti Communications. He joined the firm in 2005, having worked in the telecommunications industry for 20 years in a number of UK and international sales and marketing roles. He has been the Chief Operating Officer for the past nine years, during which time Avanti has launched two satellites, acquired a third in orbit and has commissioned two more satellites that are now in construction.



# Getting From There... To There: The FedEx Space Desk

A conversation with Craig Simon, President and CEO, FedEx Supply Chain

**C**raig Simon is the President and CEO of FedEx SupplyChain, an integrated logistics provider that serves as a vital piece of the overall FedEx enterprise operation.

Simon and his team leverage the FedEx transportation and information networks in markets around the world, providing specialized solutions for customers with high-value products and complex supply chain requirements. This includes the movement of critical parts while providing end-to-end visibility, global warehousing, inventory and transportation management, and temperature-controlled delivery services for the pharmaceutical and diagnostic industries.

After joining FedEx in 1999 as director of FedEx eSupply Chain Services, Simon later served as vice president of FedEx Solutions, where he oversaw teams responsible for designing and implementing logistics tools, processes and solutions. Prior to FedEx, Simon spent eight years with Andersen Consulting (now Accenture), providing supply chain strategy development and operations improvement efforts to Fortune 500 companies in the consumer products, retail, food and high tech industries. He also developed a successful health care information start-up company in Silicon Valley.

Simon's role at FedEx takes him to all parts of the world, and under his leadership, FedEx SupplyChain has expanded globally. Since 2010, the company has grown its service operation from 10 to more than 20 countries.

Simon also serves on the Board of Directors for Knowledge Quest, a Memphis, Tennessee, based after-school education and community development program. He is also an advisory board member at the Reilly Center for Science, Technology and Values at his alma mater, the University of Notre Dame. Simon holds two degrees from the university: a Bachelor of Science in Mechanical Engineering and a Bachelor of Arts in History, and is certified in production and inventory management (CPIM) from the American Production and Inventory Control Society (APICS).

The FedEx® Space Desk is a first-of-its kind centralized logistics and information hub for the space industry and is the cornerstone of FedEx® Space Solutions.



## SatMagazine (SM)

Mr. Simon, what is FedEx Space Solutions?

### Craig Simon

FedEx Space Solutions is a turn-key, comprehensive shipping solution for the space industry that is built on the foundation of 40 years of FedEx innovation in logistics.

Led by the Space Desk, FedEx Space Solutions offers configurable services for customers shipping everything from cube satellites and biomedical experiments to parts needed for shuttle launches. Our services include...

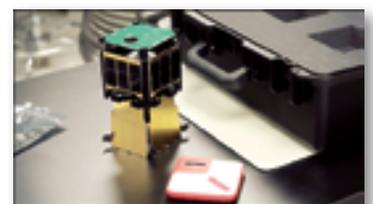
*The FedEx SupplyChain®—whether it's a part required for a launch, or a custom package for a biomedical experiment, FedEx Supply Chain offers specialized logistics through a robust network of resources.*

*Highly trained space experts—the Space Desk team of specialists was trained by Space Tango, a well-respected expert in the space industry. FedEx specialists are trained to understand the specific needs of the space industry.*

*The FedEx Packaging Lab, which is equipped with state-of-the-art package testing and design equipment that exposes packages to real-world conditions in order to create the best possible packaging for critical shipments.*

*The FedEx Space Desk will offer proactive tracking and tracing of all space shipments. There's also our experts' ability to assist space customers navigate international customs clearance issues for space industry shipments. Should there be unforeseen delays in the planned routing of a shipment, the specialists at the Space Desk have the ability to halt a shipment in transit and transfer it along a faster route to help ensure an on-time delivery.*

*Enhanced visibility—when transporting highly-sensitive shipments, FedEx can provide peace of mind with enhanced visibility into the factors affecting the package using SenseAware™, powered by FedEx. SenseAware can track a*



*FedEx Space Desk expertise in handling space shipments.*

shipment's location around the world in near real-time and is also able to monitor environmental factors such as temperature, humidity, barometric pressure or exposure to light.

Of great benefit is the FedEx Space Desk operating as a one-stop shop for every space industry shipper. We will handle any possible issue that can arise with a space industry shipment—track, trace, re-route, expedite, notification, customs clearance, and so on.

## **SM**

Please take us through the process of using the FedEx Space Desk and FedEx Space Solutions.

### **Craig Simon**

When a customer contacts the FedEx Space Desk, its team of experts—trained by the respected Space Tango organization—spring into action. Depending on the shipment, timing and route, Space Desk experts will tap into expertise across the FedEx organization, working to ensure that each unique need is met.

## **SM**

What makes FedEx qualified to serve the space industry?

### **Craig Simon**

At FedEx, we know a space launch waits for no one. We are uniquely positioned, thanks to our vast global network, with innovative tracking systems and suite of shipping options to provide premium logistics support to the growing space industry.

Throughout our 40 year history, FedEx has earned a reputation as an innovative company built to move high-value packages around the world on time and securely. With a variety of next-business-day services—and even same-day or next-flight-out in some cases—FedEx can provide the speed space shipments need. FedEx can also work with customers to delivery sensitive, classified or hazardous shipments.

## **SM**

What's next for the FedEx Space Desk and FedEx Space Solutions?

### **Craig Simon**

We are currently learning as much as we can about the needs of our space industry customers and continue to build out solutions that matter to them. We will grow our Space Desk solutions as our customers' needs expand.

To learn more about this FedEx service, please visit  
<http://www.fedex.com/us/space-solutions/>

# SatBroadcasting™: The Current Trends + Prospects For PayTV Versus FTA In Russia

**T**he Russian payTV market steadily grew in 2013 at a faster rate as compared to the rest of the world, by attaining a 16 percent expansion rate.

According to data published by Telecom Daily, an information and analysis agency that provides data regarding the telecommunications market, the number of payTV users in the Q2 2014 increased from 500 thousand to 3.5 million users. The average growth in the Q2, 2014, was 30 percent less when compared to the previous two quarters. Moreover, from the end of Q2, 2013, the annual growth of payTV subscribers was approximately 3 million users, while the previous year's growth amounted to 4.5 million subscribers.

Today, payTV's penetration rate in the Russian market has reached 63 percent. In particular, that amount was more than a 72 percent influx in Russia's larger cities. The share of FTA (Free-To-Air) broadcasting is currently about one-third of all households, while some of them view the offerings from the commercial operators as public packages.

Infomir Multiscreen Index figures indicate the Russian DTH platform Tricolor TV was the world leader in terms of the subscriber growth in Q1, 2014, by gaining 380,000 new subscribers, and then again in Q2, 2014, by achieving an additional 380,000 new subscribers. The largest sports events in 2014 were the Olympic Winter Games in Sochi, Russia, and the 2014 FIFA World Cup Brazil—both events were key components for this growth.

Market trends are rather controversial as Tricolor TV growth in urban areas with populations of 500,000 and above are reaching significant saturation levels—however, prospects are far better in Siberia, the Russian Far East and the South of Russia, where payTV penetration amounts to roughly 52 to 57 percent saturation. The entire payTV market is expected to continue a slowdown for another year and a half. In the meantime, the international consulting agency iKS Consulting reports that market operators will start to experience an increase in consumer use with FTA services.



*A night view of St. Petersburg's city TV tower.*

## PayTV Market Segments

Private National Satellite Company operating under the Tricolor TV brand name still remains the largest Russian DTH (Direct-To-Home) operator. The operator's subscriber base is estimated at 14.48 million subscribers, while in some regions of the country, particularly the South of Russia and the Caucasus regions, total market share exceeds 50 percent.

Tricolor TV is actively developing its services by investing in HDTV, thereby making the operator the Russian broadcast leader in terms of HDTV viewing. In Q1 and Q2 of 2014, new HD subscribers totaled more than 99 percent of all users.

Other satellite operator's market share is quite insignificant in comparison with Tricolor TV. Orion Express had 2.13 million subscribers and NTV-Plus had 650,000 subscribers at the end of the Q1, 2014, figures.

Satellite technology is one of the fastest growing segments in Russia. The main factor for this growth is Russia's complex and diverse terrain, which poses major challenges for any effective cable infrastructure. This impediment paves the way for Russia's satellite business development sector. The newly launched Russian satellite Express-AT1 (slotted at 56 degrees East) on March 16, 2014, has allowed for significant positioning improvement in Siberia, the Urals and portions of the Russian Far East.

After evaluating the payTV penetration into these regions, there will be a huge jump in users from 49 percent in the Russian Far East up to 80 percent in the central part of the country. As mentioned before, satellite TV dominates the South of Russia where market shares reach 71 percent.

Currently, cable operators occupy around a half of the Russian market. The biggest of them is the state owned company Rostelecom that has base subscribers numbering at 7.61 million, followed by MTS-TV with 2.7 million subscribers, ER-Telecom and Akado with 2 million plus and over 1 million subscribers, respectively. However, small private operators with coverage areas limited to one region or even one city represent a majority of the cable TV sector.

## Major Challenges

Despite evident success of Russian satellite infrastructure establishment, the lack of transponder capacity remains one of the major complexities that must be solved. HDTV is increasingly popular in Russia and requires higher capacity for new HD channels.

The second issue rests within the rough transformation of regulatory framework. Amendments to federal law regarding "On advertising," accepted this summer, places advertising on satellite and cable TV channel networks under a complete ban, starting from the beginning of 2015. This could easily cause further slowdown in payTV services within Russia. The new law has evoked dissatisfaction with many market players whose fear of license and subscription fees has now increased.

## Development Forecast

The Russian commercial television market will continue to grow until at least 2017. The market will see a clear separation between commercial and public TV at a 4:1 ratio. The Russian state will develop 20 to 25 free channels in the country's DTT network.

The proportion of HDTV will dramatically increase within payTV packages. The first Ultra HD (4K—UHDTV) TV channels will finally start to appear. Such channels could already be introduced into Russia on a technical competence level.

Tricolor TV had the first successful experience in broadcasting 4K a year ago, while NTV-Plus had broadcast the Olympic Winter Games 2014 Opening ceremony in Ultra HD. These broadcasts initiated Russian media holdings company, Bridge Media, to start broadcasting multiple 4K TV channels.

For additional information regarding the GS Group, please visit <http://en.gs-group.com/>

### About GS Group

GS Group is an international investment and industry holding company, operating on the basis of its own technologies in telecommunications and the firm's numerous innovations. The international office of the holdings is located in Zug, Switzerland.

Key activities for the GS Group include: implementation of international broadcasting projects, Nano-materials and microelectronics R&D and mass-production; deep wood processing; investment in venture projects; media content production and management; software products design and integration; full-service advertisement; logistics and trade.

GS Group is a strong promoter, investor, integrator and leader in international broadcasting projects sphere worldwide. These projects include Tricolor TV, the second largest DTH operator in the world. Followed by; One TV, the first digital terrestrial television broadcasting project in Cambodia that was launched in 2012 by the GS Group jointly with a local partner. International experts of the industrial trade fair Broadcast Asia 2013 named the project "a model for further digitization of Asian countries." In May 2014, GS Group and Beximco Group, a leading Bangladeshi industrial conglomerate, announced the launch of first DTH company for Bangladeshi TV viewers would be accomplished at the close of 2014.



# Looking Forward To The Satellite Industry's Future

A conversation with Serge Van Herck, Chief Executive Officer, Newtec

**S**erge Van Herck, the CEO of Newtec, talked to *SatMagazine* about his vision, what potential dangers lay ahead and how Newtec is keeping their competitive edge to meet the growing demands of their customers.

## *SatMagazine*

*Serge, what pressures do you currently see in the marketplace and how is Newtec providing solutions for them?*

## **Serge Van Herck**

Our customers are always seeking new innovations in the market to improve the quality of their services and the efficiency of their networks. As a technology provider, the pressure is on Newtec to continuously provide reliable and highly efficient solutions to meet our customers' needs.

Take the satellite broadcast industry, as an example. At Newtec, we have acknowledged these pressures and knew, for example, that as the industry moves from Standard Definition (SD) to High Definition (HD) to Ultra HD (UHD) television, and the demand for more bandwidth technology increases, we had to develop new technologies to bring more bits per hertz into play.

Our answer, in this case, was to team up with DVB to help create a new satellite transmission standard, DVB-S2X, to ensure that our industry can successfully move forward by employing reduced costs and increased speeds for clients. This new standard enables new services and higher transmission efficiency for the broadcast industry as well as for the VSAT industry.

With a strong demand for new satellite services such as Direct-To-Home (DTH) UHD4K broadcasting, the new DVB-S2X standard will prove an instrumental enabler. We have demonstrated transmissions to DTH terminals with the transmission scheme revealing as much as a 20 percent throughput gain, using an unaltered, regular, geostationary satellite transponder.

We have also recently delivered another new, return transmission technology to the market, which eliminates the headache for our customers of having to decide between SCPC and MF-TDMA return technologies. Our solution, Mx-DMA™ (or Cross-Dimensional Multiple Access), combines the best qualities of both technologies.

For fixed capacity services, Mx-DMA can bring more than a 35 percent bandwidth saving. This is the equivalent of putting 54 percent more customers into the same bandwidth when compared to SCPC.

For shared and overbooked services, the bandwidth saving of Mx-DMA is more than 50 percent, equivalent to bringing more than double the number of customers in the same bandwidth. In addition to the efficiency increase, Mx-DMA further improves signal availability, which helps our customers to further improve their quality of service.



## *SatMagazine*

*Does the rise of High-Throughput Satellites (HTS) limit or increase available business opportunities for you in the market?*

## **Serge Van Herck**

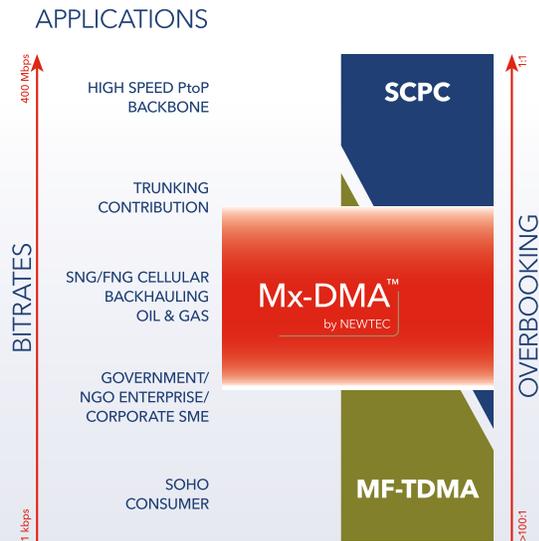
The introduction of HTS, whether in Ka-, Ku- or C-band, is undoubtedly a blessing for our industry. HTS creates a new momentum that enables our data customers to offer telecommunication services which, in most cases, can be provided at a much lower cost than previously thought possible. This is key in order to stay competitive with alternative, terrestrial solutions.

The introduction of HTS has also had a major impact on the industry's business model and value chain. The first US HTS were launched by technology companies that, over time, became fully vertically integrated; they operate their own telecom services on their own satellites. This has had a profound effect on the profitability and viability of other service providers and satellite operators who used to be their customers and suppliers in the past.

In the meantime, we have started to witness a new trend wherein the "traditional" satellite operators launch their own HTS on which they sell "MHz capacity" to their customers. I'm convinced that this trend is going to expand further to generate strong business opportunities for technology companies such as Newtec, who's mission is to help their customers achieve their business objectives. However, let me be absolutely clear—Newtec has no ambition, whatsoever, to launch its own telecom service or HTS.

We have demonstrated with several customers that HTS works well with an open system architecture. We encourage VSAT operators and service providers to adapt to this approach. They will then have the flexibility to select the best equipment and modems for themselves, and can take full control of managing their system.

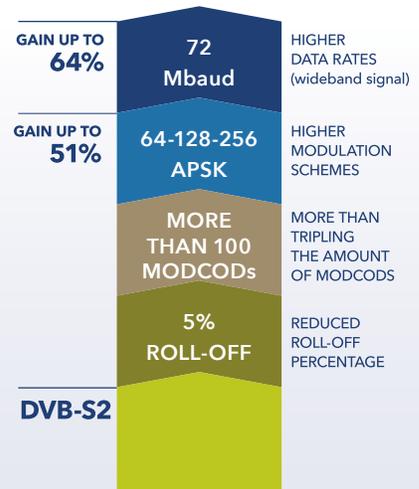
# Mx-DMA™ BANDWIDTH ALLOCATION



Mx-DMA combines the best qualities of SCPC and MF-TDMA return technologies.

# DVB-S2X SPECTRAL EFFICIENCY

## KEY BENEFITS



DVB-S2X, a new satellite transmission standard, reveals important throughput gain.

## SatMagazine

You recently launched a new multi-service platform, Newtec Dialog®. In a multi-platform era, what does this mean for your customers?

## Serge Van Herck

There is a constant shift in the satellite industry—some applications are being used more and other applications are being used less. Broadcasting services will always remain key to the industry. However, we have noticed that trunking applications over satellite have decreased due to more fiber being rolled out all over the world. Fortunately, we see that consumer broadband, mobile backhauling, Oil & Gas and mobility applications on land, sea and air really represent a major growth opportunity for many service providers.

Our new scalable multi-service platform, Newtec Dialog®, allows service providers to build and adapt their infrastructure easily as their business and the satellite market grows and changes. The platform gives our customers the flexibility to support any type of application, ranging from consumer and enterprise VSAT, to broadcast, to mobile backhauling, all from a single platform and with the knowledge that they are using the most efficient modulation and bandwidth allocation.

Newtec Dialog supports several return channel technologies, including our new Mx-DMA previously mentioned.

We take great pride in being able to develop these new innovative solutions for our customers and have been doing so for nearly three decades now. We share the same vision of watching our satellite industry develop and grow.

The feedback we receive from our customers and partners is always highly encouraging and this provides our engineers with the energy to continue pushing the technology boundaries forward to set new standards.

For additional information, please visit the Newtec infosite at <http://www.newtec.eu/>

# Addressing The European Market: A Spacecom Perspective

By Jacob Keret, Senior Vice President Sales, Europe, North America and the Middle East, Spacecom

**A**pproaching the IBC Show and the last quarter of 2014, Spacecom, the operator of the AMOS satellite fleet, has made the AMOS brand a well known name across the globe.

In the company's role as an emerging global satellite provider, AMOS is known in Europe—primarily the Central, Eastern and Russian regions—as well as throughout all of Africa, the Middle East and important areas of Asia that include China and Southeast Asia. New and improved technologies are also a part of the equation that ensure Spacecom's worldwide reputation for excellence and prompt response.

Since the successful launch of AMOS-4 to the 65 degrees East prime orbital position, where it serves Russia, China and Southeast Asia with valuable Ku- and Ka-band capacity, Spacecom has expanded its presence to new markets that are hungry for reliable service.

Today, the AMOS fleet consists of the AMOS-2 and AMOS-3 satellites that are co-located at the 4 degrees West orbital position, serving Central and Eastern Europe, the Middle East and the U.S. East Coast. AMOS-5, located at 17 degrees East, serves Africa and the Middle East along with AMOS-4.

Together, these satellites offer a wide range of communication and broadcast services for the telecom, broadband and broadcast markets such as direct-to-home (DTH) and direct broadcast satellite (DBS) operators, Internet service providers (ISPs), telecom operators, network integrators and government agencies.

Europe has always been a key market for Spacecom and will soon become an even stronger component for the company. During two decades of operation in the CEE region, the company has developed long-term cooperations and partnerships with the region's key players and major media groups.



*The build of the AMOS-6 satellite.  
Photo courtesy of IAI.*

From the 4 degrees West orbital position 'hot-spot' where AMOS-2 and AMOS-3 are co-located, the AMOS constellation provides excellent, strong broadcast neighborhoods. Clients include DTH platforms such as T-Home SatTV (Magyar Telekom) in Hungary, a subsidiary of the Deutsche Telekom group; Xtra-TV in the Ukraine and Israel's Yes DTH platform. These DTH operators anchor the European business. With one of the strongest satellite presences in Central and Eastern Europe, Spacecom also works with leaders such as HBO for its European cable and IPTV distribution, Ukraine's Inter Media Group and MTV channels, among others.

In 2015, Spacecom's next satellite, AMOS-6, is scheduled for launch and commercial operations will quickly follow its slot positioning. Also to be co-located at the 4 degrees West orbital position, AMOS-6 will be larger than AMOS-2 and AMOS-3 combined, and will incorporate new technologies, such as High Throughput (HTS) Ka-band spot beams for improved broadband Internet access as well as Ku-band technologies.

With a launch weight of 5,500 Kilograms, the satellite will use 9KW of power and offer 39 Ku-band segments and 24 Ka-band beams to provide a wide array of services. Fitted with numerous new technologies that include electronic propulsion capabilities to save on weight and cost, Spacecom expects AMOS-6 to have a long and highly productive life in orbit.

HTS is expected to provide a growing market, worldwide, and already the market is ramping up with various operators and services providers providing packages. With AMOS-6, Spacecom's Ka-band spot beams will enable HTS based services in Central and East Europe as well as be ready to meet the needs of service providers in Sub-Saharan Africa.

As broadband Internet access for the consumer and business markets moves forward—and we are closely monitoring these markets—the company is excited by the opportunities being presented. Broadband service providers will find our spot beams' excellent coverage and high capacity to be a great fit in expanding their offerings.

The HTS capacity and attractive Mbps cost will answer the markets' emerging needs. Spacecom sees AMOS-6 playing a role in providing dual-play with UltraHD content in specific markets; 3G and 4G backhaul to smaller sites to enhance low ARPU; IP trunking; Oil & Gas platforms; and Government services, among others. With the unique coverage and built-in operational flexibility, AMOS-6 HTS is designed to concurrently provide multiple services and the company looks forward to bringing new clients to the AMOS brand.

Taken together, the satellite's technologies will enable Spacecom clients to provide more and higher quality services to their customers. As a larger satellite, AMOS-6 will strengthen the AMOS brand by adding Western Europe to its service capabilities, in addition to Central and East Europe, with the satellite's resources being developed to provide services in parts of Africa.

Though much of Spacecom's business in Europe is broadcast related, telecom and communication related services are also becoming more a part of the firm's operations. The connected world is becoming even more reliant upon satellites for backhaul, redundancy and for QoS over vast areas or mountainous and hard to reach regions.

Today's satellite technologies are certainly becoming more cost effective, as pricing per Mhz is being reduced to better enable service providers to stay ahead of their competition and make their end-customers happier and satisfied with the services being received.

For further information, please visit  
<http://www.amos-spacecom.com>

**About the author**

*Jacob Keret brings to his position more than 20 years of global business and management experience in the aerospace and telecommunications arena. Before returning to Spacecom in 2011, Jacob served for six years as vice president of marketing and sales at Starling Advanced Communications. Prior to that, Jacob co-founded Spacecom Satellite Communication Services. He served as vice president of marketing and sales at Spacecom, and helped build the company into what it is today. Previously, he held the positions of marketing manager and space systems engineer in the MBT Division, Space Directorate of Israel Aerospace Industries (IAI). Mr. Keret holds a B.Sc. in aeronautics and space engineering from the Technion – Israel Institute of Technology and an MBA from Tel Aviv University.*



# Advanced Technologies In Satellite Ground Stations: A SatService GmbH Perspective

By Michael Ulbricht, Managing Director, SatService GmbH

**M**onitoring & Control Systems (M&C) and Network Management Systems (NMS) have always been important sub-systems of satellite ground stations and VSAT networks. However, we see a new trend wherein the importance of that sub-system for the operators and service providers has increased significantly. This demands implementation of new technologies. This article will present some highlights of these new trends and technologies.

## Integration + Interoperability

The technology and implementation of M&C systems has improved so drastically that the equipment of one satellite ground station is not just integrated into one M&C system but into several ground stations. In example, the ground stations all located at a single site are now being monitored and controlled from one server system. This has the advantage of investment and maintenance costs being distributed over a larger number of ground stations—certainly the CFOs of such operations are all in favor of implementing. The decision and subsequent design for such an approach has to be performed quite carefully. The drawback of availability must be considered, perhaps requiring a redundant M&C system.

Another new feature that is much in favor by multinational operators are M&C systems, located at different sites, can now “talk” to one another, exchanging important monitoring information and automatically reacting with special software algorithms, such as site diversity switching, or backup antenna selection and setup.

## User Screens Improvement

Surprisingly to many, engineers don’t operate the M&C systems day by day. This task is performed by operators who are normally not engineers. The operators are not interested in the behavior of installed equipment such as IRDs, encoders or up-converters, just to name some typical satellite ground station equipment.

Operators are interested in performing tasks. For example, in an occasional use scenario, they perform an uplink on Intelsat 905 Trp 81, TX Pol X, uplink frequency 14,123Mhz, RX pol receive frequency 11,105MHz with modulation DVB-S2 16APSK, FEC 3/4, symbol rate 10Msbps. These operators want user friendly graphic user interfaces (GUI) that are dedicated to their workflows and not to simply define the workflow around the equipment. The new technology of modern M&C systems takes this user demand into account and provides more user friendly GUIs. There is also a demand to configure new workflows, even on-the-fly and directly into the M&C system without changing software.

## Integration Of More Functionality

Another user demand and trend is to integrate more functionality into the M&C system. Many different PCs are now necessary in a satellite ground station. This number is being reduced because functionality is being integrated into a single M&C system. Candidates for these PC reductions include: antenna pointing and tracking systems, uplink power control systems and redundancy switching functionality.

Take the transmit system redundancy controller as an example. Some customers still like to have an independent redundancy controller for each sub-system. If the customer decides to procure a TWTA subsystem from a certain company, then there is a tendency to also procure the matching redundancy controller from the same manufacturer. This same customer then decides to acquire an up-converter and DVB-S2X modulators from another company, with the tendency to then also invest in that same manufacturer’s redundancy switching systems, in this case two additional 19-inch drawers, one for the up-converter and one for the satellite modulators. There are now three different units to be procured and interfaced via device drivers into the M&C system, with quite some cost involved.



More operators and system integrators want to integrate these as a single function into the M&C system. The main reasons: cost reduction, fewer rack units to be used, less equipment which can become defective and, therefore, less service interruptions. The redundancy switching philosophy is under local control—no longer does one have to rely on different redundancy switching implementation from different manufacturers which are, unfortunately, not standardized. Certainly the drawback is that you need a stable and reliable M&C system as well as a redundant system, for if you lose the M&C system, the redundancy switching capability is also lost for some period of time.

Another completely different example would be the implementation of uplink power control (UPC) functionality within an M&C system. The M&C system already interfaces to all of a satellite ground station's equipment, so all input data for this UPC functionality is already present. The M&C system has, in real time, the beacon level and beacon frequency information.

The system integrator or the operator owning the M&C system can decide if he or she wishes to adjust the uplink power via the satellite modems' output levels, the gain setting of an up-converter, or even the gain setting of an TWTA—such makes no difference. Certainly also needed is a comprehensive error handling algorithm. A user friendly, open and parameterized software module is all that is required from the M&C vendor.

### Continuous Upgrades Of M&C + NMS

The definition and implementation of new features and standards, such as DVB-S2X, drives the development of new satellite ground station equipment, or at least the upgrades of existing equipment. The operator has to integrate these into their existing M&C infrastructure in a smooth and cost effective manner. Such is definitely not occurring in many cases, thanks to proprietary software implementations in a widely installed base. Operators do not appreciate investing resources into proprietary software drivers and graphical user interface (GUI) upgrades. A trend has become quite clear—operators

will now invest in open, widely distributed, non-proprietary, subsystems. To protect the customer's investments in terms of license costs, operator and administrator training and configuration time, it's important to have an M&C system with a clear upgrade path philosophy. It is most helpful if the M&C system is based on an open platform, such as Linux, with lifetime support to ensure future developments can be acquired, managed and implemented.

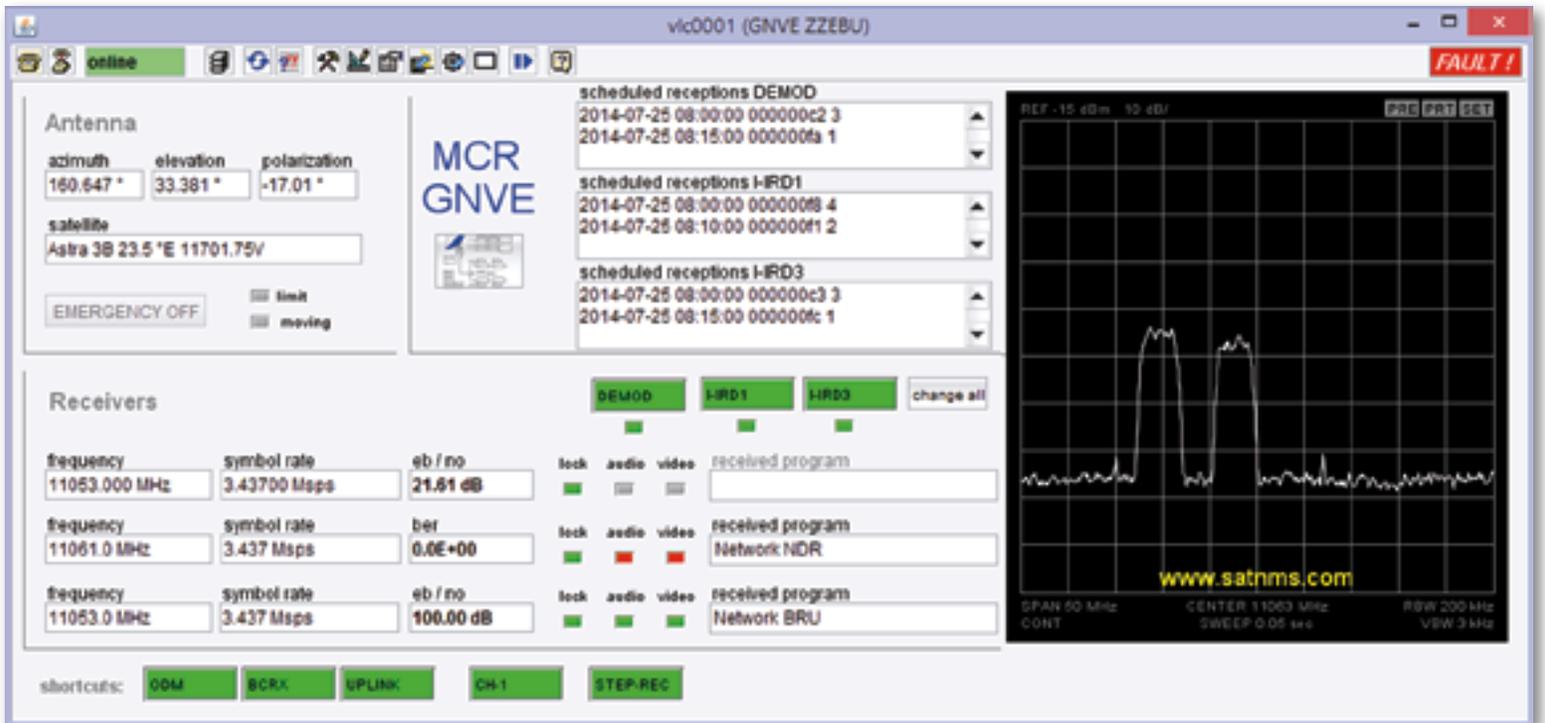
### Scheduling + Transponder Allocation

Operators and multinational organizations like to reduce their overhead when it comes to transponder allocation and usage, especially in the occasional use (OU) applications such as satellite news gathering (SNG) or TV contribution from fixed, uplink stations. There is a growing demand for M&C systems to "talk" to one another and to implement an overall network management system that includes transponder slot management, channel databases for uplink and down-link and, last but not least, complete equipment configurations.

The goal is that the operators in the master control room—normally the site where the NMS is located—have control over the "fleet" of SNG terminals or the various uplink stations that are delivering their contents to different partners. This technology will, in the near future, also be used by smaller organizations in order to reduce overall operational cost—certainly the driver for reducing the cost of transponder usage and manpower.

There remains a lot of room for new technologies and fine tuning for M&C systems. The future will reveal how the various manufacturers will react to the new trends and demands of the user and associated customer requirements.

For further company information, please visit  
<http://www.satservicegmbh.de/>  
<http://www.satnms.com/>



# Executive Spotlight: Christian Allred, Senior Vice President, Int'l Business Development + GM of ORBCOMM Europe

**M**r. Allred is responsible for growing ORBCOMM's business across international markets and managing the company's regulatory and licensing efforts. Under his guidance, ORBCOMM has received approvals to expand into 39 new countries and territories. Mr. Allred has also led an effort to consolidate ownership of key regional Gateway Earth Stations and to expand to new sites around the globe.

Prior to joining ORBCOMM in 2006, Mr. Allred was Vice President of Sales at Enfora, where he managed channel activity with M2M solution companies and telecommunications operators throughout Latin America, Europe and the U.S.

Mr. Allred began his career with MicroAge, Inc., where he held a variety of positions such as Wireless Data Analyst, Program Manager, Director of Marketing and General Manager of Mobility Solutions. Mr. Allred holds a B.A. from Brigham Young University, a M.B.A. from Arizona State University

and a M.I.M. from Thunderbird, The American Graduate School of International Management.

## SatMagazine

*Mr. Allred, what originally prompted you to become involved in the communications industry?*

## Christian Allred

My interest started while I was attending Thunderbird, The American Graduate School of International Management, working on my MBA and doing an internship as a Wireless Data Analyst with MicroAge, Inc. That internship was my entry point into the wireless communications industry. Soon after, I was managing a team that was responsible for developing and marketing mobility solutions that led the company to become one of the first Wireless Data Master Agents for AT&T in the late 1990s. This was exciting, to be



ORBCOMM OG2 Mission 1 launch on July 14, 2014, from Cape Canaveral, Florida. Photo courtesy of SpaceX.



on the forefront of working with the next generation of communications products, and finding innovative sales opportunities using wireless technologies through an extensive network of Value-Added Resellers (VARs) and distributors. There are not that many people in our industry who were in M2M from the beginning. I saw this industry's potential before it began to even bloom, and knew I wanted to be a part of it.

### **SatMagazine**

*What drew you to ORBCOMM?*

### **Christian Allred**

Having spent time leading sales and marketing departments for companies that were either distributing or manufacturing state-of-the-art wireless products, I was looking for an opportunity to move into the network communications side of the business. It was quite clear that the hardware vendors were quickly becoming a commodity, and the competition was fierce. At that time, I decided to make a move towards the network side.

ORBCOMM offered me a great opportunity to leverage my skills and relationships without leaving the industry, and to change the focus to a new aspect of the M2M industry. Learning the importance of recurring service models was a dynamic and exciting change from selling hardware. ORBCOMM has continued to evolve as a solution provider, which has made my position within the organization even more interesting as we put more focus on the problems that need to be solved, and the value of the data that is being provided to our customers.

### **SatMagazine**

*The global interest in M2M... to what do you attribute this attention and growth?*

### **Christian Allred**

The key, in my mind, has been the growing demand for connectivity. If you look back 15 to 20 years ago, we were all amazed at having pagers in order for the office to stay connected with us—then came the cell phone, which enhanced our ability to stay connected even further. Wireless email enabled us to take our office on the road.

Now we want to be connected to our belongings, as well, which is only natural. Whether that connectivity is to our vehicles, machinery, electric meters, cargo or oil tankers anywhere in the world, it doesn't matter. That's why M2M communications is really becoming the Internet of Things (IoT). The possibilities for connecting assets are limitless.

### **SatMagazine**

*Given the broad range of recently-released and in-development third-party M2M technologies, what companies and technologies attract ORBCOMM's attention for possible partnerships or integration?*

### **Christian Allred**

When ORBCOMM began acquiring companies in 2012, we were looking for companies that were well-positioned within their niche markets. We wanted companies that had established leading market positions within their own vertical space, which is why you've seen us acquire companies that specialize in solutions as diverse as temperature recording and monitoring for trailers and intermodal containers, to heavy machinery monitoring.

We have also found that ORBCOMM's strength has been in the ability to scale globally by offering multiple technologies as part of the overall solution through partnering with leading communications companies such as Inmarsat, Globalstar and Tier One cellular carriers. Our customers tend to care about their data and information, and are not as interested in knowing what technology is being used as the means to get them their data. Therefore, that becomes the role of ORBCOMM as a comprehensive solution provider, to consistently be integrating the latest technologies—from wireless sensors, RFID and Zigbee to CANbus, OBDII, NFC or many others—and offering complete, end-to-end solutions—from hardware to web reporting platforms to communications services to device management platforms—so our customers can receive data and manage their assets effectively and economically.

### **SatMagazine**

*Globally speaking, what do you see as the main areas of growth for M2M in the commercial arena?*

### **Christian Allred**

ORBCOMM hasn't really changed its market focus. We still offer connectivity services within our key vertical markets, such as heavy equipment, oil and gas, transportation, maritime and government. We believe there is still growth available in these markets. Of these verticals, I think there is untapped potential for M2M in the oil and gas sector.

With our recent announcement of putting a Gateway Earth Station in the Middle East, I believe we will see incredible potential for new growth in that geography. In addition, each of our new OG2 satellites is equipped with an Automatic Identification System (AIS) payload to receive and report transmissions from AIS-equipped vessels for ship tracking and other maritime navigational and safety efforts. This should greatly enhance our maritime and AIS offerings, as well as fueling additional growth within that sector.

### **SatMagazine**

*How will the recent launch of ORBCOMM's next generation OG2 satellites help expand ORBCOMM's sales and marketing efforts within Europe?*

### **Christian Allred**

We launched our first six OG2 satellites on July 14, 2014, aboard a SpaceX Falcon 9 rocket from Cape Canaveral Air Force Station, Florida. The OG2 satellites were slotted within a fraction of a kilometer of their intended orbit. Each of the six satellites separated, deployed its solar panels and antennas properly, and they established connectivity at ORBCOMM's Gateway Earth Stations around the world.

The OG2 satellites are currently undergoing extensive in-orbit testing as planned and they are expected to provide full commercial M2M messaging and AIS services within 60 days of launch.

This is truly a great time for ORBCOMM and our global customers. The advanced, more capable OG2 satellites will replenish our existing OG1 constellation and will deliver faster service, larger message sizes, better coverage at higher latitudes and increased network capacity, all with reduced power requirements. In regions of the world such as North America, South America, Asia, Europe, Australia and Africa, typical message delivery speeds are expected to improve significantly and average delivery times are expected to be less than three minutes. For example, when it comes to tracking and monitoring high-end assets such as pharmaceuticals, greater coverage and improved latency are of utmost importance, especially in areas with poor terrestrial coverage such as Northeast Europe.

ORBCOMM continues to develop M2M solutions that are capable of working on either our satellite network or the GSM networks. We believe that when customers are truly interested in guaranteeing mission-critical information delivery, they tend to opt for dual-mode communications, which is a blend of satellite and cellular communications.

Customers tell us on a regular basis that the data is the most important piece of the solution, and that they are less concerned with whether their data is sent via satellite or GSM. While owning and operating a satellite network is a major competitive advantage for ORBCOMM, our highly sophisticated, end-to-end solutions – from our award-winning hardware to our advanced web reporting applications to our versatile device management platforms— are what ultimately drives value to our customers around the world.

### **SatMagazine**

*ORBCOMM recently acquired Euroscan, a transportation solutions company based in the Netherlands and Germany. What was the strategic benefit of this acquisition?*

### **Christian Allred**

Euroscan is Europe's market share leader in refrigerated transportation (please see product photo below). Their turn-key systems are used worldwide to ensure the safe and secure transportation of food and pharmaceuticals by monitoring and assuring temperature compliance throughout the supply

chain. The Euroscan acquisition supports ORBCOMM's long-term growth strategy of adding vertical expertise, technologies and geographic markets to strengthen our end-to-end solutions portfolio.

We are very excited about this acquisition as it offers several key strategic benefits. ORBCOMM's cold chain technical capabilities and infrastructure are broadened, enabling us to gain the competitive edge by delivering the most advanced, cost-effective and high-performance solutions in the refrigerated transport industry. The acquisition has also enhanced our international growth platform by adding Euroscan's existing distribution channels in Europe and other key geographies, including the Far East, South America and South Africa, to increase market expansion of our M2M products and services in industries such as transportation and heavy equipment.

We have also gained local sales, technical and engineering support and expertise throughout Europe, which will help us deliver effective products and services tailored for the region. We expect Euroscan's M2M solutions business to grow rapidly in the coming months as we add the entire suite of ORBCOMM's M2M products and services to their broad distribution channels and transition Euroscan to a full transportation service provider.

### **SatMagazine**

*Was ORBCOMM interested in Euroscan because of the specific technology and products that they market?*

### **Christian Allred**

After years of innovation and product development, Euroscan's suite of temperature recording products was unsurpassed by any other company within their market. They were clearly the market leader in Europe. The acquisition has launched ORBCOMM into a new market focused on addressing future FDA food safety regulations. Euroscan helps ORBCOMM meet the M2M demands of food and pharmaceutical companies in North America who are increasingly adopting temperature recording systems that can improve food safety and security. Their advanced technology coupled with their long-time partnerships with premier OEMs in the industry made the acquisition a logical next step for us. However, Euroscan's cold chain monitoring product has only recently become wirelessly integrated. We see an enormous opportunity for growing the deployed base of temperature recorders and enabling the solution to be wirelessly enabled using satellite, cellular or dual-mode communications technologies.

### **SatMagazine**

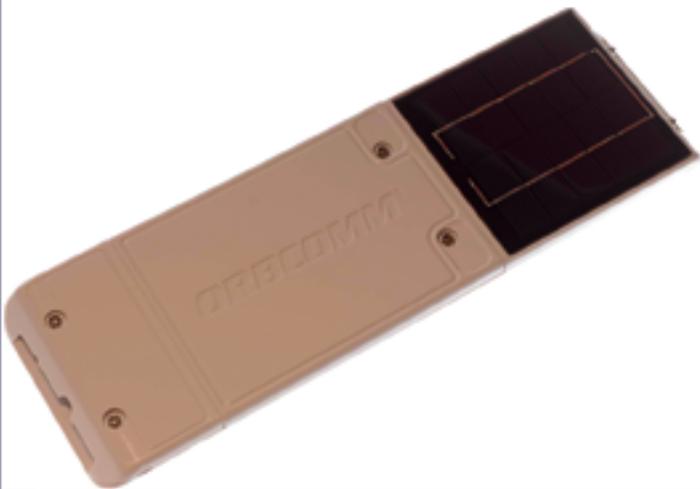
*Throughout Europe, there are often significant compliance requirements in some industries, such as food service distribution. Has the market benefited from technology solutions or has the use of technology alleviated the need for compliance?*

### **Christian Allred**

Technology and compliance go hand-in-hand in Europe. Euroscan's products are directly related to temperature monitoring and compliance requirements that are driven by law in Europe. Euroscan has been extremely successful in helping their customers leverage their products to reduce costs and maximize compliance with these regulations. Similar legislation is being adopted in other major areas of the world, including the



*Euroscan's temperature recording & monitoring device for refrigerated assets.*



ORBCOMM's GT 1100 solar-powered asset tracking solution

United States, and we are poised to enter the North American market with Euroscan's proven solutions.

### SatMagazine

*Has there been interest from European customers in other M2M solutions offered by ORBCOMM?*

### Christian Allred

In addition to our cold chain solutions, ORBCOMM offers a dry van transport solution, the GT 1100 (product photo above), which is a ruggedized, easy-to-install device with a low profile and sleek design that makes it easy to install on almost any type of fixed or mobile asset that requires tracking or monitoring. The GT 1100 is sensor-compatible and self-powered with solar recharging technology for low power consumption and long service life, which eliminates the need for frequent battery changes.

This solution complements Euroscan's sales strategy and offers new revenue opportunities with their existing customers that have mixed fleets with both refrigerated and dry van assets. In the past, Euroscan was only able to address one aspect of the customer's fleet, and now we are able to address both the refrigerated and dry van market.

European customers have also expressed interest in our GT 2300 intermodal container tracking and monitoring solution, especially given the large number of international ports and extensive cargo traffic throughout the continent. This unique device is designed to fit internally within the container corrugations to avoid damage during cargo loading, unloading and movement. The GT 2300 combines position, load stage, door events and cargo status to help customers reduce container idle time and gain greater visibility to their loads (product photo is shown at the top right of the next column on this page).

In addition, ORBCOMM's heavy machinery monitoring solution has been well-received throughout Europe. We offer a complete, end-to-end solution tailored for any size fleet in any geographic region that also supports the full value chain—from OEMs to dealers to fleet owners. The ability for OEMs to monitor their heavy machinery assets anywhere in the world using ORBCOMM's dual-mode technology solution has led to greater asset productivity and



ORBCOMM's GT 2300 dry intermodal container monitor solution

utilization by their end users, reduced downtime for maintenance concerns by the dealers and increased quality and reliability from the manufacturers. Combine these benefits with the ability to communicate with an asset to and from anywhere in the globe, and you have a winning combination.

### SatMagazine

*Is ORBCOMM increasing its presence within the government and military market sectors?*

### Christian Allred

In 2013, ORBCOMM acquired GlobalTrak, an information services company that uses satellite and cellular communications and sensors to deliver real-time situational awareness and intelligence to improve logistics and security processes and operations in support of the Defense Logistics Agency, U.S. TRANSCOM, Maersk and LoJack, among others. The acquisition of the GlobalTrak business has helped ORBCOMM to expand its end-to-end solutions portfolio into new geographic regions, including the Middle East, Asia and South America, as well as helping to increase our presence in the government sector.

ORBCOMM's partner, Savi Technology, was awarded the five-year RFID-IV contract from the U.S. Department of Defense to provide cargo visibility solutions. The Indefinite Delivery, Indefinite Quantity or IDIQ program, for which Savi has a \$102M current spending cap, is an ideal contract vehicle for many branches of the U.S. military to procure ORBCOMM satellite solutions for transportation and cargo security. This opportunity has opened up new avenues to ORBCOMM for providing our telematics solutions to the government through an established, secure contract.

We also recently announced an agreement with CorpTen International, a leading provider of complex tracking and management solutions to government customers, to offer a suite of ORBCOMM M2M products to the U.S. government under their GSA schedule. Being on the GSA schedule has been one of our goals, and that is an integral part to growing our U.S. government business. We will now be able to provide additional government customers with easy access to our products through this vehicle.

Additionally, ORBCOMM's satellite Automatic Identification System (AIS) business, which is used for ship tracking and other maritime navigational and safety efforts, provides service to both commercial and government customers, such as the U.S. Coast Guard, foreign Navies and other international maritime authorities. By using ORBCOMM's AIS service, security and intelligence departments around the world can know where nearly every large vessel is located, where it's going, and when it will get there. These agencies can use this valuable data to quickly react to anomalies at sea such as suspicious movements, route deviation and other unusual behavior.

ORBCOMM plans to continue expanding our reach in the government and military markets through the use of these advanced solutions. What is interesting to watch is how governments continue to affect and create change. As mentioned earlier, compliance to federal regulations (such as the Food Safety Modernization Act) continues to provide ORBCOMM an opportunity for growth within our vertical markets as our customers seek to maintain compliance.

### **SatMagazine**

*Could you tell us about ORBCOMM's Gateway Earth Stations and the roles they play?*

### **Christian Allred**

ORBCOMM's strategically-placed GES facilities located throughout the world connect our satellite constellation to our ground-based network infrastructure.

In addition to providing links to our fleet of first generation OG1 satellites, ORBCOMM's global network of GES facilities will also enable us to deliver the advanced services to be provided by our recently launched OG2 satellites,

making ORBCOMM's M2M communications offerings even more efficient, reliable and globally available.

We recently made progress on improving our ground infrastructure so that we can deliver the best satellite M2M product in the industry. In the Middle East,



*The SpaceX launch of ORBCOMM's OG2 satellites. Photo is courtesy of SpaceX.*

our partner Mahd Telecom based in Muscat, Oman, has been granted regulatory approval to provide ORBCOMM services there. This service authorization allows for installation of a new Gateway Earth Station in Oman, and completion of the radio spectrum licensing process.

This is a major opportunity to improve service levels in the region. This also gives us satellite access to a new major market for deployment of ORBCOMM solutions.

In South America, we recently purchased the Gateway Earth Station (GES) in Rio de Janeiro, Brazil, completing our ownership consolidation of all Western Hemisphere GES facilities. Given the Brazilian GES's key location near the Brazilian coast, and between our GES's in Curacao and Argentina, it will bring increased efficiencies and service reliability enhancements to our customers throughout the Americas, the Atlantic Ocean and even parts of Africa.

### **SatMagazine**

*When are the remaining OG2 satellites expected to launch, and what will they bring to your business efforts?*

### **Christian Allred**

We anticipate launching the remaining eleven OG2 satellites and enhanced OG2 services as early as the end of the fourth quarter of 2014 to complete our next generation constellation. Each OG2 satellite will offer up to six times the data access, and up to twice the transmission rate of an existing, first generation OG1 satellite. Each OG2 satellite is the equivalent of six OG1 satellites, providing faster message delivery, larger message sizes and better coverage at higher latitudes, while drastically increasing network capacity.

Additionally, the higher gain will allow for smaller antennas on communicators, reduced power requirements and yields a longer battery life. Our high-performance OG2 satellites will average from 100 to 140 passes per day, depending on latitude, providing near-continuous global coverage. The OG2 satellites are also completely backward compatible, and interoperable with the existing OG1 network so they will communicate seamlessly with the ORBCOMM devices already deployed in the field.

In addition, the OG2 satellites are equipped with an AIS payload to receive and report transmissions from AIS-equipped vessels for ship tracking and other maritime navigational and safety efforts. The OG2 satellites will dramatically increase asset visibility and the probability of detection for ORBCOMM's AIS customers. These improvements will have a major impact on enhancing network service for ORBCOMM's customers and increasing the M2M markets they can serve, while continuing to support the reliable mission-critical communications available today through ORBCOMM's current OG1 network.

### **SatMagazine**

*Over the next couple of years, what can we expect to see occurring from ORBCOMM? With M2M?*



### **Christian Allred**

We are excited about the recent launch of our OG2 satellites, which will significantly enhance network performance and improve global coverage for ORBCOMM's customers around the world. We expect to build a Gateway Earth Station (GES) in the Middle East that will become operational at the beginning of next year.

While I believe ORBCOMM will consistently be looking for further acquisitions to support our growth strategy, we are focused on providing the most comprehensive portfolio of M2M solutions to our current customers, as well as expanding our market reach through new vertical markets and geographies.

### **SatMagazine**

*With your experience in this industry, when you look back at your career, what project or projects truly bring to you a sense of deep satisfaction?*

### **Christian Allred**

While there have been a number of key projects I've enjoyed working on at ORBCOMM—such as launching an end-to-end heavy equipment monitoring solution for Doosan, a leading global OEM, consolidating the ground infrastructure segment of our network and helping pave the way for new GES's to be installed in South Africa and Oman—the excitement and satisfaction I get on a daily basis really comes from seeing how we can solve potential problems for our customers to help them operate their business smarter and more efficiently.

I think ORBCOMM has exemplified this as an organization, and has continued to change and evolve as the needs of our customers have changed and evolved as well. The ability to help solve our customers' problems is what adds to ORBCOMM's long-term value to the company. Rather than looking back, I'm looking forward to see what the next big project might be.

For further information regarding ORBCOMM, please visit <http://www.orbcomm.com>

# Powering The NexGen Of Inflight Connectivity: An Inmarsat Perspective

By Miranda Mills, President, Inmarsat Aviation

**A**vailable for airlines in 2015 will be GX Aviation. This will be the first—and only—Ka-band network that will provide consistent coverage, delivering 50Mbps to aircraft, everywhere in the world.

Inflight entertainment (IFE) has come a long way—gone are the days of waiting an hour for a movie to be projected onto the bulkhead. Today, passengers want to watch live news as it happens or watch their favorite program when it suits them; video on demand has become the norm. People also want Internet access at the same speed they receive on the ground so they can stay in touch with the office, connect to social media, play online games, and make video calls if they wish—they expect all of these capabilities wherever they fly.

Passenger experience is an on-going competitive battleground and cabin connectivity is the latest frontier. Connectivity solutions have been around for some time but don't yet replicate what we're

used to using on the ground, in terms of speed, coverage and price.

## **GX Aviation: For The Future**

GX Aviation changes the IFE paradigm—the technology will uniquely provide customers with the ability to deploy new types of solutions and services at a less expensive price, at a higher speed and with higher bandwidth.

Perhaps the most important element is that GX Aviation will be available across the globe. GX Aviation will offer the most extensive coverage of airline routes and the services in demand are all provided by a single operator, not a patchwork of service providers that's been stitched together.

As you fly across time zones, passengers will have a continuous, consistent service as traffic is handed seamlessly across each spot beam, and from one satellite to another. Using GX Aviation, passengers can connect with their smartphones, tablets and laptops over a WiFi hotspot or onboard cell phone network, wherever they fly.

In addition, Inmarsat enables all of the operational and safety communications for the flight crew through the Classic services. An entirely new set of applications will become available with GX Aviation. We already know what some of them will be; many, many others will be developed, once GX is flying and people come to truly understand the potentials.

Some of the applications supported by GX include real-time TV and on-demand TV. High-speed broadband Internet access will provide much enhanced browsing, as well as enabling video calling and voice over IP. GX Aviation will also provide enough bandwidth and

capacity to replicate 4G cell phone services. In addition to the passenger applications, the range of flight deck and cabin crew applications that will be powered by GX Aviation are only just starting to be explored.

## **Technology Excellence**

Inmarsat has been operating the most reliable commercial satellite communications network for more than 30 years and quality of service is fundamental to our business. For safety services and extra resilience, GX Aviation is complemented by Inmarsat's Classic Aero and SwiftBroadband services on the Inmarsat-3 and 4 satellites, which deliver on average 99.9 percent network availability. This is the only satellite network that combines Ka- and L-band technologies.

## **Set For A 2015 Launch**

GX Aviation is on track to be available to airlines during the first half of 2015 and the announcement of the first customer is imminent. The first satellite, covering the Indian Ocean region, is already on orbit and is currently undergoing onsite acceptance testing. The satellite is connecting to maritime terminals with great success and is on track to start a regional service in Q3 of this year.





*Artistic rendition of an Inmarsat 5 Global Xpress satellite.*

The second satellite is being readied and will ship to the launch site in Baikonur, Kazakhstan, in Q2 2014 for subsequent launch. This satellite will cover the Atlantic Ocean region and the Americas and is scheduled to be in service by January of 2015.

F3 will complete the constellation, covering the Pacific Ocean region and has completed the mechanical environmental and thermal vacuum testing at Boeing's El Segundo facilities in California. F3 is scheduled for launch during late summer and is due to reach its final orbital position by the close of 2014.

Each satellite is served by two ground stations, the first two operational, with the others being on track to meet the satellites' needs when they are launched.

Honeywell is responsible for the development and production of the GX Aviation avionics. Following the completion of the successful Critical Design Review in February, the program has entered the production phase. Honeywell has signed an agreement with Air China to test GX Aviation on the carrier's A330 aircraft during the second quarter of 2015.

## What's Next?

GX Aviation is available to airlines through a range of partners, including Gogo, OnAir, Rockwell Collins and Thales. They have all been talking to airlines around the world and the announcement of the launch airline customer, as stated earlier, is imminent.

Once the constellation of satellites is flying and operating, early next year, the next major step will be having passengers use the power of Inmarsat's global Ka-band network. GX Aviation is coming to an airline near you quite soon.

### **Business Aviation—Jet Connx**

*For business travelers, picture this—you're on your laptop, checking your latest stock price. Every now and then you look up to catch the live news on TV. In between, you're looking at the weather forecast on your smartphone. Seconds later, it rings. It's your daughter wanting to know if you bought the cinema tickets for the weekend. You haven't done so—you book online while you're talking and cruising at 5,000 feet over the Atlantic in your business jet.*

*All this will happen with JX, which will uniquely provide customers with the ability to deploy new types of solutions and services at a cheaper price, at a higher speed, with higher bandwidth and truly global coverage. You will connect to JX with your laptop, tablet and smartphone over your WiFi system from the moment you step on board, wherever you fly.*

*JX will allow you to do all the same things you would back at the office, even hold a videoconference while you're flying. Or if you'd rather kick back and relax, you can download a movie or watch the game live at the same time as you would back at home. Inmarsat also enables all the operational and safety communications for your pilot—this is one solution you will want on board.*

*As you fly across time zones, you'll have a continuous, consistent service as traffic is handed seamlessly across each Inmarsat satellite, and from one to another. Services will be delivered over the company's nexgen of satellites, the Inmarsat-5s.*

*The first satellite was successfully launched in 2013, providing coverage over Europe, Middle East, Africa and Asia. The second satellite will cover Asia-Pacific and full global coverage is planned for the end of 2014.*

For information regarding GX Aviation and Jet Connx, visit <http://www.inmarsat.com/about-us/our-satellites/global-xpress/gx-aviation/>

# SatBroadcasting™: TV Receive Only (TVRO) In The 21<sup>st</sup> Century

By John Kerkamp, Consultant, for Superior Satellite Engineers

**In the past, it was quite simple—satellites transmitted one analog program per downlink channel. However, all that changed in the early 1990s, with the advent of digital transmission systems and modulation methods which allowed data rates high enough to incorporate multiple programs per channel. Still, moderate-sized antennas worked well enough for the new digital signals that little change was required at existing Earth stations.**

Then came high-definition television (HDTV), requiring higher data rates, and then more programs per channel, requiring even higher data rates. Higher-order modulation methods were developed to carry the higher data rates in the same channel bandwidth. And Earth stations began to struggle to maintain signal reliability for the downlink signals.

Now, still higher data rates are being proposed with modulation methods to match. The old antennas will no longer be able to keep up with the requirements for these new signals. Here's why: Classic digital signals, used for low data rates, used a two-condition transmission method. A "bit" of data was represented by one condition, the absence of a "bit" by the other condition (typically called a "state" in the industry).

Because the differences between these two states were easy to distinguish, the transmission was quite robust and error-free. However, as data rate requirements increased, the number of transmitted "states" was increased, using discrete phase shifts to indicate groups of bits, then discrete amplitude changes, then combinations of these methods to indicate still larger groups of "bits."

These advances allowed dramatically faster data rates for the digital transmissions. But, with these advances came problems. Because of the increased number of "states" in the transmission, the difference between the "states" became quite small, making them difficult to distinguish from noise at the receiving end of the system.

The signal-to-noise ratio became a more important factor in maintaining reliability of reception. For most TVRO operators, their existing antennas were adequate, if just barely. Now, new, higher-order modulations methods are being proposed, and it is quite certain they will come into operation in the not-too-distant future. These new systems will have even more data "states" than the existing systems, making them much more subject to data errors caused by system noise.

In order for these new higher-order transmission systems to maintain a high reliability factor, the system signal-to-noise ratio will need to be much better than that required for the older digital transmission systems.

There are two basic ways to improve the signal-to-noise ratio in a TVRO system. One is to increase the power of the transmitted signal. But modern satellites already employ the latest transmitter technologies, and,

for the older satellites, replacing them is typically a multi-hundred-million-dollar process.

The other way to improve the signal-to-noise ratio is to use an improved receiving antenna. We need to digress for a moment, and talk about "noise."

"Noise" in a satellite receiving system comes essentially from two sources—the first amplifier in the LNB (*Low Noise Block downconverter*), and extraneous signals picked up by the antenna. Modern LNBs employ state-of-the-art electronics and little or no improvement can be anticipated there.

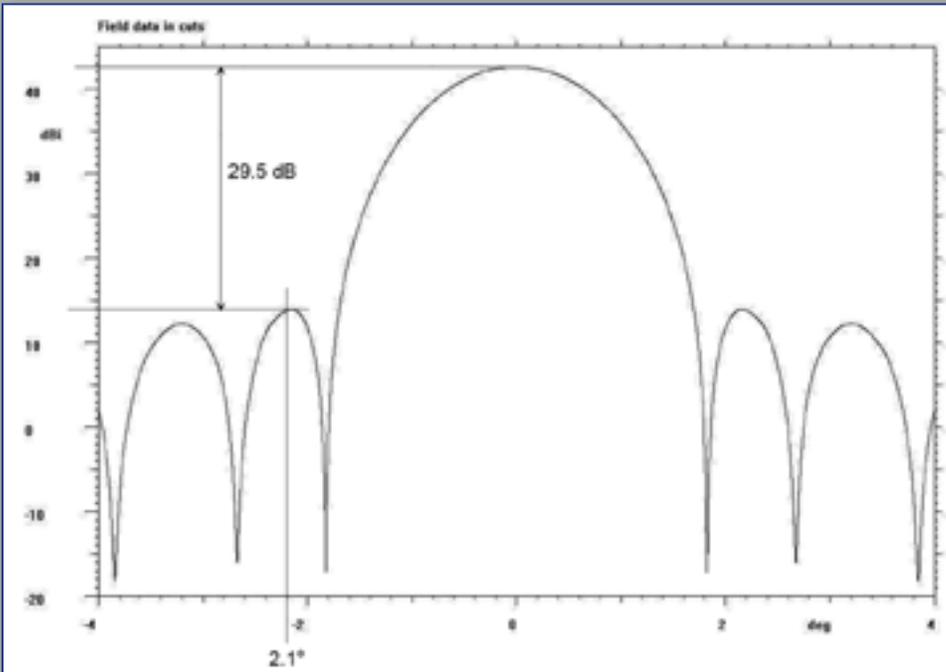
However, in most TVRO operations, the antenna can be improved to reduce these extraneous signals. Many TVRO operators installed 3.7 meter antennas years ago and are still using them today. For the current digital transmission systems, they are adequate, but just barely. For the new proposed systems, they simply will not do the job. The problem, as mentioned before, is the pickup of undesired signals by the antenna.

Remember that all the TVRO satellites transmit with the same channel frequency lineup, with adjacent satellites having the polarizations of the channels reversed from each other. Therefore, for any given channel on any given satellite, there may be two adjacent satellites transmitting on the same channel frequency, with reversed signal polarization. As the satellites are spaced only two degrees apart in the geosynchronous orbit, the signals from the two adjacent satellites can easily be picked up by the sidelobe responses of the ground antenna, and can enter the receiving system as "noise."

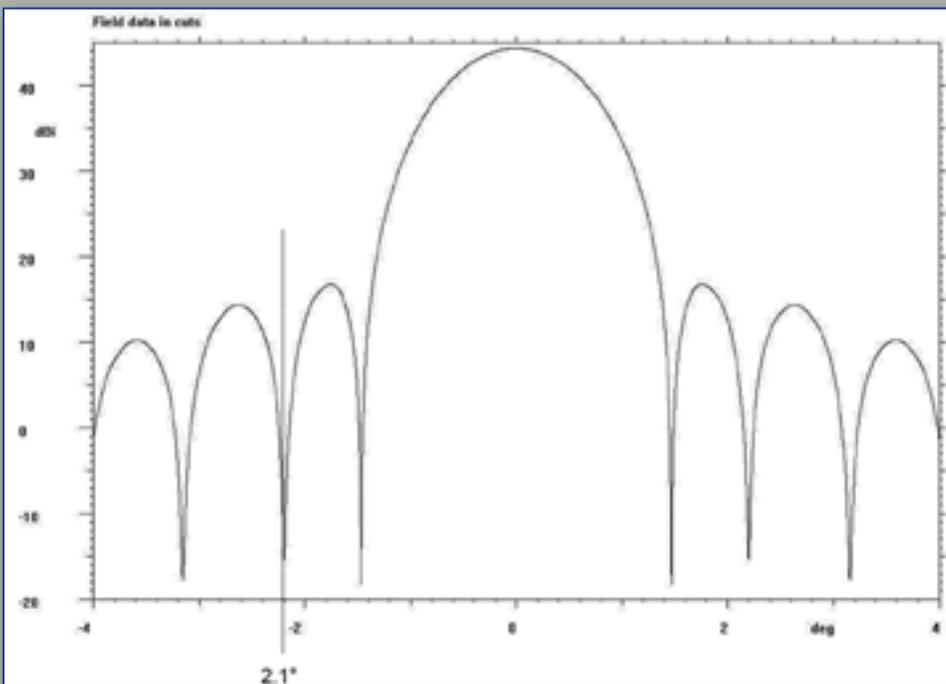
The two diagrams on the next page will show why the selection of the antenna will be critical for new and upgraded TVRO systems. The first plot shows a typical sidelobe response of a 3.7 meter antenna, a widely-used antenna in TVRO operations. Note that the first sidelobe peaks at 2.1 degrees offset from the main lobe, and is down about 29.5dB. This sidelobe response allows considerable energy from the adjacent satellite to enter the receiving system, and potentially interfere with reliable reception of digital signals.

*A note here—although the satellites are spaced at two degrees, that spacing angle is based on the center of the Earth. Actual differential look angles from the surface of the Earth are slightly greater. Thus, the attention to the response of the antenna at 2.1 degree, rather than at 2.0 degrees.*

The next plot shows the same type of sidelobe pattern analysis for a 4.5 meter antenna. The 4.5 is also a popular size, but was often overlooked in the past, as it is more expensive than the 3.7 meter antenna and the 3.7 was adequate for the older transmission methods.



3.7 Meter Antenna Standard Illumination



4.5 Meter Antenna Standard Illumination

Notice that the 4.5 meter antenna has the second null in its sidelobe response pattern at exactly 2.1 degrees. This null allows this antenna to dramatically reject the signals from the two adjacent satellites.

In conclusion, it is sure that new, higher-order modulation methods for satellite transmissions will not work well with older antennas, due to adjacent satellite signals entering the system through the relatively high sidelobe responses. New antennas will be required, which must be designed to have sidelobe responses properly placed to effectively reject the adjacent satellite signals.

**About the author**

John Kernkamp has been involved in satellite communications since the mid-1980s, including design, construction and implementation of satellite communication systems, and serving as chief engineer in the restoring of a decommissioned ATT uplink station to provide modern satellite communication service. He currently offers consulting services.



**About Superior Satellite Engineers**

For more than 30 years, Superior Satellite Engineers has been a leading provider of respected satellite access products and services to TV industries, featuring the popular Navigator series steerable satellite antenna systems, fixed antenna systems, and our "Best in the Industry" Multiple-Satellite (MBF) Feed Systems. The MBF products configure a single existing or new satellite antenna to access programming from as many as three adjacent satellites. SSE has provided more than 20,000 retrofit MBF Systems worldwide for virtually every commercial-quality prime focus satellite antenna, ranging in size from 3.7 meters up to 11 meters in diameter .

For additional information regarding Superior Satellite Engineers, please visit <http://www.superiorsatelliteusa.com/>

# SATCOM Points To Ponder: From Devices To Super Yachts

By Sally-Anne Ray, Managing Director, NSSGlobal

**S**atellite communications have come a long way since Sputnik 1, the world's first communication satellite, which was launched into orbit by the Soviet Union on October 4, 1957. Fast forward more than half a decade and now, making phone calls, sharing documents and emails as well as accessing a network from anywhere in the world has become the reality. Indeed, some would even say rather commonplace. However, what's next?

Where are satellite communications (SATCOM) heading in the near to distant future?

While perhaps an obvious point, the biggest focus for the satellite communications industry is to provide increased speeds. As the global proliferation of smartphones and tablets, combined with the need to be 'connected,' continues to gain momentum, SATCOM must keep pace, offering more capacity and bandwidth.

According to the research group BI Intelligence, at the end of 2013, 6 percent of the global population owned a tablet, 20 percent owned PCs, and 22 percent owned smartphones. Considering there are approximately seven billion people populating Earth, this means an incredible 1,540,000,000 of them own a smartphone.

What's more, users continue to accomplish more tasks on their devices, with potential use definitely set to dramatically increase in the future. Watching television on mobile devices has become a part of everyday life for many—whether using an unlimited subscription service such as Netflix to view films, or watching YouTube clips. M-payments and mobile banking have given smartphone users more flexibility in terms of managing their finances—many already use their phone as a debit or credit card. Furthermore, smartphones are being used for health or fitness monitoring, calorie counting and other important daily activities.

All of these widely used applications consume large amounts of data, making them bandwidth-heavy. This means their operations must be carried out across a robust network connection to ensure a positive user experience.

The impact of this on the SATCOM market is that as such uses become commonplace, people expect to use their devices, regardless of where they are located in the world. Being in the middle of the ocean or in

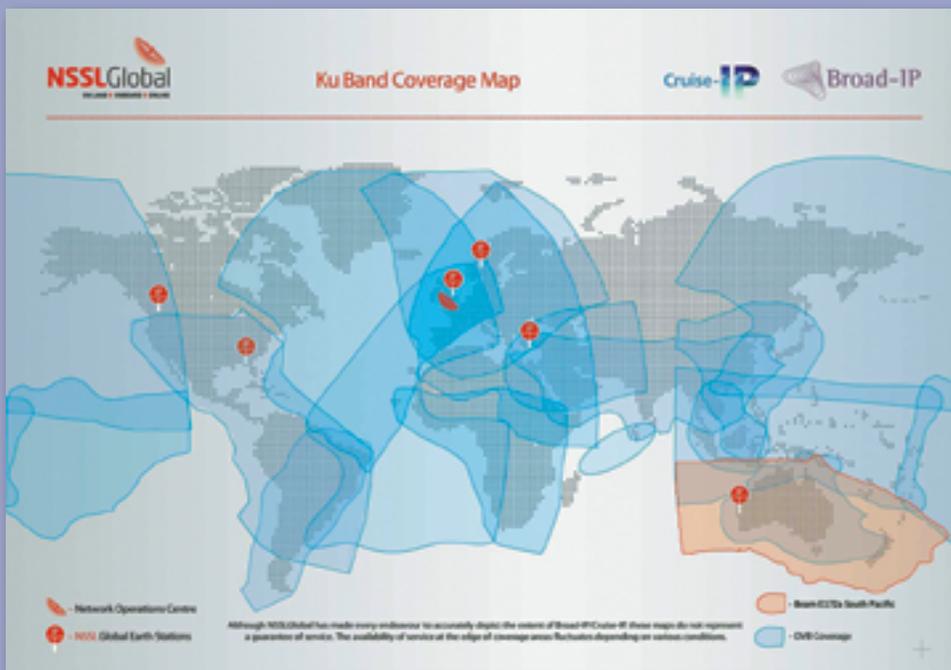
the heart of the desert is no longer seen as a barrier to going online or communicating with the rest of the world. People increasingly assume they will be able to enjoy their online activities whenever such are needed, rather than consider such a luxury.

The SATCOM industry is, and will continue to, respond to this challenge by offering faster connections. In many ways, this is akin to the transition from 3G to 4G on a traditional mobile network. Within the SATCOM market, the superyacht industry is leading the way as early mobility adopters as crews and passengers demand more speed. Unsurprisingly, superyacht owners and charterers who have the financial means are making certain that those on board their vessels can use smartphones and tablets to access the services they want, when they want them, regardless of their location.

Some recent research we conducted found that 90 percent of superyacht owners offer Internet access on board, with a VSAT connection being one of the most popular and currently in use on more than two-thirds of these vessels. Interestingly, almost half of all superyacht owners expect their Internet connection to offer the same experience, or at least nearly the same experience, as what is enjoyed at home. This underlines the pressure that SATCOM service providers are under to deliver faster access with lower latency, increased coverage and availability.

While the SATCOM industry will be responding accordingly with High Throughput Satellites (HTS) on orbit over the next few years, users at sea must continue to be educated as to the expectations they should have as far as various SATCOM packages are concerned. Important to remember is that SATCOM and traditional mobile networks are not identical.

For example, those using SATCOM services need to remember to turn off automatic updates and to delay that hungry app download during peak service times—this ensures fair usage for all. While increasing the speed of satellite networks is a necessity, also vital is that service providers and customers work together to make the most efficient use of the bandwidth that is available.



NSSL Global infosite:  
<http://www.nsslglobal.com>

*About the author*

Sally-Anne Ray has been Managing Director of NSSLGlobal since July of 2013. Sally previously held the position of Sales Director and then Chief Operating Officer at NSSLGlobal and has been active in the global satellite and communications industry for more than 20 years.



# ***A Competitive Business Essential: Audio Networks Flexibility***

By Werner Drews, Managing Director, 2wcom

**T**he widespread revision and restructuring of satellite infrastructure taking place in the audio market today is due to a number of causes; the most important being the need to replace the outdated 1gen of satellite receivers, and the new palette of possibilities offered to audio broadcasters by audio over IP.

Broadcasters attempting to purchase the older generation or receivers find that such is no longer possible—plus, that equipment is inefficient in bandwidth use. The drive to greater operating economies is a powerful incentive to upgrade to receivers supporting more efficient standards, such as DVB-S2, as well as use the upgrade process to investigate the potential for audio over IP, or a hybrid combo of IP and satellite.

## ***What To Look For***

Certain trends are emerging as leading players investigate the potential of new satellite standards and look at how satellite can be combined with IP. Flexibility is one of the main requirements for many, and this reflects the

wide variety of ways that broadcasters construct their infrastructure and the necessity of keeping options open to future change.

Flexibility—a key requirement for achieving economies as well as for raising revenues through regionalization. A more flexible generation of hardware is allowing operators to experiment with IP and IP/satellite hybrids more easily, in search of economies and more sophisticated regionalization. Broadcasters also want to improve their backup capabilities. The latest generation of hardware can make backup easier and more cost-effective to implement.

Broadcasters also want the flexibility offered by hardware based on open standards, rather than proprietary technology. Some manufacturers remain committed to the proprietary model. However, broadcasters are wise to steer clear of those models so they avoid getting locked into a single supplier and limited in their options for future network development.



Operating economies are, of course, high on the needs agenda for any network. The greater efficiency of DVB-S2 offers valuable savings. For even better use of bandwidth, broadcasters can install receiving devices that support codecs such as AAC and eAPTX. These codecs are ideal for studio-to-studio transmissions as the technology allows re-encoding of audio as many times as needed—without loss of quality.

Although audio content distribution by satellite is still the most reliable method, broadcasters are increasingly considering the possibility of OPEX reductions through the use of IP over DSL lines. IP can have a very useful role to play in audio distribution. If the hardware they select is flexible and incorporates built-in technologies such as FEC (Forward Error Correction) to improve the quality of IP transfers, broadcasters can be confident about using IP in their overall solution. IP support in today's generation of satellite receivers gives broadcasters the option of using IP easily, if they wish to do so.

To meet these diverse requirements, the latest generation of hardware concentrates a wide range of functionality into a single chassis. This means that 'satellite receiver' is more or less obsolete as a term, as the best of the new devices can receive from IP as well as satellite. Advanced regionalization capabilities, backup solutions and more are combined into the same unit. 'Contribution device' may be a better description.

With the implementation of technologies like dual streaming and FEC, the best of the new generation of devices can increase the security of IP transmission—different types of IP feed, such as RTP and Icecast, are supported in order for operators to accommodate any kind of source and network configuration.

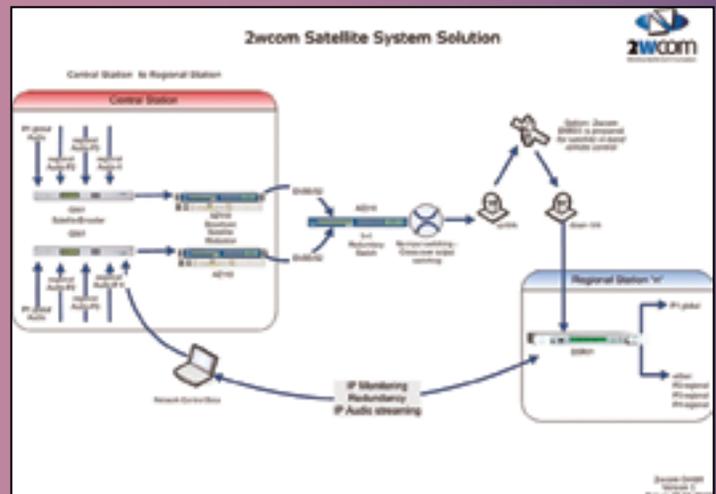
The interplay between IP and satellite varies from broadcaster to broadcaster. Those that go all-out for the economies of contribution over DSL lines may feel more able to do so if the infrastructure they have installed allows them revert to satellite whenever they want, without further capital cost.

### Nothing Quite Like A Solid Mix

Another approach is to use a mix of IP and satellite as part of the backup strategy (with either IP or satellite as the main feed), or to achieve economies by sending some content—perhaps content of less critical importance—via IP, while using satellite for most of the feed. An example of this approach would be the broadcaster who contributes regionalized content via IP, while using satellite for the national feed. If the IP contribution of regionalized content fails, the regional audience then hears the national feed instead.

By concentrating the functionality required for regionalization into the same unit that receives the content, manufacturers allow broadcasters to dispense with limitations of a separate (usually PC-based) regionalization installation. The integrated contribution device can offer a highly streamlined, cost-effective and robust solution by receiving regionalized content either by a different route from the main feed (such as a DSL line), or in a side channel if satellite is used exclusively.

The regionalized content is stored onboard and, when a trigger signal from the headend is received by the device, that content plays out immediately. When a broadcast is implementing a regionalized operation over a network



of several hundred receivers, the integrated contribution device is a much more efficient way to manage the process.

An integrated contribution device like this is also much easier and economical to operate remotely. With an optional dual power supply, and remote management inclusion, feature upgrades and software updates are far smoother to implement. Remote control and management can be effected through IP or directly by satellite through in-band control (SIRC). Built-in snmp support facilitates the integration of the devices into a network management system.

The broadcaster will find even more flexibility if the contribution device offers extremely accurate synchronization capabilities between multiple transmitters. This allows for the implementation of single frequency networks to optimize the use of FM frequencies as well as offering a valuable asset in non-SFN configurations to have micro-second accuracy built into the infrastructure.

More than ever before, equipment choice today has the potential to influence—positively or negatively—the future broadcaster's business evolution. In today's highly competitive commercial and technical climate, one that is far more fluid and diverse, flexibility and the ability to adapt, improve and grow without limitation is no longer a luxury—such is a key requirement to include in any new technology purchase.

For further details, please visit the company's infosite at <http://www.zwcom.com>

#### About the author

Werner Drews is the founder and managing director of Zwcom Systems GmbH, a leader in the field of systems for wireless and digital information transfer. Holding a degree in Electrical Engineering and Computer Engineering, Werner Drews was a senior product manager with Rohde & Schwarz before establishing a spin-off company to develop products for FM/RDS systems. The company was founded in 1996 and is now a subsidiary of the WISI Group.



# Global Real-Time Tracking + Monitoring For Aircraft

By Jean-Louis Larmor, Vice President, Corporate Development, STAR Navigation Systems Group, Ltd.

**Over the first part of 2014, the news has been focusing on several tragic aerospace accidents and on the necessity to efficiently track aircraft fleets around the world.**

Star Navigation Systems Group Ltd., a leading-edge Toronto and Montreal based Canadian technology company, has presented the aerospace community with a complete solution for monitoring all aircraft and helicopter. This solution provides asset tracking and also monitoring and has already been demonstrated and validated end-to-end from the aircraft to the ground stations and operators. This solution is now offered to airlines and operators and is already being implemented on several aircraft and helicopter types.

Star has developed the STAR-ISMS® In-Flight Safety Monitoring System, the heart of the STAR Airborne Data Service (STAR A.D.S.™). This is the first system in the world that features in-flight data monitoring and diagnostics with real-time and secure connections between the aircraft and the ground, using satellite communications, and has been certified by world transport authorities that include the FAA and Transport Canada.

STAR A.D.S.™ real-time data transmissions enhance aviation safety, facilitates and reduces aircraft maintenance costs, reduces their carbon footprint, all the while providing the opportunity to dramatically increase airline profits. This application answers the critical requirements of modern airlines and operators as well as meeting governments' suggested regulations:

- *Tracking the airplanes and knowing where they are located on a continuous basis, a need that has recently been tragically placed at the forefront of everyone's attention*
- *Saving on costs that range from maintenance to fuel consumption and the time spent collecting, storing, and analyzing all of the relevant data for airline operations*

Star is now implementing the Airborne Data Services (ADS) to airlines as well as developing new applications for environmental monitoring and additional added-value services for operators.

The overall STAR A.D.S.™ is articulated around three elements:

- *The on-board part of the system, the STAR-ISMS®, collects all data existing on-board a modern aircraft, which is producing enormous amounts of data that is being filtered and routed through aircraft computers and converted into different data sets—some of this information is stored in digital flight data recorders (DFDR) commonly known as the 'Black Box.' The data are sorted, formatted and encrypted on-board the aircraft and then transmitted through an Iridium satellite.*

- *Through compression and use of the Iridium worldwide constellation, the system allows for an economical and secure transmission of this crucial data, with full global coverage to ground stations. The data flow from the aircraft comes "live" to a STAR Navigation communication center and is then distributed to the customers or as direct feeds to the airline Operations Center.*

The ground segment of the STAR A.D.S., which is a platform hosted by the customer, receives, and decodes the transmitted information for display in real-time and also builds the performance data base and the mandatory documentation for an airline.

In terms of regulations, ICAO Annex 6 dictates that any civil or commercial airline/operator having an all, up weight of 27,000kg or more must have a flight data monitoring (FDM/FOQA) program in place. Star A.D.S meets these regulations. The product provides a fully seamless and automatic way of calculating and determining various aspects of FDM/FOQA. This is all done in real-time and through all phases of the flight.

The real-time FDM/FOQA analysis is done on the aircraft while it is flying, providing and analyzing key elements for airplane operations such as attitude, configuration changes, parameter exceedances and more. All these data have impacts on an aircraft, its performance, and operations. In addition, STAR A.D.S.™ provides real-time processing of flight data as the aircraft is flying in terms of:



- *Maintenance Operations Quality Assurance*—providing maintenance related information
- *Engine Condition Monitoring*—a tool to monitor engine trends and failure predictions
- *Real-time 'Situational Awareness,'* with flight following, where the plane is located and how the aircraft is flying
- *Aircraft Systems and Sub-systems degradation*—real-time information regarding the entire aircraft

STAR Navigation has developed a comprehensive suite of added-value services for operators to make use of the now-available data and information received on the ground that includes:

- *Nominal tracking and following of the aircraft with geo-localization and "health" snapshots*
- *Automatic alerts based on customized parameters*
- *Automatic documentation generation, from Engine Condition Monitoring reports to End Of Flights analysis*
- *Building a historical database of reference for all flights and aircraft performances*
- *Building tailored dashboards in order for airlines to monitor cost controls and to analyze key costing parameters, such as fuel consumption*

All this is now possible, thanks to an entire end-to-end system that is formulated in real-time and not days after the flights or events, as is the case in a traditional environment.

STAR Navigation is already deploying the technology and the system toward new market segments, such as the Medical Evacuation helicopters and aircraft. This will allow the transmission of real-time patient bio data to the emergency medical center, speeding the dispatch of the crucial data, and assisting in the preparation of medical intervention and ultimately saving time, as well as lives.

A first collaborative R&D program on the matter has been launched in Quebec between Star Navigation, universities, a major hospital center, an EMS operator and additional, complementary industries. The program will span over 2015 and will include the technology insertion of the STAR-ISMS® computer, together with its satellite communication capabilities, on an EMS



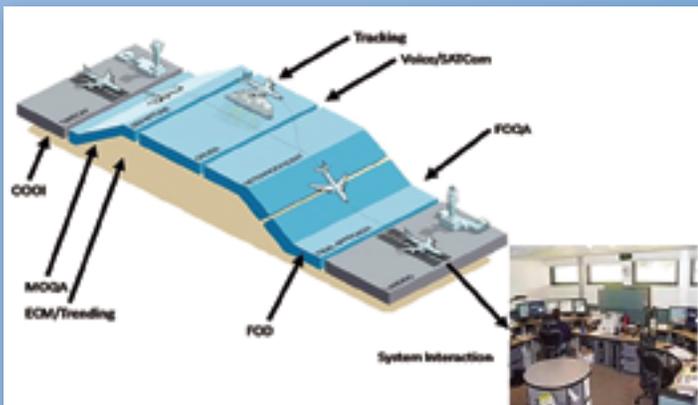
*STAR-ISMS® In Flight Safety Monitoring System*

helicopter, the program's interface with the on-board bio monitors, with direct communication links to the medical dispatch center. The system will also be connected to the data processing environs of the hospital, allowing two-way communications, direct access to the electronic file of the patient as well as to the hospital's available emergency medical resources.

This technology is also transferable toward trains as well as trucks fleets, all to allow accurate tracking as well as providing company awareness of their fleets or rail overall situations.

The company is also expanding its operations into the aerospace market. Star Navigation is working on adapting their technology for communication satellites, pending their use and regulatory authorizations, for global monitoring coverage.

Additional information regarding Star Navigation is available at <http://www.star-navigation.com/>



*Star Navigation system overview illustration.*

# Executive Spotlight: Kirill Makhnovskiy, Director of Telecommunication Services, Orion Express

**M**r. Makhnovskiy has been with Orion Express since 2011. He graduated from the Moscow Technical University of Communications and Informatics, where his area of study was in network and switching systems.

From 2004 to 2006, Mr. Makhnovskiy was the chief specialist for regulators at Moscow Cellular Communications Company. He then moved onto Sky Link as the head of the institutional control department, and then worked as the Deputy General Director of TelekomInfoProet. From 2008 to 2011, he was the Deputy Director for Government and Regulators in the Telecom Express Company.

## SatMagazine

Mr. Makhnovskiy, would you please tell our audience about Orion Express and its business goals?

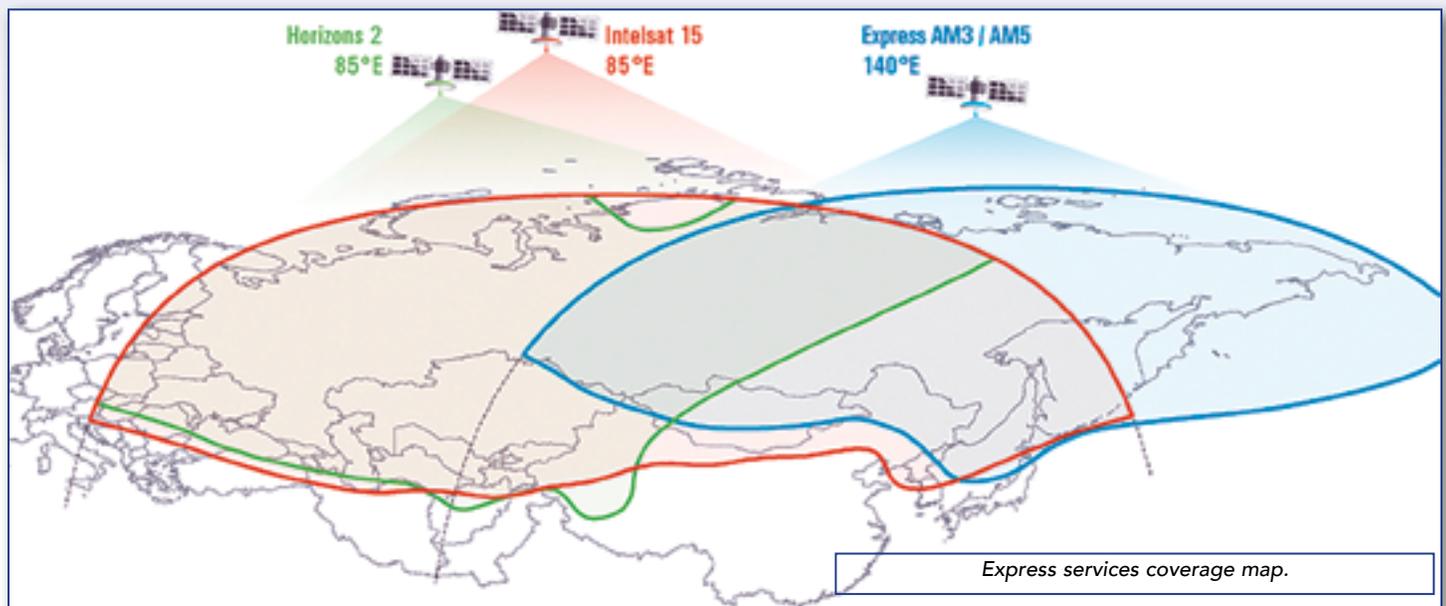
## Kirill Makhnovskiy

Orion Express is a Russian satellite TV provider and one of the key players in B2B and B2C markets. We are the only operator with 100 percent coverage of the Russian territory and the Commonwealth of Independent States (CIS).

Orion Express is the most actively growing operator on the Russian payTV market. In 2013, the company's subscriber growth was more than 80 percent, when the industry average growth was approximately 13 percent. The Orion Express subscriber base up to May 1, 2014, amounted to more than two million people.

Today, the company is the leading media platform in Russia and CIS, as well as a leading media partner for Intelsat in Russia. Our Business-To-Consumer (B2C) market company works under the brand "Telekarta." For the Business-To-Business (B2B) market, we provide the most comprehensive range of services to Russian and foreign broadcasters with unique satellite media platforms located at 85 degrees and 140 degrees East. Apart from Russia, Orion Express also provides DTH services in Kyrgyzstan through our "Vision" company.

Our marketing strategy is based on offering subscribers the most interesting and affordable product. Our partners, distributors and the installers of satellite TV receive maximum support and benefits from working with us. We focus on available equipment, TV-balanced packages, which offer all a viewer could want, from Russian federal channels and its hour broadcasts, regional channels, thematic channels that deliver the most popular Russian and foreign program brands. The cost of entry for customers is low in relation to the quality equipment and programming received. These are the key advantages that distinguish Orion Express from competitors.



## SatMagazine

Which satellites are involved in your company's content delivery for both Direct-To-Home (DTH) and your Enterprise customers?

### Kirill Makhnovskiy

Orion Express broadcasts from three satellites: Horizons 2 at 85 degrees East, Intelsat 15 that co-resides at the same orbital slot, and Express AM5 at 140 degrees East. By the way, Orion Express is the largest Intelsat media partner in Russia—our work with that company allowed us to take a leading position in the broadcasting and DTH market.

## SatMagazine

Please tell us about Telekarta.

### Kirill Makhnovskiy

Telekarta is an independent satellite TV product of Orion Express. There are two basic TV packages available in Telekarta: Standard (more than 70 channels) and Unlimited (more than 125 channels). Telekarta has more than two million subscribers, and those numbers are increasing year by year.

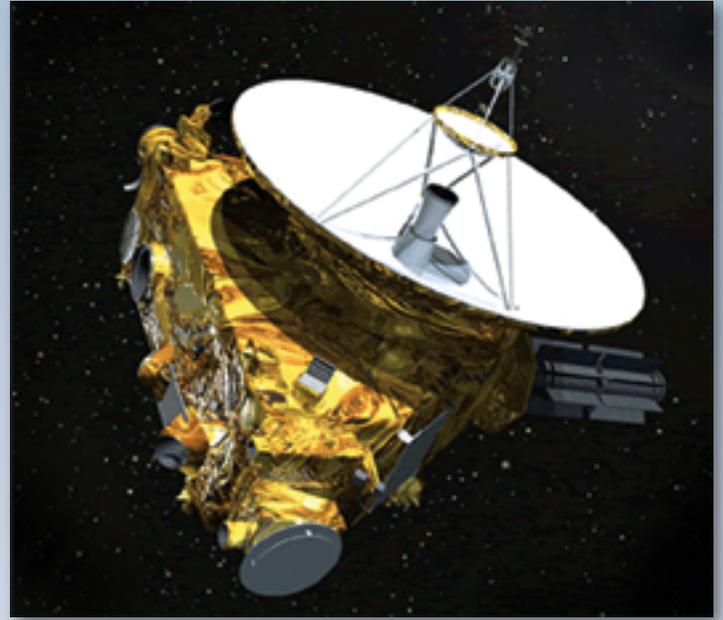
Telekarta broadcasts via three satellites—the U.S. Intelsat-15, Horizons 2 and Express AM5. The broadcasting area covers the entire territory of Russia from Kaliningrad to Sakhalin. The connection cost at the moment is the most affordable in the Russian payTV market. Telekarta offers more than 100 channels (Russian and foreign), federal channels and their hour program versions, regional channels and popular thematic channels.

## SatMagazine

The global payTV (DTH) market continues to experience significant growth—does this also apply to the Russian payTV market?

### Kirill Makhnovskiy

According to the research of the J'son & Partners Consulting company, the Russia payTV market will continue to expand. In 2013, payTV services in Russia were enjoyed by 35.1 million households. That is 10 percent higher than in 2012. PayTV penetration was 64 percent in 2013. According



An artistic rendition of the Horizons 2 satellite.

to analysts, the payTV subscriber base will be 40.9 million households by 2018—that is 17 percent higher than the subscriber base in 2013. Penetration by 2018 will reach 75 percent, and the average market growth rate for the period 2014 to 2018 will be 3 percent.

## SatMagazine

How does the Russian payTV market differ from the European and American markets?

### Kirill Makhnovskiy

To begin with, I would like to note that, as of this writing, the Russian payTV market is the largest in Eastern Europe. Subscribers, who at the moment are more than 40 million in number (about 70 percent of the households in Russia), are offered more than 300 channels.



The Orion Express satellite farm.

Unfortunately, until recently, the development of payTV, including DTH, was based on dumping and a constant decrease in ARPU. However, that trend is changing—the largest Russian operators are starting to offer so-called world premium content, whose popularity is growing year by year.

### **SatMagazine**

*Are western channels distributed via the Russian payTV market? If so, what are the most popular venues?*

### **Kirill Makhnovskiy**

Yes, Western TV channels are presented for the Russian market. The most popular are: Animal Planet, Discovery, TLC, Universal, National Geographic, Outdoor Channel, Viasat, Disney Channel, Mezzo and many others.

### **SatMagazine**

*Is Russia exporting their payTV channels to western as well as Asian payTV markets? If so, what programming is being exported to these various regions of the world?*

### **Kirill Makhnovskiy**

There are some Russian payTV channels presented for Western viewers. The larger Russian content producers deliver one channel from their portfolio to Europe. For example, the STREAM company presents the Russian Life channel; the TPO Red Media company offers the La Minor channel. Several companies are available for western viewers.

### **SatMagazine**

*The weather must offer a significant challenge for Russian broadcasters, considering rain fade, snow and ice storms, and so on. What contingency plans does Orion Express have to offset such delivery challenges?*

### **Kirill Makhnovskiy**

We give our customers a guideline to reserve 5db as an extra power margin for our nation's various weather conditions. When customers follow our recommendations, reliable signal reception is assured.

### **SatMagazine**

*Please discuss your services for Enterprise customers throughout Russia and your additional served regions.*

### **Kirill Makhnovskiy**

We provide the full range of services for broadcasters: channel uplink to satellite, content adaptation for the Russian audience, channel distribution in cable networks. This business model is also a great tool for suppliers of Western channel content, as the service allows them to earn on pay broadcasting in Russia. This range of services the company provides allows for contributions on more than 50 Russian and some foreign TV channels.

### **SatMagazine**

*How much independence does Orion Global Express have with its business operations, or is there severe government oversight in regard to content delivery?*

### **Kirill Makhnovskiy**

The TV market in Russia is regulated by several laws. The main ones are the "Communications Law" and the "Law on Mass Media". Orion Express is operating in strict compliance with those laws, holding all necessary licenses (Television Broadcast License, Service License for On-air Broadcasting, Service License for Communication Links, Telematic Services License, Service License for Data Transmission). According to the licenses, we can legitimately implement a full range of services for DTH broadcasting and for signal delivery to numerous channels.

### **SatMagazine**

*What advice do you have for content providers in the western world and the APAC region who might wish to distribute their programming in Russia through your company?*

### **Kirill Makhnovskiy**

My advice is that there should be no fear in entering the Russian market. This market certainly has challenges, but remember that the Russian market continues to develop and grow.

As for our company, we distribute satellite TV channels and have been doing it for the past seven years. From year to year, the number of subscribers continues to increase, as well as the number of our partners and their income has certainly increased.

Currently we are working with more than 360 cable operators across Russia, including all of the top operators (Rostelecom, ER-Telecom, MTS, Beeline, Megafon), which cover more than 20 million subscribers in cable and IPTV networks. For Western partners, we can offer a large pool of services: translation, registration services, uplink to the satellite, and distribution. We can run channels from scratch. Today, Orion Express is distributing more than 20 channels of various genres.

For further info: <http://orion-express.ru/>





## Event—IBC2014's Industry Importance

Over the years the IBC Awards has become one of the centerpieces of the entire show: a fast-paced, vibrant, and free-to-attend celebration of the best that the global industry has to offer that acknowledges excellence in a number of key fields. This event is more than simply an awards show—many times, the crowd in the 1,700 seater RAI Auditorium will delight at the exclusive glimpses of cutting-edge content.

### Awarding Industry Excellence + Embracing Change

First, though, IBC2014 must honor the work that has been throughout 2014, and the IBC Innovation Awards accomplish that task. To be considered for one of these prestigious prizes, a project must demonstrate a positive collaboration between a broadcaster and its technology partners; placing innovation at the heart of solving a creative, technical or commercial issue.

The shortlist of 10 companies has now been announced across three categories: Content Creation, Content Management and Content Delivery. Among a mix of intriguing projects, the shortlist features the entertaining and informative Horse Tracker app developed by the UK's Channel 4, Civolution, Monterosa and TurfTrax; Sky News Arabia's Project Skynet which, developed alongside Blackmagic, Haivision, Nevion, Vizrt and Zixi, allows the broadcaster to broadcast and transmit from anywhere in the world; and the multiple social, legal and technical issues that had to be solved by India's Airtel Digital Television and technology partner BrizzTV Media Labs.

Then, of course, there is the IBC International Honor for Excellence, which was won last year by film director Sir Peter Jackson (and where the audience at the ceremony got a privileged first view—in high framerate 3D—of the trailer for the second of his Hobbit trilogy, *The Desolation of Smaug*).

The evening is rounded out by the Best Conference Paper Award and the Exhibition Design Awards. To see the winners collect their prizes in person, join the crowd at the Awards Ceremony, on Sunday, September 14th, at 6:30 p.m. in the Auditorium.

The second day of the conference is based around the theme of Embracing Change and examines the new opportunities and challenges that technological progress is providing. A busy day of sessions examines the increasing list of disruptors—IP production, the cloud, Ultra HD, social networking and more.

*Natural future: The new natural history documentary* at 4:00 p.m. on Friday, September 12th, in G102/103 examines the trend for a full-spectrum experience in natural history programming and what financial, production, and ethical challenges producers face in creating expanded content. There's also what promises to be a fascinating debate on *More pixels or better pixels? Making the case for 4K or Ultra High Definition* at 2:00 p.m. in the Forum.



Lastly, there is *The 2020TV experience and how to get there* on Friday, September 12th, at 4:00 p.m. in the Forum. At this forum, a group of leading executives from across the broadcasting spectrum will provide a glimpse of their five-year roadmaps that will allow attendees to assess which game-changing technologies and consumer behaviors they believe will forge the 2020 TV landscape.

To determine where you will be in 2020, IBC2014 in Amsterdam will help you uncover your future.

### Demonstrating The Future

IBC Content Everywhere is a new series of global events that have been created as a response to the enormous growth in the IP-connected devices that are altering the way we consume media. Launching at IBC2014 in Amsterdam, IBC Content Everywhere Europe is going to be the essential event to attend to understand this market which—after all, research firm Ovum estimates there are now 4.7 billion devices worldwide that are capable of streaming live and on-demand video—this capability is becoming a more crucial task for broadcasters with every passing week.

The IBC Content Everywhere Europe Hub, located in Hall 14, will host a program of free-to-attend sessions at no cost as well as product demonstrations built around two, hour-long, curated and editorially-independent sessions and panel discussions. These will provide insight into the consumer behaviors, business models and technologies that are drivers of the growth in this sector. A series of short demonstrations from exhibitors will also feature the latest products and services in the field.





The RAI Center in Amsterdam, the home of IBC2014



Photo of an informative conference session from IBC2013.

Subjects under discussion include social TV, audience measurement in a digital world, in-stadia second screens for spectators, 'dongle wars' and more. Located within the Hub is a Download Wall, which enables attendees who have upgraded to IBC Content Everywhere Europe to collect session and demonstration presentations as well as exhibitor brochures, white papers and more, all using their personal Touch & Connect devices. This material, together with contact details of other Touch & Connect users that have been met at the show, can then all be reviewed online in the dedicated Touch & Connect portal.

An automatic upgrade to IBC Content Everywhere Europe will be granted if you meet a specific entry criterion which is filtered when you register for IBC2014. Expect to hear much more about many of these subjects, as well, in the Business Operations & Content Innovation stream at the IBC Conference. This stream concentrates on practical sessions that examine the new techniques and platforms that are changing the way that content is being created and presented.

The cloud is, of course, a crucial part of that section of the innovation story, and in *Can broadcasters get real benefit from Cloud Computing?* on Friday, September 12th, at 2:00 p.m. in G102/103, the practicalities behind the hype will be closely examined. What impact could the cloud have on current business plans, how can it be integrated into operational

workflows, and what experiences and advice can early adopters impart to help make the decision to jump into the cloud, now or in the future?

Big Data has not been short of hype recently and in the appropriately named *Big Data: Hype or Reality?* on Saturday September 13th at 4:30 p.m. in G102/103, an impressive panel, including Channel 4's Sanjeevan Bala (who has spearheaded one of the most effective audience engagement campaigns yet seen) will chart how leading media companies are moving Big Data from the science lab to the forefront of their competitive strategy. Effective use holds out the promise of allowing adherents to understand their audiences, drive intelligent marketing, target advertising, reduce churn, and lead to smarter content acquisition, but there are traps for the unwary.

Other subjects to be covered include personalization, the threat of ubiquitous wireless to broadcast, and the promise of a complete IP-based production chain.

This promises to be a fascinating stream within a fascinating conference.

Please visit the IBC infosite for details of obtaining passes and pricing:

<http://www.ibc.org/conference>

For more information about the IBC Conference Program please visit

<http://www.ibc.org/conferenceprogram>

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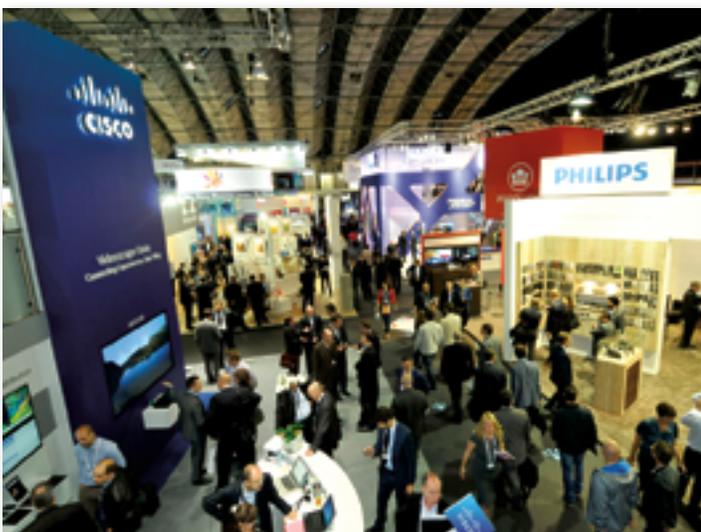


Photo of the IBC exhibitor floor from the 2013 event.







