

*Worldwide Satellite Magazine*

*June 2013*

# *SatMagazine*

## *Asia-Pacific Markets*

*Executive Spotlight: William Wade, President + CEO, AsiaSat  
Newtec, Indonesian SatComs, Beam, Agilent, Kratos, RaySat,  
ND Satcom, Telstra Global, ETL Systems,  
Columnists: Antonovich, Heyman, Sadtler  
and more...*



Cover image—AsiaSat-8, courtesy of AsiaSat





# SatMagazine

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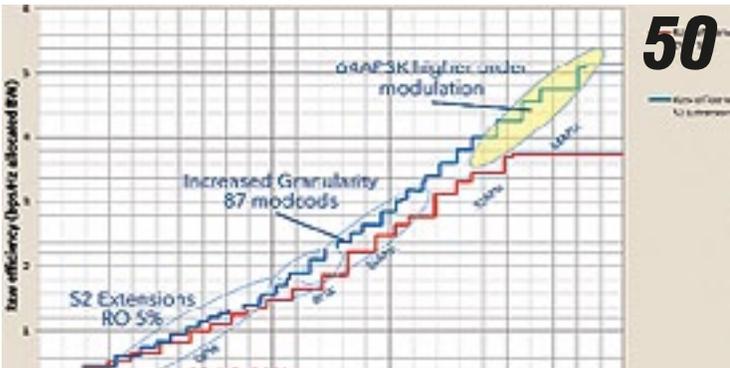
## Features



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### Executive Spotlight: William Wade, President + CEO, AsiaSat

Mr. Wade was appointed as the President and Chief Executive Officer of the Company on August 1, 2010. Prior to assuming his role as Chief Executive Officer, Mr. Wade had served as AsiaSat's Deputy Chief Executive Officer for 16 years.



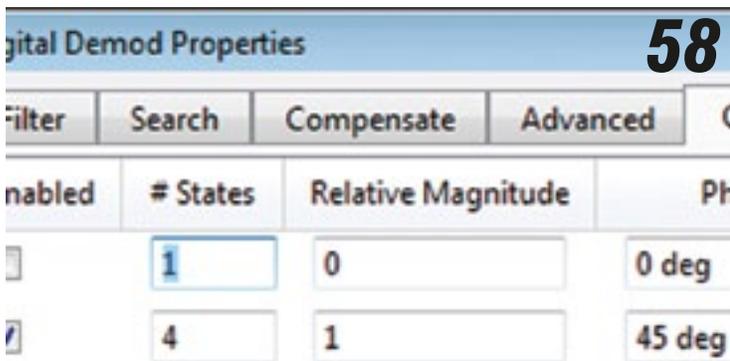
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### SatBroadcasting™: S2 Extensions Demystified

DVB-S2 is the most accepted and widely spread standard in the satellite market. The standard has a deep market penetration in Sports and News Contributions, Professional Video Distribution solutions, IP trunking and Cellular Backhauling, Broadband VSAT...



By Koen Willems, Newtec



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<input type="checkbox"/>	4	1	45 deg

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### Standard + Customized APSK Schemes For Satellite Transmission

The requirements of satellite communications can make APSK a more suitable modulation scheme than QPSK or QAM. For any kind of modulated communication signal, a decision must be made as to how the data to be transmitted will be...



By Donald Vanderweit,  
Agilent Technologies



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### SatBroadcasting™: What The Heck Does HEVC Mean To You + Me?

Having returned safely from the National Association of Broadcasters show in Las Vegas earlier this year, I can confidently say that the dominant themes of the show revolved around three acronyms: HEVC (short for High Efficiency...)



By Mike Antonovich,  
ATEME



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## Features (cont.)



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### Executive Spotlight: Susan Saadat, Vice President, ETL Systems

After graduating from the University of California Berkeley with a Master's degree in Electronics Engineering majoring in telecommunications, I started my career as a hardware and modem design engineer in the Silicon Valley. It was after a few years when I landed a job at COMSAT...



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### Reliable Mobile Communications Do Matter

The physical nature of the country poses a severe problem to telecommunications. While the country possessed a land based telephone network infrastructure, it was restricted and, particularly with the introduction of television, the country became a prime candidate for the application of satellite communications.

By Marie O. Petersson, Beam Communications



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### The Ups + Downs Of Indonesian ComSats

The physical nature of the country poses a severe problem to telecommunications. While the country possessed a land based telephone network infrastructure, it was restricted and, particularly with the introduction of television, the country became a prime candidate for the application of...

By Jos Heyman, Tiros Space Information



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### Executive Spotlight: Peter Hobbs, Telstra Global

Peter Hobbs is based in Sydney, Australia, where he is responsible for the global voice relationships and business development within the global satellite and broadcasting markets. Peter joined Telstra Corporation in 1999 and transferred into its joint venture, REACH, in 2001.





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## Features (cont.)



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### A Case In Point: Emergency Communications

Telecommunication infrastructure provides the critical path for relief in emergency and disaster situations. Communications connect and help move logistical, rescue and first responder resources in any region of the world facing or recovering from natural or man-made disasters.

By Michel Zimet, Director Marketing & Strategy, ND SatCom

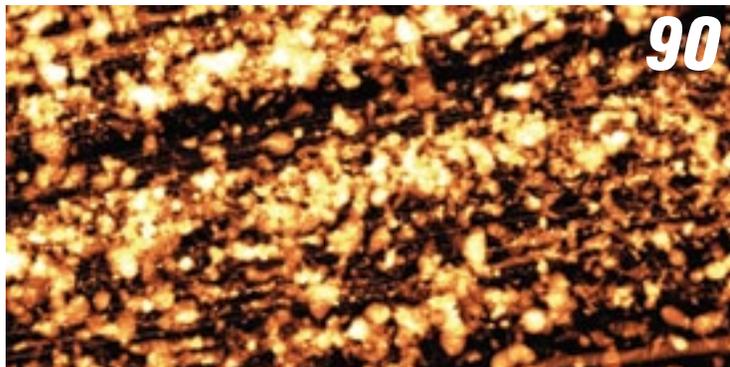


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### What Do The Sun + The Wind Have To Do With Non-Compete Agreements?

While current economic challenges are causing many companies to right-size or down-size, employers who are recruiting critical talent have both the luxury of available qualified talent and the pressure to hire the most qualified difference-maker.

By Bert Sadtler, Boxwood Search



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### The Human Factors In SATCOM (RF) Interference: Creating More Effective Mitigation Teams

It's convenient to think of problems such as RF interference by reducing it to its technical form. However, in the operator's world view, it's far more than phenomenon of physics; it's a human-centered challenge to be solved as...

By Bob Potter, SAT Corporation



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### Travel Habits Are Changing, Thanks To SATCOM

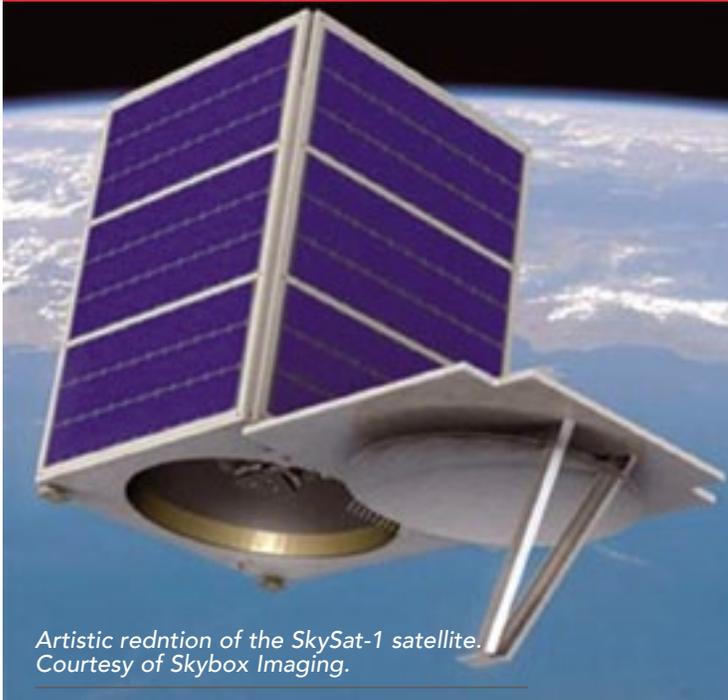
When I was in my twenties, it was possible to show up to the airport 30 minutes before a flight and still have time for a coffee before boarding. Over the last two decades, the time required at the airport before a flight has increased, taking a sharp rise in the aftermath of the September 11th terror attacks.

By David Leichner, Gilat Satellite Networks





## Picture Perfect Partnership



Artistic redntion of the SkySat-1 satellite.  
Courtesy of Skybox Imaging.

**Skybox Imaging (Skybox) has entered into a multi-year, strategic partnership with Japan Space Imaging (JSI), a subsidiary of Mitsubishi Corporation, to provide high-resolution imagery and full motion commercial video to the Japanese market.**

The agreement, subject to U.S. regulatory approval, will enable JSI to directly task, downlink and receive imagery from Skybox's constellation of microsatellites on a reliable and frequent basis.

Skybox will provide JSI a rapidly deployable ground station, called a SkyNode, comprised of a 2.4 meter communications antenna and two racks of supporting software and equipment.

Skybox is pioneering the use of Apache Hadoop, an open-source framework that allows for the distributed processing of large data sets, for geospatial applications.

Skybox has designed the SkyNode software suite to enable customers to efficiently schedule imagery collections, task satellites, downlink imagery and process image products on a user-friendly web platform.

Operations will start following the launch of Skybox's first two microsatellites, SkySat-1 and SkySat-2, currently scheduled for late 2013. By combining Skybox's product offerings with JSI's existing product offerings, JSI will be able to continue expanding the uses of satellite imagery in applications including land monitoring, environmental monitoring, and disaster response.

## Anniversary's Pricing Promo



KOMPSAT-3 image capture of the Pentagon, USA

**Korea Aerospace Research Institute (KARI) has announced the successful operation of KOMPSAT-3 for one year since its launch on May 18, 2012.**

During the first year of operation, the performance of KOMPSAT-3 was validated and KARI's worldwide commercial service was launched through Satrec Initiative, starting on April 1, 2013. KOMPSAT-3 is the first sub-meter satellite from Korea and was developed by KARI as a successor to KOMPSAT-2 for VHR EO data continuity. KOMPSAT-3 can provide sub-meter images with various imaging modes that include single pass stereo.

The satellite will continue to provide sub-meter imagery to domestic and international users for use by public safety agencies, for resource management, environmental monitoring, location-based services, intelligence and disaster monitoring. The constellation that is comprised of KOMPSAT-3 and KOMPSAT-2 now has a data collection capacity that reaches 2M km<sup>2</sup> per day, of which 300,000 km<sup>2</sup> per day is from KOMPSAT-3.

After the launch of KOMPSAT-5, the KOMPSAT constellation will offer a combination of optical and radar sensors. KOMPSAT-3A, with enhanced performance, is planned for launch in 2014. KOMPSAT-6, with SAR payload, will enhance the capabilities of KOMPSAT constellation. Currently, the catalog of KOMPSAT-2 and KOMPSAT-3 imagery is available at <http://arirang.kari.re.kr>.

In honor of the one-year anniversary of the KOMPSAT-3 launch, **Satrec Initiative** (<http://www.satreci.com/eng/index.htm>) has released sample data and is offering promotional prices for KOMPSAT-3 imagery in order for users to experience the KOMPSAT-3 data sets. Promotional pricing is applicable to orders confirmed by Satrec Initiative until June 17th at 6:00 p.m. KST. During the promotional period, KOMPSAT-3 imagery will be offered at the same price with KOMPSAT-2 imagery. Orders placed through resellers are also eligible.

## Bridge Building



### **Bridge Technologies has appointed Acetel Co. of Seoul, Korea, to supply and support Bridge Technologies digital media monitoring systems in South Korea.**

Acetel is the systems integrator, having installed the first multi-service digital head-end system in Korea, and with a considerable presence in terrestrial, digital cable, DTH and telco integration.

"The Korean Broadcasting Market is already mature and Korean broadcasters focus on the quality of the video and audio they are delivering," said Acetel's Steven Park.

"Bridge Technologies' market-leading range of digital media monitoring systems will help our customers maintain the quality of their services by quickly assessing where and when any problems occur."

Based in Oslo, Norway, Bridge Technologies designs and develops advanced analysis, measurement, and monitoring solutions for the digital media industries. Bridge Technologies systems offer true end-to-end monitoring and analysis capability from satellite to set top box and viewing device, giving the operator total control over delivery chain performance and the customer's quality of experience.

In addition to state-of-the-art solutions for terrestrial, cable and satellite infrastructure, Bridge Technologies offers OTT monitoring tools included in most of its probes, as well as the new microAnalytics™ System for monitoring OTT and 'TV everywhere' services to multiple devices including smartphones and tablets. The

microAnalytics System allows operators to remotely access real-time data from set top boxes, connected TVs, iPads, iPhones and other mobile devices, making accurate and comprehensive end-to-end multiservice/OTT monitoring a reality for the first time.

"We welcome Acetel to our network of Business Partners," said Philip Burnham, Sales Director, Bridge Technologies. "Korea is a very dynamic market with rapid development in conventional and OTT services, so we are delighted that Acetel will be able to offer its customers the most advanced and comprehensive monitoring systems."

## A Hub Of Activity



**Hermes Datacommunications (M) Sdn. Bhd. ("Hermes") and MEASAT Satellite Systems Sdn. Bhd. ("MEASAT") now have an agreement for the provisioning of VSAT (Very Small Aperture Terminal) satellite communication services across Malaysia's offshore oil fields via the MEASAT-3 satellite.**

Under the agreement, Hermes will base their new communications hub at the world-class MEASAT Teleport and Broadcast Centre. The Hermes hub will provide telecommunications access to Malaysia's growing oil and gas industry via VSAT connectivity. The hub represents a significant investment by Hermes to support a drilling campaign being carried out in Malaysian waters.

"This is a very exciting new service," said Mohd Faizal Zainal Amri, General Manager, Hermes Malaysia. "Our new hub provides optimized bandwidth utilisation for efficient and reliable communications with high link quality to support voice calls, video and real-time data applications for Malaysian oil fields."

"MEASAT is pleased to support Hermes to provide reliable satellite communications connectivity to the Malaysian oil and gas industry," said Alex Tan, Director, Sales and Marketing, MEASAT. "Our collaboration with Hermes expands MEASAT's support to local companies and the Malaysian Information and Communication Technology industry. We look forward to continue supporting Hermes as their service grows."

## Moving On Up



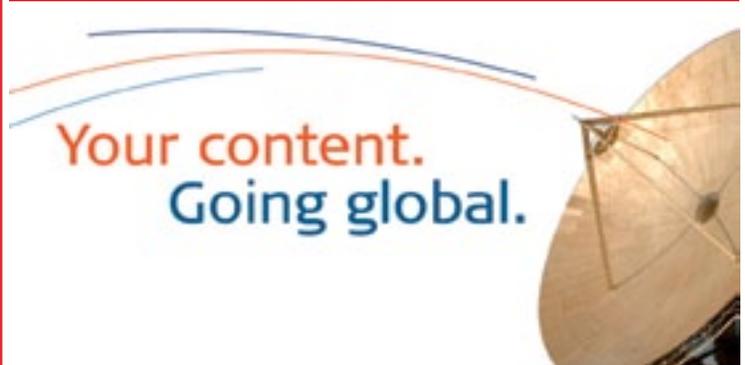
**Pactel International has appointed Peter Dowers as a Voice & Data Business Development Manager, for Oceania.**

Peter will be responsible for the management of some existing accounts spanning across 15 countries across Asia-Pacific as well as lead the initiative of developing new business relationships in this region.

Peter brings over 25 years of engineering and senior sales experience in the telecommunications industry, serving recently as the Voice Manager-Pacific Islands at Telecom New Zealand International.

"I am confident Peter's past experience and expertise will add further value to our customers", said Andrew Taylor, CEO at Pactel International. "I feel this appointment is an indication of Pactel's commitment to providing superior customer service and expanding company voice capabilities to address the changing market environment", Mr. Taylor added.

## Expanding The Message



**RRsat Global Communications Network Ltd. (NASDAQ: RRSAT) now has a long term agreement to enable Word Network, the largest African-American religious network in the U.S., to reach millions of viewers in Australia, New Zealand and the Arab world.**

The broadcast solution uses RRsat's Ku-band platforms on the Eutelsat 25C satellite and Optus D2 satellite.

Under the agreement, RRsat will enable Word Network to reach cable headends and DTH viewers in Australia and New Zealand, as well as DTH viewers throughout the Arab world.

The Eutelsat 25C satellite, located at the Badr position, reaches viewers throughout the Arab world, in the Middle East as well as North Africa (MENA). The RRsat platform on Optus D2 satellite provides coverage of Australia and New Zealand.

RRsat currently provides turnaround and uplink services for Word Network from its platforms on the Galaxy 19, Eutelsat Hot Bird 13A and Thaicom satellites.

## Engineering Pick Hit Award

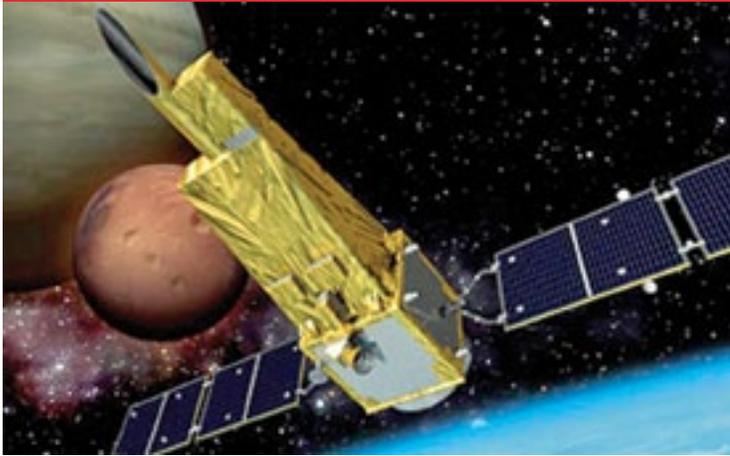


**Vislink won the prestigious Broadcast Engineering Pick Hit award in April at the National Association of Broadcasters trade show.**

The NewStream is a state-of-the-art vehicle system combining Satellite News Gathering (SNG), Electronic News Gathering (ENG), and Cellular News Gathering (CNG) in one compact rack mounted unit. This new multi-mode system is the most comprehensive mobile broadcast system available today.

The NewStream combines both licensed and unlicensed RF technologies together within a user-friendly platform. As the newest addition to Vislink's LiveGear brand, the NewStream provides multiple ways to transmit up to two simultaneous live videos; anytime, anywhere.

## Ready To Sprint



**The Japan Aerospace Exploration Agency will launch the Spectroscopic Planet Observatory for Recognition of Interaction of Atmosphere (SPRINT-A) by the first Epsilon Launch Vehicle (Epsilon-1) in the following schedule.**

»Launch date: August 22 (Thursday), 2013 (Japan Standard Time)

»Launch time: between 1:30 p.m. through 2:30 p.m. (JST)\*

»Launch window: August 23 (Friday) through September 30 (Monday), 2013

»Launch site: Uchinoura Space Center

The Spectroscopic Planet Observatory for Recognition of Interaction of Atmosphere (SPRINT-A) is the world's first space telescope for remote observation of the planets such as Venus, Mars, and Jupiter from the orbit around the Earth. The image of the satellite to the left is courtesy of JAXA.

## Lift Off To A New Era



Artistic rendition of the ISRO's IRNSS satellite.

**The Indian Space Research Organisation (ISRO) is all set to deploy the crucial Indian Regional Navigational Satellite System, or the IRNSS, on June 12th, thus ushering in a new era in terrestrial, aerial and marine navigation services.**

Slated to be launched on board home-grown rocket PSLV-C22 XL at 1:01 a.m. from the Sriharikota spaceport, the IRNSS will help in disaster and fleet management as well.

The Standard Positioning Service of the satellite will help navigation services on land, air and water for civilian use, while the encrypted Restricted Service is meant only for authorized users, such as the armed forces.

The navigation system, which will also be used for tracking vehicles by law enforcement agencies, is housed in a 1425kg. satellite, with a life span of about 10 years. IRNSS has been developed at a cost of Rs 16 billion.

IRNSS is an independent regional navigation satellite system, and at its peak operational capacity, it should provide positional accuracy of better than 10 metres over Indian territory and extending to about 1,500km around the country.

The system will include a constellation of seven satellites under IRNSS by 2014-15. The fully-deployed IRNSS system will consist of three satellites in GEO (geostationary orbit) and four in the GSO (geosynchronous orbit), at approximately 36,000km above the Earth's surface.

Each satellite will be continuously monitored and maintained by a team of on-ground engineers. The navigation software of the satellite has been developed indigenously by ISRO engineers in Bangalore.

## Best Operator In India



**Hughes Communications India Limited (HCIL), a subsidiary of Hughes Network Systems, LLC (Hughes), has been awarded "2013 Best VSAT Operator in India" at the Telecom Operator Awards 2013 presentation that was held on March 21, 2013.**

The prestigious award recognizes companies that demonstrate outstanding performance in delivering world-class results in service and support in the telecom sector.

The award was presented to Partho Banerjee, president and managing director of HCIL by Alok Brara, publisher of Tele.net. HCIL has now been honored for the sixth year in a row.

The award winners were selected by Tele.net on the basis of an extensive survey conducted among a carefully selected group of professionals and sector experts. Hughes Communications India emerged the winner by a wide margin.

## Selecting Beidou—Not GPS

**Pakistan is set to become the fifth Asian country to use China's domestic satellite navigation system, which was launched as a rival to the U.S. global positioning system (GPS), a report said on Saturday.**

The Beidou, or Compass, system started providing services to civilians in the region in December and is expected to provide global coverage by 2020. It also has military applications. Thailand, China, Laos and Brunei already use the Chinese system, which currently consists of 16 operational satellites, with 30 more due to join the system, according to English-language China Daily.

Huang Lei, international business director of BDStar Navigation, which promotes Beidou, told the newspaper the company would build a network of stations in Pakistan to enhance the location accuracy of Beidou. He said building the network would cost tens of millions of dollars.

American website Defensenews.com reported early in May that Pakistani military experts were in favor of using the Chinese system, even though the availability of the signal could not be guaranteed in case of conflict. But, according to one of them, Pakistan cannot place its trust in the United States. "Pakistan's armed forces cannot rely on U.S. GPS because of its questionable availability during a conflict that has overtones of nuclear escalation," former Pakistan Air Force pilot Kaiser Tufail told the site. Chinese Premier Li Keqiang recently traveled to Pakistan, a long time ally, after a visit to India.



## WGS Terminals Out The Door



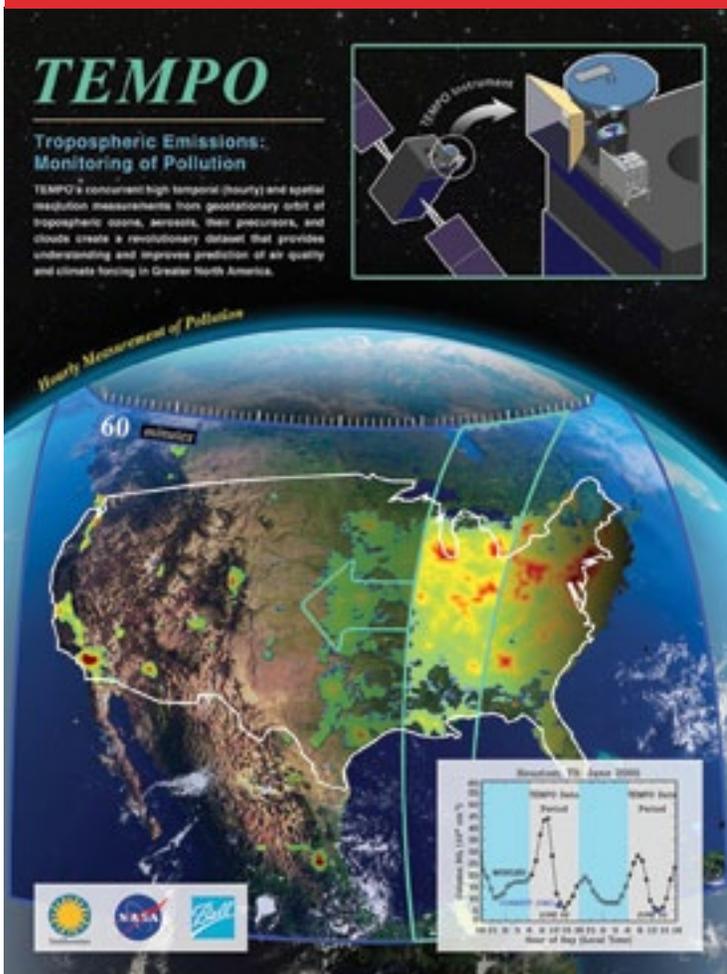
GigaSat's FA-100 deployed in China for disaster relief ops.

**Good news from New Zealand for GigaSat...the company has announced the signing of a contract with the New Zealand MoD for the supply of WGS certified flyaway satellite terminals for use as part of the NZDF Strategic Bearer Network.**

GigaSat is an ideal candidate to meet the exacting tender requirements due to the extensive experience supplying WGS certified terminals to other nations in the program.

The GigaSat FA-240 2.4m and FA-370 3.7m terminals are fully certified in X- and Ka-Bands for use on the WGS network. And the FA-100 is specifically designed for high mobility and rapid deployment needs, such as emergency telecommunication services, front line military communications, and (D)SNG.

## GEMS For The Portfolio



**Ball Aerospace & Technologies Corp. has been awarded a contract from the Korea Aerospace Research Institute (KARI) to build the Geostationary Environment Monitoring Spectrometer (GEMS) for the National Institute of Environmental Research in the Ministry of Environment of South Korea.**



KARI's GEO-KOMPSAT-2B, artistic rendition.

GEMS is a geostationary scanning ultraviolet-visible spectrometer designed to monitor trans-boundary pollution events for the Korean peninsula and Asia-Pacific region.

The spectrometer provides high spatial and high temporal resolution measurements of ozone, its precursors, and aerosols. Hourly measurements by GEMS will improve early warnings for potentially dangerous pollution events and monitor long-term climate change.

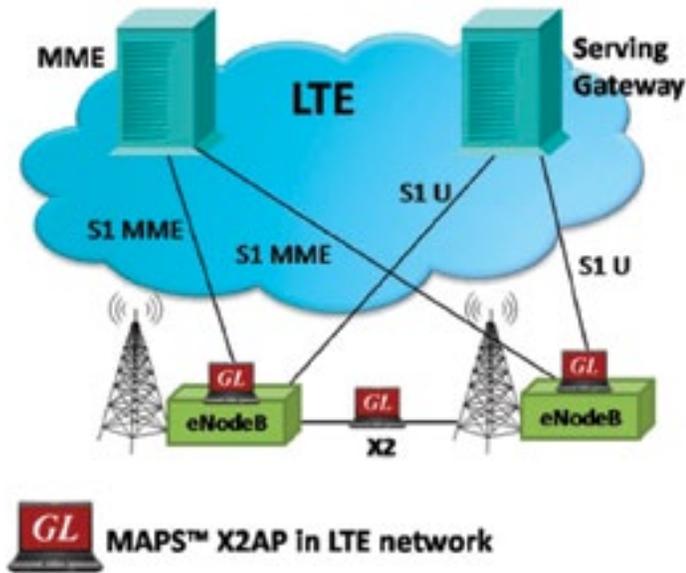
Ball Aerospace and KARI will design, fabricate and test GEMS which is manifested on KARI's GEO-KOMPSAT-2B geostationary satellite for a 2018 launch.

The GEMS instrument is the Asian element of a global air quality monitoring constellation of geostationary satellites that includes the Tropospheric Emissions: Monitoring of Pollution (TEMPO) spectrometer.

Ball is the TEMPO instrument provider for NASA Langley Research Center and Harvard Smithsonian Astrophysical Observatory on this Earth Venture line program.



## Higher Data Rates Brought Into Play



### GL Communications Inc. has released its latest product—Long Term Evolution (LTE) Emulator for X2 Interface.

Mr. Jagdish Vadalia, Senior Manager for product development at the company, said, "Long Term Evolution is the all packet architecture that mobile networks are in the process of transitioning. It will permit vastly higher data rates to mobile smartphones, making voice, video, and data truly integrated for the first time—thru a single access technology. This is yet to be accomplished over wired networks."

In simple terms, LTE consists of a "Packet Core" and a network of eNodeBs (as shown above). eNodeBs have two interfaces, the X2 interface permits eNodeBs to talk to each other directly, and the S1 interface permits talking to the "Packet Core." Vadalia added, "GL has introduced LTE X2 Interface Emulation to test and verify eNodeB implementations through its MAPS architecture. GL's Message Automation & Protocol Simulation (MAPS™) is a multi-protocol, multi-technology platform used for the emulation of a variety of communication protocols over IP, TDM, and Wireless networks. MAPS™ can be used to test signaling over legacy networks (such as CAS, SS7, ISDN, PPP and more), IP networks (such as SIP, MGCP, MEGACO, SIGTRAN, Diameter...) and also the Wireless technologies including GSM, UMTS, and LTE networks. Recently LTE X2-AP has been introduced."

Mr. Vadalia added, "GL's MAPS™ X2 Application Protocol (X2-AP) Interface Emulator is used to coordinate handovers and perform load management between eNodeB (Evolved Node B) network elements - Source eNodeB and Target eNodeB. The MAPS™ X2-AP test tool is designed with specific test cases, as per LTE 3GPP mobile standards. It supports powerful utilities like Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using messages and parameters."

## Ionosphere Investigation



Image credit: NASA/John Grant

### Red and white vapor clouds filled the skies over the Marshall Islands as part of NASA's Equatorial Vortex Experiment (EVEX).

The red cloud was formed by the release of lithium vapor and the white tracer clouds were formed by the release of trimethyl aluminum (TMA).

These clouds allowed scientists on the ground from various locations in the Marshall Islands to observe the neutral winds in the ionosphere.

The EVEX was successfully conducted during the early morning hours on May 7th from Roi Namur, Republic of the Marshall Islands.

A NASA Terrier-Oriole sounding rocket was launched at 3:39 a.m. EDT and was followed by a launch of Terrier-Improved Malemute sounding rocket 90 seconds later.

Preliminary indications are that both rockets released their vapor clouds of lithium or trimethyl aluminum, which were observed from various locations in the area, and all science instruments on the rockets worked as planned.



## Amplifier Amplification



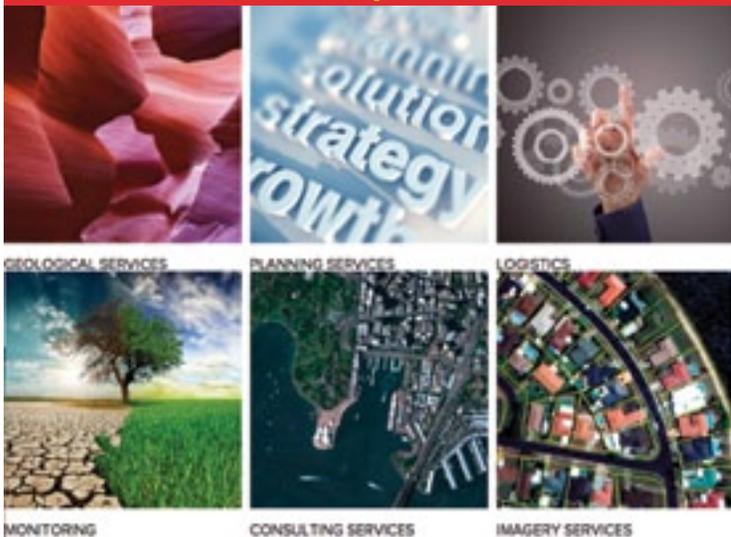
**Pro-Comm, Inc. has introduced the latest in the company's Solid State RF Amplifier Series, the PC1300-3C.**

This new product is a 3-channel Solid State RF Amplifier with independent channels, with each channel providing 1000 watts peak RF power. The RF amplifier is driven by a single customer supplied RF input signal. Power and phasing are manually adjusted via a front panel control as well as via a dB-25 coupled remote control.

The unit is ferrite isolator protected at the RF input and at each of the three RF outputs. The power of each channel is adjustable from max to -10 dB—the unit is completely self-contained and includes all of the power supplies as well as internal cooling.

The PC1300-3C Iso offered in a complete stand-alone package that includes the internal source with the only customer requirement being the input trigger and AC voltage only; no RF signal is required. Multiple channels are available, depending on customer requirements. Output power is as low as 10 to 1000 Watts Peak. CW output power ranges from 10 to 250 Watts.

## Productive Partnership



**Geoimage has signed a partnership with Spatial Energy which will build capacity and expand access to greater spatial content within the Oil and Gas industry in Australasia.**

This partnership will enhance the capabilities of Australian customers who operate nationally and globally and allowing them to derive more value from their existing and new geospatial datasets.

Spatial Energy is a market leader in providing, hosting and disseminating spatial imagery and derived content to the Oil and Gas industry through its widely used online system, Spatial on Demand®. Geoimage is recognized as a premier provider of satellite imagery and processing services to the Mining, Oil and Gas and Engineering sectors in Australia.



Through this partnership, Geoimage augments its existing capabilities by providing Australian customers with the superior hosting and dissemination technologies that Spatial Energy brings, offering local expertise and services to global customers operating in the Australian region. This will bring new products, capacity and technology to the Australian energy sector, allowing customers to extract even more benefit from their imagery and derived spatial data layers.

## Hams + Pros Piece Photos Together



**For about one week, engineers at NASA's Ames Research Center, Moffett Field, California, and amateur radio operators around the world collaborated to reconstruct an image of Earth sent to them from three smartphones in orbit. The joint effort was part of NASA's nanosatellite mission, called PhoneSat, which launched on Sunday, April 21, 2013, aboard the Antares rocket from NASA's Wallops Island Flight Facility in Virginia.**

Although the ultimate goal of the PhoneSat mission was to determine whether a consumer-grade smartphone can be used as the main flight avionics for a satellite in space, the three miniature satellites used their smartphone cameras to take pictures of Earth and transmitted these "image-data packets" to multiple ground stations.

Every packet held a small piece of "the big picture." As the data became available, the PhoneSat Team and multiple amateur ham radio operators, who call themselves "hams," pieced together a high-resolution photograph from the tiny data packets.

"During the short time the spacecraft were in orbit, we were able to demonstrate the smartphones' ability to act as satellites in the space environment," said Bruce Yost, the program manager for NASA's Small Satellite Technology Program. "The PhoneSat project also provided an opportunity for NASA to collaborate with its space enthusiasts. Amateur radio operators from every continent but Antarctica contributed in capturing the data packets we needed to piece together the smartphones' image of Earth from space." (continued on next page.)



*This was taken by the PhoneSat-2 (Graham) nanosatellite and the most recently reconstructed by the Ames PhoneSat Team and multiple volunteer ham radio operators around the world. Image credit: NASA Ames*

(continued from previous page.) As part of their preparation for space, the smartphones were outfitted with a low-powered transmitter operating in the amateur radio band. They sent the image information to awaiting hams who worked with the Ames engineers to stitch together multiple, tiny images to restore the complete Earth view.

Piecing together the photo was a very successful collaboration between NASA's PhoneSat team and volunteer amateur ham radio operators around the world. NASA researchers and hams working together was an excellent example of Citizen Science, or crowd-sourced science, which is scientific research conducted, in whole or in part, by amateur or nonprofessional scientists. On the second day of the mission, the Ames team had received over 200 packets from amateur radio operators.

"Three days into the mission we already had received more than 300 data packets," said Alberto Guillen Salas, an engineer at Ames and a member of the PhoneSat team. "About 200 of the data packets were contributed by the global community and the remaining packets were received from members of our team with the help of the

Ames Amateur Radio Club station, NA6MF." The mission successfully ended Saturday, April 27, 2013, after predicted atmospheric drag caused the PhoneSats to re-enter Earth's atmosphere and burn up.

"The NASA PhoneSat Team would like to acknowledge how grateful we are to the amateur radio community for contributing to the success of this mission," said Oriol Tintore, an engineer and a member of the PhoneSat Team at Ames who participated in the picture data processing.

The PhoneSat project is a technology demonstration mission funded by NASA's Space Technology Mission Directorate at NASA Headquarters and the Engineering Directorate at NASA Ames Research Center. The project started in summer 2009 as a student-led collaborative project between Ames and the International Space University, Strasbourg. These results will encourage further research into applying low-cost terrestrial technologies to space applications and also may open space to a whole new generation of commercial, academic and citizen-space users, according to Yost.

## 3D Is Home In Its Slot



**The EUTELSAT 3D satellite of Eutelsat Communications (Euronext Paris: ETL) was successfully launched by a Proton Breeze M rocket supplied by ILS for operation at 3 degrees East.**

Lift-off of the satellite, built by Thales Alenia Space using their Spacebus 4000 platform, occurred on May 14th at 16.02 GMT (18.02 CET). Following a 9-hour 13-minute flight, Proton released EUTELSAT 3D into geosynchronous transfer orbit. The partial deployment of the satellite's solar panels was successfully carried out from Eutelsat's control centre in Rambouillet three hours and 15 minutes after separation from the rocket.

Eutelsat also announced that it has signed a new launch contract with ILS for a satellite to be launched in the 2014-2016 timeframe. This will be the eighth satellite to be launched for Eutelsat by the Proton launcher.

Michel de Rosen, Eutelsat CEO, said, "We are delighted to confirm that EUTELSAT 3D is on its way to 3 degrees East. From next month, this new satellite will take service at 3 degrees East to a new level in advance of the launch in 2014 of EUTELSAT 3B. Our thanks to Thales Alenia Space for delivering our new satellite and to ILS and Khrunichev for this flight which maintains our track record of 100 percent success since our first Proton launch in 2000. We are pleased to renew our confidence in the powerful Proton launcher with a new contract that gives us the scope to increase our operational agility, a key asset in our business."

ILS President Phil Slack added, "The Proton vehicle and Eutelsat partnership dates back 13 years starting with the SESAT 1 launch on Proton in 2000. After seven launches, including the 50th ILS Proton launch in 2009 with the EUTELSAT 10A satellite, we are honoured that Eutelsat continues to place their trust in us to enable the expansion of their business. Many thanks to the Eutelsat, Thales Alenia Space, Khrunichev and ILS teams for ensuring mission success with the launch of EUTELSAT 3D."

With a baseline design equipping it to strengthen Eutelsat's overall in-orbit flexibility and back-up from multiple orbital slots, EUTELSAT 3D address high-growth video, data, telecom and broadband markets. It will serve customers in Europe, North Africa, the Middle East and Central Asia through a configuration of Ku- and Ka-band transponders connected to three footprints. A fourth service area in the Ku-band will serve markets in sub-Saharan Africa.

EUTELSAT 3D will operate at 3 degrees East slot until the deployment of the EUTELSAT 3B satellite to this position in 2014 to provide spectrum growth and high levels of operational flexibility in C-, Ku- and Ka-bands. It will subsequently continue service at 7 degrees East. The satellite is designed to operate in orbit for 15 years.

## Product Presentations



Digital Rapids' Transcode Manager 2.0

**Digital Rapids will be showcasing the company's newest media transformation and workflow solutions at BroadcastAsia2013, June 18-21, in Singapore, with partner Gencom in booth 5D2-01... on display:**

» *Digital Rapids Transcode Manager 2.0 powered by Kayak— This automated media processing software goes far beyond transcoding, seamlessly blending media file transformation and workflow processes while offering unparalleled efficiency and agility for applications from post production and archive*

to multiscreen distribution. Powered by the Kayak workflow platform, Transcode Manager 2.0 combines powerful management tools, superior quality and exceptional format flexibility with adaptive, automated decision-making; exceptionally rich metadata support; intuitive, visual workflow design tools; dynamic deployment; fast, easy integration of new and emerging technologies; and a deep ecosystem of third-party technology partners

» *StreamZ Live 8000EX—Simplifying the convergence of core television and multi-platform streaming operations, the new StreamZ Live 8000EX integrated broadcast/multiscreen live encoder combines the proven multi-format flexibility and output quality of the StreamZ Live family with robust features for the unique demands of satTV, broadcast, cable, and telco deployments*

» *StreamZHD—A new version of the software for the versatile StreamZHD multi-format ingest and encoding system will be shown, featuring further quality and performance enhancements for Digital Rapids' highly-acclaimed H.264, MPEG-2 and DVCPPro encoding, plus expanded support for transforming advertising insertion markers for multiscreen protocols. StreamZHD provides superior quality, flexibility, format support and efficient automation for transforming media for applications from post production and archive to live and on-demand multi-screen distribution.*

## WORK @ CommunicAsia2013



WORK Microwave's DVB-S2 Demodulator SDD-TS / SDD-IP / SDD-DV



WORK Microwave's DVB-S2 IP Modem SK-DV / SK-IP

**For the first time in the Asia-Pacific market, WORK Microwave will unveil a powerful new multistream feature for its demodulator product line.**

WORK Microwave will be located at stand #1V2-07 showcasing a wide range of innovative satellite communications technologies spanning various applications within the broadcast, satellite, and telco markets.

Attendees will get a first look at the DVB-S2 multistream functionality being integrated into WORK Microwave's complete line of demodulator solutions, including the company's popular SDD-TS and SDD-DV products. Using this powerful new technology, users can seamlessly deaggregate up to six transport streams and IP data from a single carrier, thereby optimizing efficiencies while reducing the amount

of equipment required for uplink and downlink operations. Ideal for local cable distribution and satellite newsgathering applications, the technology simultaneously supports IPv4 and IPv6 outputs, as well as full integration of DVB-S2 multistream, including null-packet reinsertion and output realignment, decreasing CAPEX and OPEX for cable and satellite providers.

Also on display at CommunicAsia2013 will be WORK Microwave's DVB-S2 Modem SK-DV. Using DaVid technology, the combined data and video modem simultaneously transports data (network connection) and live broadcast (video content) over a single satellite carrier, aggregating multiple MPEG transport streams and IP data into a unified DVB-S2 multistream. Ideal for operators relying on a hybrid infrastructure that requires TS and IP interfaces, the DVB-S2 Modem SK-DV leverages a powerful feature set, including VideoACM, traffic shaping, cross layer design, Generic Stream Encapsulation (GSE), and OptiACM, to maximize data throughput and bandwidth use while reducing OPEX and CAPEX.

WORK Microwave will also demonstrate the DVB-S2 IP-Modem SK-IP at CommunicAsia2013. Harnessing XipLink traffic shaping and WORK Microwave OptiACM functionalities, this powerful IP modem optimizes throughput and increases network bandwidth for service providers, corporate networks, and telcos. An additional showcase will include several important enhancements to the company's new-generation frequency converter series designed for applications that require low phase noise, ranging from S-band to Ka-band. Utilizing a sophisticated new synthesizer, the frequency converters can deliver phase noise at a level that significantly exceeds the respected industry standard according to Intelsat's Phase Noise Specification, IESS-308/309.

## New APAC Senior Director

**Inmarsat has named Bill Peltola as Senior Director, Aviation Services in the Asia-Pacific region.**

Bill will be responsible for developing market opportunities for Inmarsat aviation services in the region, building on the company's long standing leadership position in satellite-based, aviation safety services and introducing Global Xpress (GX), the world's first globally available superfast mobile broadband service, delivered through Ka-band.

Bill joins Inmarsat's aviation team from Panasonic Avionics Corporation, where he was instrumental in the development and implementation of connectivity services offered by its Global Communications Services group. He has also held senior positions with aircraft connectivity companies including AirCell (Gogo), Stratos and British Telecom.

Miranda Mills, Vice President, Aerospace, Global Xpress, said, "Bill's strong background in aviation connectivity will be put to good use in the Asia Pacific region as we expand our

already broad offering with the introduction of our unique, high bandwidth aviation services."

Bill Peltola said, "Inmarsat has a great story to tell. Its reputation for technology development, customer focus and market innovation are second to none. Inmarsat's game-changing Global Xpress broadband solution is coming online at the perfect time to satisfy the growing needs of airlines and aircraft operators. I look forward to using my industry experience to help communicate this story—ensuring GX's profile in the aviation space continues to keep pace with our growing position and potential in the Asia-Pacific region."

Inmarsat's GX service will offer the unique combination of seamless global coverage from a single operator and consistently higher performance with download speeds of up to 50Mbps, and the network reliability for which Inmarsat is well known.

Services will be delivered over Inmarsat's next generation of satellites, the Inmarsat-5s, with the first satellite scheduled for launch by the end of 2013. Global coverage is planned for the end of 2014.



## WGS-5 Wends Its Way Upwards



Cape Canaveral Air Force Station, Florida. (May 24, 2013) – In the second launch in just nine days for the U.S. Air Force, United Launch Alliance (ULA) successfully launched a Delta IV rocket carrying the fifth Wideband Global SATCOM (WGS-5) satellite at 8:27 p.m. EDT today from Space Launch Complex-37. Wideband Global SATCOM provides anytime, anywhere communication for the warfighter through broadcast, multicast, and point to point connections. WGS is the only military satellite communications system that can support simultaneous X- and Ka-band communications. Photo by Pat Corkery, United Launch Alliance

### **A United Launch Alliance (ULA) Delta IV rocket successfully launched the fifth Wideband Global SATCOM (WGS-5) satellite for the U.S. Air Force from Space Launch Complex-37.**

This mission launched just nine days after ULA successfully launched the GPS IIF-4 satellite last Wednesday, May 15th.

“United Launch Alliance and our many mission partners continue to focus on mission success, one-launch-at-a-time,” said Jim Spornick, ULA vice president, Mission Operations. “We are honored to work with such a strong industry and government team and deliver another critical communication capability to orbit to support our nation’s warfighters throughout the world.”

This mission was launched aboard a Delta IV Medium-plus configuration vehicle using a single ULA common booster core powered by a Pratt & Whitney Rocketdyne (PWR) RS-68 main engine, along with four ATK GEM 60 solid rocket motors.

The five-meter diameter upper stage was powered by a PWR RL10B-2 engine with the satellite encapsulated in a five-meter diameter composite payload fairing.

The WGS-5 launch marked the third flight of the Delta IV medium+ (5,4) configuration and the 22nd flight of the Delta IV family of launch vehicles.

This was the first Delta IV launch following the low engine performance that was identified on the successful Global Positioning System (GPS) IIF-3 launch last October. Although the GPS IIF-3 spacecraft was accurately placed into the required orbit, ULA, Pratt & Whitney Rocketdyne (PWR) and our U.S. Air Force teammates embarked on an investigation to determine why the upper stage engine performance was lower than expected.

Prior to this mission, rigorous hardware inspections along with vehicle and operational design modifications were implemented to prevent a recurrence of the fuel leak in the RL10 engine that was the direct cause of the low engine performance on the GPS IIF-3 launch.

“The team has worked tremendously hard and exceptionally well to complete a robust investigation and get us to a successful launch today,” said Spornick. “We sincerely thank the PWR team and our customer community for working with us throughout the investigation and flight clearance process, as well as the involvement from senior industry technical advisors.”

Wideband Global SATCOM provides anytime, anywhere communication for the warfighter through broadcast, multicast, and point to point connections.

WGS is the only military satellite communications system that can support simultaneous X- and Ka-band communications.

ULA’s next launch is the Atlas V MUOS-2 mission for the U.S. Navy scheduled for July 19, from Space Launch Complex-41 at Cape Canaveral Air Force Station, Florida.

The EELV program was established by the United States Air Force to provide assured access to space for Department of Defense and other government payloads.

The commercially developed EELV Program supports the full range of government mission requirements, while delivering on schedule and providing significant cost savings over the heritage launch systems.

ULA program management, engineering, test, and mission support functions are headquartered in Denver, Colorado. Manufacturing, assembly and integration operations are located at Decatur, Alabama, and Harlingen, Texas. Launch operations are located at Cape Canaveral AFS, Florida, and Vandenberg AFB, California.

## More Product Presentations

**At BroadcastAsia2013, Harmonic will showcase solutions that enable more efficient multiformat content production, more cost-effective distribution of content over any network, and better support of high-quality video delivery regardless of the display device.**

Harmonic will demo HEVC compression for OTT and the latest Ellipse® contribution encoder.

Spectrum™ ChannelPort™ Integrated Channel Playout System—The Spectrum ChannelPort™ integrated channel playout system will feature powerful, new channel-in-a-box capabilities such as dual DVEs with independent branding. The Spectrum ChannelPort platform speeds the cost-effective deployment of new SD and HD television channels by integrating branding and master control switching with clip playback on the industry's most trusted media server platform. Fully compatible with Spectrum MediaCenter™ and MediaDeck™ 7000 servers, ChannelPort fits seamlessly into existing production and playout infrastructures, reducing complexity and cutting the time it takes to launch new services.

Also to be showcased will be the Ellipse® 3000 contribution encoder for the first time in Asia, which employs MPEG-2 and MPEG-4 AVC 4:2:0/4:2:2 8- and 10-bit compression technologies to enable transmission of pristine real-time video over satellite and broadband contribution networks. By encoding the highest-possible picture quality at the front end of the broadcast chain, the Ellipse 3000 offers low latency in conjunction with multiformat and multicodec versatility. The Ellipse 3000 is ideal for digital satellite newsgathering (DSNG) operations and live sports coverage—or any application in which premium image quality and high performance are primary considerations.

Harmonic has made significant enhancements to its award-winning ProMedia™ suite of adaptive bit rate (ABR)

solutions for multiscreen processing and delivery. New features include support for HEVC for VOD transcoding, increased synergy with the Harmonic MediaGrid shared storage system, and support for closed captioning, regional blackouts, and Nielsen ID3 tagging. ProMedia is the industry's most complete multiscreen preparation solution. streams, and improve the video experience.

Also to be shown is Harmonic's new ProStream® 9000 and industry-leading Electra™ universal multifunction, multiformat encoding platform, which currently powers more than 75,000 channels worldwide.

## DoD Experiments To Japan



The STP-H4 complement is pictured here prior to encapsulation and shipment to Japan. NRL's three experiments—SWATS, MARS, and GLADIS—are identified. (Photo: DoD Space Test Program)

**The DoD Space Test Program STP-H4 payload complement, which includes three Naval Research Laboratory experiments bound for the International Space Station, has been shipped to Japan for integration on the HTV-4 vehicle that is expected to launch from the Tanegashima Space Center in August of 2013.**

The STP-H4 payload complement is a suite of experiments managed, integrated, and flown to the International Space Station (ISS) under the direction of the DoD Space Test Program (STP).

The complement consists of five payloads developed by the DoD and three experiments from NASA.

Three of the DoD payloads were developed and built at the Naval Research Laboratory. NRL's Space Science Division developed the Small Wind And Temperature Spectrometer (SWATS) and Miniature Array of Radiation Sensors (MARS), and the Space Systems Development Division, part of NRL's Naval Center for Space Technology (NCST), developed the Global Awareness Data-Exfiltration International Satellite Constellation Concept (GLADIS) experiment. The Spacecraft Engineering Department, also part of NRL's NCST, provided the flight harness for the STP-H4 platform and the Power Control Electronics Box for STP-H4.

The STP-H4 payload complement is scheduled for launch in August 2013 from Tanegashima Space Center in Japan, on an H-II Transfer Vehicle (HTV) launch. After launch, the HTV will free-fly to the ISS and then berth to the ISS. The HTV Exposed Palette (EP) will then be transferred to a temporary storage location on the ISS. The STP-H4 complement will be removed from the HTV-EP and installed on the Express Logistics Carrier (ELC-1) for initial checkout and operations.

The SWATS experiment is a low size, weight, and power space weather experiment suite that will acquire simultaneous co-located, in-situ measurements of atmospheric density, composition, and winds of both ions and neutrals. MARS consists of an array of nine micro dosimeters that measure the total dose radiation at different locations on the STP-H4 complement for 3-D radiation modeling. NRL researchers look to these experiments to improve their ability to understand and forecast space weather at Earth that can affect military and civilian space and communication systems.

## U.S. STRATCOM + Australia



**A new agreement made between the United States and Australia represents the first in what U.S. Strategic Command's commander hopes will be many that promote transparency in the space domain.**

U.S. Air Force Gen. C. Robert Kehler signed the agreement on

behalf of the United States, short-cutting the process for the Australian government to request data through STRATCOM's Space Situational Awareness Sharing Agreement Program.

The agreement represents another step in the November 2010 pact between the two countries to cooperate on space situational awareness activities. It streamlines the process

for the Australians to make specific requests about space data gathered by STRATCOM's Joint Operations Center at Vandenberg Air Force Base, California. This information, which includes locations of some 23,000 man-made objects in space, is critical in planning launches into the increasingly crowded space domain.

"Many nations share the space domain, and it is in our best interest to create an environment where the sharing of [space situational awareness] data facilitates transparency and improves flight safety," Kehler said.

The new U.S.-Australian agreement paves the way for similar ones between the United States and its closest allies and partners, and is modeled on commercial agreements STRATCOM has forged with commercial companies over the past three years. Space situational awareness exchanges will assist partners with activities such as launch support, maneuver planning, support for on-orbit anomaly resolution, electromagnetic interference reporting and investigation, support for launch anomalies and de-commissioning activities, and on-orbit conjunction assessments, officials noted. (Source: Donna Miles, American Forces Press Service.)

## Spatial Fender Bender Perhaps Fatal



**A small Ecuadoran satellite collided in orbit with the remains of a Russian rocket, certainly classifiable as “junk,” but it is too soon to know how much damage it might have sustained, Ecuador’s space agency stated.**

Ecuador’s space agency EXA had warned that a space fender-bender was likely between its “Pegaso” (Pegasus) nanosatellite and the remains of the Soviet rocket S14

launched into space nearly three decades ago. The agency’s director Ronnie Nader said in a Twitter message sent after the crash that U.S. space officials had confirmed Pegaso had suffered only a glancing blow from the Russian space debris.

“It was not a direct hit,” tweeted Nader. “Pegasus remains in orbit.”

He added that despite the collision—which occurred at around 0538 GMT some 1,500 kilometers above the east coast of Madagascar—the satellite seemed to be holding its course. However, Nader said it was too early to say what the extent of the damage to the nanosatellite is, adding that it would take another day or two to know for sure.

However, this collision has now ended up being more than just a fender bender. Unfortunately, this collision has resulted in the nanosatellite now spinning like a top, unable to send or receive signals.

The small satellite did survive the encounter, according to the Ecuadorian Space Agency (EXA)—final findings should be released shortly as to whether or not Pegaso is salvageable. It is unknown if this setback for the Ecuadorian space program will affect their planned launch of their second satellite, named Krysaor, set for August by Russia. Both Ecuadorian satellites required an investment of approximately \$780,000, which was supplied by EXA, private companies, and the government of Ecuador and required a year to build.

## Active Hurricane Season For U.S.



Hurricane Sandy as seen from NOAA's GOES-13 satellite on October 28, 2012.

### **In its 2013 Atlantic Hurricane Season Outlook recently issued, NOAA's Climate Prediction Center is forecasting an active or extremely active season this year**

For the six-month hurricane season, which starts June 1, NOAA's Atlantic Hurricane Season Outlook says there is a 70 percent likelihood of 13 to 20 named storms (winds of 39 mph or higher), of which 7 to 11 could become hurricanes (winds of 74 mph or higher), including 3 to 6 major hurricanes (Category 3, 4 or 5; winds of 111 mph or higher).

These ranges are well above the seasonal average of 12 named storms, 6 hurricanes and 3 major hurricanes.

"With the devastation of Sandy fresh in our minds, and another active season predicted, everyone at NOAA is committed to providing life-saving forecasts in the face of these storms and ensuring that Americans are prepared and ready ahead of time," said Kathryn Sullivan, Ph.D., NOAA acting administrator. "As we saw first-hand with Sandy, it's important to remember that tropical storm and hurricane impacts are not limited to the coastline. Strong winds, torrential rain, flooding, and tornadoes often threaten inland areas far from where the storm first makes landfall."

Three climate factors that strongly control Atlantic hurricane activity are expected to come together to produce an active or extremely active 2013 hurricane season. These are:

» *A continuation of the atmospheric climate pattern, which includes a strong west African monsoon, that is responsible for the ongoing era of high activity for Atlantic hurricanes that began in 1995*

» *Warmer-than-average water temperatures in the tropical Atlantic Ocean and Caribbean Sea*

» *El Niño is not expected to develop and suppress hurricane formation*

"This year, oceanic and atmospheric conditions in the Atlantic basin are expected to produce more and stronger hurricanes," said Gerry Bell, Ph.D., lead seasonal hurricane forecaster with NOAA's Climate Prediction Center. "These conditions include weaker wind shear, warmer Atlantic waters and conducive winds patterns coming from Africa."

NOAA's seasonal hurricane outlook is not a hurricane landfall forecast; it does not predict how many storms will hit land or where a storm will strike.

Forecasts for individual storms and their impacts will be provided throughout the season by NOAA's National Hurricane Center.

New for this hurricane season are improvements to forecast models, data gathering, and the National Hurricane Center communication procedure for post-tropical cyclones.

In July, NOAA plans to bring online a new supercomputer that will run an upgraded Hurricane Weather Research and Forecasting (HWRF) model that provides significantly enhanced depiction of storm structure and improved storm intensity forecast guidance. Also this year, Doppler radar data will be transmitted in real time from NOAA's Hurricane Hunter aircraft. This will help forecasters better analyze rapidly evolving storm conditions, and these data could further improve the HWRF model forecasts by 10 to 15 percent.

The National Weather Service has also made changes to allow for hurricane warnings to remain in effect, or to be newly issued, for storms like Sandy that have become post-tropical.

This flexibility allows forecasters to provide a continuous flow of forecast and warning information for evolving or continuing threats.

"The start of hurricane season is a reminder that our families, businesses and communities need to be ready for the next big storm," said Joe Nimmich, FEMA associate administrator for Response and Recovery. "Preparedness today can make a big difference down the line, so update your family emergency plan and make sure your emergency kit is stocked. Learn more about how you can prepare for hurricane season at [www.ready.gov/hurricanes](http://www.ready.gov/hurricanes)."



## First Looks



Red River, Hanoi (Vietnam)



Melbourne (Australia)

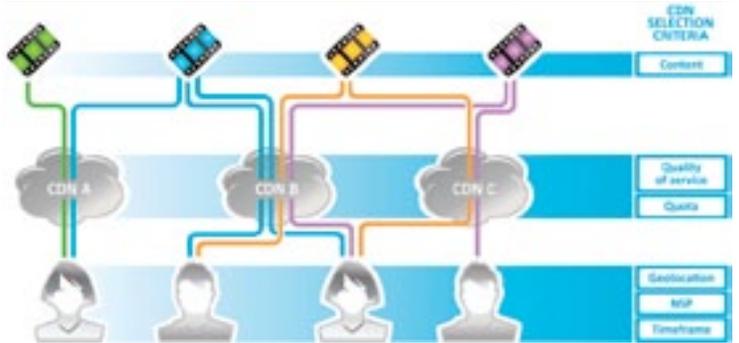
### Forty-eight hours after launch, Astrium delivered the first VNREDSat-1 images.

Astrium is the prime contractor for the Vietnam Natural Resources, Environment, Disaster Satellite, the first Vietnamese Earth observation satellite. The Astrium-built VNREDSat-1 was launched on May 7th from Kourou.

The images show Hanoi's Red River (Vietnam) and the city of Melbourne (Australia) at a resolution of 2.5 metres.

Having reached its operational orbit, the satellite has now entered its in-orbit test phase. Official delivery to the customer, the Vietnam Academy of Science and Technologies (VAST), will occur at the end of this phase.

## Even More Product Presentations



Broadpeak's umbrellaCDN chart.

### Broadpeak will showcase several innovative technologies at CommunicAsia2013.

For the first time in Asia, Broadpeak will demonstrate their umbrellaCDN solution—content providers can allocate the ideal CDN for their content according to various criteria such as format, end-user location, content provider, quality, or time of day. umbrellaCDN also offers the opportunity to centralize content geoblocking to manage the sending of replacement content and the modeling of quotas. Advanced analytics provide full information about the audience and the content consumption.

At CommunicAsia2013, Broadpeak will also showcase C-CAS (Conditional Access System-Compliant Adaptive Streaming), an innovative technology that enables payTV operators to support adaptive streaming protocols while simultaneously remaining compliant with conditional access systems on subscribers' existing set-top boxes (STBs).

Leveraging adaptive streaming technologies, C-CAS unifies the video user experience across next-generation and existing STBs, providing superior video quality for subscribers in a very short time frame with minimal cost for pay-TV operators. The first application of C-CAS is available on Broadpeak's widely deployed Bks100 VOD servers, enabling operators to ensure a superior Quality of Experience while relying on adaptive streaming controlled at the network level as opposed to within the player.

Broadpeak will also demo its nanoCDN technology at CommunicAsia2013. Harnessing subscribers' home networks, nanoCDN dramatically reduces infrastructure investments for network service providers. The first application of nanoCDN is to optimize live OTT video delivery, with more applications to be supported in the future. nanoCDN improves the scalability of live OTT TV content by effectively managing video consumption peaks that are not supported by the network infrastructure. Using nanoCDN, cable and telecom operators can cost-effectively deliver high-quality, live OTT video services to millions of simultaneous viewers using only a few megabits per second from the operator network.



## A Shallow Team Is Initiated



**Leading geospatial services company AAM has announced the launch of a dedicated Shallow Water Survey Team, with world-renowned hydrographic surveying expert Andy Waddington appointed to lead the team.**

The announcement follows AAM's merger with Vekta Pty Ltd. in April and represents another significant investment in Australia's fast-growing geospatial sector.

Under Waddington's leadership, the newly-formed team will provide innovative geospatial solutions to support government, environment, resources and infrastructure projects in shallow water environments.

AAM's Executive Director, Brian Nicholls, said the announcement represented a major addition to AAM's diverse range of geospatial services and technology. "The interaction between natural and man-made features in the coastal zone creates unique and complex management challenges," said Nicholls. "This near-shore region is subject to increasing pressure as 44 percent of the world's population lives within 150km of the sea and the vast bulk of world freight is transported via the ocean. Andy's knowledge of both traditional and modern survey theory and practice will assist our clients with managing these challenges."

A former ship's captain in the Royal Navy, Waddington has been active in the development of bathymetric LiDAR and remote sensing surveying techniques, particularly in shallow water and the near-shore region.

He is a qualified FIG/IHO Cat A Hydrographic Surveyor with 25 years of surveying experience, including two years on exchange with the Royal Australian Navy.

He also holds a BSc in Systems Management and an MSc in GIS and is a member of the Chartered Institute of Civil Engineering Surveyors, the Nautical Institute and Chairman of the Hydrographic Society (UK) SW Region.

## Acquiring Australian Talent



**Inmarsat has acquired TC Communications Pty. Ltd. of Australia, an award winning SATCOM specialist.**

Inmarsat will integrate the company into its existing operations with a particular focus on supporting its expanding Global Government and Enterprise Business Units.

Concurrent with the acquisition, Todd McDonell, CEO of TC Communications, joins Inmarsat as Vice President of Global Government Solutions. His role will cover sales and operations of the direct arm of Inmarsat's Global Government business in Australia, Canada, New Zealand and the Netherlands.

Andy Start, President, Inmarsat Global Government, said, "The strategic rationale is compelling. The acquisition of TC Communications brings strong VSAT, Wideband Global Satcom system, aviation and solutions skills to Inmarsat's Global Government and Enterprise Business Units. These skills are particularly important to drive the take-up of Global Xpress® in the enterprise and government markets following the launch of the first satellite later this year. In acquiring TC Communications, Inmarsat has gained access to a professional team with a strong reputation for excellent customer service and technical expertise."

Todd McDonell, CEO of TC Communications, said, "We see this acquisition as a very natural growth strategy for TC Communications. Inmarsat brings the financial capital and reach to be able to fully exploit the solutions and expertise that TC has built up over the past twenty years in the satellite industry. This move will enable us to share and replicate our successful, multipronged model with Inmarsat providers throughout the region so as to assist the entire market to aggressively pursue Inmarsat's growth objectives."

In 2012, TC Communications had 24 employees. The acquisition will increase Inmarsat's team in Australia to 65 people based in Sydney, Perth and Canberra.



# ***Executive Spotlight: William Wade, President + CEO, AsiaSat***

**M**r. Wade was appointed as the President and Chief Executive Officer of the Company on August 1, 2010. Prior to assuming his role as Chief Executive Officer, Mr. Wade had served as AsiaSat's Deputy Chief Executive Officer for 16 years.

Mr. Wade has more than 26 years of experience in the satellite and cable television industry. Prior to joining AsiaSat in April 1994, he was with Hutchison Whampoa, as Director of Business Development for Pan Asian Systems, and was in charge of all sales and regional operations. Mr. Wade had also served as the Executive Director for Echosphere International (Echostar), where he established Echosphere's permanent Asian operations in Singapore while managing the company's activities in Asia and the Middle East.

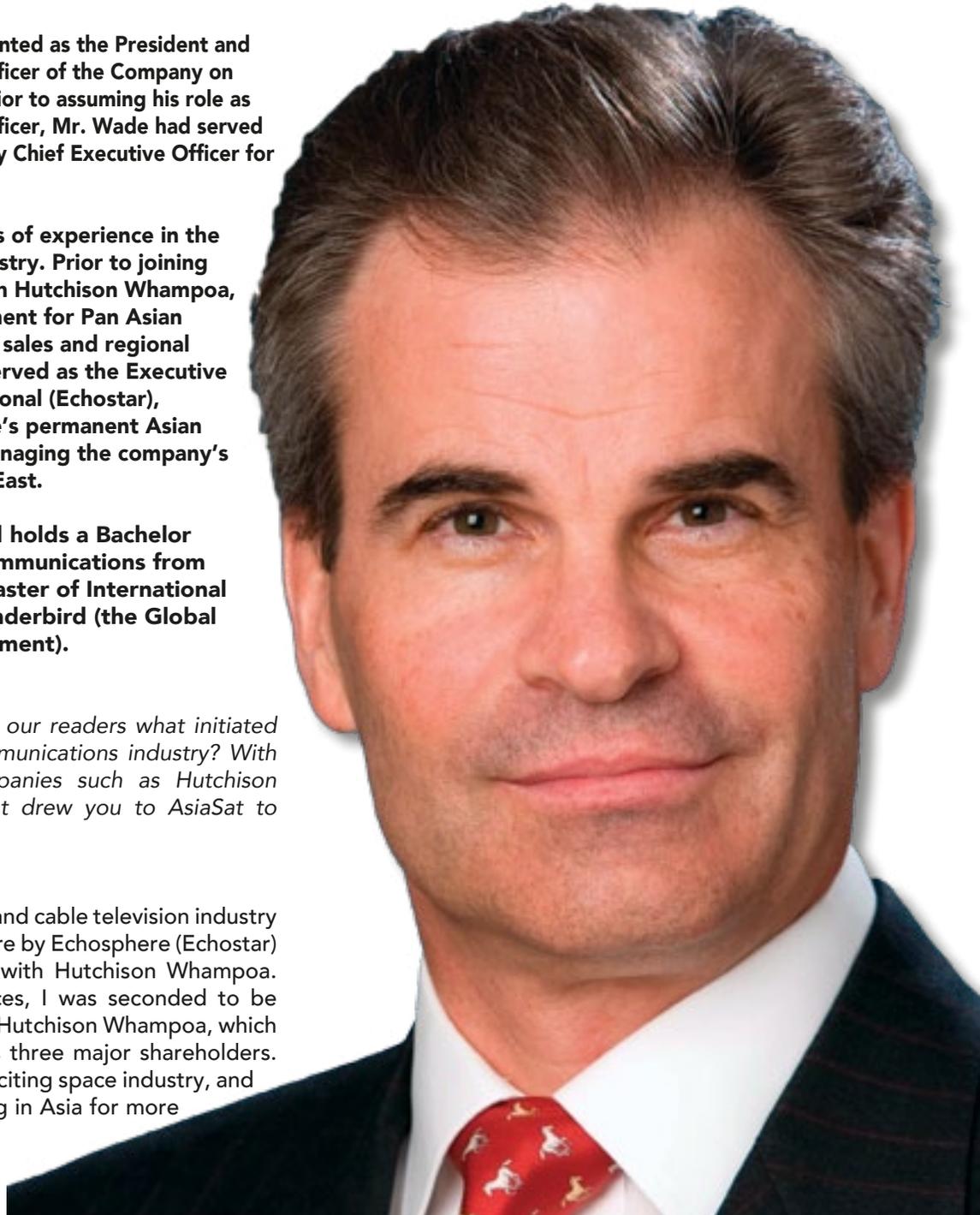
Mr. Wade speaks Mandarin and holds a Bachelor of Arts (Honours) degree in Communications from the University of Utah and a Master of International Management degree from Thunderbird (the Global School of International Management).

#### **SatMagazine (SM)**

*Mr. Wade, would you please tell our readers what initiated your interest in the satellite communications industry? With previous involvement with companies such as Hutchison Whampoa and Echosphere, what drew you to AsiaSat to further your executive career?*

#### **William Wade**

I started my career in the satellite and cable television industry in Asia when I was sent to Singapore by Echosphere (Echostar) and later moved to Hong Kong with Hutchison Whampoa. Due to these previous experiences, I was seconded to be AsiaSat's Deputy CEO in 1994 by Hutchison Whampoa, which at that time was one of AsiaSat's three major shareholders. That's how I got my start in this exciting space industry, and how I ended up living and working in Asia for more than two decades.



**SM**

*With 25 years of successful operations in Asia, how do you view AsiaSat's development and that of the Asian satellite industry over the past decades?*

**William Wade**

I am very proud of AsiaSat's development over the past two and a half decades. The evolution of AsiaSat has driven many of the important milestones for the development of the Asian satellite and pay television industries. As Asia's first private regional satellite operator we helped pioneer satellite television in Asia in 1990 with the launch of **AsiaSat 1**, Asia's first private regional satellite.

We continued to evolve from a private single satellite company to a publicly listed company, which now operates a fleet of four in-orbit satellites, with two new satellites under construction targeted for launch in 2014 and another satellite planned for launch in 2016.

Along with our company development, we have witnessed the exciting development of the Asian satellite industry over the years, from technological advances including the conversion from analogue to digital transmissions, developments in VSAT, the advent of HDTV, 3D and 4K delivery, the diversity of content development, and the availability of new distribution platforms such as IPTV, OTT, digital cable and DTT.

**SM**

*What market sectors do you see as holding the most growth potential within the APAC region?*

**William Wade**

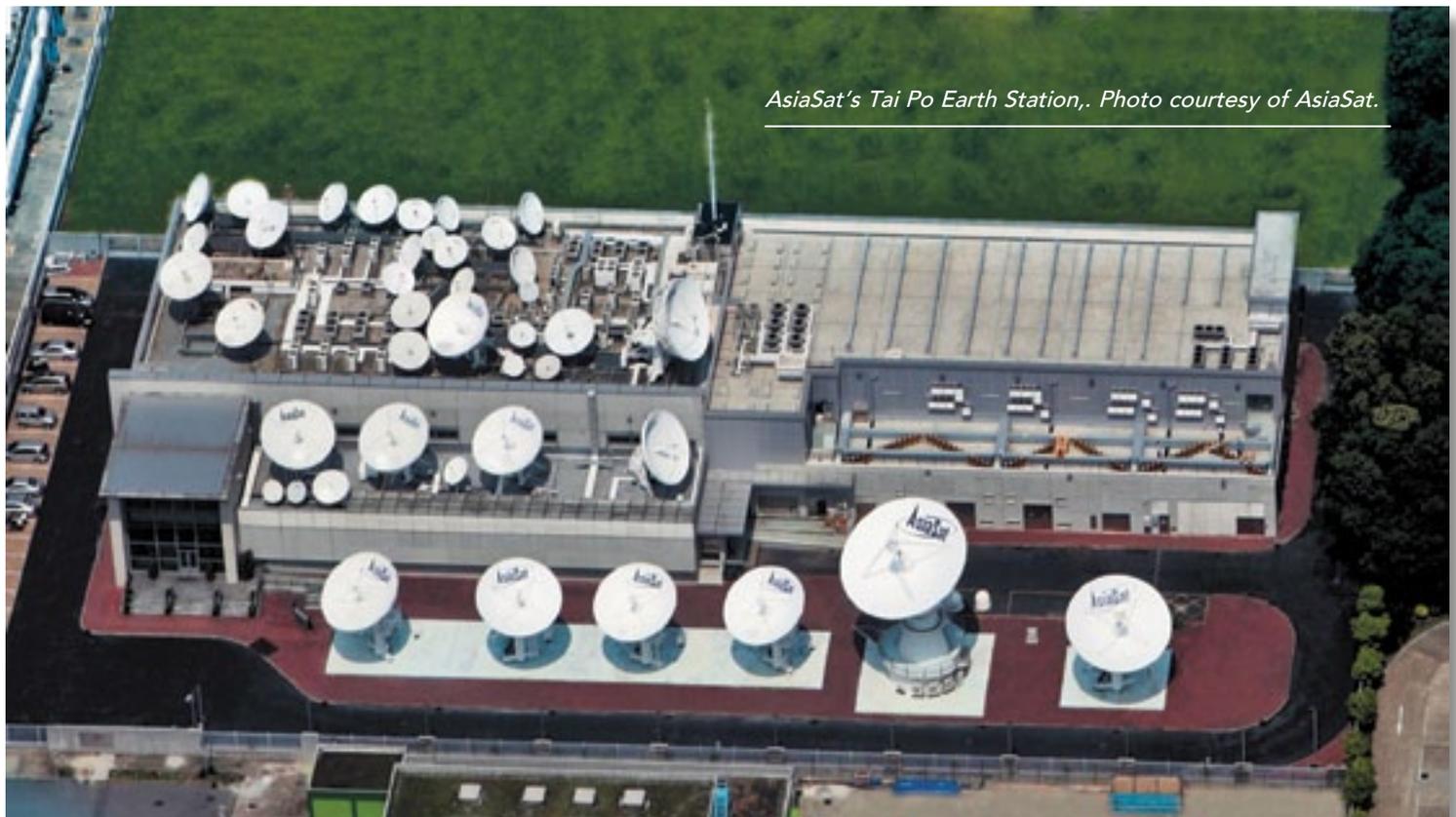
We see continued strong demand for DTH, notably in India and Indonesia. The HDTV conversion in the Asia-Pacific region is still a major growth area. Increased sports and event activities requiring capacity for intercontinental and cross region video transmissions, the digitization trends in major cable markets in India, Taiwan, and the implementation of DTT among ASEAN countries are also driving industry growth. We also see opportunities from other service sectors such as mobile backhaul, VSAT and broadband, which are on the top agenda of many Asian governments for improving their domestic communications infrastructure.

**SM**

*Where do you believe the opportunities exist for the company's growth in the future?*

**William Wade**

We look for opportunities for growth in all potential growth areas, whether DTH, DTT and digital cable, particularly in places where the supply of national networks is insufficient to meet local development. For example in India, DTH operators need capacity to expand their service offerings to compete with each other and with cable TV digitization. We



*AsiaSat's Tai Po Earth Station,. Photo courtesy of AsiaSat.*

## Executive Spotlight: William Wade (Cont.)



One of AsiaSat's latest satellites—AsiaSat 8—under construction at the Space Systems/Loral facility in the U.S.

also envisage opportunities from other markets issuing more DTH licences, and the doors of countries such as Cambodia, Laos, Bangladesh and Pakistan eventually opening to more satellite services. We also expect to see future growth from applications emerging from new technologies. Cooperation with and/or acquisitions of other satellite operators will also offer opportunities for future growth.

### SM

Does AsiaSat have any additional new projects in the development pipeline in addition to the upcoming AsiaSat 6 and AsiaSat 8 satellites?

### William Wade

We have issued an RFP for the construction of **AsiaSat 9**, a replacement satellite for **AsiaSat 4 at 122 degrees East**, to be launched in 2016. In addition to expanding our capacity in C- and Ku-band, AsiaSat 9 will host **GeoMetWatch's** first **hyperspectral STORM™** sensor, which will collect and return to Earth sophisticated and critical weather data not currently

available with the present global weather satellite network. We are excited by this ground breaking project as this new partnership with GeoMetWatch will expand our satellite services into a new arena and will provide additional revenue sources for the Company.

### SM

How will expanded ground facilities help reinforce and complement your firm's core transponder capacity leasing?

### William Wade

Through our expanded infrastructure and facilities at our **Tai Po Earth Station** in Hong Kong, we are offering a diverse range of value added services to our customers. This will complement our existing transponder capacity leasing business and enable us to offer more comprehensive service solutions to customers, from signal turnaround and uplink, MCPC platforms to broadcast and teleport services.

### SM

In your opinion, how important are hosted payloads to the future of SATCOM?

### William Wade

I expect hosted payloads to be a growing part of the future satellite business; however, the use of hosted payloads in Asia is not developing in the same way as many countries in the West where governments and organizations are developing projects for environmental, meteorology and military applications specifically with a hosting strategy in mind.

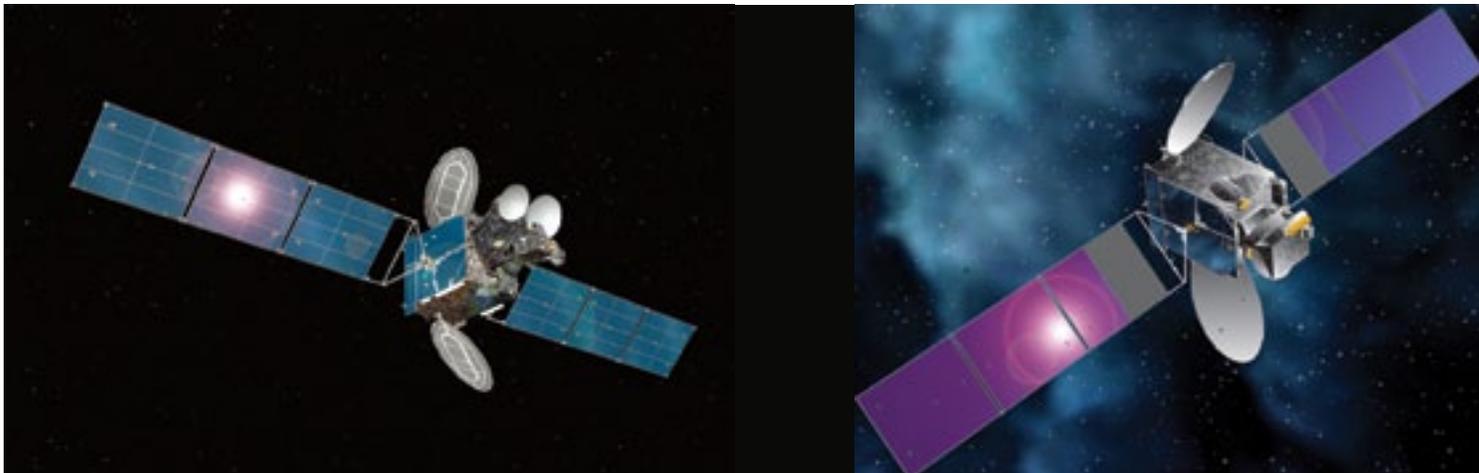
In Asia, the focus still seems to be on developing the core technological capabilities, for building satellites, launch vehicles and space missions rather than a hosted payload. The limited hosted payloads in Asia, so far, have been mainly for military applications. These payloads have been deployed on domestic satellites that are controlled by government operators. However, in the future we expect to see more hosting opportunities, from scientific, imaging, weather and navigational payloads with specific hosting applications similar to our recent partnership with **GMW**.

### SM

Another area of concern for the industry is that of satellite interference. How do you approach the need for such technologies with your firm's products?

### William Wade

The best way to deal with satellite interference is to make sure the satellites are well coordinated before they are put into service. This guarantees customers with quality transmissions. In terms of interference from terrestrial networks due to the deployment of wireless broadband services utilizing frequencies initially dedicated for satellite services, we are continuing to work closely with industry associations and our government regulator to lobby authorities to protect our satellite networks.



Left: AsiaSat 7 on-orbit, to replace AsiaSat 3S in 2014. Right: Artistic rendition of AsiaSat 6, to be located at 120 degrees East.

**SM**

What differentiates AsiaSat from other firms in your core markets?

**William Wade**

In the satellite industry, keeping up with the ever-changing business environment can be extremely challenging. To stay on top of the competition, we have continued to build our core business by exploring ways to innovate and expand into new growth markets, seize new opportunities and develop new applications, while remaining conscious of the inherent risks associated with our industry.

We have invested to expand our satellite fleet and ground infrastructure to enhance our core business services and support the growing needs of our customers. Carefully looking after critical issues such as satellite coordination and interference is also a way to differentiate us from others and provide added value to our services.

We look ahead to meeting the future needs of our customers and as mentioned are building two new satellites, that will offer additional capacity in growth markets and allow us to offer a more diverse range of services. These initiatives are important to maintain our market leadership in the Asia-Pacific region, and to move the Company forward.

**SM**

With 4K technologies driving great interest within the broadcasting arena, will this technology be supported by AsiaSat for content delivery via satellite within the APAC region?

**William Wade**

With Asia still striving to increase HDTV and to implement digitization, 4K will be a small but growing niche for the moment. The technological development is moving faster than content development, so I expect the adoption of 4K in Asia will be slow, similar to the growth of HDTV.

With 4K presenting four times the pixels of the regular HD format, a substantial amount of bandwidth is needed to support the delivery of a 4K channel. Our existing high-power satellites, and our upcoming **AsiaSat 6** and **AsiaSat 8**, will be able to support such content delivery requirements if 4K develops a viable and cost efficient business model in Asia.

**SM**

Do you see satellite continuing as a major player within the APAC broadcasting segment, or as an ancillary actor to fiber and wireless?

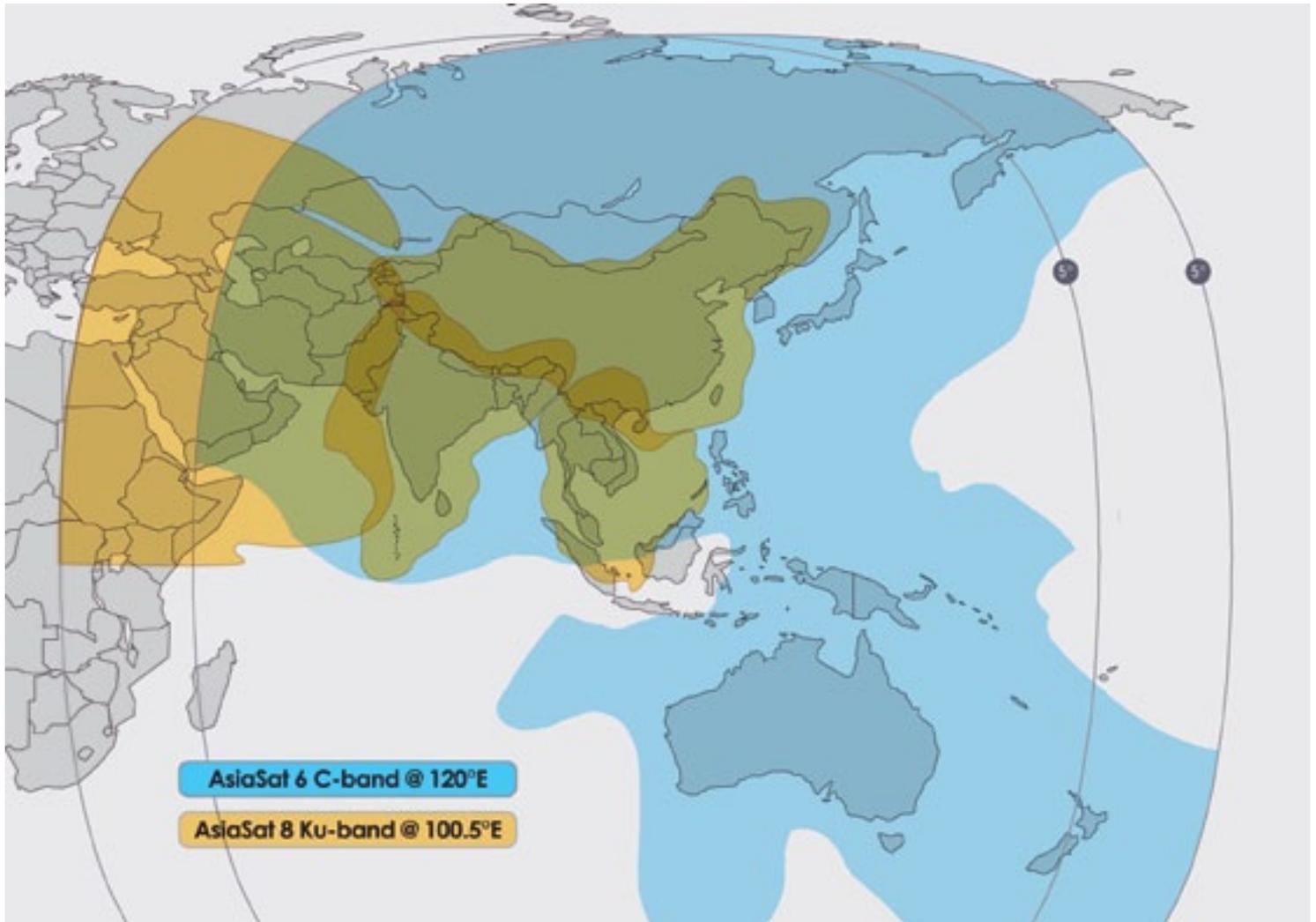
**William Wade**

Satellite will continue to be the most cost effective in terms of distributing content to multiple locations as well as serving remote areas where infrastructure is limited or undeveloped. In certain applications, satellite does not compete well with fiber and wireless, so some of these applications will see a continuing reduction in the use of satellite but, generally, I would say in most services, we are complementary.

**SM**

Some prognostication, please—what do you see as occurring within the satellite industry over the next few months into 2014 that will excite new customers and drive new partnerships?

## Executive Spotlight: William Wade (Cont.)



### **William Wade**

I would say the growing trend of cooperation amongst Asian satellite operators with consosat, dual operations and joint procurement arrangements will be in the spotlight over the next few months. This could potentially lead to mergers and consolidation over time. Additionally, we are hoping to see governments relaxing regulations to allow the entry of foreign operators to support domestic growth and demand for capacity from local broadcasters and telecom service providers.

### **SM**

*Given your 26 years of experience within this industry, what project or projects over the span of your career truly bring a sense of personal accomplishment to you?*

### **William Wade**

Since joining AsiaSat in 1994, I have had the privilege of contributing to the growth and development of the company. The past few years have been exciting and rewarding as I have witnessed AsiaSat grow from strength to strength. Through the expansion of our satellite fleet and new investments in satellite-related ventures, we have achieved record results for the past four consecutive years while embarking on new and diverse business opportunities. To continue to build on our reputation as Asia's leading satellite operator, we have refocused our efforts on our core transponder leasing business and in developing new growth businesses.





# SatBroadcasting™: S2 Extensions Demystified

By Koen Willems, Strategic Marketing Director, Newtec

**D**VB-S2 is the most accepted and widely spread standard in the satellite market. The standard has a deep market penetration in Sports and News Contributions, Professional Video Distribution solutions, IP trunking and Cellular Backhauling, Broadband VSAT solutions including Government and Defense networks over satellite.



In a fast moving satellite world, new technologies (HTS, HEVC, UHD TV) emerge and data rates increase at an accelerated pace. Within applications such as Contribution and IP Trunking, the efficiency requirements are already testing the limits of the DVB-S2 standard. The risk for a massive take-over by proprietary technologies with better performance is realistic. A proprietary scenario would disperse the satellite industry, increase the cost of satellite communications as well as prevent interoperability and result in vendor lock-in.

A new standard (or extension to DVB-S2) with improved efficiency will give the satellite industry more breathing space to increase profitability and allow for business growth throughout all applications, from High Speed IP to Broadcast to VSAT.

The efficiency technologies contributed by **Newtec** to the new DVB standard boost the satellite link as much as 20 percent in *Direct-To-Home (DTH)* networks, and 36 percent in other professional applications when compared to DVB-S2. These gains already exceed the results by proprietary systems in the market today.

## **Introduction**

Kick-started by Newtec earlier this year, key players in the satellite industry are calling for a new satellite transmission standard, specifically for professional satellite contribution links, which would extend the existing DVB-S2 standard.

The satellite world has changed a lot since DVB-S2 was first published in 2005. Higher speeds, more efficient satellite communication technology and wider transponders are required to support the exchange of large and increasing volumes in data, video and voice over satellite. The biggest demand for the extensions to the DVB-S2 standard comes from video contribution and high-speed IP services, as these services are affected the most by the increased data rates.

In the long run, more throughput will be required for DTH applications as well with the rise of *Ultra-High Definition TV (UHDTV)* and the *High Efficiency Video Coding (HEVC)* video compression standard to support the request of higher quality images by the market.

Ultimately, for satellite businesses, the creation and adoption of these extensions will translate to higher efficiency, higher speed and greater service robustness to increase business and, therefore, revenues.

Many vendors, operators and satellite specialists within the industry agree with DVB and are working towards these new extensions. As the official naming by DVB has not been decided yet, we will refer to the bundle of improved candidate technologies for the new standard as **S2 Extensions**.

### **The Market Is In (R)evolution**

#### *Satellite's Challenge Versus Fiber*

Changes have never occurred so rapidly in the satellite industry as they are today. The increasing penetration of terrestrial communication alternatives has placed satellite under pressure.

A common misconception is that fiber will entirely replace satellite sooner or later. Use cases, economic considerations and new technologies prove that satellite still has value for years to come. Terrestrial and satellite communications are more likely to cohabitate in network structures and will be selected depending on the application.

#### *Breakthrough Technologies Change The Game*

*High Throughput Satellites (HTS)* and efficiency technologies have changed the game. More bandwidth capacity will become available and prices per megabit will drop. Both HTS and efficiency technologies blow oxygen into satellite service providers' profitability and growth.

Efficiency technologies allow for more throughput in the same bandwidth or to save on OPEX. In technical terms, efficiency technologies push more bits through the same Hertz.

What can be done with these extra megabits? Examples throughout different applications demonstrate the benefits:

- In a VSAT environment more users can be added to the network resulting in extra revenue. Higher SLA's become possible increasing the user experience.
- Broadcasters can add more TV channels to their offering and increase the quality of the image.
- Extra revenues can be achieved by adding services in a multiservice context.

*The impact of efficiency technologies and HTS is so powerful in the satellite market that the standardization of these technologies cannot be delayed.*

#### *Why Standards?*

In the satellite industry there will always be a field of tension between open standards and proprietary technologies. Although in the short term proprietary technologies might be the best option to acquire quick revenues, in the long run the availability of open standards will benefit the entire satellite industry for the following reasons:

- *Open standards create an eco-system that spurs companies to develop new solutions based on common building blocks*
- *Open standards reduce the barrier for entry for companies to develop new solutions for satellite communications*
- *Open standards create an economy of scale that allows a reduction in the cost of equipment and increases the profitability of the industry*
- *Open standards avoid vendor lock-in and allow multiple vendors to enter the network, lowering the overall risk of high pricing, companies going bankrupt or non-availability of spare parts*
- *Open standards increase the quality of products as the technical implementation is supported by multiple organizations.*
- *Open Standards allow for interoperability between different government, NGOs and commercial organizations increasing the effectiveness of operations in the field.*

The impact of standardization increases the quality of life in both developed and developing countries. Standards for satellite communications allows people to connect all over the world to the information highway to give them better access to education, to (welfare) services, to economical, political and social involvement.

#### *Which Markets Will Quickly Adapt To S2 Extensions?*

The satellite industry has come to a consensus that a successor to the DVB-S2 standard is required to accommodate for increased profitability, interoperability and growth in the professional satellite communications market.

Newtec has taken the lead and teamed with other DVB-members in order to define and develop the update on the DVB-S2 standards. The current DVB-S2 standard has served the industry well, but it is now close to 10 years old.

To learn more on how the market perceives the introduction of the new S2 Extensions standard, go to the **Newtec** website and download the E-book with the S2 Extensions Survey results by 700 SATCOM experts: [www.newtec.eu/technology/s2-extensions](http://www.newtec.eu/technology/s2-extensions).

## S2 Extensions Demystified (Cont.)

Up until now, the DVB-S2 standard has been the solution for a wide scope of applications over satellite including distribution applications such as DTH. For distribution activities, broadcasters are likely to continue to use the existing DVB-S2 standard for some time to come. However, with the new, higher resolution technologies such as UDHTV and HEVC video compression about to hit the market, and the drive for more content, in the longer term the new S2 Extensions will be adopted for DTH networks as well.

We are likely to see an immediate take-up, in applications that require high throughput over satellite for professional use and in applications that suffer for bandwidth or need better margins to remain profitable. The applications that will adapt quickly to the S2 Extensions are:

- IP Trunking & IP/Telecom Backbones
- Broadcast Contribution and Exchange
- IP Backhauling & Professional IP Access
- Government High Speed Communications and Disaster Recovery
- Multi-Service networks over satellite

### The Innovations Behind S2 Extensions

The successor to the DVB-S2 standard is a combination of innovative technologies that improve overall efficiency over satellite links.

#### The technologies involved in S2 Extensions are:

- Low roll off, smaller carrier spacing and advanced filter technologies
- MODCOD and FEC upgrades (more granularity, adding 64 APSK, improving FECs & MODCODs and differentiating linear & non-linear MODCODs)
- Wideband (72 Mbaud) implementation

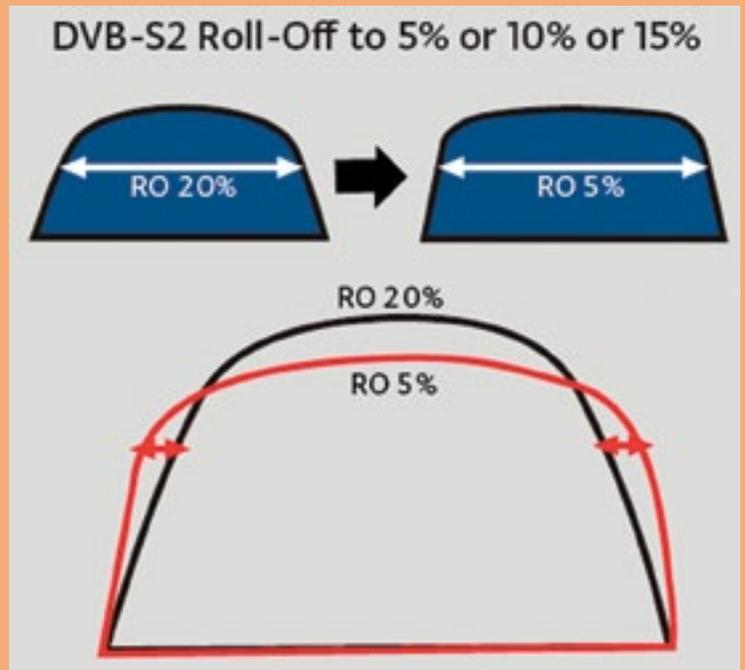
These technologies and their intrinsic benefits will be described in more detail in the sections below.

#### Smaller Roll-Offs + Advanced Filtering Technologies

The new S2 Extensions include a combination of smaller roll-offs (5, 10, 15 percent) and introduces advanced filtering technologies to allow optimal carrier spacing. Compared to DVB-S2 the combination brings efficiency gains up to 15 percent.

#### Improvement 1: Smaller Roll-Offs

A first innovation inside the new standard implements a smaller Roll-Off (RO) percentage than currently used in the DVB-S2 standard. In the DVB-S2 standard, the 20 and 25 percent RO percentages are common and are an integral part of the modulated carrier (i.e., symbol rate plus RO).

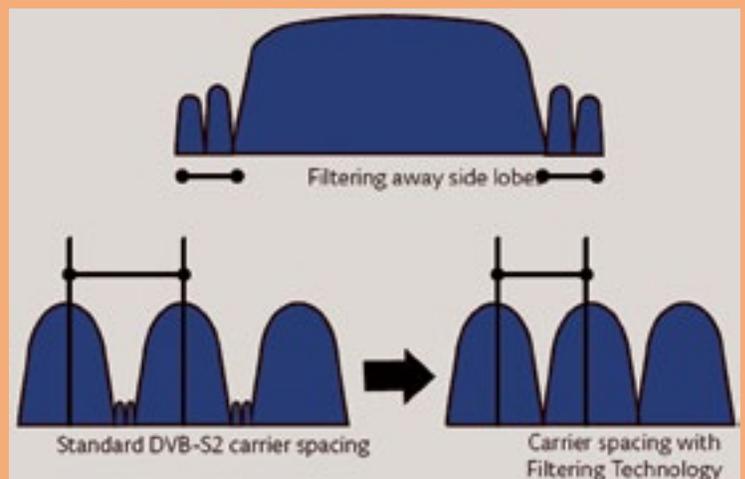


Low Roll-Off: 5/10/15 Percent

Reducing Roll-Offs to 5, 10 and 15 percent results in a direct gain in bandwidth. Looking at the spectral image when implementing smaller ROs, the slope of the carrier becomes steeper compared to DVB-S2 but still fits nicely in the allocated bandwidth. The efficiency gain by implementing smaller roll-offs can increase to 15 percent. When implementing smaller roll-offs every network and/or link needs to be checked individually, as immediately switching towards 5 percent RO does not always bring the best efficiency. In some cases, 10 percent roll-off will afford better results.

#### Improvement 2: Advanced Filtering Technologies for Improved Carrier Spacing

The second innovation deals with noise levels (side lobes) on both sides of the carrier. These side lobes



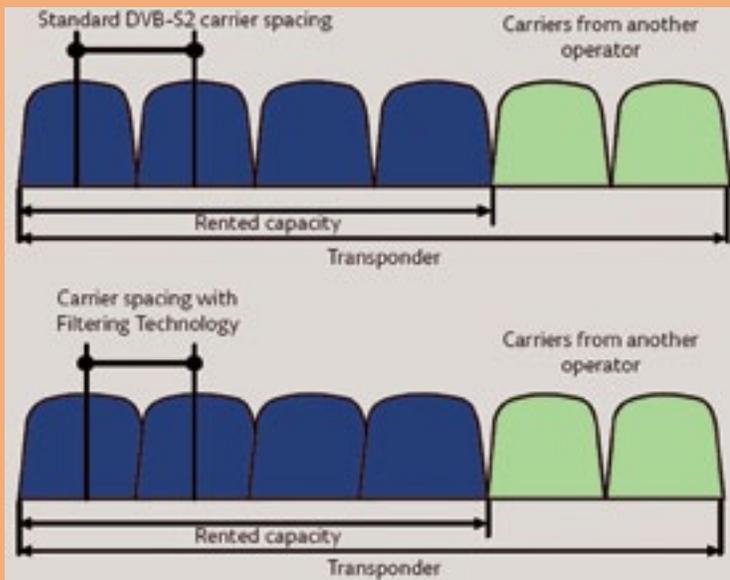
Optimal Carrier Spacing

prevent putting satellite carriers close to one another. Applying advanced filter solutions has an immediate effect on bandwidth savings, as the spacing between carriers can be put as close as 1.05 times their symbol rates (or even closer in some specific use cases).

It is important to note that even with 35, 25 and 20 percent ROs, better filtering results are obtained. The improvement has the best effect when the ground station *High Power Amplifier (HPA)* is driven close to saturation. The spectral regrowth at a frequency offset (= symbol rate) will be lower with the better filtering. Meaning, at saturation the result will have a much cleaner signal spectrum.

### Improvement 3: Supporting Different Network Configurations

The RO and filtering innovations within the new standard can be applied in satellite links with single carriers (mainly RO effect), multiple carriers (Filtering and RO effects) or carriers sharing the same transponder with other providers. In the latter case, S2 Extensions carriers can easily coexist with adjacent carriers from other operators within the



Shared Transponder Support

same transponder. The improved ROs and filtering technologies are only applied on the allocated carriers. Neighboring carriers will not be affected and do not notice any form of interference.

## S2 Extensions MODCOD and FEC Upgrades

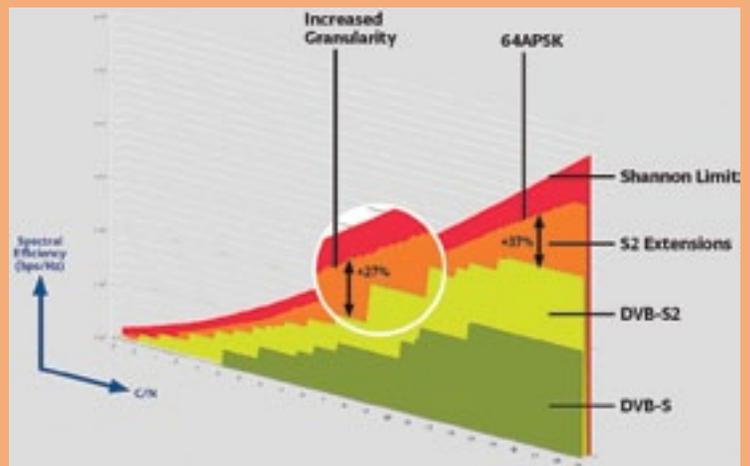
### Improvement 4: Increased Granularity in MODCODs

As a next step, the S2 Extensions increase the *modulation and coding (MODCOD)* schemes and *Forward Error Correction (FEC)* choices when compared to DVB-S2.

By introducing an increased granularity, the highest resolution for optimal modulation in all circumstances can be provided. The current DVB-S2 quantization steps are quite far apart. By adding granularity in the upcoming standard, the service provider can further optimize the satellite link depending on the application. In combination with *Adaptive Coding and Modulation (ACM)*, where the highest MODCOD is selected automatically, full efficiency can be gained. The amount of MODCODs has grown from 28 in DVB-S2 up to 87 in the S2 Extensions, bringing efficiency as close to the theoretical Shannon limit as possible.

### Improvement 5: Higher Modulation Schemes Up to 64APSK

Adding higher modulation schemes such as **64APSK** proves to be useful considering the professional applications that work with improved link budgets provided by, for example, bigger antennas (more powerful satellites that become available). Newtec sees the **32APSK** boundary being reached frequently with its auto-adaptive **FlexACM®** technology during clear weather conditions. In these situations 64APSK is highly beneficial. When combining the increased granularity (MODCODs and FECs) and 64APSK (higher order modulation and coding) immediate efficiency gains up to 37 percent can be achieved when compared to DVB-S2 (see figure below).



S2 Extensions Compared To DVB-S12 (64APSK & Increased Granularity)

# S2 Extensions Demystified (Cont.)

## Improvement 6: Different Classes for Linear and Non-Linear MODCODs

Different to DVB-S2, the MODCODs in the S2 Extensions have two different classes for linear and non-linear MODCODs. Since the DVB-S2 MODCODs are focused on DTH, the constellations are well suited for distribution applications with quasi-saturated transponders. For high-speed data and contribution applications other constellations can be considered where the performance gain is larger than 0.2dB.

Although the MODCODs might use the same code/name, the linear and non-linear MODCODs are not interchangeable. Additionally the MODCODs and FECs themselves have been improved compared to the DVB-S2 standard to achieve even better efficiency levels.

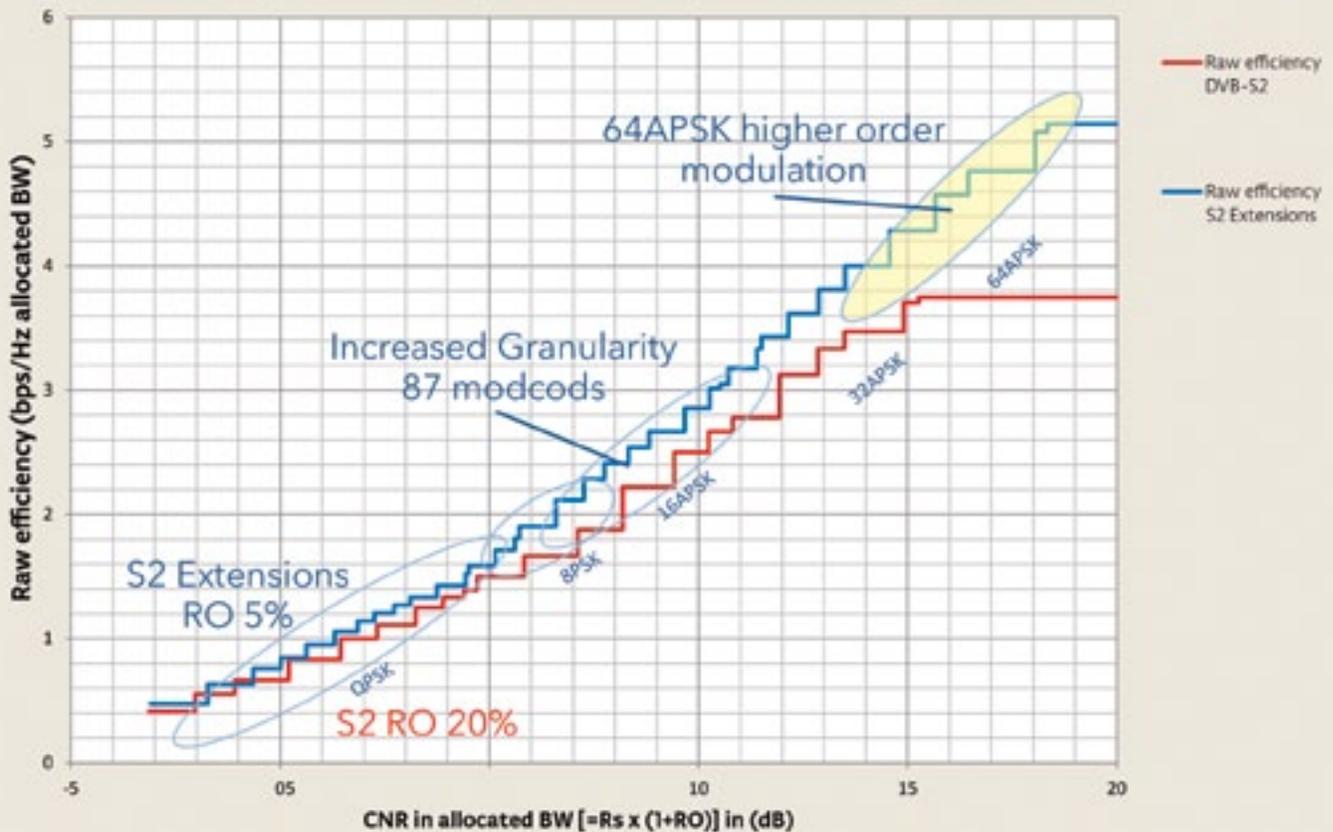
## Wideband

### Improvement 7: Wideband Support up to 72 Mbaud

The S2 Extensions support technology for typical wideband transponders that become/are available today hosting high-speed data links.

When comparing the current DVB-S2 standard against the full implementation of S2 Extensions (activating smaller Roll-Offs, advanced filtering, 64 APSK and wideband) staggering efficiency gains up to 37 percent can be achieved for professional applications over satellite. For DTH networks up to 20 percent efficiency increase can be obtained. These gains already exceed the results by proprietary systems in the market today.

The wideband implementation (up to 72 Mbaud) in S2 Extensions typically addresses satellite transponders with bandwidths from 72MHz (typically C-band) up to several hundred MHz (Ka-band, HTS). In principle it would be possible to allocate several narrower channels inside the wideband transponders, but this would require the operation of the satellite transponder with reduced downlink power and therefore at sub-optimal efficiency. The S2 Extensions demodulator will receive the complete wideband signal up to 72 Mbaud resulting in a very high data rate. The introduction of the wideband technology adds extra 20 percent efficiency gain.



### *S2 Extensions Technology Results*

In the figure on the previous page, DVB-S2 with 20 percent RO is compared with S2 Extensions and 5 percent RO. The main efficiencies are located in the higher MODCODs. Herein resides the reason why the S2 Extensions standard first targets data rate hungry applications such as Broadcast contribution and exchange, TSoIP Contribution and Primary Distribution, IP backbones and IP Trunking related configurations (IP Access, IP Backhaul, Government high speed communications).

### **Newtec Implementation Of The S2 Extensions**

The smaller ROs and advanced filtering technologies were already introduced by Newtec as early as September 2011 as a first step towards the new S2 Extensions standard through Newtec's **Clean Channel Technology**®, which is available on Newtec's professional equipment, both as a software field upgrade for installed based equipment as well as new Newtec equipment.

The MDM6000 Satellite Modem is the versatile next generation modem optimized for medium to high-speed applications over satellite. The MDM6000 modem is typically installed at both ends of a point-to-point satellite link or at the remote sites of a star network. The unit can act as a modulator, demodulator or modem depending on the network configuration and integrates seamlessly with terrestrial IP networks and equipment. The modem is in full compliance with the DVB-S2 standards and supports the S2 Extensions candidates to achieve barrier-breaking efficiency. On top of the DVB-S2 Extensions the MDM6000 modem can be used in combination with technologies such as Adaptive Coding & Modulation (ACM), Pre-distortion, bandwidth cancellation, network optimization software and cross-layer optimization to bring the efficiency of the satellite link to the highest level at maximum service availability.

In the meantime, Newtec has invested a lot in its innovative technology to add to the new S2 Extensions standard. Newtec's contribution to the new S2 Extensions standard has resulted in the technology candidates that are already implemented on Newtec's newest family member, the **MDM6000 Satellite Modem**. The modem integrates all S2 Extensions innovations on board, from smaller ROs, advanced filtering, MODCODs and FEC upgrades to wideband support.

*When adding technologies such as Adaptive Coding & Modulation (ACM), bandwidth cancellation, pre-distortion, network optimization software and cross-layer optimization to the S2 Extension innovations, the final bits can be squeezed through the available bandwidth, bringing the satellite link to full optimization.*

On top of the DVB-S2 Extensions the MDM6000 modem can be used in combination with technologies such as Adaptive Coding & Modulation (ACM), Pre-distortion, bandwidth cancellation, network optimization software and cross-layer optimization to bring the efficiency of the satellite link to the highest level at maximum service availability.

### **How to Increase Efficiency + Availability Of A Satellite Link On Top Of S2 Extensions**

#### *Adaptive Coding & Modulation*

Adaptive Coding & Modulation (ACM) auto-adaptively sets modulation parameters to the optimal point to overcome fading or interference conditions and allows for the best possible throughput.

Newtec's implementation of ACM, called FlexACM®, combines the adaptive modulation with *noise and distortion estimation technology (NoDE)* and predictive technology on upcoming variation (**ThIMM**) to get as close to the zero margin limit as possible allowing the full use of the satellite link at maximum service availability.

#### *Pre-Distortion Technology*

Pre-distortion technologies are typically designed to compensate for the effects of imperfections in the filters and amplifiers of the satellite.

Newtec's implementation of pre-distortion technology, **Automated Equalink**®, improves the performance of the end-to-end satellite communication channel by a typical 2dB and allows the use of higher modulation schemes such as 16/32APSK or 64APSK on carriers occupying a full transponder.

Newtec's Equalink® brings up to 10 percent bandwidth efficiency gain, even in saturated non-linear transponders (which is the use case for very high speed links). Moreover a better Quality-of-Service (QoS) can be achieved.

#### *Bandwidth Cancellation*

Bandwidth Cancellation Technology combines the forward and return transmissions in the same satellite bandwidth opening up extra capacity (up to 33 percent) for the service provider. This extra capacity gives room for considerable OPEX savings or deployment expansions by adding services within the same available bandwidth.

#### *Cross-Layer Optimization™*

Cross-Layer-Optimization™ is the technology that allows the satellite modulation equipment to be in continuous interaction with Acceleration, Compression, Bandwidth Management and IP Shaping technology. As soon as a satellite link condition changes, the link will be auto-optimized following *Quality-of-Service (QoS)* and Priority Settings without the loss of data or link.

## S2 Extensions Demystified (Cont.)

### Conclusion

The satellite industry has come to a consensus that a successor to the DVB-S2 standard is required to accommodate for increased profitability, interoperability and growth in the professional satellite communications market. Newtec has taken the lead and teamed up with other DVB-members in order to define and develop the update on the DVB-S2 standard.

Applications such as Sports and News Contribution, IP trunking and Cellular backhauling up to Broadband VSAT solutions will immediately benefit from the gains achieved by the new standard. As soon as Ultra High Definition TV hits town and more content is required by the market, the Professional Video Distribution and DTH applications will quickly follow.

Newtec's contribution to the new standard (naming still to be decided by the DVB organization) consists of a number of efficiency technologies, such as...

- *Smaller Roll-Offs,*
- *Advanced filter technologies*
- *Increased granularity in MODCODs,*
- *Higher Modulation (64APSK)*
- *Wideband (72 Mbaud)*

By combining these technologies an efficiency optimization up to 37 percent can be obtained in a professional satellite link. Adding wideband to the equation adds another 20 percent gain.

The Newtec MDM6000 Satellite Modem integrates the candidate technologies combined with Newtec efficiency technologies (FlexACM®, Equalink®, Bandwidth Cancellation and Cross-Layer-Optimization™) and guarantees the best performance with barrier-breaking throughputs at optimal service availability.

For further information, please visit Newtec's online page at:  
<http://www.newtec.eu/technologies/s2extensions>

Also, download the results of the Survey on S2 Extensions, with the results by 700 SATCOM experts from 400 different companies at: [www.newtec.eu/technology/s2-extensions](http://www.newtec.eu/technology/s2-extensions) .

### About the author

Koen Willems starts his career in 1998 with Lernout&Hauspie, as project manager in the Consulting & Services division. More recently he joins Toshiba as a Product Marketing Manager for the Benelux and later for the European market. In a total of 6 years Koen contributes to all major Toshiba Retail IT product releases. Mr. Willems is, at present, Product Marketing Director Mobile TV and Digital Terrestrial TV Equipment for Newtec, a Belgium-based specialist in satellite communications. Koen holds a degree in Germanic Languages (University Ghent, Belgium, 1997) and completed a Master in Marketing Management program at the Vlekho Business School in Brussels (1998). He acquires a Six Sigma Black Belt for product development and process improvement in 2006.





# Standard + Customized APSK Schemes For Satellite Transmission

By Donald Vanderweit, Agilent Technologies, Inc.

**T**he requirements of satellite communications can make APSK a more suitable modulation scheme than QPSK or QAM.

For any kind of modulated communication signal, a decision must be made as to how the data to be transmitted will be applied to the RF or microwave carrier.

Before the digital revolution, analog signals were used to modulate the amplitude of the carrier (*Amplitude Modulation*) or the frequency or phase of the carrier (*Frequency Modulation or Phase Modulation*). Now, digital variants of these techniques encode the analog signals into groups of digital bits called symbols, and each symbol is represented on the RF carrier as a certain amplitude and phase.

One of the simplest of these schemes is *Quaternary Phase Shift Keying (QPSK)*. In QPSK, the RF carrier is shifted between four different phases. Each of these four states can be used to represent 2 binary bits of information:

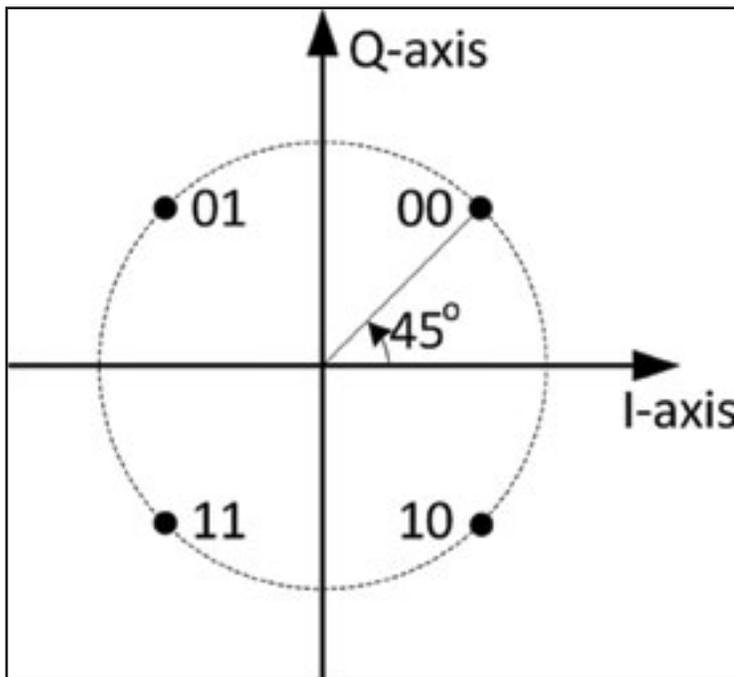


Figure 1. Constellation View of QPSK

Figure 1 shows a "constellation view" of an ideal QPSK signal. The two axes in the figure represent the positions of signal in-phase with the transmission carrier (the "I-axis") and 90 degree out of phase with the transmission carrier (the "Q-axis").

In constellation view, the phase of the signal is shown as the angle relative to the positive I-axis, and the amplitude is shown as the distance from the origin. In Figure 1, each of the four states shown represents a different symbol. Each state is the same distance from the origin, and so has the same amplitude, but a different phase.



One way to recover these states from a signal is by using an I/Q demodulator, which splits the signal into an I component and a Q component (the values of the states relative to the I-axis and Q-axis respectively). For QPSK, there are two possible I values and two possible Q values. By detecting these values you can determine which state the signal is in at each clock period, and retrieve the bits assigned to that state. Retrieving these bits over many clock periods reconstructs the signal.

Another common scheme is *Quadrature Amplitude Modulation (QAM)*. In QAM, the I and Q signals move back and forth within a finite set of discrete values. By linear combination of these I and Q values a larger constellation is achieved. If only two values of I and two values of Q are used you get something with four states that looks like QPSK. If four I and four Q values are used, you get 16 states (referred to as **16-QAM**). Six I and six Q values can be used to produce 32-QAM:

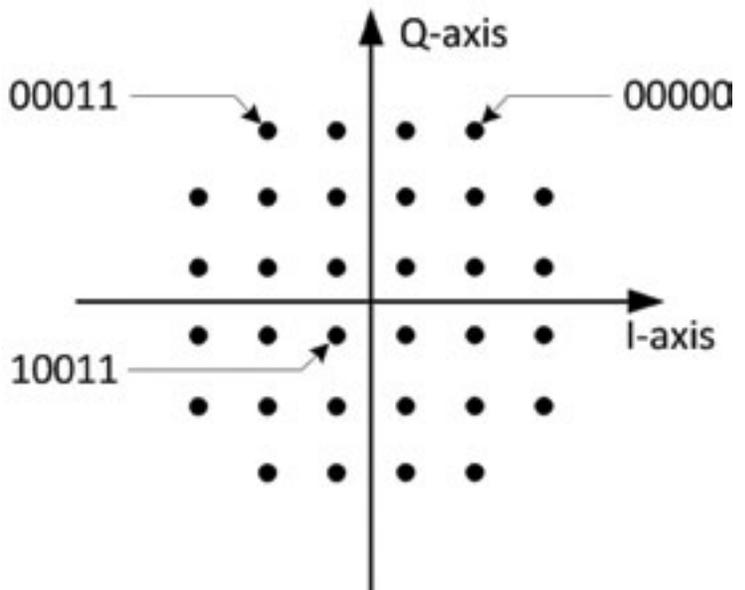


Figure 2. Constellation View of 32-QAM



# Standard + Customized APSK Schemes (Cont.)

The big advantage of QAM over QPSK is the amount of data that is carried per symbol. For 32-QAM each symbol represents five bits of information ( $2^5=32$ ). As the bandwidth of the signal largely depends on the symbol rate, you can send 2.5 times as much data as QPSK in the same bandwidth. Many QAM schemes exist, with **1024-QAM** being used in some applications.

**Satellite Transmission and Distortion:** In satellite transmission, the high-power TWT and solid-state power amplifiers used to transmit the signal are often used at or beyond their compression levels in order to maximize their conversion efficiency and get as much output power as possible given the limited power available on the satellite. Distortion from these amplifiers can “move” the states around on the constellation and make it difficult to determine which state the signal is in. Looking at the constellation diagram, the “inner” states (closer to the origin) are lower power states, and may not be distorted, while the “outer” states may drive the amplifier into compression and experience distortion.

One type of distortion (**AM/AM**) will tend to draw these outer states in toward the center of the constellation diagram, relative to the inner states. Another type (**AM/PM**) will affect the phase of the outer states, causing them to rotate around the origin relative to the inner states.

QPSK is a highly robust modulation scheme. The states are far apart, so even if the constellation is distorted during transmission, it is often still possible to retrieve the transmitted data. Although it is robust, QPSK does not send very much information (only 2 bits per symbol). QAM is much more efficient in the amount of information sent per unit bandwidth, but non-linearities in transmission can distort the positions of the states to the point where they are difficult to distinguish.

to clearly distinguish these states, then we will see very few errors. Coding techniques allow the signal to recover from errors, but only to a point; if the distortion gets large enough, the link breaks down.

**APSK as a Solution:** An ideal modulation scheme for satellite transmission would give better spectral efficiency (bits per symbol) than QPSK, but be more resistant to distortion than QAM. **APSK** (*Amplitude Phase Shift Keying*) can be a way to obtain the best of both worlds. In APSK, the symbol points are configured in concentric rings of constant amplitude (*please see Figure 4 on page 60.*)

Like QAM, APSK gives more bits per symbol than QPSK, allowing more data to be sent in the same bandwidth. But unlike QAM, the states are configured in rings, with the intent that symbol points in a given ring will react the same way to compression. This has two positive effects. The first is that compression of the signal tends to have less of an effect on the spacing between states (sometimes referred to as the “Euclidean distance”), and so the states are easier to distinguish from each other during demodulation. *Figure 5* shows a 32-state APSK signal subjected to non-linear distortion. Note that the states maintain their spacing better than the 32-QAM example (*please see Figure 5 on page 60.*)

The second advantage of APSK is that it lends itself to pre-distortion. By varying the space between rings before transmission, it is possible to pre-distort the signal in a way that counteracts the effects of transmission distortion and thereby gets a better output. In static pre-distortion, the spacing between rings is set and fixed. In dynamic pre-distortion, the signal received from the satellite is monitored and measured, and the results are fed back to the pre-distortion circuitry for adjustment. Because of the presence

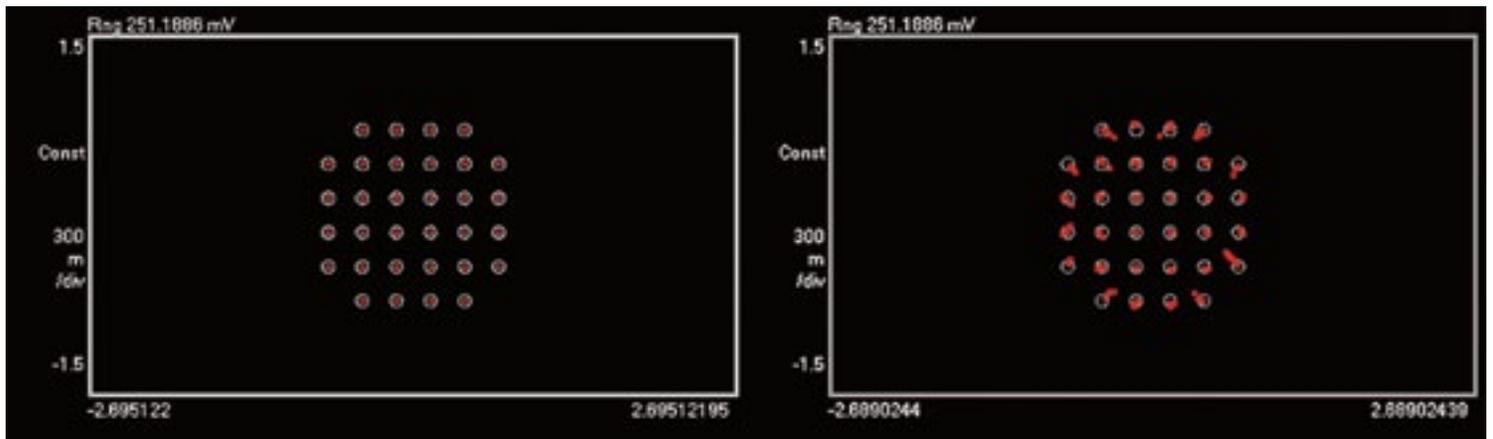


Figure 3. Effects of Noise and Compression on a 32-QAM transmission.

In *Figure 3* above, we see the constellation diagrams of a 32-QAM signal, before and after passing through an amplifier operating in compression. As you can see in the diagrams, the compression pushes the outer symbol states of the constellation inward relative to the inner states. If we are able

of **Automatic Level Control (ALC)** circuitry in the transmitter and the relatively stable operation of the satellite amplifier, static pre-distortion can give good results over long periods of time.



## Standard + Customized APSK Schemes (Cont.)

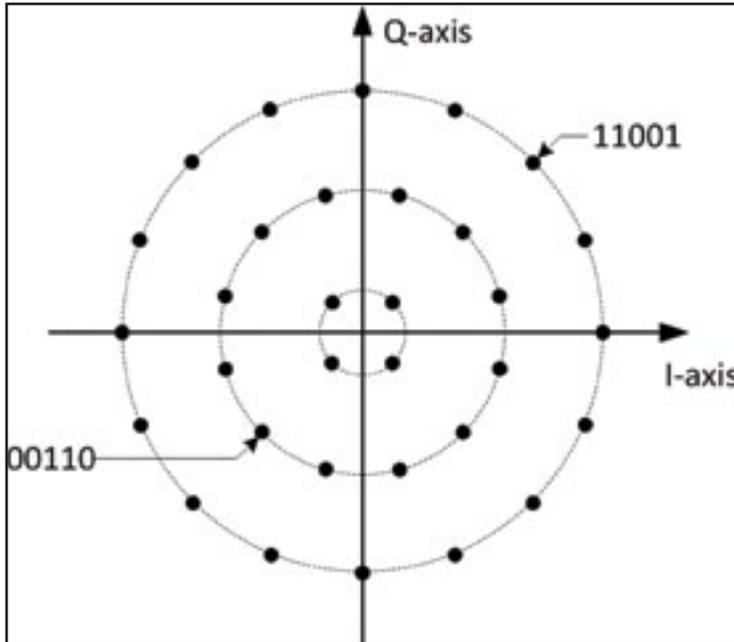


Figure 4. 32-symbol APSK Modulation Scheme Used for Satellite Video

**Example—DVB-S2 Standard:** An example where APSK is used for satellite transmission is the *Digital Video Broadcast Satellite Second Generation standard (DVB-S2)*. The DVB standards were written to give the manufacturers of satellite video receivers a limited number of modulation and data configurations around which they could design interoperable boxes. The first generation standard (DVB-S) allowed for **BPSK** (*Binary Phase Shift Keying*) and **QPSK** modulation schemes. In the early 2000s, it became apparent that higher-quality video signals with more data (HDTV signals, broadcast-quality feeds, back-haul video, etc) would require to pack more data into the same bandwidth. To accommodate these higher data rates, the DVB-S2 standard added **8-PSK**, **16-APSK** and **32-APSK** as allowed modulation schemes.

For test and measurement purposes, these signals can be generated using an RF source with a built-in I/Q modulator and arbitrary waveform generator (**AWG**), such as the **Agilent N5182B**. The AWG can be programmed to generate DVB-S2 and other signals by the Agilent **N7623B Signal Studio** for Digital Video software. Generating known test signals and applying them to the link facilitates measurements of link quality like **EVM** and **BER**.

Peak to Average Power Ratio (PAPR): Another consideration is Peak-to-Average Power Ratio (PAPR). This metric gives the ratio of the highest power the amplifier will be expected to send to the average power. This ratio is important to designers because the amount of data that can be sent is proportional to the average power, but the size of the amplifier needed for a given format depends on the peak power. The ideal PAPR would be 1:1, and this is in fact the ratio for QPSK. All of the points in the constellation are the same distance from the origin, and therefore require the same power to transmit. For more complicated schemes, APSK has an advantage over QAM: the 32-APSK scheme shown above has a PAPR of approx. 1.57, compared to 1.7 for 32-QAM. By adjusting the spacing between rings and other factors, a designer can reach a balance between lower PAPR and better resistance to distortion.

Custom APSK Signals: A key to successful use of APSK is the configuration of the constellation. Although this configuration is fixed in standards like DVB-S2, engineers working outside of these standards can adjust for their particular link parameters by optimizing the number of states per ring, the distance between rings, and the phase positions of the states within the rings. With this optimization the system can be made more robust, and carry more data with less power.

Assuming that the states in each ring are evenly spaced in phase, there are four fundamental parameters of the constellation which can be changed:

- the number of rings
- the number of states per ring
- the relative magnitude of each ring
- the phase orientation of each ring

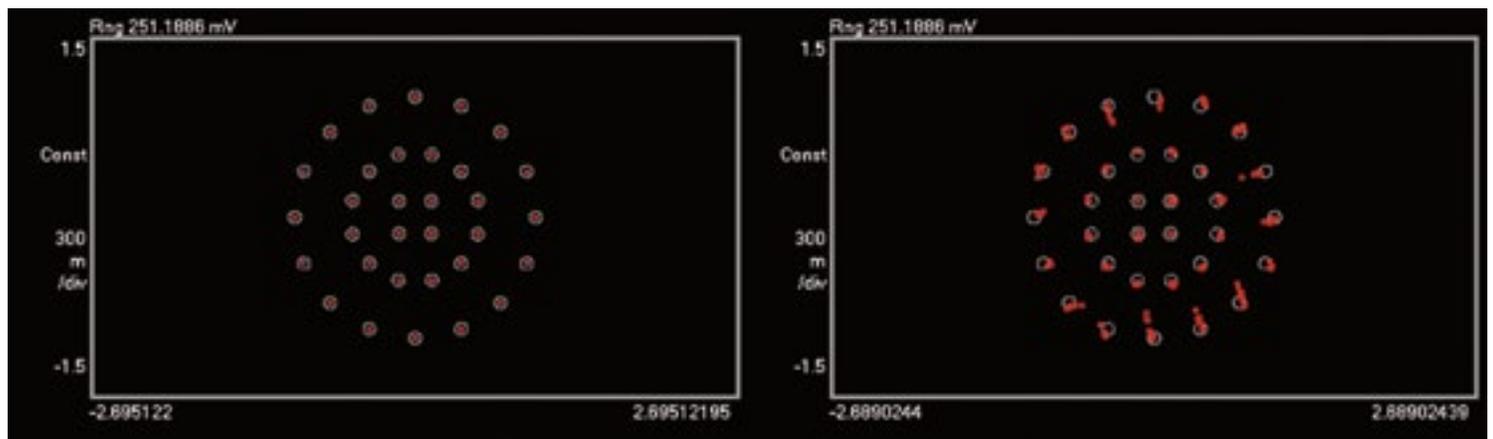


Figure 5. Effects of Noise and Compression on a 32-APSK transmission.

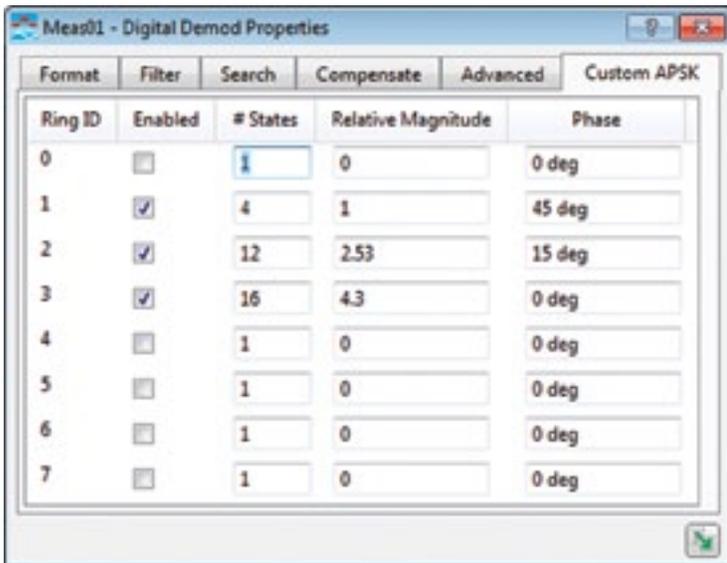


Figure 6. Custom APSK Dialog Box  
(from Agilent's 89601B software)

This customizable nature can make it a challenge to demodulate and evaluate APSK signals. Agilent's 89601B Vector Signal Analysis software can be used to demodulate many different kinds of modulation schemes. For APSK signals, it supports measurement over a wide range of parameter settings.

This flexibility allows designers of satellite systems to experiment with new modulation schemes, and users to adapt to new standards as they come along.

### Conclusion

As a modulation scheme, APSK can combine the best of the QPSK and QAM schemes to give more data per channel. By pre-distorting the channel, high-quality end-to-end transmission can be achieved. Flexible measurement tools accommodate measurements of pre-distorted and received signals and allow for real-world testing of custom configurations.

### About the author

Donald joined Agilent Technologies in 2006. He is an application engineer supporting RF and Microwave products in the Southern California region. His focus is within the Aerospace and Defense industries with special emphasis in the latest trends in radar, electronic warfare, telemetry and military communications. Before joining Agilent, Donald worked in the broadcast and entertainment industries.

# SatBroadcasting™:

## What The Heck Does HEVC Mean To You + Me?

By Mike Antonovich, Vice President, ATEME

**H**aving returned safely from the National Association of Broadcasters show in Las Vegas earlier this year, I can confidently say that the dominant themes of the show revolved around three acronyms: HEVC (short for High Efficiency Video Coding, the latest and most advanced (if not-quite-ready) standard for video encoding) that will feed the latest generation of television sets; many of which will employ OLED (Organic Light Emitting Diodes, the latest and most greatest television display technology); which ultimately brings about the commercial deployment of UHDTV (Ultra High Definition Television, widely known as the "4K" super-duper high definition standard).

**Together, we have HEVC, OLED, and UHDTV. Rearranged, we get something one of my British friends might say....'E LOVED DUTCH TV.... [any far more clever anagrams greatly appreciated]**

Working backwards, many of you already know that the UHDTV standard is at, essentially, 4x the pixel count (picture elements, for those keeping score) of today's HD standard. The most generally agreed frame rate for UHDTV will be a minimum of 60 progressive frames per second (2x HDTV's most common rate)—collectively, 8x the amount of picture information needed to be transmitted in raw or compressed format. Now that is a tall order and exceeds the capabilities of today's encoding formats and transmission pipes. More on this later...

Ultimately, what matters is what you and I will get to hang on our walls or wander down to the sports bars to view—increasingly, it looks like the display format of choice. At NAB there were OLED displays ranging in size from 56-inches all the way up to 110-inches, priced somewhere between a compact car and a Swiss chalet, but with simply stunning and breathtaking video images.

Super sharp details, more vibrant, more accurate colors than we've ever seen before, and the promise that the pricing of retail models will be affordable and will not require you or me to sell our

home to obtain such a set. Which is good, as most of these wonderful OLED sets won't work out in the rain. However, we're still at least a year away. Which is good, as there isn't anything to watch just yet... more on that later....

That leads us to HEVC, the brand spanking new video encoding standard. So new, in fact, HEVC isn't even finished yet. While the framework has been agreed to, there are still "details" to be worked out regarding user profiles, frame rate options (including 60i or "interlaced" option into the standard) and other more arcane items—but the paint is nearly dry

The good news, unlike UHDTV and OLED, HEVC will be available in the market much sooner and will be useful on devices many of us already own. The beauty of the HEVC standard is that it allows for more efficient video

encoding, not just for traditional "living room" television, but also for the mobile phone, "phablet" and tablet device markets. Think every Android and

Apple "i-thingie" known to man (and woman) out there. Even we old codgers watch increasing amounts of video content on our mobile appliances—HEVC is going to enable true HDTV viewing using increasingly less Internet bandwidth to an ever increasing truly global deployment of portable video devices.

The future of HEVC is... almost now! I have the privilege of working for one of the true leaders in HEVC encoding technology (check the author's bio, and buy now while the rates are low.).

ATEME was demonstrating perhaps the finest UHDTV over HEVC video delivery (albeit, we're still talking only file delivery at the present time), but also showcasing what HEVC will look like for file and live streaming delivery of HDTV content in 900Kbps of Internet bandwidth. And it looked awesome. Finally, we'll all get to see what full resolution video looks like on our Retina and AMOLED displays, and you'll see this year.

ATEME has said it will be releasing its HEVC software-based encoding platform by September, just in time for the IBC show in





*OLED versus 4K... and the winner will be... ??*

Amsterdam. If it weren't for trade shows, I don't think any product, anywhere, would ever be delivered. Thank goodness for trade shows!

Delivery to tablets and phones with HEVC is cool. Very cool, in fact. However, when will all the promised goodies become a reality? Well, children (who else reads this stuff?), it's not this Christmas [*insert collective groan here*], but likely next Christmas.

Here is how it will likely play out: HEVC hits the tablet market by Christmas. Makes people want it on the big screens. UHDTV "ready" TV's start showing up mid-2014, but nobody buys them because there's nothing to watch. Enter the next-gen web-enabled New-Ray player (I just made up that name!) so that at least you can watch UHDTV movies and some file-based "catch-up" TV. That's your Christmas 2014 present [*insert collective cheer here*].

You'll see increasingly more UHDTV broadcast gear show up for "contribution" of live sports and production of studio based television, but you still won't have the complete network fabric of terrestrial, cable and DTH "last mile" sorted out yet. That's where HEVC comes in again to help.

As most of you know, the existing "live" paths to the home are fully used for all the existing streams of programming that currently reach your doorstep. Packed up to the rafters, actually. How do we squeeze more TV out the toothpaste tube? HEVC compression!

We start by squeezing the Standard Definition (SD) channels more tightly together; then we squeeze the existing high definition (HD) channels more tightly, as well. Then we shoehorn in the first round of UHDTV channels. Rinse, repeat.

Perhaps we may be able to, finally, put an end to the analog tier in CATV that gums up bandwidth? Oh, but such would require a whole lot of capital spent by your last-mile stakeholders, a dash of FCC re- or de-regulation, and a pinch of urgency to make any of this happen before the next *World Cup 2014* (not likely) or *Summer Olympics 2016* (more likely).

A lot to chew on? A little heartburn? You bet'cha! That's why we love this business. The more things change, why, well, the more things change! You see, the Brits can't wait to watch more of that "Dutch TV" on their tablets or 180'-inch UHDTV OLED TV's.

*And that is what HEVC means to you and to me.*

**About the author**

Michael Antonovich joined ATEME in 2013 as Senior Vice President and General Manager, Americas, bringing 30 years of sales, marketing, operations and executive experience. Mike formerly served as Vice President, Sales and Marketing for Roberts Communications Network, President and CEO of Genesis Networks, President and CEO of The Spaceconnection, and Executive VP, Global Sales and Marketing of PanAmSat. Mike has a Master's degree in Communications from Fairfield University and is an active member of the Society of Satellite Professionals International (SSPI), the North American Broadcasters Association (NABA), the Inter-Systems Operations Group (ISOG), the World Teleport Association (WTA), the Sports Video Group (SVG) and is a frequent conference contributor. He is a Senior Contributor at SatMagazine.



***Executive Spotlight***  
***Susan Saadat,***  
***Vice President,***  
***Sales,***  
***ETL Systems***



Photo credit: Sardari

**SatMagazine (SM)**

*Good day, Ms. Saadat. Would you please tell our readers how you became interested in the world of satellite communications?*

**Susan Saadat**

After graduating from the University of California Berkeley with a Master's degree in Electronics Engineering majoring in telecommunications, I started my career as a hardware and modem design engineer in the Silicon Valley. It was after a few years when I landed a job at COMSAT where I was first introduced to satellite communications, and of course, never left the field. It is an amazing area of the telecoms world, and I have been involved not only in the design and engineering side of satellite communications, but also on the commercial side, in sales, strategy and business development and have thoroughly enjoyed every aspect of it.

**SM**

*With your experience at many major actors within the SATCOM community, what drew you to ETL Systems?*

**Susan Saadat**

I have a strong entrepreneurial spirit, and was looking to have the opportunity to be part of a vibrant, and growing company and help expand its market share. ETL is a dynamic company with a strong financial balance sheet and has a bright future. These are very interesting times for us and our customers and

we pride ourselves in providing our SATCOM customers with a well designed solution with a focus on flexibility and resilience.

**SM**

*Please tell us about ETL Systems.*

**Susan Saadat**

ETL designs and manufactures professional RF distribution equipment for satellite ground stations and other microwave users. The product range includes L-band Routers, Switches, Splitters, Combiners and Amplifiers covering DC-40GHz. Reliability, Resilience, and RF performance are the core customer requirements which drive ETL's product innovation and development. Adaptability and scalability combine with these to provide future expansion.

**SM**

*As the leader of the firm's North American operations, what are your responsibilities?*

**Susan Saadat**

With almost 40 percent of sales coming from U.S.-based customers I will be responsible for supporting ETL Systems' already strong presence in the U.S. market. With this much business coming from the States it became imperative for us to have a timely and physical presence in the U.S.

## ***Executive Spotlight: Susan Saadat (Cont.)***

ETL is the Rolls Royce brand for L-band Routers, Switches, Splitters and Combiners. It is a brand very much in the ascent and I look forward to helping drive the continued growth of sales in the U.S. and Canada.

### **SM**

*What are your plans for this new ETL Systems division?*

### **Susan Saadat**

ETL has had a very long history and solid reputation in the research and design of RF sub-systems and components. My role will certainly be to continue promoting ETL's solid product portfolio in the U.S. Having been in the industry for a long time I will be using my experience and industry contacts to promote ETL's market presence and brand recognition in the Americas.

While we do sell directly to some of the verticals we are in, such as the satellite operators and the broadcasters, I would like to expand our sales channels and partner with more of the systems integrators who can introduce us to new verticals and help us to increase sales in some of our existing markets.

### **SM**

*What is trending for the commercial and for the MAG SATCOM industry in 2013?*

### **Susan Saadat**

High Throughput Satellites (HTS) will be very important this year with many Ka-band satellites being launched. There are a number of teleports being constructed globally. We are involved with most of those projects and anticipate that we will be involved with the expansion of these projects in the coming years as well.

### **SM**

*What key technologies are driving satellite broadcasting?*

### **Susan Saadat**

Today, HD is 1080 pixels, and has a total of 2.1 Megapixels per frame. Ultra HD TV, also known as 4K TV, which is 4x the

definition of today's HD, has two standards: 4k which is being showcased by **SES** (which is 2160 pixels has 8.3 Megapixels per frame), and the 8k. Japan is planning on broadcasting the World Cup in 4K in 2014.

From our perspective, these key technologies mean more unique content, requiring more reliable, resilient, flexible and cost effective solutions.

Set top box (STBs) costs are currently high, but judging from the price drop of current HD flat panel sets, the price will become reasonable once the standard becomes universally adopted. The second trend is distribution via the cloud that could negatively impact the satellite business. The third trend that is driving satellite bandwidth is the growth of streaming TV to PC's, tablets and handhelds.

### **SM**

*Now, for some prognostication for 2014 and beyond... what do you believe will be the prime technologies to take note of?*

### **Susan Saadat**

- 1. For normal HD, transmission and modulation schemes are getting better going from QPSK to 8 PSK, resulting in a more efficient use of BW, and therefore for the same amount of BW, more data can be pushed, allowing broadcasters to go from DVB-S to DVB-S2 with a much better error correction.*
- 2. There are plans for DVB-S2 with Adaptive Coding and Modulation (ACM) that will improve the efficiency of VSAT return links.*
- 3. Electric propulsion technology will lower satellite mass resulting in less expensive launch costs.*
- 4. Satellites with multi spot beams will drive terrestrial costs down. Using channelizer technology on board satellites will allow for more efficient routing and increased frequency reuse. It will also allow moving connectivity around by using smaller beams.*

**SM**

*Ms. Saadat, given your company's involvement in the APAC region, what are your thoughts regarding this market?*

**Susan Saadat**

Most of the Asian region still suffers from fragmented connectivity, as fibre and IP connectivity is often concentrated in the main city hubs. As a result SATCOM remains the dependable route for broadcast, broadband and cellular backhaul. ETL Systems has benefitted from this hugely as we are working closely with programs such as O3b to offer 24/7 satellite feeds for these services across the APAC region.

Original program content is another driver for dependence on satellite networks. Broadcasters are serving a young and vibrant Asian market who demand streaming content onto phones, tablets and PC/TV's, and I am always amazed when I visit Hong Kong and Singapore as to how many people are watching video while on the street. These broadcasters have to differentiate their programming and satellite offers fast access to many national and international programs to make unique entertainment to a very technology savvy audience.

Whether ETL is providing RF splitters for a disaster, recovery VSAT network, or installing Enigma L-band matrices to handle new HD feeds for a TV station, APAC needs resilient and reliable solutions to route high quality SATCOM signals to demanding customers.

**SM**

*Have you had any major contract wins for ETL in North America that you are able to discuss?*

**Susan Saadat**

ETL has been involved in a major U.S. Government satellite downlink project to provide expansion and redundancy RF matrix systems for routing satellite signals. The heart of the systems were based on ETL's proven Enigma Matrix modules. ETL's 25-strong team of R&D experts also created a newly designed NGM-32 especially for the project, to handle a higher 1dB gain compression point of greater than 8dBm.

The NGM-33 (950-2450MHz) matrix has also recently been put into service with CP Communications to offer a unique solution to outside broadcasts. Along with newly developed matrix control software, multiple radio camera antennas can be seamlessly switched to diversity receivers and maintain coverage.

**SM**

*Which vertical markets are benefitting the most from ETL's products?*

**Susan Saadat**

Oil and Gas, Government and DOD, broadcast, telecoms and satellite operators.

## Executive Spotlight: Susan Saadat (Cont.)

### SM

Many companies are finding it challenging to locate suitable candidates for their professional openings that are required to build product. What can the industry do to further the cause of STEM to ensure a well-educated talent pool for future growth? Is ETL Systems involved in support of any STEM programs?

### Susan Saadat

I am a big proponent of a strong education. As parents, and coming from an engineering background, both my husband and I have been promoting STEM studies at home. When it comes to encouraging young minds and enlarging the pipeline of students who are both passionate about and proficient in STEM, the learning that happens outside the classroom is equally as important as what takes place during the school day.



ETL Systems' Extended L-band Matrix 32x32 Model NGM-33-xx

Summer internships offer an optimal environment for building a young person's competence and confidence as well as their connection to the scientific world. This happens when they are able to explore topics of interest more deeply and engage in hands-on projects that may further stimulate curiosity about math and science—key to attracting more young people to science, engineering, and technology careers.

Our industry provides exciting opportunities and we at ETL do offer summer internships, hoping to not only promote STEM studies, but also to be able to attract young and talented engineers as we expand globally.

### SM

With your experience in many companies, when you look back at your career, are there any projects that truly bring a smile to your face and a deep sense of satisfaction?

### Susan Saadat

Yes, I have had a long career in the SATCOM industry and have been fortunate enough to be involved in a number of successful endeavors, such as the buyout of **Comsat Network Systems**, the founding of **Paragea Communications** and the sale of **Paravoice Technologies**, but I think the one that gives me a big smile happened when I was leading the broadband services division at **Intelsat** and we launched a consumer broadband service on **Viasat's Surfbeam** platform in the Middle East and North Africa (MENA)—before the product was even ready for the North American **Wildblue** service.

Orbit was a multi-million dollar project, still going strong, and was the first of its kind using a DOCSIS based cable modem protocol on satellite. This project got launched against all odds, as the modem was not ready, the hub was still in design phase, and we did not have the right satellite coverage over the targeted region; the main three elements needed to complete a satellite link that were a work in progress, but it all came together with a dedicated group, hard work and a professional team. There were a lot of big smiles when the project was commercially launched.

Additional information at the company's website:

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



# Reliable Mobile Communications Do Matter

By Marie O. Petersson, Beam Communications

**A** 25-year-old man died of dehydration after his vehicle bogged down at a remote station in the Simpson Desert near the Queensland-Northern Territory in Australia. He collapsed after walking about 6km (3.7 miles) in almost 47 degrees Celsius heat (116.6 degrees Fahrenheit).

Australia is widely known for its vast land mass, where approximately 85 percent of the country is considered to be "remote." These areas have no mobile phone service and poor UHF and HF radio service during the daylight hours. When an emergency occurs, the most reliable communication is over satellite—satellite communications are a lifesaver for those living or traveling in these vast remote areas.

Australia suffers through many natural disasters each year. Bushfires, cyclones, floods—disasters can strike at any moment at any location and have a huge impact on the environment and the people. Emergency services and rescue teams are always on alert and ready to quickly respond to any disaster. In an emergency, the team depends on the reliability of their communication be such voice or data, to alert authorities, contact loved ones, coordinate rescue teams, and to facilitate the response that is required. However, in a majority of cases, either the terrestrial communication is damaged or congested, or the emergency is in locations where terrestrial communication are non-existent, such as at sea or in truly remote areas.

Satellite communication (SATCOM) is the perfect option being, as it is, unaffected by terrestrial issues, all the while offering global connectivity. Nevertheless, the satellite user equipment and solutions must meet specific requirements to accommodate the needs required.

## **Emergency Communication**

Disaster situations have two categorizations: The emergency and the recovery. Emergency solutions are designed to prevent or alleviate dangerous and life threatening situations by alerting authorities or rescue teams as quickly as possible. Should a vehicle be traveling in a remote area suddenly break down, SATCOM enables the operator of the vehicle to send a message or a call for assistance.

Piracy at sea is an emergency scenario wherein Beam Communication solutions can make a real difference for those involved. In case of attacks from pirates, the ship's crew can send an Alert message to the authorities. The covert nature of the Beam solutions also makes it difficult for the pirates to notice the equipment, which is then less likely to be destroyed by the attackers. This is an example of how an emergency communication solution can be matched to very specific environmental and user requirements.

## **Recovery Communication**

The recovery phase focuses on a quick deployment of resources to reach an affected area.

The solution must be portable and able to handle rugged environments. The rescue team should be able to easily carry the equipment to the disaster zone and the complete solution is packaged in a robust, transportable case. Another requirement is ease of deployment and use. The emergency team is able to deploy the equipment quickly to create a local network for data communication or for deployment for voice transmissions. In minutes, they need to be able to start transmissions, as being able to respond quickly is critical and can save lives.



For both cases of emergency and disaster recovery, a common denominator is the reliability of the equipment. Any solution must work correctly when it is needed and must continue to viably operate throughout the duration of the emergency.

### **Queensland Emergency Ops**

Queensland Emergency Services deals with rescue and recovery from the occasional floods and cyclones that strike Australia every year. For example, there are huge areas of desert around geological centers in Queensland that attract many travelers and adventurers—many arrive at these locations totally unprepared for, and unaware of, the dangers that can suddenly occur in these terrains.

*Mick Selfe*, who works for the emergency services, is faced with such disasters on a regular basis. He has installed a Beam **DriveDOCK** docking station and an **Iridium 9575** in his vehicle as tried and true safety measures. He relies on Iridium 9575's safety features to communicate with other emergency services and rescue teams when they are needed.

### **Royal Flying Doctors' Service**

The Royal Flying Doctors (RFDS), New South Wales, takes care to the furthest reaches of Australia. Anyone who lives, works or travels in remote and rural Australia can enjoy the best of health, thanks to this service's use of the latest aviation advances, medical and communications technology.

Services are delivered by dedicated teams of professionals with 24-hour emergency services as well as everyday essential health care.

The Royal Flying Doctor's Service is a not-for-profit organization and is supported by the Commonwealth of Australia, State and Territory governments, and also receives generous donations from corporations and the communities they serve.

There are four operating sections that provide the remote and clinical services across the country. RFDS operational bases and health facilities form a strategic network that delivers effective health care via a range of staff that includes management, medical practitioners, women's health doctors, registered nurses, Aboriginal and Torres Strait Islander health workers, allied health professionals, pilots and administration officers in its mission to improve the health of the nation.

## Reliable Mobile Communications (Cont.)



*Beam's RemoteSAT unit*

RFDS installed Beam's satellite equipment on their planes a few years ago. The **RemoteSAT** unit is installed in the plane's cabin and uses standard telephone handsets to provide reliable communications, whether on the ground or in the air.

This direct communication feed helps doctors maintain those vital contacts when transferring a patient from a remote location or a disaster and moving the casualty to a surgery or hospital for urgent medical attention.

IT Manager *Gary Oldman* said, "This is, by far, the best communications system we have tested. Having the quality of coverage is making it much safer and easier for our doctors and patients"

**Just for Kids Children Charity** is a registered organization with a focus on assisting disabled and disadvantaged children and affording them a true adventure. The organization travels extensively to remote areas where there is no phone service. Satellite communication is a lifesaver when something goes wrong.

"One fundraiser event to the geological center in Australia (Lamberts) saw us break two springs in our food wagon that was crossing from Cameron Corner to the Strzelecki Track, an extremely remote location in the middle of the desert, delaying our arrival at Arkaroola for the night," said *Mark Louez*, Director of Just4kids Motortrails.

"One hundred people had to be fed," he continued, "and a quick Iridium call to the chef at Arkaroola Village, some 400km away in South Australia, and a meal was prepared for all



*A Just for Kids expedition*



*Royal Flying Doctors' Service*

of our personnel that very evening. We were also able to call our spring manufacturer in Queensland to make arrangements for a new set of springs to be sent to Alice Springs.”

Just4kids Motortrails uses Beam’s **PotsDock 9555**, which is mounted inside the car with a privacy handset. The Iridium 9555 handset fits securely into the docking station which also

features phone charging, RJ11/Pots, GPS, tracking, Bluetooth, and so on.

The alert and tracking module can be configured to support periodic polling as well as emergency alert reporting.

Further information at the company’s website:  
<http://www.beamcommunications.com>

# The Ups + Downs Of Indonesian ComSats

By Jos Heyman, Managing Director, Tيروس Space Information



Indonesia spreads about 5,100km along the equator, between 95 degrees East and 140 degrees East, an area that could easily cover the entire European continent and the Middle East. Indonesia consists of approximately 17,500 islands with a land size area of 1,919,440km<sup>2</sup>. In 2012, the country had a population of some 237.4 million.

The physical nature of the country poses a severe problem to telecommunications. While the country possessed a land based telephone network infrastructure, it was restricted and, particularly with the introduction of television, the country became a prime candidate for the application of satellite communications. The advent of the Internet and cell phones made the acquisition of SATCOM even more obvious.

Indonesia currently has 50 million households with television—that's approximately more than 90 percent of the households. As far as television stations are concerned, there are currently ten *Free-To-Air (FTA)* stations, including the government owned **TVRI** and nine commercial station (**RCTI**, **SCTV**, **MNCTV**, **ANTV**, **Metro TV**, **Trans TV**, **Trans 7**, **Global TV** and **TVOne**), as well as numerous local stations and nine payTV stations.

Currently, there are more than 55 million Internet connections and 220 million cell phones. As far as cell phones are concerned, Indonesia is fifth in quantity, behind China, India, Russia and the USA. However, taking into account the population, more than 90 percent of the citizens are using cell phones, higher than in any of the other, larger countries.

Finally, there are about 38 million land line telephone connections, but only about 11 percent of households have such connections.

## Pre-Satellite History

The first telecommunications service in Indonesia dates back to October 23, 1856, when the then colonial Dutch government established the first telegraph service between, what are now, *Jakarta* and *Bogor*. In 1882, telephone services were introduced and these were run by privately owned companies until they were taken over by the government's *postal, telephone and telegraph (PTT)* service.

After Indonesia gained independence in 1945, the PTT services were transferred to the Indonesian government. In 1965, the telephone services were split off into a separate company,

**PN Telekomunikasi**, which, in 1974, was further divided into two state-owned companies—**Perusahaan Umum Telekomunikasi (Perumtel)**, to provide domestic and international telecommunications services, and **PT Industri Telekomunikasi Indonesia (PT INTI)**, to manufacture telecommunications equipment. In 1980 the international telecommunications business was split off as a separate company named **PT Indonesian Satellite Corporation (Indosat)**.

In 1991, Perumtel was renamed as **PT Telekomunikasi Indonesia**, or **Telkom**, which was partially privatized on November 14, 1995. The Indonesia government retains a large portfolio of the shares of the company, including a single share that gives it special voting and veto rights over certain matters.

In 1999, the government deregulated the telecommunications industry that encouraged private investment and competition. This was followed on August 1, 2001, by the government's termination of the exclusive rights of Telkom and Indosat.

## Palapa

Indonesia was the first so-called developing nation that adopted satellite technology for its telecommunications solution and the *Palapa (meaning fruits of labor)* system is currently owned by Indosat.

The system was started in February of 1975 when the government ordered two **HS-333** satellites from **Hughes**. They were fitted with 12 C-band transponders and were launched on July 8, 1976, and March 10, 1977. Their respective orbital locations were 83 degrees East and 77 degrees East.

## Palapa-1

The next generation, known as **Palapa B**, was based on the Hughes **HS-376** and carried 24 C-band transponders. The first of these, **Palapa-3**, was launched on June 19, 1983, and was located at 108 degrees East.

The next satellite in this series, **Palapa-4**, was launched with the **Space Shuttle** on February 6, 1984. However, the **PAM-D** upper stage failed to place the satellite into its designated geostationary orbit at 113 degrees East.

The satellite was retrieved on November 16, 1984, during the **STS51A** mission and, after having been refurbished, was launched again on April 13, 1990, as **Palapa-6** with a location at 118 degrees East.

**Palapa-5** was launched on March 20, 1987, and was located at 113 degrees East, while **Palapa-7** was placed into an orbit at 118 degrees East on May 14, 1992.

Indosat consistently took the steps necessary to develop its existing geostationary satellite system for multiple capabilities, including new services and the third generation of Palapa satellites that commenced with **Palapa-8**.



Map of Indonesia



*Artistic rendition of the Palapa C satellite series.*

### **Palapa C**

This generation was also built by **Hughes** but was now based on the **HS-602** platform and were fitted with 30 transponders in the C-band and 4 transponders in the Ku-band.

Launched on February 1, 1996, and located at 123 degrees East, **Palapa-8** suffered a failure in the electrical system that prevented the eclipse period power back-up from operating. The satellite was acquired by **Hughes Global Services** as **HGS-3**. A procedure was developed to maintain full operations except during an eclipse itself and for brief periods of time on either side of each eclipse event. This meant that for 88 days of the year, the satellite had to be switched off for three hours per day (on average), providing 96 percent service availability. The satellite was renamed **Anatolia-1** and in December 2002 was sold to Pakistan when it was moved to 38 degrees East, from where the satellite began operation as **Paksat-1**.

**Palapa-9** was launched on May 16, 1996, as the replacement satellite and it was located at 108 degrees East.

For its fourth generation communications satellite, Indosat turned to **Thales Alenia** and used the **Spacebus 4000B3** platform for a 35 C-band and 5 Ku-band transponder payload. Known as **Palapa D-1**, the satellite was launched on August 31, 2009, and was located at 113 degrees East. Problems with the third stage of the launch vehicle placed the satellite in a 217 x 21138km orbit with an inclination of 22.4 degrees. Using the on-board attitude control motor, the satellite was gradually moved to its geostationary position, which it reached on September 9, 2009.

**Palapa-D** was built with a design life of 15 years, but due to the expenditure of fuel during maneuvers to correct its orbit, there's enough fuel for about 10 years of operations.

### **Telkom**

PT Telekomunikasi Indonesia, the other company that had its roots in the national PTT, remains the largest telecommunications services company in Indonesia and services approximately 130 million customers.

In June 2004, Telkom began to provide international direct dial, fixed line services. This was followed in 2009 by an expansion into information technology services, media and edutainment to reflect the shift in lifestyles of its customers. .

Telkom's first satellite, **Telkom-1**, was launched on August 12, 1999, and was located at 108 degrees East. The 2763kg satellite was built by **Lockheed Martin** using an **A2100** platform and carried 36 transponders in the C-band.

On November 16, 2005, the **Telkom-2** satellite was launched and placed at 118 degrees East. This satellite was built by **Orbital Sciences** using their **Star-2** platform and was fitted with 24 transponders operating in the C-band.

### **Telkom-3**

The **Telkom-3** satellite was built in Russia by **ISS Reshetnev** using their **Ekspress 1000N** platform. The payload of 32 C-band transponders and 10 Ku-transponders were provided by **Alcatel**.

The satellite was launched on August 7, 2012, but a premature shut down of the upper stage's Briz M engine resulted in the satellite being placed in an incorrect orbit, rather than the intended geostationary orbit at 118 degrees East. Both Telkom-1 and Telkom-2 remain operational as of this writing.

### **Indostar (Cakrawarta)**

**PT MediaCitra Indostar** was part of the **Indovision** group, a multichannel payTV company, starting operation using channels on the Palapa C2 satellite. However, the company had ambitious plans to provide the world's first dedicated DBS for radio and TV for a single nation.

To accomplish this goal, the company planned to have four satellites—they would have been located at 115 degrees West, 106 degrees East, 107.5 degrees East and 119 degrees East. The first satellite was to have five S-band transponders for digital television and a second would have also carried an additional L-band transponders for CD quality radio.

Initially known as **Indostar-1** and later renamed **Cakrawarta-1** ("News Weapon"), the first satellite was ordered from **CTA International** (now **Orbital Sciences Corp.**) in 1993 and was to be based on the Star platform.

### **Indostar-1**

The commercial Indostar system was to use **USD100** hand-held radios, **USD100** analog receivers and **USD500** digital satellite decoders with satellite dishes from 0.7 to 1m in diameter—these were probably meant to have been marketed by Indostar to consumers, or by one of its associate companies.

The first satellite was launched on November 12, 1997, and was placed at 107.5 degrees East. Indovision intended to use this satellite for its program until they could move to the use of **IndoStar-2**.

Indostar-2 was based on a **Boeing BSS-601HP** that was originally ordered as **Galaxy 8iR**, but was cancelled in 2004. The satellite, then fitted with 10 S-band transponders, was owned jointly by **Protostar**, a Bermuda company, and Indovision, and was launched on May 16, 2009 as **Protostar-2/Indostar-2**. It was located at 108 degrees East.

# The Ups + Downs Of Indonesian ComSats (Cont.)

Protostar went out of business in October of 2009 and Protostar/Indostar-2 was sold to **SES** as **SES-7** and remained at the 108 degrees East slot, where it continues to provide services to Indovision today.

## Garuda

**ACeS (Asia Cellular Satellite)** was a regional satellite telecommunications company that offered GSM-like satellite telephony services to Asian market, covering Indonesia as well as Malaysia, Thailand, Philippines, Sri Lanka, Vietnam, China and India. The company only offered the **Ericsson R190** hand phone—when Ericsson went out of the mobile phone business in 2001, ACeS had no other handset available to offer to its customers.

## Garuda-1

The **Garuda-1** satellite was launched on February 12, 2000, and was located at 123 degrees East. It was built by **Lockheed Martin** using the **A2100** platform that was fitted with transponders in the C- and L-bands, with a capacity for 11,000 simultaneous telephone connections.

The satellite was to operate with terrestrial gateways in the C-band and interface through the L-band directly with subscribers, using 140 spot beams that covered the entirety of Asia.

The ACeS network was designed to serve up to two million subscribers and aimed at markets that were not served by regular terrestrial cellular networks, such as rural areas, mining industries and marine applications. However, sales grew slowly and after five years of operation, ACeS had fewer than 20,000 subscribers. With the company failing to attract more customers, and its only satellite nearing its end of life, ACeS, which by then had amassed huge debts, entered into a collaboration agreement with **Inmarsat** in 2006. This essentially meant that the the remaining assets were taken over by Inmarsat and ACeS ceased to exist.

A second satellite, **Garuda-2**, was ordered in 1999 with the intention to use this satellite as a back-up and to allow expansion of operations into western and central Asia, the Middle East, Europe and northern Africa. This never materialized as the satellite was cancelled.

## M2A

During the 1990s, **PT Pasifik Satelit Nusantara (PSN)**, which was established in 1991, ordered a **LS-1300S** space platform from **Space Systems/Loral (SS/L)** to be used for the **Multi-Media Asia (M2A)** satellite system. To be fitted with 84 C-band and X-band transponders, this satellite was expected to provide multi-beam coverage of the Asia Pacific region, including Indonesia, Australia, India, China, Indochina, Korea, Japan and ASEAN. The C-band transponders were to handle four million fixed telephone lines and 100 television channels, whereas the X-band transponders were to provide gateway services. Services were to include low cost rural telephony, data, facsimile, Internet access, and video multi-media services to a potential subscriber base of millions.

Name	Launch
Palapa-1	8-Jul-1976
Palapa-2	10-Mar-1977
Palapa-3	19-Jun-1983
Palapa-4	6-Feb-1984
Palapa-5	20-Mar-1987
Palapa-6	13-Apr-1990
Palapa-7	14-May-1992
Palapa-8	1-Feb-1996
Palapa-9	16-May-1996
Cakrawarta-1	12-Nov-1997
Telkom-1	12-Aug-1999
Garuda-1	12-Feb-2000
Telkom-2	16-Nov-2005
Indostar-2	16-May-2009
Palapa D-1	31-Aug-2009
Telkom-3	7-Aug-2012

The contract was cancelled in 1998 and then reinstated again and, in 2001, a **Delta 4M** launch was booked to occur in 2003. However, the entire project was cancelled once again. Pasifik Satelit Nusantara continues to operate as a communications service provider but does not own its own satellite.

## About the author

Jos Heyman is the Managing Director of Tiros Space Information, a Western Australian consultancy specializing in the dissemination of information on the scientific exploration and commercial application of space for use by educational as well as commercial organisations. An accountant by profession, Jos is the editor of the **TSI News Bulletin** and is also a regular contributor to the British Interplanetary Society's Spaceflight journal. Jos is also a Senior Contributor for SatMagazine.



# Executive Spotlight

## Peter Hobbs, Head of Voice + Satellite Division, Telstra Global

**P**eter Hobbs is based in Sydney, Australia, where he is responsible for the global voice relationships and business development within the global satellite and broadcasting markets.

Peter joined Telstra Corporation in 1999 and transferred into its joint venture, REACH, in 2001. He became Director EMEA Voice Business, until moving to Sydney in 2005 to become the General Manager, Global Sales, for the voice business. The REACH transaction in March 2011 saw Peter return to Telstra to take up his current position.

Peter also worked at Telia as Product Manager for voice related services, and at Primus Telecommunications as Business Development Manager into the U.K. SME market, focusing on the IT sector. He holds a Bachelors degree in History, Politics and Philosophy from the University of Southampton (U.K.).

### SatMagazine (SM)

*What are your responsibilities in your role at Telstra Global?*

### Peter Hobbs

As Head of the Voice and Satellite business at Telstra Global, I am responsible for the global voice relationships and business development within the global satellite and broadcasting markets.

### SM

*Please tell us about Telstra Global as a company. When was it founded? How has it grown? What are its major products, services and markets?*

### Peter Hobbs

The company has maintained a presence in the Asian region for more than 30 years, where it is headquartered today, in Hong Kong. Telstra is a leading global supplier of managed network services and international data, voice and satellite services. The company is a part of the Australian-based, tier 1 telecommunications and media services company, Telstra Corporation Limited, and owns one of the most technologically advanced IP backbone networks in the world. Telstra provides global telecommunications services and solutions and is an expert in bringing the advantages of customer-centric managed network solutions to the business community serving many of the world's top companies, spanning Europe, Asia Pacific and the Americas. We have licenses in Asia, Europe and the U.S., facilitating access to more than 1,400 PoPs (Point-of-Presence) in 230 countries



### SM

*What is Telstra Global's position in the global satellite market? What types of solutions do you offer and what types of clients do you service?*

### Peter Hobbs

Telstra Global provides integrated satellite and terrestrial broadcast solutions out of Hong Kong, Perth and Sydney—we offer customized satellite solutions at competitive rates, supported by expert technical personnel. The services include a range of Satellite Media Services, Satellite Teleport and Collocation Services that include Virtual Network Operator Services, a range of Satellite Data Services for carrier as well as enterprises from Oceania to Africa. These services seamlessly integrate to our domestic and international fiber based IP and MPLS Network.

### SM

*How has the role of satellite changed in recent years, particularly as it relates to developing markets and economies?*

### Peter Hobbs

The role of satellite has changed from legacy carrier services to enterprise VSAT (both point-to-point and point-to-multipoint, Star and Mesh Networks) in both domestic and international markets.

Developing markets are seeing a very high growth in Direct-to-Home (DTH) and there is still overall growth in the video distribution market, mobile, POS connectivity and Enterprise connectivity in remote areas. Disaster recovery



still relies heavily on various forms of satellite services. Telstra Global adapts its services to the customer's needs to ensure it provides the right solutions for its wide variety of customers and for global needs in an evolving market.

**SM**

*How is the satellite industry innovating to remain competitive?*

**Peter Hobbs**

The satellite industry has seen more innovation in the last five years than it has in many decades. There is innovation in the space, ground segment and launch industries. Ka-band and *High Throughput Satellites* (**HTS**—100 Gbps and beyond) have now become a reality and the trend is catching up in many markets.

Ka-band is now being applied in maritime and IP backhaul markets through different satellite constellations. The ground segment industry is innovating in every field, from auto pointing to flat panel antenna. Additionally, the price for equipment is coming down, making it all more affordable for the end customers. There is also a big trend to make the equipment easy to install and maintain remotely. Telstra Global has embraced many of these cutting edge technologies in all the services it provides to its customers, including media, data and teleport services, to both enhance the experience and provide high value to its customers.

**SM**

*What does the threat of submarine cable as well as local ISPs/ phone companies with innovative wireless solutions and/or 4G mean for the future of satellite?*

**Peter Hobbs**

The satellite services industry is still growing in spite of the massive developments in terrestrial and wireless technologies. In many ways, those developments complement the expansion that is being generated by the Internet and mobile markets.

Satellite services have the unique advantage of adapting to different applications—we note this occurring in every market. Telstra sees great opportunities for media content distribution and contribution across Asia Pacific using hybrid solutions that are comprised of its satellite and international submarine cable networks. Telstra Global's advanced IP network complements its teleport services for numerous customers, especially in the high bandwidth applications.

For further information, please access the company site at <http://telstraglobal.com/>

# A Case In Point: Emergency Communications

By Michel Zimet, Director Marketing and Strategy, ND SatCom

**T**elecommunication infrastructure provides the critical path for relief in emergency and disaster situations. Communications connect and help move logistical, rescue and first responder resources in any region of the world facing or recovering from natural or man-made disasters.

Deploying wireless communications is typically among the first priorities in any emergency response, rescue, or relief situation. However, terrestrial wireless equipment (cellular phones or land mobile radios) is only useful when communication towers and other fixed equipment are in place to connect wireless handsets to the local and global communications backbone. In the majority of emergency situations, this infrastructure has either been destroyed by the disaster or is not available in the first place. This reality makes it critical for local government and emergency workers to have access to a wireless communications network that is independent of terrestrial infrastructure.

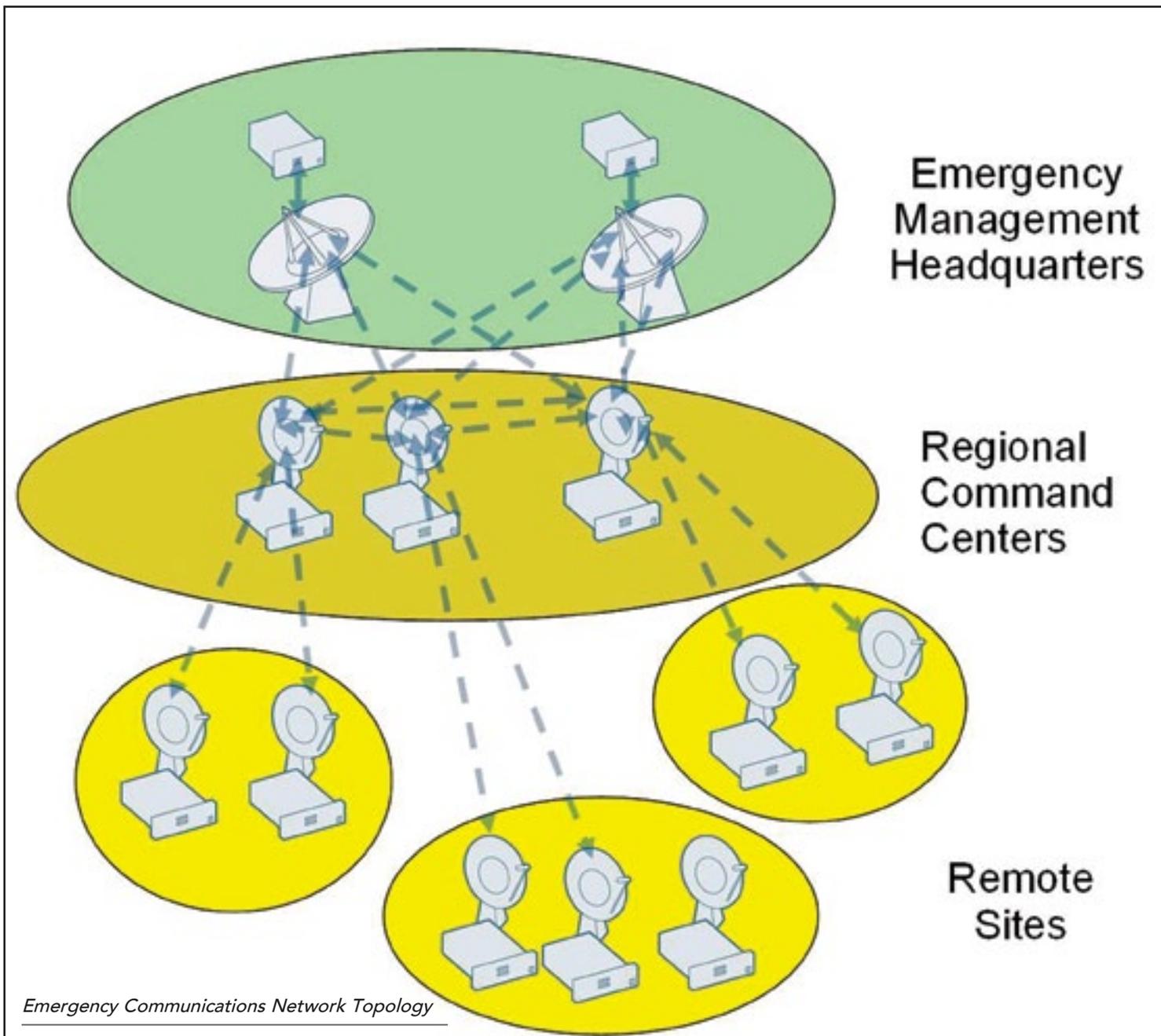


Satellite-based communication allows first responders at a disaster site to work independently from any terrestrial telecommunications infrastructure. Generally, a satellite link is the only means to guarantee reliable communication under all circumstances.

ND SatCom's SKYWAN satellite network solution for emergency response and disaster management provides terrestrial independent communications capabilities wherever and whenever they are needed. The solution combines high quality VSAT connectivity matching the performance of terrestrial networks with simultaneous support for data, video and voice traffic to multiple locations while guaranteeing quality of service. In addition, the inherent flexibility of the SKYWAN platform allows the emergency



*The aftermath of China's Sichuan earthquake in 2008.*



response network topology to be tailored to the network's changing communication requirements at a moment's notice by enabling any-to-any single-hop connectivity between remote locations, regional command centers and emergency management headquarters.

#### **The Customer Challenge**

The **Chinese Earthquake Administration Bureau** is currently operating an ND SatCom SKYWAN satellite network to support their emergency response and disaster management communication requirements.

Prior to implementing a SKYWAN solution, the Earthquake Bureau was running a star based VSAT network supporting very low bit rate (up to 76.8kbps) SCADA applications to approximately 100 sites. However, the Bureau, needed an emergency response and disaster management network solution that could support the following requirements:

- A satellite network that is fully independent of existing infrastructure with no terrestrial backhaul facilities between satellite hub locations and regional or head-quarter emergency response centers

## Emergency Communications (Cont.)



- Highly flexible broadband any-to-any connectivity capabilities between remote sites, regional centers and emergency management headquarter locations, to support applications such as video conferencing and high quality video transmission from affected sites
- Data, voice and video traffic support with guaranteed quality of service
- Support for both mobile and transportable stations in order to provide access to any remote location in affected areas
- Pre-configured satellite terminals with quick deploy antenna systems

After evaluating a number of alternatives, the ND SatCom SKYWAN platform was selected as the satellite network solution that best fulfilled these needs.

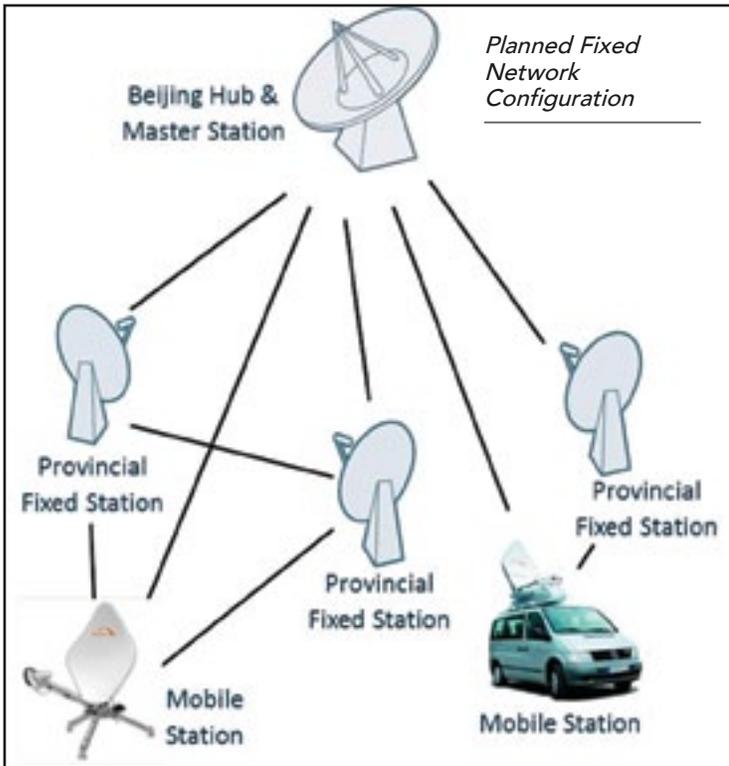
### The Solution

The SKYWAN based emergency VSAT satellite communication network supports coordinated relief efforts between Chinese first responders in affected sites, regional command centers setup in proximity to disaster areas and the Earthquake Administration Bureau's headquarters in Beijing.

The nationwide network consists of a central hub/master station in the headquarter site with a geographically redundant backup master in *Kunming*, 19 provincial capital fixed stations (each of which can be configured as regional hubs for provincial command center operations), five *Communications-On-The-Pause (COTP)* vehicle stations, two *Communications-On-The-Move (COTM)* vehicles, and 14 Flyaway stations.

The nationwide network is split into two sub-networks: One for daily conventional data traffic and one dedicated to crisis communication with the hub station in *Beijing*. Fixed terminals as well as various vehicle-based stations and transportable Fly-Away antenna systems can be rapidly deployed to disaster impacted areas for communication to the regional command centers.

The ND SatCom SKYWAN solution supports one-way high quality video transmission, two-way video conferencing, VoIP, data communication, file transmission, and Internet access 24/7 from any site in the network. Without the use of any terrestrial facilities, and only by means of the SKYWAN high bandwidth network infrastructure, a large number of images and videos of an earthquake affected area can be transmitted from the disaster site to Earthquake Administration Bureau headquarters in a matter of seconds. During disaster situations, video conferences are held on a continual basis giving the central command unit a much better understanding of the disaster situation.



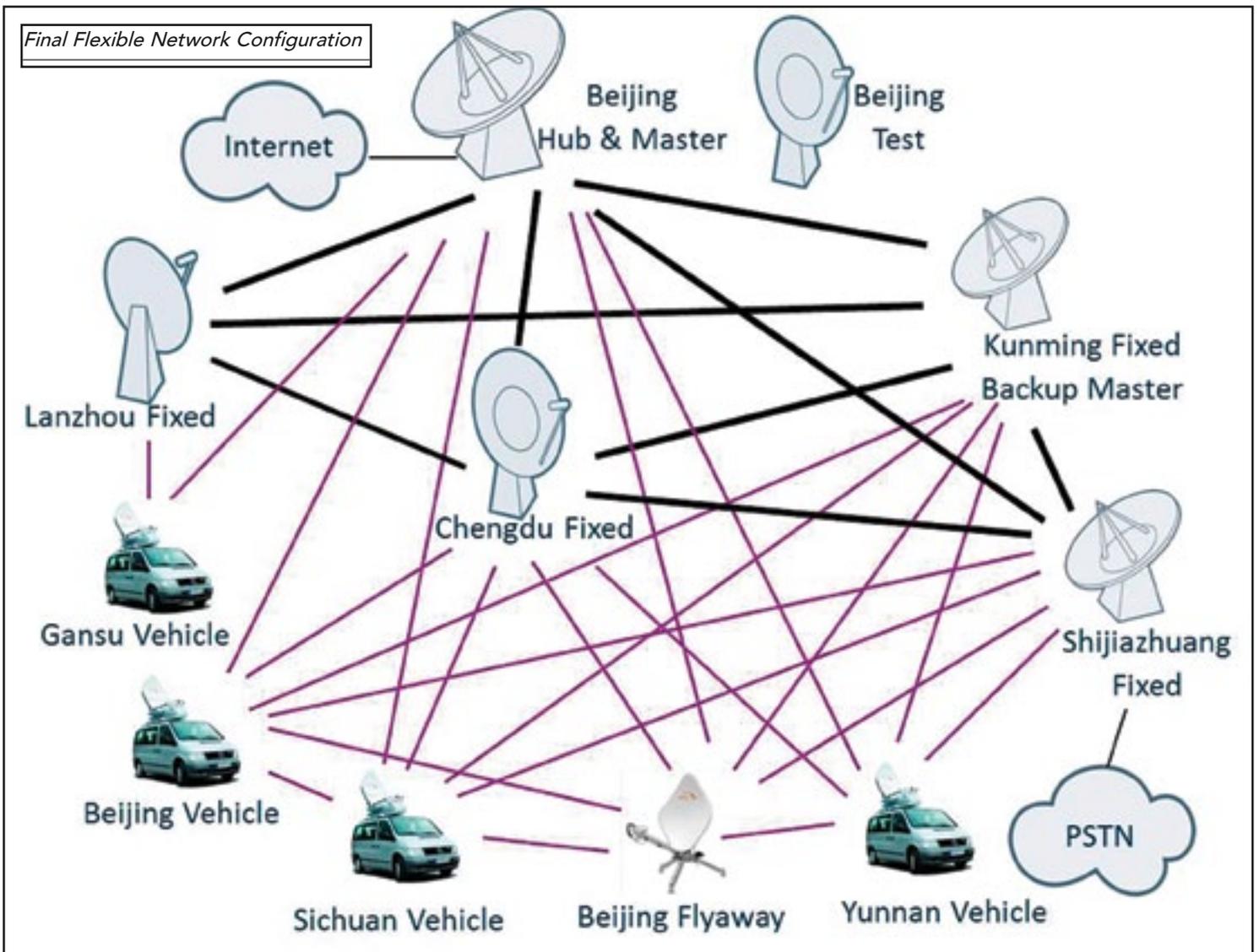
The Bureau had originally planned to implement a fixed configuration for their emergency response satellite network, as shown in the accompanying diagram on the next page:

Following the devastating *Sichuan* earthquake in 2008, and using the SKYWAN platform's inherent flexibility, the network was rapidly reconfigured to accommodate the much more dispersed and complex communication requirements that needed to be deployed in the wake of this disaster.

Although these requirements were much more complex than previously envisaged by the Earthquake Administration Bureau, the SKYWAN based network was able to seamlessly deliver the necessary connectivity and bandwidth with less than 100ms of reconfiguration time.

**Conclusion**

With the latest earthquake incident in Sichuan province causing repeated destruction to the area's telecommunication infrastructure, the Chinese Earthquake Administration Bureau was, once again, able to put its emergency response and disaster management satellite network to good use.



## ***Emergency Communications (Cont.)***



The solution's high level of reliability, along with its ability to deliver broadband connectivity between all sites in the network independent of existing terrestrial facilities, has allowed the Chinese Earthquake Administration Bureau to rapidly respond to this latest disaster in a highly coordinated and effective manner.

Today, thanks to a satellite communication network built around the highly flexible SKYWAN platform, emergency

responders in China are gaining a new edge in situations where access to critical information at a moment's notice can mean the difference between life and death.

***Skywan: Enabling Agile Networks***  
<http://www.ndsatcom.com/skywan>





# What Do The Sun + The Wind Have To Do With Non-Compete Agreements?

By Bert Sadtler, President, Boxwood Search

**W**hile current economic challenges are causing many companies to right-size or down-size, employers who are recruiting critical talent have both the luxury of available qualified talent and the pressure to hire the most qualified difference-maker.

For a professional to be regarded as highly qualified and able to make an immediate impact, it would be critical for the candidate to possess strong

relative industry and customer relationships. Candidates needing to first develop these relationships would be viewed as less than proven and requiring more time to ramp-up.

Now comes into the equation the philosophical contradiction and the complication factor of the employer's non-compete agreement.

From a philosophical perspective, it reminds me of a story my grandmother told me many times about the Sun and the Wind.

The sun and the wind were comparing their strength one day and decided to hold a contest. The wind pointed out a man walking down the street and challenged the sun to see who could remove the man's coat first.

The wind blew. The harder it blew, the tighter than man cinched his coat. After some time, the wind ran out of energy.

When the sun took its turn, it directed warm, glowing rays toward the man. In short order, he became warm and then so warm that he removed his coat.

Force did not motivate the man to remove his coat. Warmth made him want to remove it because it was no longer needed.

Philosophically, should we take another look at non-compete agreements? Have we been taking a "gale force wind" approach (symbolizing our desire to force talent to do what we want) or a "warmth of the sun" approach (symbolizing our ability to lead talented people to do what we want)?



Here are some thoughts about the “Wind’s impact” on Non-Compete Agreements:

- *If the most qualified talent you are seeking to hire currently possesses deep industry relationships, why would they agree to a Non-Compete Employment Agreement that would keep them away from their prior connections for a year or two should they leave their employer?*
- *Employers are seeking candidates who demonstrate confidence and strength. If a prospective employee showed insecurity and weakness, they would not be well regarded. Doesn't a Non-Compete Agreement show a version of Employer Insecurity and Weakness? Is this an example of a contradiction?*
- *How much time and legal fees do employers spend on writing and revising bullet proof Non-Compete Agreements? What if the employer used the same resources toward best practices leadership instead?*
- *How productive is an employee who is only retaining an employee due to having once signed a restrictive Non-Compete Agreement? This employee will be forever distracted wishing his efforts were better appreciated working for someone else.*
- *How many resources is the employer devoting toward playing a defensive role though a Non-Compete Agreement that could be otherwise made available for the employer to play on offense such as business development, community relations, marketing, etc?*
- *How much time does a new employer spend having their legal team review a candidate's Non-Compete Agreement to evaluate its worthiness? What if the employer used the same resources toward best practices leadership instead?*
- *Once a Non-Compete is breached and the battle lines are drawn, relationships and reputations are tested. The employee's credibility can be compromised as well as both the ex-employer and the new employer.*
- *How much overall loss in productivity occurs during a full-blown dispute over a Non-Compete Agreement?*
- *Regardless of the duration, all Non-Compete Agreements have an expiration date. Once it has passed, how well does the ex-employee regard their previous employer? Usually, not well at all. What if the employer used resources toward best practices leadership instead of the Non-Compete Agreement in the first place?*
- *Can the total value of a damaged / destroyed business relationship be fully measured?*

Business needs to be direct and sometimes hard-edged. We are not suggesting changing the business climate into a type of a “kumbaya” atmosphere in which we all hold hands

and sing around the campfire. However, considering the influence of the sun’s warmth from our story above, what would be the possible outcome of the elimination of Non-Compete Agreements in favor of a *Structured Best Practices Leadership Program*?

The introduction of a *Structured Best Practices Leadership Program* might include:

- *Accountability for leadership to provide transparency with clear communications*
- *Reviews, feedback, through established goals and objectives. Employees know exactly where they stand*
- *Implementation of a strong employee retention plan. The best talent will not stay if they don't feel well regarded.*
- *Acknowledgement that successful people are goal driven. Their career path may carry them to another employer. Considering that is likely, has leadership developed a well-planned succession program?*
- *Once a critical talent leaves your employment, it could be the beginning of a new relationship, not the end of one. They could turn into an advocate, a partner or return back to your company with more experience at in more senior level in the future*

For those who have experienced the battle from a contentious Non-Compete Agreement, you would surely agree that there has to be a better way. Is using a version of the alternative *Structured Best Practices Leadership Program* an easy option? Definitely not. At the end of the day, does it deliver a better outcome to all involved parties?

***Just ask the sun.***

***About the author + Boxwood Search***

**Bert Sadtler is the President of Boxwood Search and a Senior Contributor for SatMagazine—There is an ongoing battle for senior level talent. A great hire can make a long term positive impact and a failed hire can prove to be very expensive. How does a company recruit and hire the right talent? It is more than just networking within the community of friends and business associates. It requires focusing on results through a process oriented approach. We are committed to reaching a successful outcome. Our recruitment method has repeatedly proven to deliver very qualified senior talent. Contact Bert at [BertSadtler@BoxwoodSearch.com](mailto:BertSadtler@BoxwoodSearch.com) for more information.**



# ***The Human Factors In SATCOM (RF) Interference: Creating More Effective Mitigation Teams***

*By Bob Potter, President, SAT Corporation*

**I**t's convenient to think of problems such as RF interference by reducing it to its technical form. However, in the operator's world view, it's far more than phenomenon of physics; it's a human-centered challenge to be solved as quickly and inexpensively as possible, with the least amount of disruption to customers and service.

Until we have fully self-healing networks, and magic push button technology, we'll continue to rely on (the often unheralded) human who lies at the center of the equation. People can be brilliant problem solvers—so how can we unleash their full potential to take on more of today's complex interference scenarios and get further along the detect-locate-resolve problem resolution path—without relying on more specialized, costly, and scarcer expertise?

Rather than a wish list of blue sky hypotheticals, we look at three of the most practical and impactful areas for improving the human performance when it comes to RF interference, particularly to help Level 1 operators do more before escalating problems to Level 2 or higher. These include...

- 1) On the job training to better prepare operators for today's wide variety of RF interference scenarios***
- 2) Workflows that bridge discrete parts of the problem into a unified whole to take on more of the 'monitoring to mitigation' problem set***
- 3) Intuitive tools designed to match how operators think and accelerate complex problem-solving***

Together, strengthening these three areas enables Level 1 operators to tackle more interference challenges more efficiently—for better talent utilization internally, and customer service externally.



## ***RF Interference Training— More Effective, Less Disruptive***

If you have ever wondered why special ops teams perform so well in varied situations, or how an athlete overcomes physical impediments so well during a high-pressure moment, it can be distilled down to practice: Consistent practice that's rooted in realistic scenarios that prepare them for those moments.

Unfortunately, the majority of today's interference preparation is relegated to infrequent, expensive and inconvenient offsite training—it's understandable why interference events are sometimes so disruptive and require escalation. Satellite congestion, an explosion of VSATs, configuration errors from added services, not to mention hostile jamming, all make identifying, locating and resolving interference harder for today's less experienced operators, and why repeatable, on the job training is critical to ultimate success.

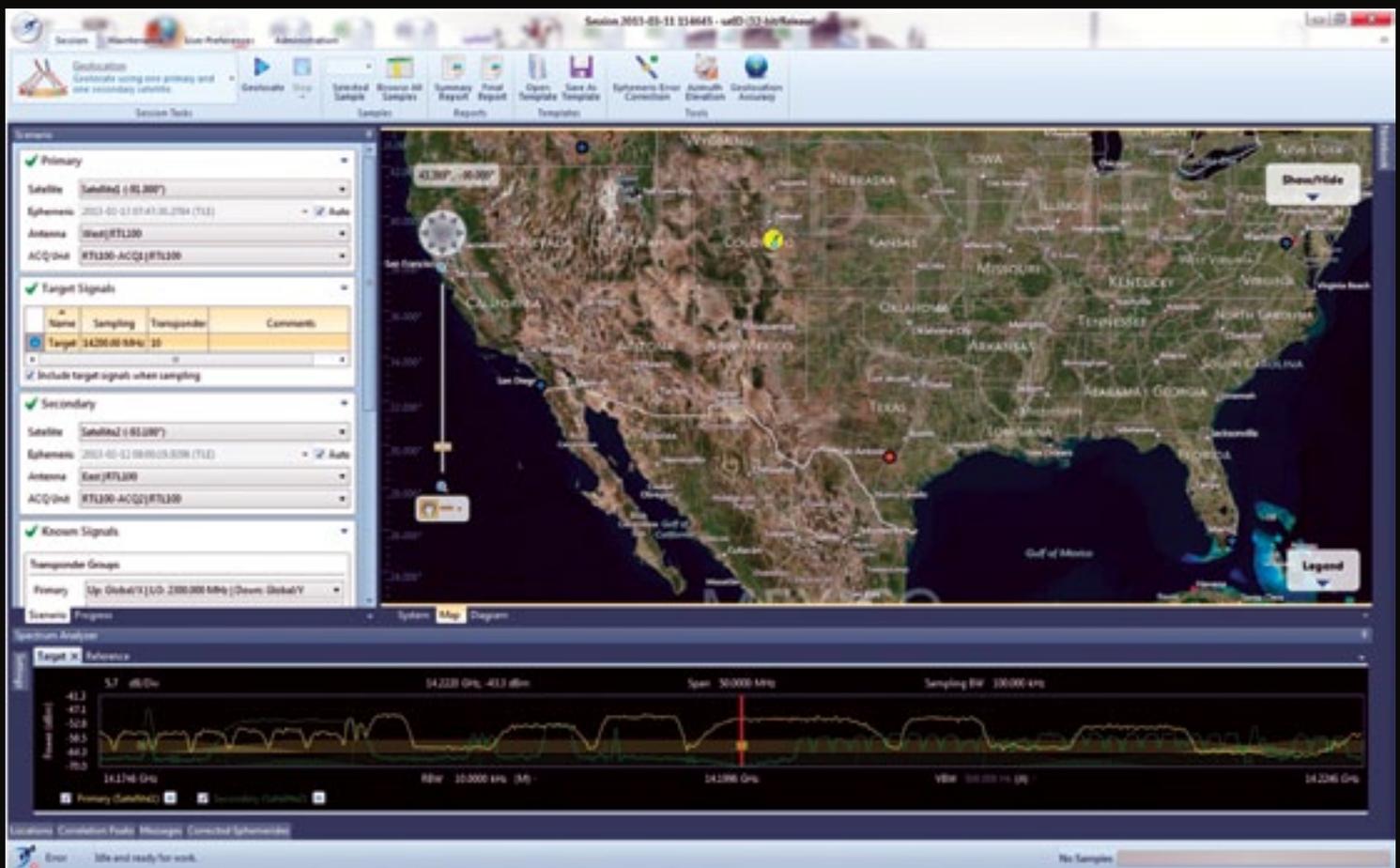
By practicing against a wide spectrum of signal misbehaviors rooted in realistic situations, operators can be better prepared for whatever they might encounter.

Consider this typical occasional use scenario, where a conflicting signal is detected shortly before a live news broadcast. In an ideal world, the Level 1 operator detects and determines the originating source, calls the conflicting carrier, and resolves the issue quickly. In reality, however, determining whether the disruption is, for example, from broadcaster XYZ or the test transmission from a mobile truck, may take longer, so it is passed to a Level 2 operator who's required to build a geolocation scenario. The difference between the ideal and the actual response hinges on the Level 1 operator's limited exposure to, and preparation for, these scenarios.

One highly effective, low cost approach to gaining those valuable on-the-job repetitions is to use monitoring and geolocation systems with capabilities that enable them to simulate a wide variety of interference events.

For example, a monitoring tool, when combined with a signal generator, allows a system administrator to create and insert a modulated waveform into any of the downlink monitoring paths without disturbing the traffic on the satellite. The occurrence looks and feels like real interference for all intents and purposes, creating an alarm for operators to respond to and to work through necessary protocols and procedures.

Another way for operators to prepare and train for a wide spectrum of interference events is with a geolocation simulator. By injecting signals through the ground station (within the geolocation system itself), the operator can practice against interference that might occur due to equipment failure, operator error, intentional jamming, or unauthorized use.



Integration of RF tools enables a seamless process for operators to detect, characterize, identify and locate interference.

## ***The Human Factors In SATCOM (RF) Interference (Cont.)***

The geolocation simulator eliminates the issues associated with relying on a live satellite for training, as is the typical case today, thereby eliminating traffic disruption, and increasing training time onsite training, which dramatically reduces training costs. The simulator can also be used as a geolocation self-test solution, for assuring peak performance of vital link protection systems, and as a pre-mission simulator to anticipate, plan and design against interference scenarios. The operator can select ground locations for transmission and reception sites, choose satellites, enter antenna pattern information, and generate protected, interference and reference signals.

These approaches dramatically sharpen the operator's geolocation techniques and knowledge, resulting in faster and more accurate detection, diagnosis, location, and resolution. Operators can now train consistently on the job anywhere, anytime, obtaining the necessary reps and varied scenario exposure they need, rather than relying on the limited and intermittent training that comes from live-fire events.

### ***Tools That Support Improved Workflow + Efficiency***

With better training, Level 1 operators can address more of the full 'monitoring to mitigation' cycle, rather than parsing and passing along the problem (in a stove-piped manner). This problem-solving depends on tools that are integrated and that can bridge the workflow between monitoring and geolocation. By pulling important data from monitoring, such as detailed signal-under-signal characterizations, into a graphically-oriented geolocation interface, more complete scenario analysis can be performed at lower levels in the organization, with greater geolocation confidence.

By integrating the toolsets, the detection-to-geolocation process becomes more seamless, making the Level 1 operator far more productive. This boosts the bench strength of front line talent and increases the potential of faster, less costly, interference resolution. Considering that Level 1 operators are the 24x7 staff who are most plentiful, this is critical, especially when more specialized expertise or Level 2 operators are scarce, off-shift, or unavailable when interference strikes.

When "Murphy's Law" types of scenarios do arise, don't overlook the importance of contingency planning. When Level 1 or Level 2 expertise is needed, but unavailable, globally managed RF services with 24x7 operations center staffed by experts are available to perform interference detection and geolocation in a matter of minutes. These outside resources are also an economical option for cases where a small team can't support the need for a Level 2 operator, the amount of geolocation scenarios encountered are too few to warrant a full-time Level 2 operator, or third party validation of results is needed.

Now that Level 1 operators are more thoroughly trained and prepared, it makes sense to extend geolocation capabilities to other monitoring sites to protect more beams and spectrum. By adding/upgrading geolocation software to distributed sites where (PC-based) hardware is already used for monitoring, you gain dual-use, dual benefits from invested equipment for not much more expense.

#### ***Better Decision Making By Supporting How Humans Think***

Today's satellites scenarios are more complex, involving more beams, switching, and transponders. It's much easier to pictorially understand these satellite states and configurations through a map visualization, rather than text or tables.

The text-based data in most tools today present operators with unnecessary complexity and restrict how they can interpret and interact with the information. It's the difference between the earliest DOS-based computers and the revolution in business productivity that resulted from the graphically rich and intuitive displays we use today.

**Geographic context is central to understanding and optimizing the geolocation process. Starting with a visually detailed map at the center of the interface (rendered directly from Bing, Open Street Maps, Google Maps, or a private map server), an operator can overlay satellite and signal information, spectrum analyzer displays and other elements to perform geolocation within the map. This scenario visualization allows the tool to suit the user, not the other way around, providing a more efficient way of generating geolocation results and expediting mitigation.**

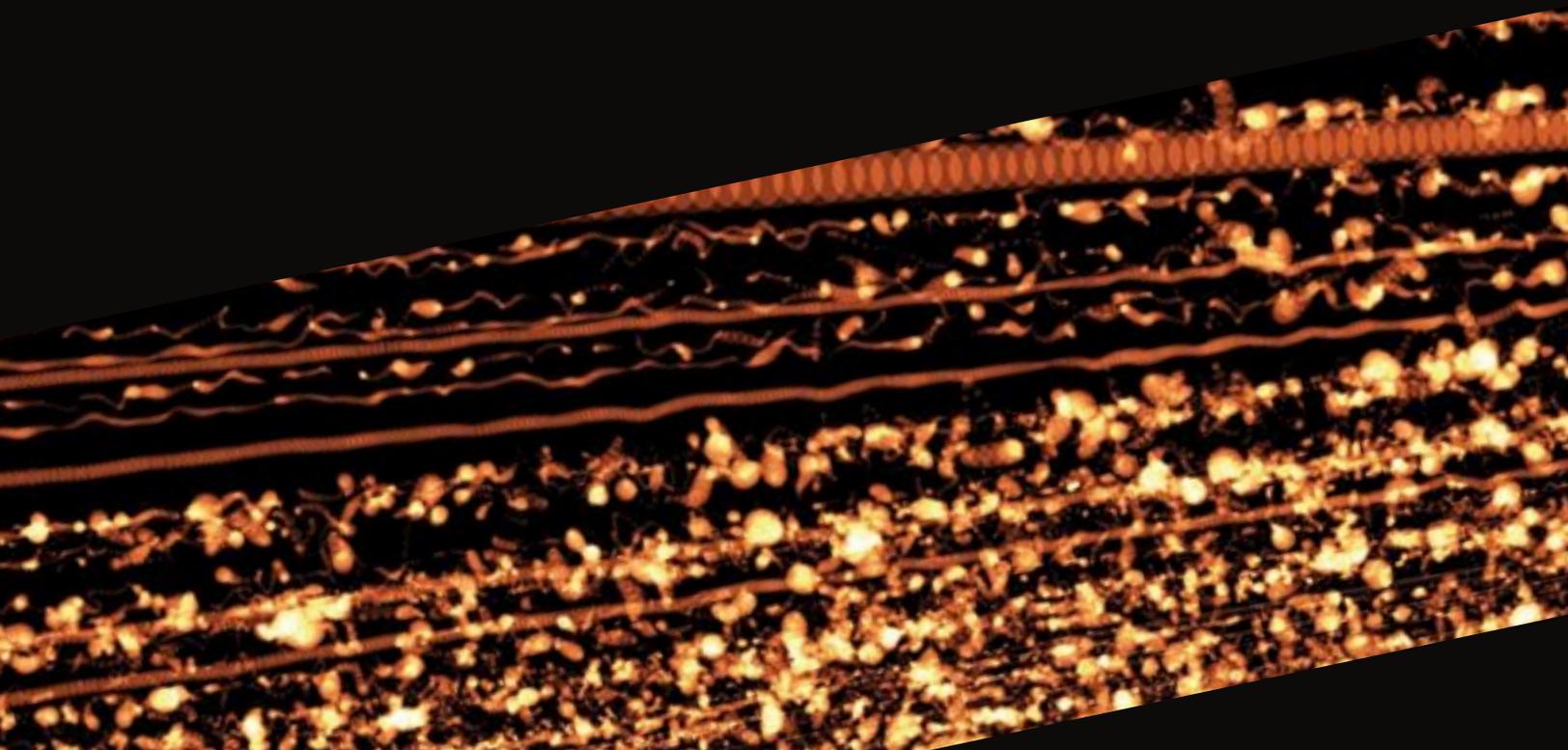
An example of the cumulative power of combined training, integrated tools, and graphical displays is demonstrated when trying to resolve intermittent interference—the type that appears for a short time, goes away, and returns again. Level 1 operators can now be made aware of the interference, replicating the event in the training tools to practice against the event. When the interference event does re-occur, the Level 1 operator is notified immediately via the monitoring tool, and within the same environment activates the geolocation scenario to more quickly locate the source and expedite the interference resolution.

#### ***A Future Of Promise***

**With 50 percent more satellites being built for launch from 2011-2020 than the previous decade, the satellite industry is positioned for exceptional growth. More capacity, users and services will present more interference challenges. However, satellite companies now have a roadmap to efficiently and cost effectively prepare and equip their human talent for the road ahead. By empowering its front line operators to do more and solve more, the organization's return on their human investment dramatically increases, as does customer service and satisfaction.**

#### ***About the author***

Bob Potter is the President of SAT Corporation, a Kratos subsidiary. His experience in RF systems design and measurement techniques extends for more than 25 years. He is a leading member of sIRG with a focus on carrierID.



# End-To-End RF Interference Mitigation Solutions

SAT Corporation, a Kratos company, provides a comprehensive suite of solutions that address RF interference challenges, including products and services used by 80 percent of major satellite operators to help quickly identify and mitigate costly RF interference events.

## Improving Workflow and Efficiency in RF Interference Mitigation

SAT enables operators to be more effective with its integrated RF interference tools Monics® and satID® that improve their ability to monitor and geolocate RF interference. SAT's products provide RF signal monitoring as well as an accurate, fast, all-in-one solution for locating and identifying sources of interference due to equipment failure, operator error, intentional jamming, or unauthorized users.

Using the map-driven user interface in satID, SAT's powerful geolocation product, provides operators with the ability to perform geolocation scenarios more efficiently and effectively. Integration with Monics®, the industry's leading carrier monitoring solution, provides an advanced spectrum measurement and interference analysis. Important data from Monics, such as detailed signal-under-signal characterizations, is pulled into satID's graphical interface to provide an even more complete scenario analysis and greater geolocation confidence. With satID and Monics integrated together, the full spectrum of detection, characterization, identification and location of RFI becomes a seamless process for operators.

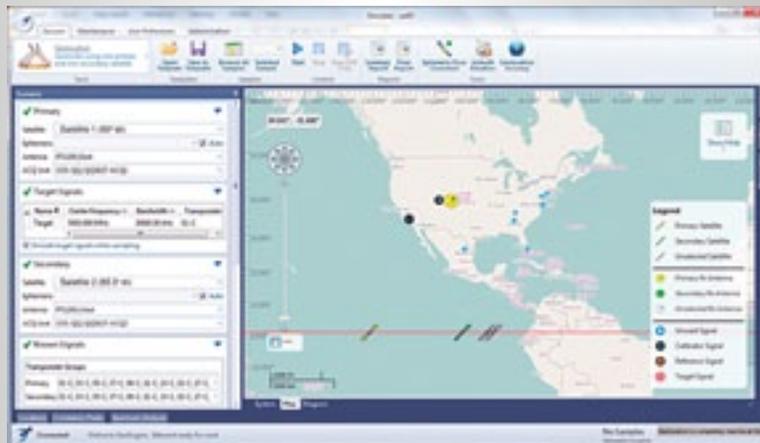
## Cost Conscious Geolocation Testing and Training Solutions

Executing RF interference mitigation training can become expensive and time consuming when you have to use live satellite bandwidth. satID GeoSim, the industry's first geolocation simulator from RT Logic, also a Kratos company, can increase effectiveness of satID users by creating exact, real-world, complex RF signal conditions that will exist when a geosynchronous satellite encounters interference. satID GeoSim, allows for simulation of a wide range of nominal and worst case RF signal scenarios to increase the readiness of operators to help ensure high data and communication system uptime.

## RF Interference Expertise Available 24/7

In some cases an organization is not prepared to take on a full-time interference monitoring model. SAT is the only global provider of 24/7 managed SATCOM Network Operations Services. SAT's global network of dual antenna sites equipped with Monics and satID provide the best in class network for monitoring, locating and mitigating costly RF interference. SAT's state of the art Network Operation Center is staffed by full time Satellite Network Analysts with a combined 25+ years of experience in resolving RF interference.

Additional information is available at the company's website:  
<http://www.sat.com/products/satID.php>  
or email [rfi@sat.com](mailto:rfi@sat.com).



Geolocation using the map-driven interface of satID 3.0 allows quicker identification and location of interference, whether from equipment failure, operator error, intentional jamming or even unauthorized users.



# Travel Habits Are Changing, Thanks To SATCOM

By David Leichner, Vice President, Corporate Marketing, Gilat Satellite Networks

**W**hen I was in my twenties, it was possible to show up to the airport 30 minutes before a flight and still have time for a coffee before boarding. Over the last two decades, the time required at the airport before a flight has increased, taking a sharp rise in the aftermath of the September 11th terror attacks. The increased security, waiting in long lines, removing of shoes, and gulping down the last of the diet coke while the person in front of you desperately searches for the small perfume bottle

deterrent, many families are still taking to the road in their RVs, vans and luxury vehicles.

While transportation companies are constantly working to reduce costs, competition is growing more than ever before between the various means of transport.

One of the emerging service differentiators in the competitive transportation market is the ability to offer live TV and Internet access during travel. Transportation companies are now able to provide new or upgraded entertainment systems with live TV channels and in-seat viewing choices and always-access.

The added-value service of live entertainment and Internet access can increase revenue margins, provide a strategic competitive advantage and increase customer contentment and brand satisfaction.



forgotten in one of her carry on pockets, has significantly increased the time spent at the airport before a flight.

Bus and train travel have become a real alternative to air and sea travel as conditions have improved on both, with train travel being the typically more cost-effective means of travel. Customers often make their travel decision based on time of trip, cost and comfort. Depending on budget, comfort may be the primary factor, or not. And while rising gasoline costs may be seen as a

## Connectivity Is A Must-Have

Passenger communication and entertainment for long commute hours, including Internet surfing, email, social networking and live web updates on news, sports and weather are becoming a "must-have" in many parts of the globe. In addition, transportation companies are challenged

to meet the growing connectivity demands for real-time information for both passenger and cargo transportation. Connectivity requirements span a wide set of services that include not only the well-being of the passengers by providing entertainment, but also business and security services, as well as enhanced fleet operation and control applications.

Another major need for continuous broadband connectivity is in the area of operation and control applications that can provide increased security and more effective fleet management. These applications include such essential tasks as surveillance, remote monitoring and control, hazard alerts, and collision prevention. Security and regulatory standards, often government driven, are becoming stricter, requiring more stringent safety requirements.

The ground connectivity challenge is often magnified due to topology and country regulations. The challenge therefore is to provide uninterrupted connectivity independent of terrestrial infrastructure.

In addition, economic considerations need to be taken into account. Train and bus routes often pass through remote areas where it is not economical to layout communication groundwork. The high cost of installing cellular towers every few kilometers along the entire track, as well as the lengthy implementation schedule, makes this option unfeasible. Equally impractical is the option of laying out fiber or copper lines in rugged terrain.



*Travel bus equipped with a RaySat SpeedRay 1000 antenna.*

Continuous connectivity service for both passengers and operation and control is required along the entire bus or rail route. This route might include remotely populated areas with diverse terrain conditions. The coverage of both cellular networks and the availability of WIFI hotspots is spotty or unavailable along long routes that often pass through uninhabited or sparsely populated areas.

### **Satellite Is The Solution**

The delivery of broadband communication service in a moving bus, vehicle or train is a technologically demanding challenge. Satellite-on-the-move is by far the most robust solution and the one that can provide the most continuous coverage. It is also at times the only option and the most cost effective alternative when other means of communication are not present. Naturally, the geographic terrain, the environmental

# Travel Habits Are Changing, Thanks To SATCOM (Cont.)

conditions, the vehicle or train mechanics, and of course the desired applications are all key to making the appropriate solution choice that will increase revenues while delivering customer and operational value.

It is important to note that the requirements for SOTM are markedly different than conventional stationary satellite communication. All equipment installed on the roof of the bus, train or vehicle must be designed to meet aerodynamic and environmental challenges and in many cases, must have a low profile to fit into low height tunnels. They must operate in high and low temperatures and have high resistance to shock while in motion. The antennas must be able to track the satellite, and have fast reacquisition of the satellite link in case of line-of-sight blockage. In addition, for the solution to be cost effective, a high gain antenna is required with adequate transmission and reception rates for effective bandwidth allocation.

A SOTM solution is comprised of distinct elements that must come together to provide a robust, secure, manageable and affordable satellite communication system. A major element in this system is the low-profile SOTM antenna.

## Mobile Satellite TV + On-the-Move Antennas

The satellite antenna itself is the enabling SOTM technology. The tracking antenna must be low profile, rugged, and wide reaching with a high gain to cost effectively meet the growing broadband communication needs.

### Physical criteria—low profile

A key requirement for a SOTM antenna is that it should minimize the level of aerodynamic interference and be no higher than 30cm, for safe passage through tunnels and under bridges; it also must be robust enough to operate in temperatures as low as -40°C. Low weight is required for simple transport and safe installation, eliminating the need to modify the bus or locomotive/cabin roof.

### High gain—more throughput

A high gain antenna supporting higher transmission rates enables efficient data, voice and video streaming. A high gain antenna is particularly important for SOTM to enable cost effective bandwidth allocation and high enough transmission rates to overcome signal drops due to electric poles found along the train route (when electric trains are in operation). A high gain antenna can be a key factor in reducing both capital expenditure (e.g., usage of smaller power transmitters) and operational expenses (reduced satellite space segment allocation).

### Elevation angle—wide coverage

Tracking of the satellite on the move requires different antenna elevation angles which are dependent on the location of the antenna relative to the equator above which the satellite is located. A wide elevation angle range can ensure maximal flexibility in choosing the satellite of operation, as well as a unified solution architecture that can be implemented over a long spread of railway tracks within the country or even within the continent.

### The Conclusion is Clear

It is reasonable to assume that the transportation industry is aware of the need to provide continuous uninterrupted broadband communication to improve passenger experience for business and pleasure, operations and security. The organizations that will provide a safer, more productive and enjoyable ride are those who will prevail in the years ahead.

RaySat antennas are enabling satellite TV and on-the-move connectivity around the globe for buses, trains, VIP vehicles, luxury cars, vans and recreational vehicles. Designed for commercial use in a variety of different markets, RaySat antennas provide:

- Sleek design to complement vehicles' profiles
- Low-profile and fits many size vehicles
- Automatic and autonomous operating system for easy use
- Rapid satellite tracking for reception at high speeds
- Satellite acquisition in < 1 min for quick signal reception
- Satellite re-acquisition in < 10 sec following Line of Sight blockage

For more information about RaySat low-profiles antennas, please visit [www.gilat.com/Satellite-TV-Antennas](http://www.gilat.com/Satellite-TV-Antennas) To learn more about becoming a reseller of RaySat antennas for mobile satellite TV, please visit <http://www.gilat.com/learn-more>

### About the author

Mr. Leichner has more than 20 years of marketing and management experience. He is responsible for corporate marketing and business development for Gilat Satellite Networks and its subsidiaries. Prior to joining Gilat, Mr. Leichner served as; the VP of Sales and Business Development at Dynasec; CEO of SafePeak Technologies; CMO at BluePhoenix Solutions; VP of Marketing at Unipier Mobile; and as VP of Worldwide Marketing at Magic Software Enterprises. Mr. Leichner has been a member of the global board of the Israeli Mobile and Communication Association since 2005.





