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### Senior Contributors

*Tony Bardo, Hughes | Chris Forrester, Broadgate Publications*
*Karl Fuchs, iDirect Government Services | Bob Gough, Carrick Communications*
*Jos Heyman, TIROS Space Information | David Leichner, Gilat Satellite Networks Giles Peeters, Track24 Defence*
*Mike Antonovich, ATEME | Richard Dutchik*
*Bert Sadtler, Boxwood Executive Search*

### This Issue's Authors

*Eran Avni | Noel Brown*
*Stuart Brown | Kevin Corbley*
*Cristi Damian | Adina Eckstein*
*Doran Elinav | Dan Freyer*
*Chris Forrester | Roger Franklin*
*Simen K. Frostad | Bob Granath*
*Jos Heyman | Hartley Lesser*
*Rainer Lorger | Dr. Gerhard Mocker*
*Henrik Nørrelykke | Peter Ostapiuk*
*Simon Pryor | Bert Sadtler*
*Dr. Walter Scott | Stewart Schley*
*Phil Toms | Pattie Waldt*



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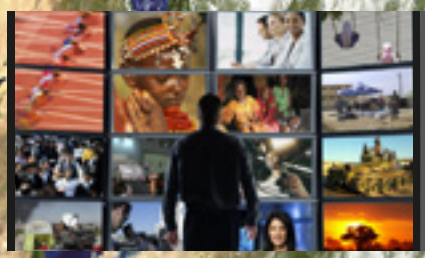

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SatMagazine September 2013

## InfoBeam

*Inmarsat and Arianespace—Alphasat Away, 12*

*SSL + Eutelsat—Bringing The 1300 Platform Into Play, 12*

*e2v + Astrium—A Spatial Sentinel, 12*

*SES—The SES-6 Satellite Is On Track + On Task, 14*

*NASA—The Magnificent Magnetometer, 14*

*Investigate IBC2013, 15*

*NOAA—Pushing The Terraflops, 16*

*HITS™—A Quantum Move, 16*

*Rockwell Collins +ARINC—Acquisition In The Works, 18*

*ARINC + Air Canada—rouge Strategy Inclusion, 18*

*ARINC + South African Airways—Five Years' Flying Partnership, 18*

*International Launch Services—Pysher To V.P., 18*

*DISH Puerto Rico + Claro—Hopper'ing To It, 19*

*Es'hailSat + Arabsat—The Tie That SatBroadcasts, 20*

*PCI Geomatics—SAR Learning Path, 20*

*MEASAT—Mathur To Senior Director, 21*

*Harris + FAA—Taking It Digital, 21*

*Blue Sky Network—A Heli Of A Good Job, 22*

*India—A Leak Is A Game Changer, 22*

*Aeroject Rocketdyne—First Of Four Ship, 23*

*Advantech Wireless—Extended Converters Debut, 24*

*Indra—Terminals To The German Navy, 24*

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SatMagazine September 2013

## InfoBeam


*EURO World Networks + World Media—To Kiwis + Kangaroos, 24*

*Raytheon—Signing On For Number Three, 24*

*Kratos ISI + PT Telekomunikasi Indonesia—Backup Measures, 24*

*Vislink—Adding On, 25*

*NASA—Big Steps Start With Little Cubes, 25*

*DigitalGlobe—4,000,000,000, 26*

*GVF + PTC'14—More To Hawaii Than Just The Beaches, 27*

*NASA—Suomi NPP's Plume Pounce, 28*

*IFEN + WORK Microwave—An Upscale Update, 28*

*Inmarsat + Volvo Ocean Race—Over The Oceans With Support, 29*

*Thales Alenia Space + Visiona—Satellite Creation, 30*

*ILS—Anomaly Investigation Concluded, 30*

*University of Stuttgart—Laptops To Fly Higher, 30*

*NASA—A Golden Anniversary + Golden Opportunities Recalled, 32*

*NewSat Limited—Mining The Diggers + Dealers Event, 34*

*Sentech—Sending Vivid Signals, 34*

*Bridge Technologies—Breaking With Tradition, 34*

*SpaceX + NASA—Dragon Determination, 35*

*EMC—Nothing Pending About This Patent, 36*

*Yahsat + Global Telesat—Access For Angola, 36*

*Space Foundation—Lifetime Achievement Award Nominations, 37*

*Astrium—Making Things Fly... On The Ground, 38*

*Gilat Satellite Networks—Spacenet Goes To SageNet, 38*

*Space Systems/Loral—The Silence Is Broken, 40*

*Advantech Wireless—The Extended Family, 40*

*iGT—Speeding Up Innovation, 40*

*Niagara Thermal + ViaSat—A Heated Exchange, 40*

*ImStrat + GeoSoluciones—Imparting ISR Intelligence, 40*

*Sierra Nevada Corp.—Dream Chaser's Two New Milestones, 42*

*NOAA—GOES Goes, 42*

*USGIF—GEOINT Lightning Talks, 44*

*United Launch Alliance—Congratz To Delta Clipper Team, 44*

*Inmarsat Government—Miller Is New President + CEO, 44*

*Inmarsat—Solar Challenge Ahead, 46*

*ESA + UK Space Agency—Live In Edinburgh, 46*

*Millennium Space Systems + Sinclair—Wheel-y Good News, 47*

*NewSat Ltd.—Brown To Sr/ Vice President, Strategic Planning, 47*

*Digital TV Research—Dishes To Appear In 1 In 4 Homes By 2018, 47*

*NASA—Temper, Temper—Showa Blows Its Top, 47*

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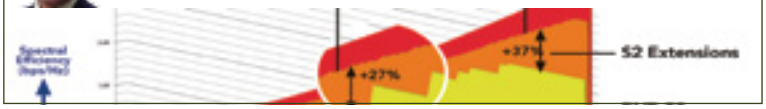
# SatMagazine

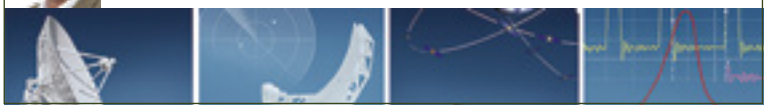
September 2013

## Features

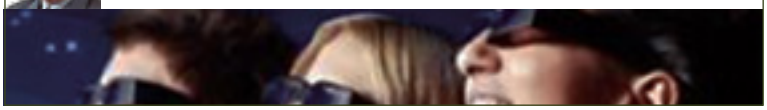
*SatBroadcasting™*
*Strategies For Introducing S2 Extensions, HEVC + UHDTV*
*by Simon Pryor, Newtec — Page 48*



*Eliminating Rain Fade Issues In The Ka-Band*
*by Dr. Gerhard Mocker, WORK Microwave GmbH— Page 54*



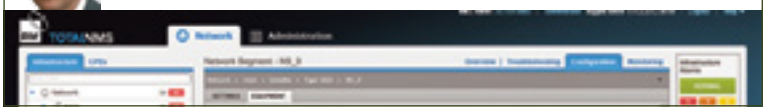
*Executive Spotlight*
*Gary Carter, Vice President + CTO,*
*International Datacasting— Page 52*



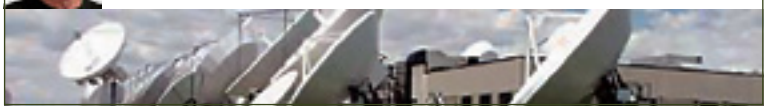
*Satélites Mexicanos S.A. de C.V. Absorbed With Aplomb*
*by Chris Forrester, Senior Contributor, Page 58*

*Saving Time+ Money With Used Uplink Antennas*
*by Dan Freyer, AdWavez Marketing, Page 62*

*HTS—Risks, Challenges + Opportunities*
*by Doran Elinav, Gilat Satellite Networks, Page 70*



*SatBroadcasting™: Now Playing On Transponder 3*
*by Stewart Schley, Page 72*



# SatMagazine

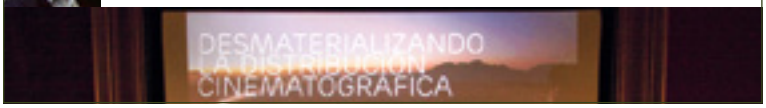
September 2013

## Features

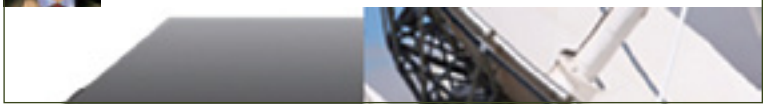
*The SES Success Story*
*by Jos Heyman, Senior Contributor, Page 74*

*SatBroadcasting™: Satellites Ready To Serve*
*by Peter Ostapiuk, Intelsat, Page 78*

*Satellite Revolutionizes Film Distribution*
*by Ignacio Sanchis, Hispasat, Page 76*



*Downlink: Intelligent Redundancy*
*by Simen K. Frostad, Bridge Technologies, Page 80*



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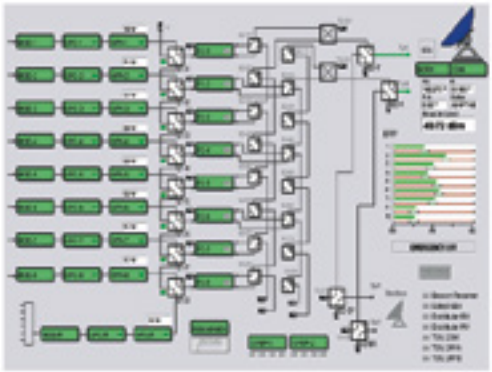

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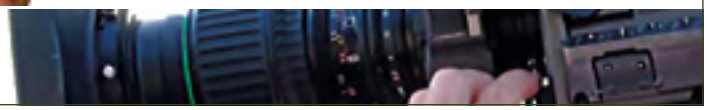
# SatMagazine

September 2013

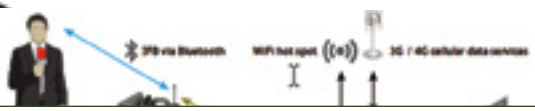
## Features

*SatBroadcasting™: The New News Mobility*
*by Henrik Nørrelykke, Cobham SATCOM, Page 82*



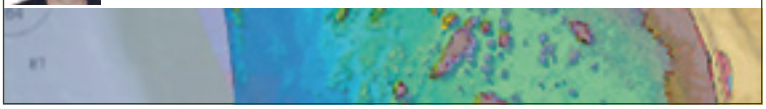
*SatBroadcasting™: The European SATCOM Blanket*
*by Jacob Keret, Spacecom, Page 98*

*SatBroadcasting™: The Suitcase Solution*
*by Stuart Brown, Cobham Broadcast, Page 84*



*A Case In Point: TV Teleport For Turkmenistan*
*by Rainer Lorger, DEV Systemtechnik, Page 100*

*Marine Mapping's Paradigm Changes*
*by Kevin Corbley, Page 86*

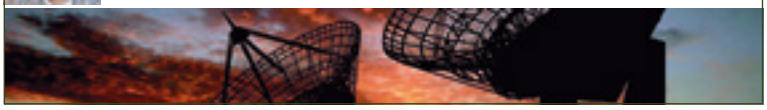


*Downlink: HIgh Power GaN Ku-Band SSPA Systems*
*by Cristi Damian, Advantech Wireless, Page 102*

*Careers: The Road To The Future—Writing The 2013 Résumé*
*by Bert Sadtler, Senior Contributor, Page 90*

*SatBroadcasting™: Broadcasting In Europe—Meeting The Needs Of The Disaporas*
*by Eran Avni, European Communication Services, Page 104*

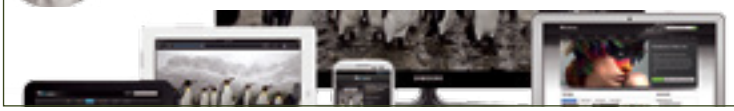
*SatBroadcasting™: Struggling To Monitor*
*by Roger Franklin, Crystal Solutions, Page 92*



*Executive Spotlight: Vern Fotheringham, Chariman and CEO, Kymeta, Page 106*

*The World Wants More Than 10,000 Shakers*
*by Noel Brown, Brüel + Kjær, Page 94*

*SatBroadcasting™: Challenges Into Opportunities For Satellite Operators*
*by Adina Eckstein, Tvinci, Page 110*



## Advertiser Index


*2nd Annual Space and Satellite Regulatory Colloquium, pp. 56 & 57*

*Asia Broadcast Satellite (ABS), 59*

*Acorde, 29*

*Advantech Wireless, 1*

*AMOS by Spacecom, 17*

*AnaCom, Inc., 107*

*ANTCOM Corporation, 3*

*Arabsat Satellite, 33*

*AsiaSat—Asia Satellite, 39*

*Ateme, 43*

*AvL Technologies, 21*

*Azure Shine International, Inc., 69*

*Bridge Technologies, 5*

*Brüel & Kjær, 8*

*C-COM Satellite Systems, 79*

*Comtech EF Data, 23*

*Comtech Xicom Technology, 15*

*CPI Satcom Products, 25*

*DEV Systemtechnik, 6*

*Finisar, 51*

*Foxcom, Inc., a division of ONEPATH, 81*

*GAZPROM Space Systems, 53*

*Gilat Satellite Networks, 71*

*Global Link Productions Inc., 27*

*GlobeCast, 4*

*Harris Corporation, 31*

*iDirect, 67*

*International Research Networks—ISC 2013 Summit, 93*

*ITS Electronics, Inc., 11*

*JD Events — SATCON, 89*

*Microspace Communications Corporation, 91*

*MITEQ Inc. / MCL, 111*

*ND Satcom (Astrium), 41*

*NewSat Limited, 45*

*Newtec CY, cover + 7*

*O3b Networks, 61*

*ONE CONNXT, 55*

*Optimal Satcom, 77*

*Pacific Telecommunications Council—PTC'14, 87*

*RUAG Space, 65*

*Satelites Mexicanos S.A. de C.V., 37*

*SatFinder, 97*

*SatNews Publishers' Digital Editions, 105*

*SatService GmbH, 9*

*SSPI — Future Leaders Dinner, 99*

*ST Teleport, 19*

*Superior Satellite Engineers—SSE, 101*

*Teledyne Paradise Datacom LLC, 112*

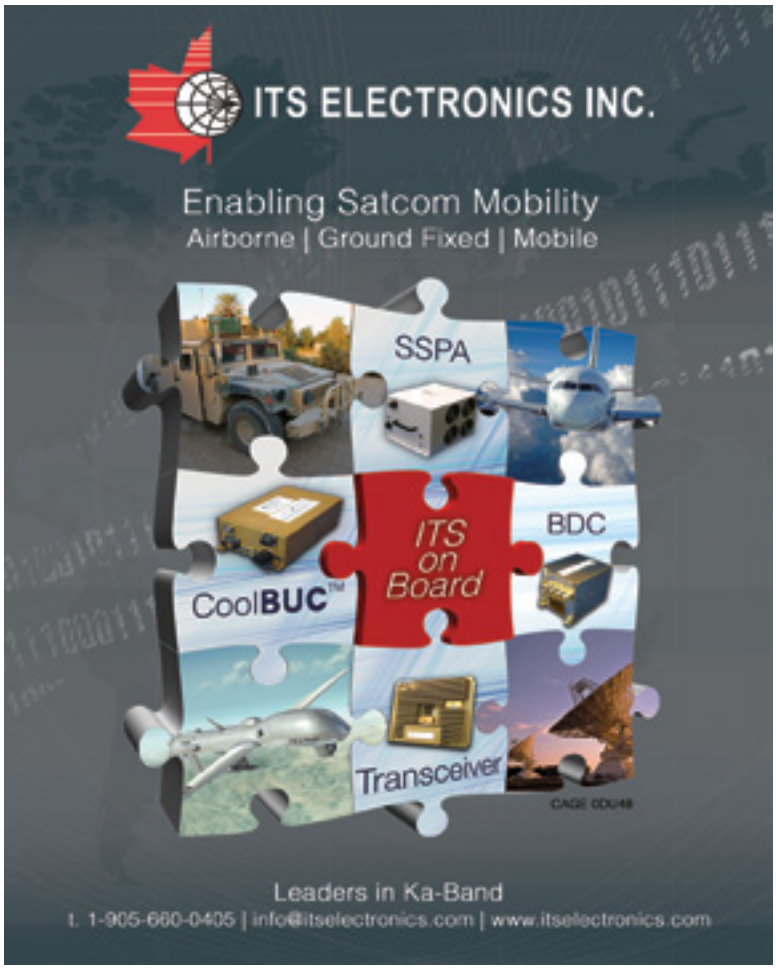
*Terrasat Communications, 35*

*Thuraya Telecommunications, 13*

*W.B. Walton Enterprises, Inc., 63*

*WORK Microwave, 73*





## Inmarsat + Arianespace–Alphasat Away

**Alphasat, designated I-4A F4 by Inmarsat was launched on an Ariane 5 ECA, which is the latest version of the Ariane 5 launchers. Alphasat is Europe's largest ever launch telecommunications satellite.**

The launch occurred from the Guiana Space Centre in Kourou, French Guiana, at 8:54 p.m. BST on July 25th. Arianespace confirmed a successful spacecraft separation at 27 minutes 45 seconds after launch and the Alphasat Mission Operations Team confirmed telemetry reception and that they had command of the satellite at 9:47 p.m. BST.

Inmarsat is the owner and operator of Alphasat, one of the most technically advanced telecommunications satellites ever constructed for civilian applications. With a US$350 million investment from Inmarsat, Alphasat complements the company's award-winning L-band satellite fleet, which has been powering global broadband connectivity for government and commercial customers on land, sea and in the air since 2009.

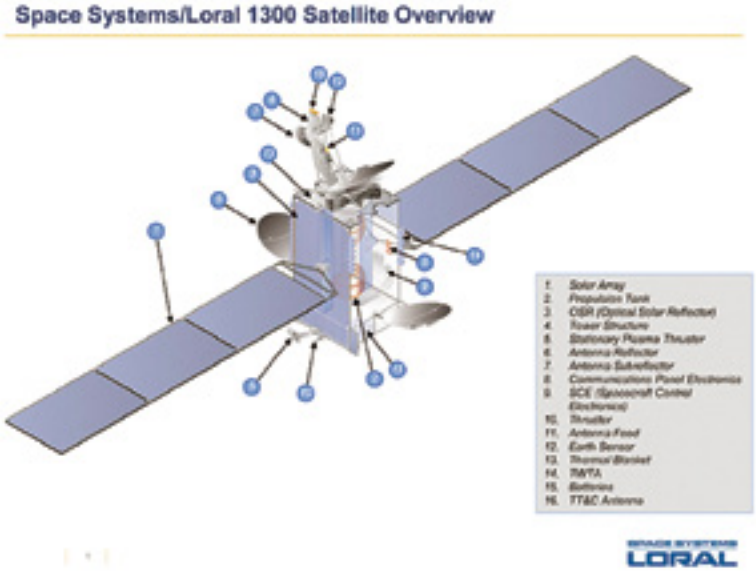
With the successful acquisition of the satellite confirmed, the Alphasat Mission Operations Team will complete partial solar array deployment overnight and commence orbit-raising on Friday night, to place the satellite into its final geostationary orbit position. This operation is scheduled to be completed on the morning of July 31st.

Rupert Pearce, CEO of Inmarsat, said, "Alphasat will strengthen our existing I-4 series satellite constellation, providing coverage over Europe, the Middle East and Africa. The launch demonstrates Inmarsat's long-term commitment to L-band services, and marks a significant milestone in the evolution of Inmarsat's flagship satellite fleet, bringing new capabilities both in terms of performance and resource availability.

Designed and manufactured by Astrium, Alphasat is the largest and most sophisticated European telecommunications satellite ever built. It is part of the European Space Agency (ESA) initiative to provide a new spacecraft platform (Alphabus) capable of carrying a large state-of-art communications payload. Developed by Astrium and Thales Alenia Space under a joint ESA and CNES contract, Alphabus allows the European space hardware manufacturing industry to address the top end of the telecom satellite market. It is also a showcase of Astrium's capability in the areas of satellite mobile payloads and on-board digital signal processing, particularly in the UK.

Alphasat is an example of partnership with industry (Public-Private-Partnership) with the European Space Agency teaming up with Inmarsat to create new services and jobs. It is the largest Public-Private-Partnership space project in Europe.

## SSL + Eutelsat–Bringing The 1300 Platform Into Play




**Space Systems/Loral (SSL) has been selected to provide a multimission satellite to Eutelsat, one of the world's leading satellite operators.**

Leveraging SSL's long-term experience with high throughput payloads and satellites that serve multiple missions, the satellite will open new markets for Eutelsat for broadcast and broadband services in Brazil and across Latin America.

"Both Eutelsat and SSL have a mission to broaden the world's ability to communicate through satellite," said John Celli, president of SSL. "This is a complex, flexible and powerful satellite that we are providing to Eutelsat, and we are very glad to have the opportunity to work together."

The satellite, to be known as EUTELSAT 65 West A, will provide approximately 16kW of power at end of life. It will be equipped with 10 C- and 24 Ku-band transponders for video services in addition to 24 Ka-band spot beams for broadband connectivity in key regions. It will be located at 65 degrees West. EUTELSAT 65 West A is based on the highly reliable SSL 1300 satellite platform that provides the flexibility for a broad range of applications and technology advances.

Scheduled for launch in early 2016, the satellite is designed to deliver service for 15 years or more.

## e2v + Astrium–A Spatial Sentinel

**e2v has signed a contract worth 2.8 million euros with Astrium to supply imaging sensors to equip the European Space Agency's (ESA) Sentinel 4 Ultraviolet Visible Near-infrared (UVN) instrument, which will gather data on the quality of the Earth's atmosphere and its chemical composition from geostationary orbit.**

Sentinel 4 is part of the Global Monitoring for Environment and Security (GMES) initiative, which is a joint undertaking of the European Commission and the European Space Agency. It will deliver environmental and security services in Europe, in response to the ever-increasing demands for effective environmental policies. ESA is responsible for the Space component of GMES, of which the five families of Sentinel missions are key components. Within this program, Sentinel 4 will be carried into orbit onboard the Meteosat Third Generation (MTG) geostationary satellite and enable seamless observations of Europe and North Africa to be taken hourly.

e2v's space qualified, custom Charge Coupled Device (CCDs) image sensors will be produced using cutting edge technologies, including back illumination, which delivers the best Quantum Efficiency (QE) and Modulation Transfer Function (MTF) over the wavelength range of interest for this hyperspectral imaging system. The sensors are mounted in an e2v designed package assembly which manages the electrical, thermal, mechanical and optical interfaces to the instrument. The contract is carried out with funding from the European Union.

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## SES–SES-6 Satellite Is On Track + On Task

**SES S.A. has announced that the SE6 satellite has successfully completed its extensive in-orbit testing and is fully operational and in commercial service at the orbital position of 40.5 degrees West**

The 53rd SES satellite was successfully launched on board an ILS Proton booster from Baikonur, Kazakhstan, on June 4, 2013. SES-6 was built by EADS Astrium in Toulouse, France, and is based on the highly reliable Eurostar E3000 platform.

The satellite is equipped with 43 C-band and 48 Ku-band transponders. SES-6 had a launch mass of 6,100kg., features a wingspan of 40m with its solar arrays deployed, and is designed for 13kW of spacecraft power at the end of its 15 year design lifetime. The satellite offers comprehensive coverage of North America, Latin America, Europe and the Atlantic Ocean.

SES-6 replaces SES' NSS-806 satellite at the prime orbital position of 40.5 degrees West, providing continuity of service and expansion capacity in the C-band for video neighborhoods in Latin America and the Caribbean

The largest Ku-band customer on SES-6 is the Brazilian telecommunication group, Oi. As a new anchor customer, Oi signed a significant long-term capacity agreement to provide Direct-to-Home (DTH) services within Brazil.

## NASA–The Magnificent Magnetometer

*Artistic rendition of the GOES-R satellite. Courtesy of NASA.*

**The GOES-R Magnetometer Engineering Development Unit has recently completed an important development in the construction of the spacecraft, after a successful boom deployment test at an ATK facility in Goleta, California.**

The Geostationary Operational Environmental Satellite-R Series advanced spacecraft and instrument technology will result in more timely and accurate weather forecasts. The satellite will improve support for the detection and observations of meteorological phenomena and directly affect public safety, protection of property, and ultimately, economic health and development.

The magnetometer boom will deploy after the GOES-R spacecraft launches, separates from its launch vehicle and undergoes a series of orbit-raising maneuvers. The magnetometer will provide measurements of the space environment magnetic field, which controls charged particle dynamics in the outer region of the magnetosphere. These particles pose a threat to spacecraft and human spaceflight.

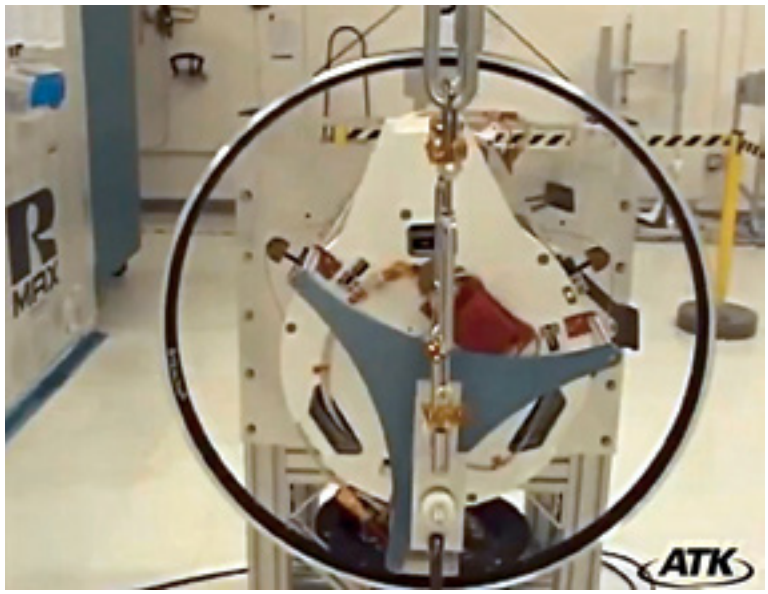



*Photo of the GOES-R magnetometer in development. Courtesy of ATK.*

GOES-R will be more advanced than NOAA's current GOES fleet. The satellites are expected to more than double the clarity of today's GOES imagery and provide more atmospheric observations than current capabilities with more frequent images.

## Investigate IBC2013

RAI Amsterdam
Conference 12-17 September 2013
Exhibition 13-17 September 2013

**With most of the world's leading media technology brands—executives from Amazon to ZDF—an attendee's appointments at IBC should be highly productive as well as lots of fun. If you're going to attend this important event, take note of the hardcore technology debates, influential speakers and surprising exclusives.**

Whether your interest is in content distribution, second screen monetization, or next generation audio, the IBC Exhibition and Conference (IBC) contains just about everyone and everything you need to know that will impact the electronic media industry. With only a few days remaining until the doors open, here are a few of the activities that will be taking place at IBC2013.

### Tomorrow's World Displayed In The Future Zone

Witness augmented reality broadcasting; test drive the next generation surround sound home audio; see pictures you have never seen before in advanced, high dynamic range; explore targeted advertising made possible via facial recognition. All of this and more ground breaking R+D that may well drive the industry is available to experience in the Future Zone: *http://www.ibc.org/page.cfm/link=628*

### Sixes and Sevens Over Ones + Zeros

Juggling recording formats? Consider data management a risk? Confused about archive needs? Visit IBC Workflow Solutions: *http://www.ibc.org/page.cfm/link=504* in Hall 9 to explore how IT conundrums can be solved with no-nonsense advice and information about file-based planning and implementation from the experts, including case study sessions from Cinergy, Sony Media Cloud Services and Quantel.

### The Competition Is Getting Hot

A 100 m.p.h. view of a cricket ball bowled at you; the live 70-day Olympic Torch Relay delivered over IP and cellular networks; a scripting and scheduling tool for soaps; and the high frame rate action of The Hobbit all compete for a coveted IBC Innovation Award: *http://www.ibc.org/page.cfm/link=722* in the Content Creation category. All of the winners for the IBC Awards will be announced on Sunday, September 15th, starting at 6:30 p.m.

### Where's The Money?

The second screen promises to change the way content is delivered on the main TV screen. However, arguably, there has been no breakthrough application to date. Zeebox, CEO, Anthony Rose, promises to show delegates the money in "Where is the Value in Second Screen Content?" on Friday September 13th, at 3:30 p.m. This is one of the thought,= provoking sessions related to the IBC2013 Conference theme—"Create a More Engaging Entertainment Experience." Download the conference program and start planning for action: *http://www.ibc.org/files/ibc1219_conference_brochure_v5.pdf*.

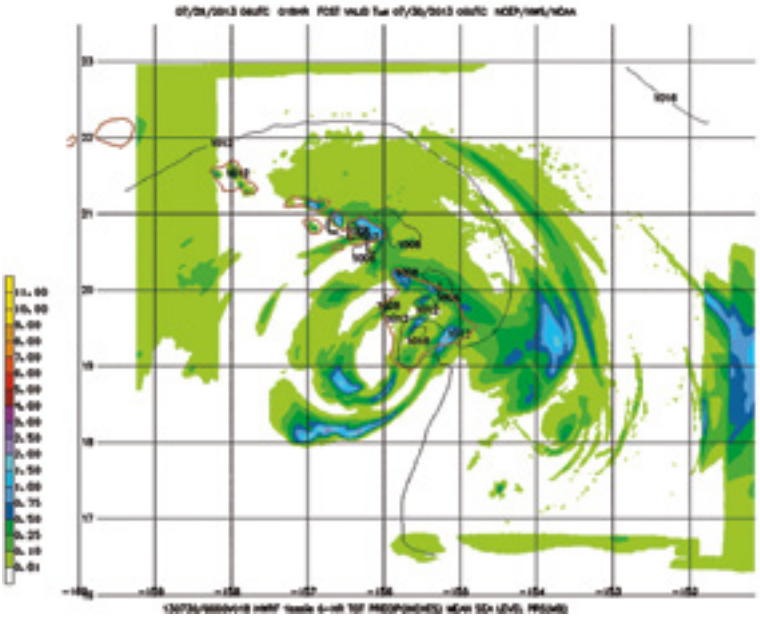
### Inspirational Conference Headliners

Exchange candid opinion, obtain key advice and build knowledge with more than 300 inspirational speakers at the IBC Conference that include Bob Harris, CTO, Channel 4; Andy Brown, Chairman, Kantar Media; and Rajesh Kamat, CEO, CA Media. Access any five sessions of your choice, including the IBC Keynotes, when you purchase a Bronze Pass: *http://www.ibc.org/page.cfm/link=478* on all conference passes.

### Meet Friends, Network + Influence Making

In addition to presentations, demonstrations and seminars, IBC will host a plethora of places to meet with those engaging in business meetings. Networking is at its most social at the Beach, or, the IBC Pub, or more focused at the IBC Feature Areas throughout the 14 halls of the exhibition. Or, attend dedicated events within the conference. There's free registration for the IBC Exhibition at: *http://www.ibc.org/page.cfm/link=478*.

## NOAA–Pushing The Teraflops



*This is the Hurricane Weather Research and Forecasting (HWRF) model showing the Tropical Storm Flossie precipitation forecast for the Hawaiian Islands on July 29, 2013. HWRF is one of the sophisticated numerical computer models now being run on NOAA's new supercomputers. Image credit: NOAA.*

**Whizzing through 213 trillion calculations per second, newly upgraded supercomputers of NOAA's National Weather Service are now more than twice as fast in processing sophisticated computer models to provide more accurate forecasts further out in time.**

As the hurricane season ramps up, forecasters will be armed with an enhanced hurricane model that will improve track and intensity forecasts. The scientific data and insights that these newly upgraded supercomputers will provide are essential to help government officials, communities, and businesses better understand and manage the risks associated with extreme weather and water events.

In support of the nation's Climate Action Plan, steps by the government will be taken such as this to analyze and predict climate variability amid an increasing number of extreme natural events affecting the nation.

"These improvements are just the beginning and build on our previous success. They lay the foundation for further computing enhancements and more accurate forecast models that are within reach," said Louis W. Uccellini, Ph.D., director of NOAA's National Weather Service. "These upgrades are a game-changer for the entire public and private weather industry. In addition to the benefits to our own forecasters and products, we will provide our private sector partners with better information to empower them to enhance their services."

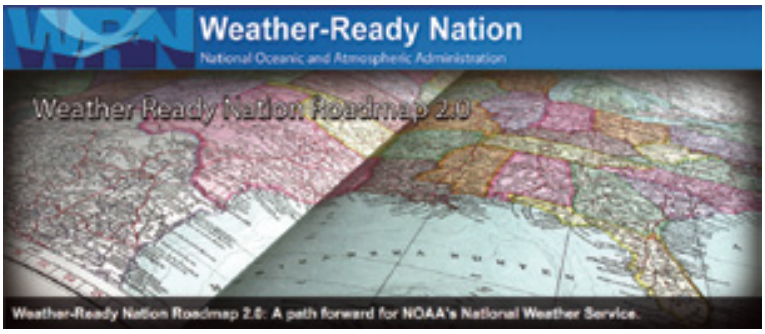
Nicknamed "Tide," the supercomputer in Reston, Virginia, and its Orlando-based backup named "Gyre," are operating with 213 teraflops (TF)—up from the 90 TF with the computers that preceded them. This higher processing power allows the National Weather Service to implement an enhanced Hurricane Weather Research and Forecasting (HWRF) model.

"These forecasting advances can save lives," said U.S. Sen. Bill Nelson, who helped get funding to add even more capacity to the supercomputer. "It's going to allow for better tracking of life-threatening storms and more accurately predict when and where they'll hit, and with what intensity."

With improved physics and a storm-tracking algorithm, the model has displayed up to a 15 percent improvement in both track and intensity forecasts, compared to last year's version of the model.

The upgraded HWRF is also capable of processing real-time data collected from the inner core of a tropical system by the tail Doppler radar attached to NOAA's P3 hurricane hunter aircraft, data which are expected to produce even greater forecast improvements.

"Next comes the quantum leap," added Uccellini. Following this round of long-planned upgrades, funding requested in the FY 2014 President's Budget, in addition to funding provided to NOAA by Congress in the spring of 2013 as part of the Hurricane Sandy emergency supplemental appropriations bill, would increase computing power even further to 1,950 TF by summer 2015.




"That gives us the necessary computer power to run an enhanced version of our primary forecast model, the Global Forecast System," said Uccellini.

"Given recent events like the tornado in Moore, Oklahoma or Superstorm Sandy, federal weather resources and personnel should be considered vital national assets. These upgrades assure world-class capabilities and a continued pathway to keep American lives and property safer," said J. Marshall Shepherd Ph.D., president of the American Meteorological Society and Professor at the University of Georgia. "As a father of two children and a scientist that understands looming weather threats, I take comfort in these developments."

Investments in supercomputing power for weather prediction are another step in NOAA's efforts to build a Weather-Ready Nation. NOAA's Weather-Ready Nation initiative, launched nearly two-years ago, has resulted in improvements in products, services and the way information is communicated to the public and partners. These improvements increase resilience to severe weather and reduce the potential of significant societal and economic impacts from severe weather. A Weather-Ready Nation is a society that is prepared for, and responds effectively to, weather-related events.

## HITS®–A Quantum Move

**HITS®, a division of Comcast Wholesale, has announced plans to further expand the new HITS Q2™ MPEG-2 satellite-based content distribution platform.**

The advanced encoding technology available on the newly upgraded platform delivers more channels using the same bandwidth.

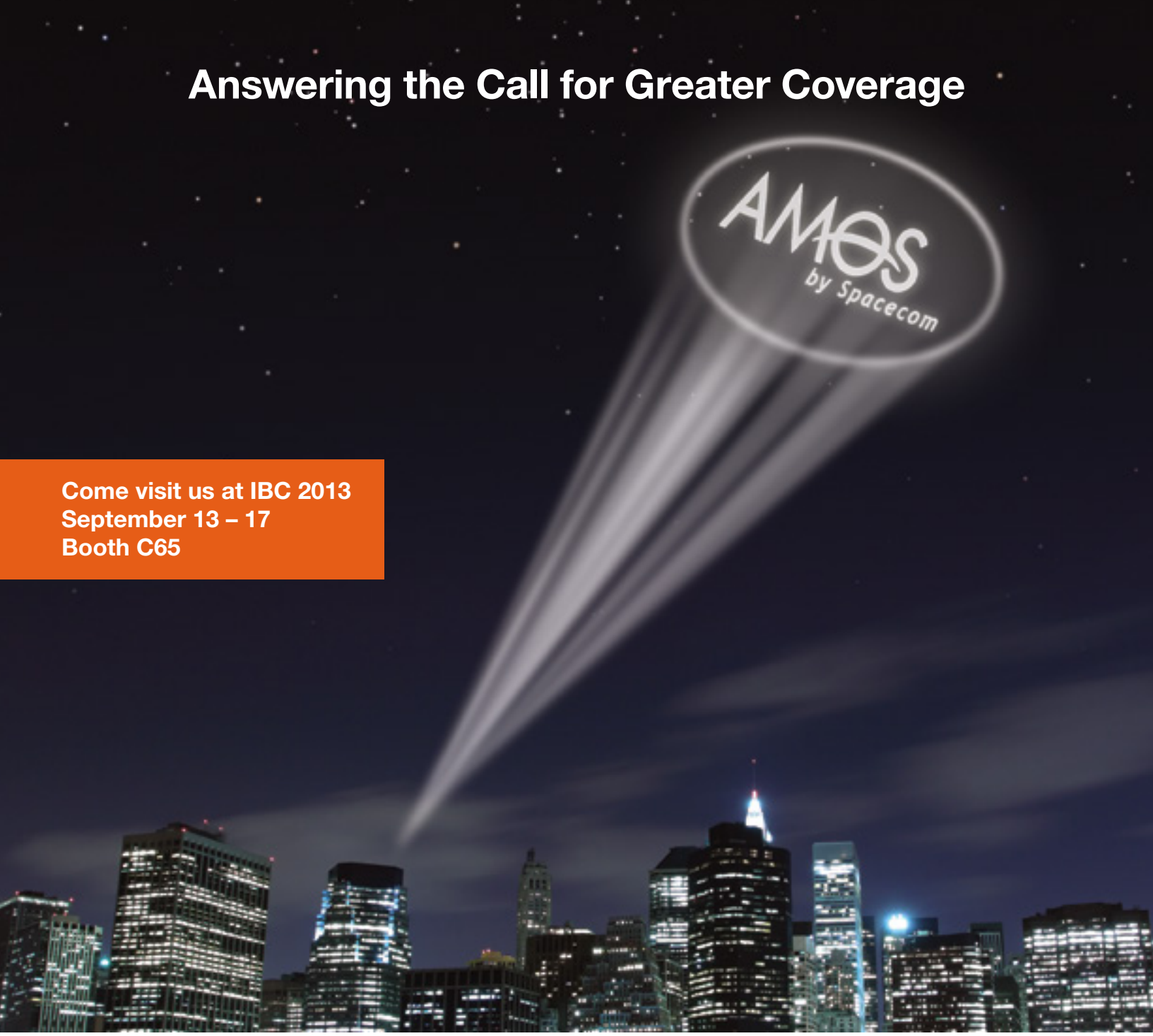
The upgraded technology allows HITS to add 10 new HD channels and three new SD channels to its HITS Quantum SD/HD lineup. This brings the total number of HD channels on HITS Quantum to 34, a 42 percent increase in the number of HD networks available to cable operators.

Ten new HD channels will be added to the expanded HITS Quantum HD lineup in the third quarter of 2013, including Bio HD, Bravo HD, CNBC HD+, DIY Network HD, E! HD, Hub HD, Investigation Discovery HD, MSNBC HD, Nat Geo Wild HD and OWN HD.

"The advanced video compression technology used on the upgraded HITS Quantum platform allows cable operators to offer more HD channels using significantly less bandwidth, without compromising the viewing experience," said Leslie Russell, Vice President and General Manager for HITS.

In addition to the new HD services, HITS announced the launch of three new SD services including Fuel TV, Nick2 and MSG National as part of the recent "Q2" upgrade. Launched in April, the upgrade uses 256 QAM DVB-S2 technology on 75 percent of the HITS multiplexes. By freeing up as much as 25 percent of local bandwidth using existing MPEG-2 architecture, the upgrade enables cable operators to add more SD and HD signals using fewer satellite receivers and their existing customer premise equipment (CPE).

# Answering the Call for Greater Coverage

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## AMOS by Spacecom Stands Ready To Provide North America With Expanded Satellite Services in Europe, the Middle East, Africa and More.

Since 1996, Spacecom's satellite constellation has grown to span multiple orbital locations, and now reaches more countries and continents than ever before.

Today, Spacecom's high-quality satellite services cover Europe, the Middle East, and Africa through its AMOS-2, AMOS-3 and AMOS-5 satellites. When AMOS-4 reaches orbit in 2013, Spacecom's coverage will include Russia and South Asia. And when AMOS-6 launches in 2015, it will add to existing coverage over Europe and the Middle East, and strengthen Spacecom's position as a multi-regional provider.

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## Rockwell Collins + ARINC–Acquisition In The Works

**ARINC Incorporated has entered into a definitive agreement to be purchased by Cedar Rapids, Iowa-based Rockwell Collins, Inc. (NYSE: COL) for $1.39 billion.**

The sale is expected to close later this year, subject to customary regulatory closing conditions. Founded in 1929 as a communications provider for airlines during the emergence of commercial air travel in the United States, ARINC has evolved into a leading provider of engineering solutions in the aerospace, aviation, airports, government, networks, security, transportation industries and public safety with products and services in over 150 countries worldwide. The company is headquartered in Annapolis, Maryland with regional headquarters in London and Singapore.

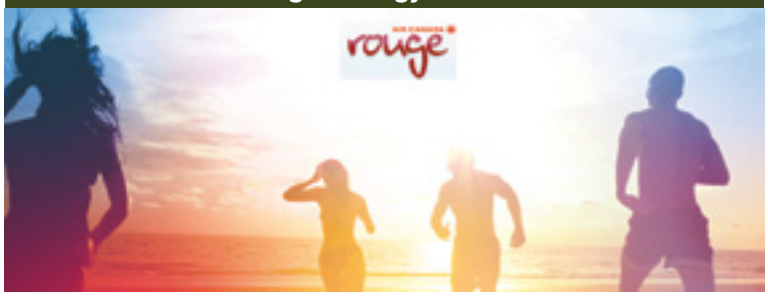
"Rockwell Collins shares a culture of engineering excellence, strong client relationships and a focus on customer service that mirrors ARINC's own." said John Belcher, ARINC Chairman and Chief Executive Officer. "We believe this transaction will benefit both company's customer bases by bringing new and innovative solutions to the market."

"ARINC is an excellent strategic fit that builds on Rockwell Collins industry leading avionics and cabin technologies," said Kelly Ortberg, Rockwell Collins Chief Executive Officer and President. "The acquisition will allow the company to combine our in-flight systems with ARINC's extensive air-to-ground communications services to take advantage of the growing demand for aviation information management solutions. ARINC also provides communication and information processing for the rail, industrial security and public safety industries, enabling us to diversify and complement our aviation technology business."

ARINC Incorporated, a portfolio company of The Carlyle Group, provides communications, engineering and integration solutions for commercial and government customers worldwide. Headquartered in Annapolis, Maryland with regional headquarters in London and Singapore, ARINC is ISO 9001:2008 and AS9100:2009 Rev C certified.

Rockwell Collins is a pioneer in the development and deployment of innovative communication and aviation electronic solutions for both commercial and government applications. Their expertise in flight deck avionics, cabin electronics, mission communications, information management, and simulation and training is delivered by 19,000 employees, and a global service and support network that crosses 27 countries.

## ARINC + Air Canda–rouge Strategy Inclusion




**ARINC, with recent news of their acquisition by Rockwell Collins** *(see above)***, has also announced that Air Canada rouge has selected them to provide it the full suite of GLOBALink(sm) Services to meet its air/ground communications needs worldwide.**

Launched July 1, 2013, Air Canada rouge is North America's newest leisure group airline and a key part of Air Canada's growth strategy. While adapting several new business practices, Air Canada rouge is also relying on use of proven services and systems that have been successfully implemented by Air Canada, such as ARINC's GLOBALink air/ground voice and data services. Air Canada rouge will be using ARINC's GLOBALink/VHF, HF and Iridium data link services to provide continuous data communications between the flight crew and the various on-ground support organizations such as dispatch and maintenance. While ARINC's data link services will be Air Canada rouge's primary communications option, ARINC's GLOBALink voice services will provide continuous enroute voice operational control capability throughout the route structure.

"Air Canada rouge's success depends upon the team work of our employees and the support of trusted partners like ARINC," said Al Read, Vice President Operations for Air Canada rouge. "Our implementation with ARINC was very smooth and well executed, contributing to a highly successful launch of operations. ARINC's GLOBALink voice and data services provide us with fast, comprehensive and reliable operational command and control capability which translates into enhanced service and operational efficiency for us and our customers. We are pleased to be using ARINC as our communication platform of choice."

## ARINC + South African Airways–Five Years' Flying Partnership

**Just prior to the acquisition notice from ARINC regarding the Rockwell Collins purchase, the company announced that its long-term customer, South African Airways, had signed a five year exclusive data link contract for ARINC's GLOBALink ACARS Services.**

This new agreement configures ARINC for all VHF, HF and Satellite ACARS traffic. ARINC also provides cabin connectivity on South African Airways long haul flights. South African Airways cited ARINC's superior service and technical support coupled with good commercials for the renewal.

ARINC's exclusive ACARS data link services provide airlines with faster, comprehensive and more reliable operational messaging. Carriers using ARINC ACARS data link benefit from greater efficiency and on-time performance by eliminating the errors associated with voice communications. ARINC's ACARS data link services are built on an integrated worldwide network of VHF and HF ground stations, along with Inmarsat and Iridium satellite networks, to provide seamless data communications to aircraft anywhere in the world.

South African Airways will use ARINC's HFDL (High Frequency Data Link) service for cost-effective global coverage across oceans, continents and Polar Regions while seamlessly interfacing with VHF and SATCOM communications.

"We are very excited to continue working with South African Airways," said Alexis i, Senior Director, Aviation Solutions, at ARINC EMEA. "We believe this renewal demonstrates the value ARINC provides our customers and positions us well for future growth in Africa."

## International Launch Services–Pysher To V.P.

**International Launch Services (ILS) has appointed Kirk Pysher as vice president of mission assurance and product development.**

Pysher will bolster ILS' focus on performance with responsibility for the overall quality review and monitoring of the Proton Quality Management System (QMS), oversight of Proton production processes and procedures, and regular reporting to industry customers and insurers on quality improvements performed by Khrunichev State Research and Production Space Center (Khrunichev). Pysher will report directly to the ILS President, Phil Slack. Pysher will also be responsible for overseeing ILS product development activities at Khrunichev, ILS' majority owner and manufacturer of the Proton launch vehicle, to include performance upgrades and new capabilities that align with customers' future requirements.

Pysher brings to ILS more than 20 years of experience serving the commercial launch industry, most recently as chief operating officer at Energia Logistics US, where he was responsible for all aspects of engineering and operations for the Sea Launch program. Prior to that post, he was the vice president and chief systems engineer for Boeing-Sea Launch. Pysher received a Masters and Bachelor of Science Degree in Civil Engineering from Penn State University and obtained a Lean Six Sigma Green Belt Certificate from Purdue University.

"Kirk is an excellent addition to our team and is a well-respected leader in the commercial launch services market. His extensive experience in launch services and international partnerships will serve our customers and the insurance community very well," said ILS President, Phil Slack.

## DISH Puerto Rico + Claro–Hopper'ing To It

**DISH Puerto Rico and Claro have introduced a bundled offer to consumers, delivering Puerto Ricans the best payTV, broadband and voice experience at the best value.**

Bundled offers are now on sale in all Claro stores, Customer Service Centers and participating DISH retailers, supported by a multi-faceted marketing campaign that delivers on the alliance the powerhouses announced earlier this month.

"DISH continues to grow in Puerto Rico and it was natural to partner with the market leader to offer bundled services. This will enhance our expansion plan in the Island giving us a broader presence in more than 150 retail locations," said Joseph P. Clayton, DISH president and CEO. "We have an advantage over our competitors; DISH is the only provider to offer more than 100 channels in High Definition (HD), and the only one with the Hopper technology. With Claro, we have a superior offer over cable, which we are confident, will be appreciated by consumers."

"This alliance allows us to continue bringing Internet to more homes in Puerto Rico, together with DISH, the leader in payTV. It is an alliance between leaders that bring to market the most robust service offerings all on the same bill. With this, Claro is reaffirmed as the largest telecommunications and entertainment company, with the most coverage in all Puerto Rico," said Enrique Ortiz de Montellano, Claro president and CEO.

All bundle packages include a dedicated Internet with speed up to 50 mega, free modem Wi-Fi, access to hundreds Claro Wi-Fi hotspots on the Island and limitless telephony in all of Puerto Rico.

Bundle customers will have the choice to receive DISH's award-winning Hopper Whole-Home HD DVR with qualified packages. Introduced in Puerto Rico last October, Hopper allows DISH customers to record, pause and playback live programming and to continue watching the program paused from any TV in the home.

Customers will be able to access their live TV and DVR television recordings over the Internet on mobile devices like their laptop, tablet or smartphone. It includes features like AutoHop™, PrimeTime Anytime™ and a recording capability of up to 500 hours of high-definition or 2,000 hours of standard definition television.

All packages also include HD free for life, Blockbuster@Home free for 3 months and four free premium movie channels—HBO, Cinemax, Showtime and Starz—for three months.

These DISH bundle services will be available at more than 150 locations in Puerto Rico including all Claro stores, Customer Service Centers and participating DISH retail locations, and soon through authorized Claro retailers.

Through the partnership, customers will be able to add their DISH service to their Claro invoice and take advantage of Claro's convenient methods of payments for their TV and telecommunications needs. These include payment in stores and in Claro's Customer Service Centers, over the Internet, eBill, by phone and through ATM machines.

## Es'hailSat + Arabsat–The Tie That SatBroadcasts

**Es'hailSat, the Qatar Satellite Company, and Arabsat have signed a strategic partnership agreement to promote closer co-operation between the two companies and strengthen the reach and penetration of the 26 degrees East hot spot neighborhood for TV broadcasting.**

Under the terms of the agreement, Es'hailSat will acquire the rights to 500MHz of premium Ku-band bandwidth at the 26.0 East TV broadcasting hot-spot. Es'hailSat's second satellite, Es'hail 2, will use these frequencies and will be designed to provide DTH and other telecommunications services from the 26 degrees East hot spot.

This will significantly increase Es'hailSat's capacity at the 25.5 / 26.0 East TV broadcasting hot-spot, and will strengthen Es'hailSat's in-orbit back-up capability when both Es'hail 1 and Es'hail 2 are operational. Furthermore, the arrangement between Es'hailSat and ARABSAT will pave the way for enhanced operational flexibility and mutual in-orbit back-up between the two satellite fleets.

The agreement was signed in Doha by Mr. Ali Al Kuwari, Es'hailSat's CEO and Mr. Khalid Balkheyour, President + CEO of ARABSAT in the presence of HE Dr. Hessa Al Jaber, Minister of Information + Communication Technology (Qatar) and Fareed Khashoggi Chairman of the Board of Directors of ARABSAT.

Commenting on the agreement, Es'hailSat CEO, Ali Ahmed Al Kuwari, said: "We are delighted to be able to work with ARABSAT on the development of the 26 degrees East prime TV broadcasting hot-spot. With our first satellite – Es'hail 1—scheduled for launch on August 29th, 2013, and our plans for Es'hail 2 now confirmed, we are moving closer to providing the necessary capacity to enable our customers to substantially increase their communications capability, particularly in broadcasting in HD and 3D".

Khalid Balkheyour , ARABSAT President + CEO Said " we are very pleased with this strategic long-term partnership with Es'hailSat which will strengthen ARABSAT hot spot 26 degrees east and will provide a strong boost for Es'hailSat. This partnership will provide our customers and viewers with more alternatives and variety of contents that will be beneficial for both operators and will make 26 degrees East the premium hot spot of the region. We wish Es'hailSat success in launching Es'hail 1 at the end of this month, and all the success and prosperity in launching and operating more satellites."

Es'hailSat, the Qatar Satellite Company, was established in 2010. Based in Doha, Qatar, the company will own and operate satellites to serve broadcasters, businesses and governments.

Es'hailSat contracted with Space Systems/Loral to build its first satellite called Es'hail 1 which will provide television, voice, Internet, corporate and government services across the Middle East and North Africa region and beyond.

Founded in 1976, ARABSAT has been serving the growing needs of the Arab world for over 30 years. Now one of the world's top satellite operators and by far, the leading satellite services provider in the Arab world, it carries more than 4,50 TV channels, 160 radio stations, three payTV networks and wide variety of HD channels reaching tens of millions of homes in more than 80 countries across the Middle East, Africa, Europe—and around the world—including an audience of more than 170 million viewers in the Middle East and North Africa (MENA) region alone tuned into Arabsat's video "hotspot" at 26 degrees East.

## PCI Geomatics–SAR Learning Path

**The company has now made available its Synthetic Aperture Radar (SAR) image analysis in Geomatica online training sessions.**

Participants in the course will explore data-processing techniques in Focus, a module of Geomatica. The course will take participants through basic techniques in ingesting, calibrating, and displaying SAR data. The course will also cover more advanced techniques, such as applying radiometric enhancements, processing detected data (single or dual polarization), performing unsupervised coherent and incoherent polarimetric decomposition, analyzing polarimetric discriminators, and performing coherent change detection with polarimetric data.

The first session of this online course is being delivered in support of The Esri and PCI Natural Resources Imagery Grant Program. Program participants will be developing projects that increase efficiency, productivity, and accuracy in the use of SAR and optical imagery for detecting and analyzing land-cover change.

"There is strong interest in using SAR data in GIS workflows," said Punarvasu Pillalamarri, Product Manager at PCI Geomatics. "This advanced course exploring data preparation, processing, and analysis techniques for working with SAR data is an excellent opportunity for GIS professionals to use SAR imagery in new ways.

"SAR imagery provides a unique layer of information that is captured from active sensors, such as RADARSAT-2, TerraSAR-X, and other commercial space-borne SAR sensors," said John Wessels, Senior SAR Scientist at PCI Geomatics. "New sources of SAR imagery are becoming available over the coming years, and PCI continues to lead the way in developing sensor-agnostic, powerful tools to extract information from SAR imagery," he added.

This course also covers the SAR Polarimetry Target Analysis (SPTA) tool. Participants will use the tool to define a series of targets and perform an in-depth analysis of their polarimetric properties. They will learn how to generate and analyze numerical and graphical outputs, including customized histogram and polarimetric response plots.

The SAR Image Analysis in Geomatica training program is the latest in a series of instructor-led online training programs delivered by PCI Geomatics throughout the year. For a complete listing of course descriptions, dates, and times, visit http://www.pcigeomatics.com/training.

## MEASAT Satellite Systems–Mathur To Senior Director

**MEASAT Satellite Systems Sdn. Bhd. ("MEASAT") has promoted Vishal Mathur from Director (South Asia) to Senior Director, Sales and Marketing.**

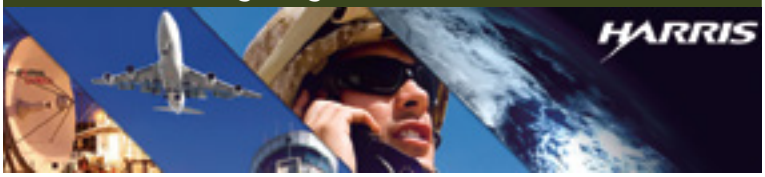
In his new role, Vishal will be responsible to build the MEASAT's customer base with a focus in the broadcasting and DTH customer segments.

Vishal joined MEASAT in 2006. During his seven (7) years with MEASAT, Vishal has been instrumental in expanding the company's position across South Asia.

Prior to joining MEASAT, Vishal has also served as Assistant Vice-President at Zee Telefilms, International division, ESPN Star Sports and Ten Sports channels handling the Affiliate sales business in India.

Vishal holds a Bachelor of Commerce and a post graduate diploma in Business Management from the University of Rajasthan, Jaipur.

## Harris + FAA–Taking It Digital

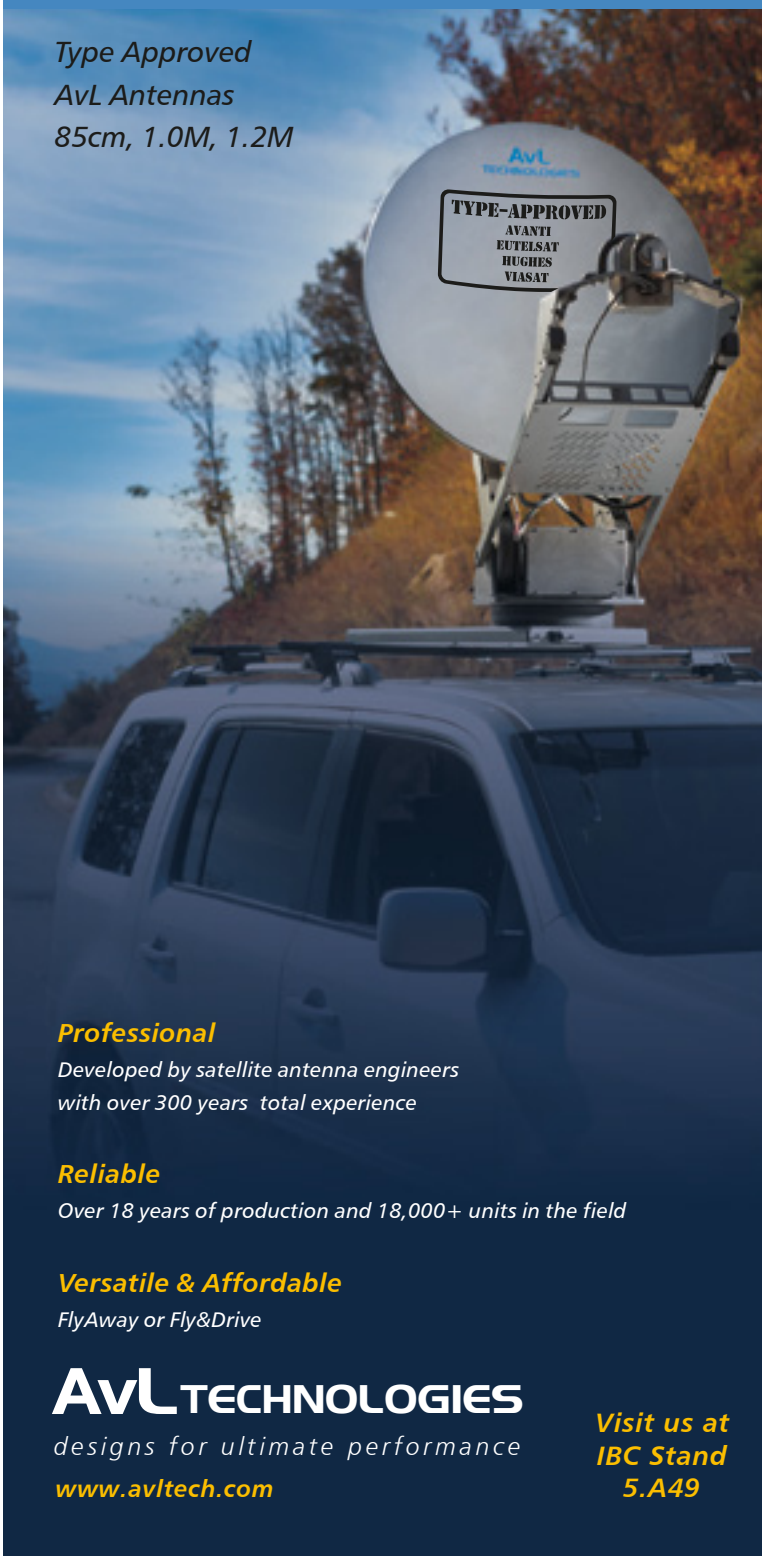



**Harris Corporation (NYSE:HRS) has received authorization from the Federal Aviation Administration to begin work on the seven-year, $150 million Data Communications Network Services (DCNS) element of its Data Communications Integrated Services (DCIS) program.**

DCNS will help to transition U.S. air traffic control from primarily analog voice communications to digital data connectivity—significantly increasing the efficiency and safety of the nation's air traffic control system. Under DCNS, Harris will provide the terrestrial circuits and very high frequency data links that connect ground-based air traffic controllers and airborne flight crews. This will enable air traffic controllers and pilots to communicate more effectively by supplementing traditional voice communications with data to enhance departure clearances, weather route, and other air traffic procedures. These enhanced procedures will save fuel, reduce flight times, and increase air traffic capacity.

Harris DCNS partners include ARINC, SITA, and Thales. The DCNS tasks will be performed under the $331 million Data Communications Integrated Services contract, which was awarded to Harris in September 2012. Under that contract, the company is helping the FAA to integrate its end-to-end data communications system.


When You Really Need It To Work... When You Really Need It To Be There...

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## Blue Sky Network–A Heli Of A Good Job

**This Company has the capability to provide lifesaving coverage.**

Blue Sky Network, a leading supplier of satellite tracking and communication solutions for aviation, land and marine use, today announced that its New SkyRouter cloud-based web portal and its D1000 Series has been selected by Erickson Air-Crane Incorporated (NASDAQ: EAC).

New SkyRouter provides comprehensive satellite tracking, and when used in combination with Blue Sky Network's leading D1000 Automated Flight Following (AFF) compliant tracking hardware, it provides Erickson assets with near real-time data while on location, and enhanced situational awareness and fire retardant usage. With Blue Sky Network, Erickson is benefiting from increased efficiency, safety, and two-way communication around the world.

"Blue Sky Network's satellite tracking solution enables crucial communication with our pilots and aircraft in remote areas. Communication is constant and uninterrupted, an essential feature during firefighting operations," said Erickson Marketing Communications Manager Brian Carlson. "We selected Blue Sky Network because they provide superior reliability and coverage for our fleets, and enable us to differentiate our operations during critical missions such as aerial firefighting."

Erickson has become a leading, and rapidly growing, global provider of aviation services to a diverse mix of end markets, including firefighting. The company acquired Evergreen Helicopters, Inc., a diversified global provider of cargo and personnel air transport services to government and commercial customers. By leveraging tools like Blue Sky Network's New Sky Router and D1000 Series tracking hardware, the company benefits from features like satellite tracking and M2M communication to help ensure fires are extinguished efficiently. Erickson has deployed aerial firefighting resources worldwide in areas like Australia, Italy, Greece, and the southwestern United States.

*Blue Sky's D1000 Automated Flight Following (AFF) tracking hardware.*

To support Erickson, Blue Sky Network's D1000 Series contains a RS232 port that enables the collection of intelligent asset data, such as the amount of fire retardant being dropped on fires, from external sensors. When paired with the ACH1000, the D1000 Series provides the ability to make voice calls and the benefit of two-way messaging between aircraft and command centers. With New Sky Router, the D1000 Series allows fleet managers to maintain, view and communicate with multiple assets simultaneously on a single map from a centralized command center.

"We maintain a strong commit to the aviation industry and continue to enhance our offerings in cockpit with M2M asset intelligence," said Jon Gilbert, CEO and founder of Blue Sky Network. "Our longstanding relationship with Erickson and the continued incorporation of our solutions into their fleets is a testament to industry adoption of compelling features that enhance fleet operations and our ability to support critical missions like aerial firefighting."

## India–A Leak Is A Game Changer

**India's efforts to power Geosynchronous Satellite Launch Vehicle using an indigenous cryogenic engine continue to be jinxed. The Indian Space Research Organisation (ISRO) called off the launch of GSLV-D5 recently after scientists detected a leak in the second stage liquid propellant tank of the Polar Satellite Launch Vehicle (PSLV) launch vehicle.**

The mood at the Satish Dhawan Space Centre at Sriharikota changed from anticipation to disappointment within minutes. The mission was called off an hour and 14 minutes before the designated lift-off at 4:50 p.m. GSLV-D5, powered by an indigenous cryogenic engine, was to launch the Indian telecommunication satellite GSAT-14.

"...we detected a leak in the fuel system of the second stage of the vehicle. We are calling off the launch," Isro chairman K. Radhakrishnan said.

He told reporters that scientists were draining nitrogen tetroxide fuel from the second stage remotely as it was unsafe to go near the launch pad. Scientists will also drain out highly combustible liquid hydrogen and liquid oxygen from the cryogenic engine. "We need to look at what went wrong and what action needs to be taken before further preparations for the launch," Radhakrishnan said.

Asked if the leak posed a threat to the vehicle while it was at the launch pad, a scientist said it would be assessed only after studying the vehicle further. The rocket will be taken to the vehicle assembly building where a close inspection will be carried out to ascertain the damage.

The GSLV-D5 launch is crucial as it would demonstrate the country's ability to develop and use cryogenic engines that are inevitable for the launch of big telecommunication satellites and Isro's ambitious projects, including manned missions. PSLVs, which India has mastered, can only carry satellites weighing less than 1,500kg.

## Aerojet Rocketdyne–First Of Four Ship

**Aerojet Rocketdyne, a GenCorp company, announced that it has shipped the first set of four Solar Electric Propulsion (SEP) thrusters for the Geostationary Operational Environmental Satellite-R Series (GOES-R).**

Aerojet Rocketdyne shipped the first set of four solar electric propulsion thrusters to Lockheed Martin at NASA's Stennis Space Center. Lockheed Martin will integrate the Aerojet Rocketdyne SEP thrusters and associated power conditioning units and electrical cabling with the GOES-R spacecraft. It will then be shipped to Lockheed Martin's facility near Denver Colorado where it will undergo final integration and testing.

The completed satellite will ultimately be shipped to Cape Canaveral Air Force Station in Florida to support a planned late 2015 or early 2016 launch on an Atlas V 541 expendable launch vehicle.

"Aerojet Rocketdyne pioneered the use of SEP on commercial, NASA and DoD satellites, and we are excited to now extend these mission cost savings advantages to NASA, NOAA and the GOES series of weather satellites," said Warren M. Boley, Jr., Aerojet Rocketdyne president. "I'd like to congratulate our Redmond, Washington team for their dedication to mission success supplying high quality SEP flight hardware for another major government flight program."

Aerojet Rocketdyne's Redmond Space Systems Business Unit is the world's leading supplier of Solar Electric Propulsion systems, with more than 500 SEP thrusters and in excess of 100 SEP power processors flown with 100 percent mission success. Aerojet Rocketdyne has successfully flown four different types of SEP products.

The GOES-R SEP thrusters are commonly referred to as arcjet thrusters. Arcjet thrusters use the electric power generated by the spacecraft's solar arrays to generate and sustain an electric arc inside a hydrazine rocket engine, boosting the performance of the engine by a factor of 3.

The arcjet thrusters enable launch of the GOES-R satellite on an Atlas V 541, resulting in substantial launch cost savings over an all-chemical propulsion approach.

The GOES-R series is a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and NASA. The GOES-R satellite will provide continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring, resulting in more timely and accurate weather forecasts. It will improve support for the detection and observations of meteorological phenomena and directly affect public safety, protection of property, and ultimately, economic health and development. The first launch of the GOES-R series satellite is scheduled for a late 2015 or early 2016 launch.

Aerojet Rocketdyne is an aerospace and defense provider of propulsion and energetics to the space, missile defense, strategic, tactical missile and armaments areas in support of domestic and international markets. GenCorp is a diversified company that provides innovative solutions that create value for its customers in the aerospace and defense, energy and real estate markets.

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## Advantech Wireless–Extended Converters Debut

**Advantech Wireless Inc. has extended their line of S-Band Synthesized and Block Frequency Converters in order to include Single / Dual / Triple / Quad, Satellite Loop Translators, Redundant Indoor and Outdoor Units.**

Advantech Wireless' extended line of S-band frequency converters provide the maximum flexibility for the new generation of LEO satellites on critical applications such as Remote Sensing, Earth Observation, Topography, Telemetry and Control, Weather Services and Digital Imaging. Combined with Advantech Wireless' line of Solid State Power Amplifiers with up to 1.2kW in RF Power and S-band LNAs, the complete product line offers a full one stop shop solution for system integrators and operators.

"The remarkable increase in services and applications provided in S-band, combined with the constant cost reduction in launching and operating LEO Satellites, is being fully supported by our technology. We are pleased to provide the most innovative line of S-band Frequency Converters making this new extended line an ideal choice for all service providers and system integrators", said Cristi Damian, VP Business Development at Advantech Wireless.

The spectral purity, low phase noise and stability of Advantech Wireless' line of S-Band Frequency Converters exceed the requirements of all major international satellite network operators. In addition as main features for these units, they provide 1KHz step size, High Linearity and Low Group Delay.

## Indra–Terminals To The German Navy

**Indra has won a contract to install its satellite communication systems in the German Navy's T-404 support ships, of the Elbe class.**

The contract, which runs for three years, includes the manufacture, installation, testing and training of the ships' crews. These terminals will allow the ships to establish secure communication anywhere in the world and in the most difficult conditions.

T-404 ships normally work as support ships, transporting fuel, food and water to help with sea operations. They can also act as medical ships. This new contract strengthens the relationship between Indra and the German Navy, with which it has been working as a technology supplier for many years. The company has already installed its terminals for communicating via high transmission capacity satellite in four type F-122 frigates and U-212 submarines in that country.

## EURO World Network + World Media–To Kiwis + Kangaroos

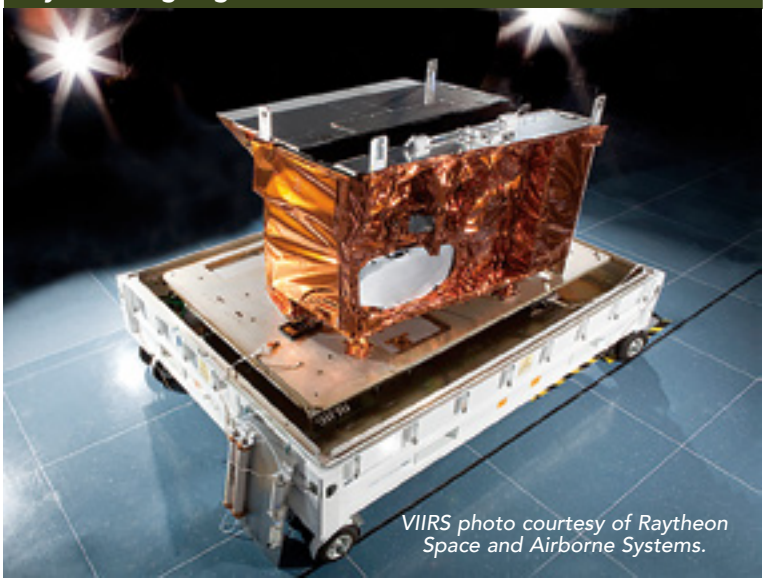
World Media International announced that it has commissioned EURO World Network to develop its 80 Plus IPTV channel solution for Australia and New Zealand satellite and cable subscribers. Viewers will now be able to access services through a proprietary STB or through mainstream streaming devices, such as NeoTV (Netgear).

WMI's task is to facilitate, distribute, customize and manage the Asia Pacific footprint by:

- Identify potential markets
- Establish and coordinate terms with operators
- Customize content
- Marketing, distribution and advertising
- Customer management and telemarketing
- Liaise with the government
- Localized television production
- Liaise with the channel providers

Mark Lobwein, Executive Chairman of EURO World Network added, "With our infrastructure, World Media is now capable of delivering hundreds of channels in real time, time delay mode or both. This enables us full flexibility for offering a total solution to any viewer no matter what their geographical location is in Australia or New Zealand.

## Raytheon–Signing On For Number Three



*VIIRS photo courtesy of Raytheon Space and Airborne Systems.*

**Raytheon Company (NYSE: RTN) has received a contract from NASA to develop a Visible Infrared Imager Radiometer Suite for the National Oceanic and Atmospheric Administration's Joint Polar Satellite System-2 spacecraft. This is the third VIIRS unit Raytheon has been contracted to build.**

JPSS is a joint program of NOAA and NASA that provides critical observations to improve the accuracy of weather forecasting. Raytheon built the first VIIRS instrument for the JPSS-precursor Suomi NPP spacecraft, which was successfully launched into orbit in October 2011, and is building a second unit for the first JPSS spacecraft.

"The meteorology community has expressed overwhelmingly positive feedback for the data VIIRS provides," said Bill Hart, vice president of Space Systems for Raytheon's Space and Airborne Systems business. "VIIRS has set new benchmarks in low light imagery and shown itself to be an indispensable tool in developing highly accurate, timely forecasts that are used to protect life and property during major weather events."

VIIRS collects imagery in 22 spectral bands, allowing scientists to understand global weather and climate patterns in greater detail than ever before. Flying on the JPSS family of satellites, VIIRS will maintain the continuity of critical data records established with predecessor instruments such as the Moderate Resolution Imaging Spectroradiometer (MODIS) and the Sea-viewing Wide Field-of-view Sensor (SeaWiFS), also developed by Raytheon.

Construction of the JPSS-1 VIIRS instrument continues on track for delivery in 2014.

## Kratos ISI + PT Telekomunikasi Indonesia–Backup Measures

**Kratos Defense + Security Solutions, Inc. (Nasdaq:KTOS) has announced that its Kratos Integral Systems International (Kratos ISI) business unit has been awarded a contract by PT Telekomunikasi Indonesia, Tbk. (Telkom) to deliver an integrated system for Telkom's Backup Satellite Control Station.**

The system will provide simultaneous telemetry, tracking and command for two of Telkom's satellites, along with the capability to expand to support future Telkom satellites.

Telkom selected Kratos ISI's industry-leading EPOCH™ Integrated Product Suite (IPS) Fleet Management System to support Telkom's satellite fleet. EPOCH IPS is a hardware-independent, database-driven, open architecture satellite fleet management system capable of controlling an array of satellites with a minimal number of personnel.

Because EPOCH can support multiple satellites simultaneously from a single ground system, it will help maximize Telkom's investment by providing an upgrade path to operate any combination of satellite platforms and ground assets in the future.

Kratos ISI will provide the backup satellite Command and Control system along with the antenna to support the two Telkom satellites, Telkom-1 and Telkom-2. Telkom-1 is a Lockheed Martin A2100 satellite and Telkom-2 is an Orbital STAR-2 satellite. The system will use two existing five meter C-band antennas, and Kratos ISI will add a new nine meter C-band antenna as part of this contract.

## Vislink–Adding On

VISLINK

**VISLINK has added to their professional staff a new business development manager and a new product line manager.**

These additions are part of the ongoing strategy to enhance customer relationships and provide the best possible solutions for the future of live video collection and distribution.

Richard Harvey was hired as the Product Line Manager for Satellite and Video Compression Solutions. These additions are part of VISLINK's ongoing strategy to enhance customer relationships and provide the best possible solutions for the future of live video collection and distribution.

Mr. Dulany brings to the VISLINK team 18 years of industry experience and expertise, including his most recent role as Vice President of Sales with Nucomm. John's primary focus will be to expand the reach of VISLINK solutions and continue to grow Vislink's leadership position within the broadcast market. With the addition of John, our six-man Broadcast sales team has 130 years of combined experience serving broadcasters.

Mr. Harvey, the business development manager, will focus on increasing the visibility and sales of VISLINK's satellite and video compression solutions in the Broadcast and Surveillance Satellite markets. In this role, Richard will work closely with the VISLINK sales and product development teams to create innovative solutions to meet the unique challenges of our industry. Richard joins VISLINK from Fujitsu Frontech North America, where he was Manager of Product Management.

"The depth of experience and track record of success that John and Rich bring will be a great asset to Vislink, helping us further our goals of developing strong relationships with customers and providing the broadest range of video solutions provided today," said Michael Payne, CEO of Vislink, Inc.

## NASA–Big Steps Start With Little Cubes

**By providing educational opportunities including CSLI for students, teachers, and faculty, this attracts and retains students in STEM disciplines.**

NASA's CubeSat Launch initiative (CSLI) provides opportunities for small satellite payloads to fly on rockets planned for upcoming launches. These CubeSats are flown as auxiliary payloads on previously planned missions.

CubeSats are a class of research spacecraft called nanosatellites. The cube-shaped satellites are approximately four inches long, have a volume of about one quart and weigh about 3 pounds. To participate in the CSLI program, CubeSat investigations should be consistent with NASA's Strategic Plan and the Education Strategic Coordination Framework. The research should address aspects of science, exploration, technology development, education or operations. Learn more here.

By providing a progression of educational opportunities including CSLI for students, teachers, and faculty, NASA assists the Nation in attracting and retaining students in STEM disciplines.

This strengthens NASA's and the Nation's future workforce. Further, the CSLI promotes and develops innovative technology partnerships among NASA, U.S. industry, and other sectors for the benefit of Agency programs and projects. NASA thus gains a mechanism to use CubeSats for low-cost technology development or pathfinders.

Satellites selected to date come from 25 states: Alabama, Alaska, California, Colorado, Florida, Hawaii, Illinois, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Montana, North Dakota, New Hampshire, New Mexico, New York, Ohio, Pennsylvania, Texas, Utah, Vermont and Virginia.

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## DigitalGlobe–4,000,000,000

**As our five satellites continue to orbit the globe capturing images of our ever-changing planet, we occasionally take pause to appreciate where we are and what we have accomplished. In June we achieved an important milestone at DigitalGlobe; our archive just surpassed 4 billion km$^2$ of imagery.**

When I think back on my early days at DigitalGlobe (then WorldView Imaging Corp.), when it was little more than a business plan, I am amazed to think how far we have come. To put 4,000,000,000 km$^2$ of coverage into perspective, our archive now contains enough imagery to cover the globe's landmass 27 times over!

In this imagery archive is practically every building, every car, every ship, every port, every house, every glacier, every mountain, hill and river on the Earth; it is as if we have a time machine with which to view our rapidly changing planet.

The progression of imaging of our Earth.

From left to right, top to bottom:

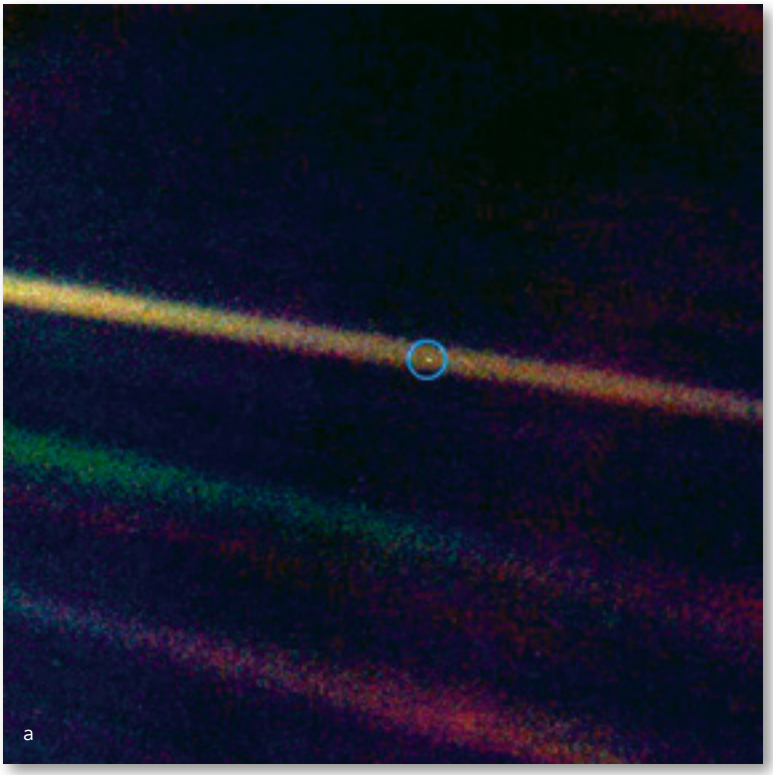
(a) Pale Blue Dot—taken from the edge of our solar system by the Voyager spacecraft

(b) The Blue Marble—taken by the Apollo 17 crew

(c) A DigitalGlobe WorldView-2 image of the Golden Gate Bridge.

With our current five satellite constellation, we are adding a billion km2 every year to our imagery archive, an area we expect to increase even further with the launch of WorldView-3 next year. I look forward to seeing what the next 4 billion will bring, though this time it will take a lot less than 21 years!

*Blog by Dr. Walter Scott, Founder and CTO, DigitalGlobe*



## GVF + PTC'14–More To Hawaii Than Just The Beaches

**The Global VSAT Forum (GVF) has officially announced its support of PTC'14, Asia-Pacific's annual Pacific Telecommunications Conference.**

Now in its 36th year, the annual conference is a strategic springboard for the global telecommunications industry. The Conference provides all attendees with a three-day platform to focus on planning, networking, and discovering what the new year will bring. PTC'14 will feature speakers such as:

- Jonathan Atkin, Managing Director, RBC Capital Markets
- Margaret Dawson, VP of Product Marketing + Cloud Evangelist, HP Cloud Services
- Kireeti Kompella, CTO, PSD, Juniper Networks
- Om Malik, Founder + Senior Write, GigaOM
- Robert Pepper, VP, Global Technology Policy, Cisco
- Jayshree Ullal, President + CEO, Arista Networks
- Jeffrey Voas, Computer Scientist, National Institute of Standards and Technology
- David Bernstein, Managing Directory, Cloud Strategy Partners
- Hossein Eslambolchi, Chairman + CEO, 202 Venture Partners
- Maribel Lopez, Principal + Founder, Lopez Research
- Surya Panditi, SVP + GM, Service Provider Networking Group, Cisco
- Lew Tucker, VP + CTO, Cloud Computing, Cisco
- Jason Verlen, Director, Product Strategy + Management, Predictive Analytics + Big Data, IBM Software Group
- Christopher Yoo, John H. Chestnut Professor of Law, Communication, and Computer + Information Sciences, University of Pennsylvania Law School

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## NASA–Suomi NPP's Plume Pounce

*The Suomi NPP satellite during the manufacturing process. Photo courtesy of Ball Aerospace.*

**Shortly after dawn on February 15, 2013, an 18-meter-wide (59 foot) meteor screamed into Earth's atmosphere at 18.6 kilometers per second (41,600 miles per hour). Burning from friction with the air, the 11,000-metric-ton space rock exploded 23.3 kilometers (14.5 miles) above Chelyabinsk, Russia. The explosion released 30 times more energy than the atomic bomb that destroyed Hiroshima.**

Some of the surviving pieces of the Chelyabinsk meteor (or bolide) fell to the ground near Chebarkul, Russia. But the explosion also injected hundreds of tons of dust into the stratosphere, allowing a NASA-NOAA satellite to make unprecedented measurements of a thin but cohesive and persistent dust belt.

"We wanted to know if our satellite could detect the meteor dust," said Nick Gorkavyi, an atmospheric physicist at NASA's Goddard Space Flight Center who grew up in Chelyabinsk. "Indeed, we saw the formation of a new dust belt in Earth's stratosphere, and achieved the first space-based observation of the long-term evolution of a bolide plume."

About 3.5 hours after the meteor explosion, the Suomi National Polar-orbiting Partnership (Suomi NPP) satellite flew over the area and detected a plume high in the atmosphere. The limb profiler instrument in the Ozone Mapping Profiling Suite (OMPS) sensed a mass of aerosols at an altitude of 40 kilometers (25 miles) and moving east at more than 300 kilometers (190 miles) per hour. The cross-section above shows the level of aerosol extinction, or how much the dust and debris blocked sunlight.

On February 16, 2013, OMPS detected the plume continuing its eastward flow and reaching the Aleutian Islands. Larger, heavier particles began to lose altitude and speed, while their smaller, lighter counterparts stayed aloft and retained speed—consistent with wind speed variations at the different altitudes. By February 19, the faster, higher portion of the plume had snaked its way entirely around the northern hemisphere and back to Chelyabinsk.

Building on these initial, direct measurements, Gorkavyi and colleagues combined their data with a series of atmospheric models to simulate how the plume from the explosion would evolve as the stratospheric jet stream carried it around the Northern Hemisphere. The model simulations agreed with the observed evolution of the plume. And indeed the plume's evolution continued: at least three months later, a detectable belt of meteor dust was still swirling around the planet, according to OMPS measurements. To view an animation of the meteor-dust model, visit the NASA homepage.

NASA Earth Observatory image by Jesse Allen, using OMPS data from the Suomi National Polar-orbiting Partnership. Suomi NPP is the result of a partnership between NASA, the National Oceanic and Atmospheric Administration, and the Department of Defense. Caption based on a story by Kathryn Hansen, NASA Earth Science News Team. Instrument: Suomi NPP - OMPS

## IFEN + WORK Microwave–An Upscale Update

**IFEN, in partnership with WORK Microwave, have released software update V.1.9 for their NavX®-NCS GNSS multifrequency simulator product line.**

Leveraging new features and functionalities, users have the flexibility to support a wide range of constellations, frequencies, and channels for research and development of GNSS safety and professional applications, as well as system integration and production testing of mass market applications, such as automotive satellite navigation, mobile phone applications, chipsets, and handheld personal navigation devices. A new key enhancement to the NavX-NCS solution is comprehensive support of China's BeiDou-2 navigation satellite system. By enabling real-time simulation of second-generation BeiDou satellite signals, also referred to as BeiDou-2, NavX-NCS expands a user's GNSS signal capability beyond GPS, Galileo, GLONASS, and SBAS constellations.

*Artistic rendition of China's BeiDou-2 navigation satellite system.*

A powerful new multi-user functionality enables the simulation of up to four different users, or one user with up to four antennas, in different locations simultaneously. Possible use scenarios include simulating a static user such as a reference station at the same time as a roving user, or simulating multiple docking maneuvers on an oil rig. In addition, the NavX-NCS GNSS simulators now include a new 6DOF functionality that makes it possible to simulate six degrees of freedom (three dimensions of space plus yaw, pitch, and roll). This allows even more true-to-life simulations of ships, airplanes, and cars. A new monitoring widget makes it easier to monitor the current state of simulation.

Optimized to perform advanced lever arm calculations, the NavX-NCS GNSS simulators ensure accurate navigation for users. In simulation environments where the antenna is not located in the center of the moving object, such as the external of an airplane wing, lever arm calculations compensate for the fact that acceleration and GPS measurements are not made at the same point. By calculating the lever arm measurement between the PAR antenna and GPS position reference for every epoch of observation, this new feature guarantees that the most accurate signal simulation is achieved.

The NavX-NCS GNSS simulators are available in Professional and Essential versions, both now optionally Export License-Free (LF), speeding up the approval process and delivery time to users abroad. With the Export LF version, users can now limit the simulated user velocity of their simulator equipment to 600 meters per second, eliminating the need for an export license. If an export license should be applied for and be granted later on, it is also upgradeable to a full version meaning the simulation of higher user velocities will be available.

All NavX-NCS GNSS simulators feature up to nine L-band frequencies and 108 channels, offering users more than twice the number of channels compared with standard GNSS simulators. The platform includes a two-year maintenance contract, the broadest range of frequencies and satellite navigation systems per chassis, as well as the flexibility for users to easily install software updates when they become available, making it the most cost-effective multi-GNSS simulator available today.

## Inmarsat + Volvo Ocean Race–Over The Oceans With Support

**The Volvo Ocean Race 2014-15 will be the most digitally connected around-the-world race in history, featuring the first purpose-built, one-design racing boat geared for 24/7 satellite communications to an audience of tens of millions.**

Inmarsat has again been selected as the Race's official Satellite Communications Partner, providing global broadband data and voice communication services for the competitors and Volvo Ocean Race's support teams. Working with the Volvo Ocean Race for a fourth consecutive edition, Inmarsat's award-winning global satellite network will be responsible for delivering cutting-edge safety services, vessel tracking capabilities, audio and video communications and social media access during the nine-month competition.

Each yacht will have a trained Onboard Reporter (OBR), who will be responsible for delivering multiple hours of broadcast and digital content daily during the course of the race. More than 2,000 applications are currently being considered by Volvo Ocean Race for the OBR roles.

Knut Frostad, CEO of the Volvo Ocean Race which celebrates its 40th anniversary in September, said, "Inmarsat performed flawlessly over the last three editions and we are sure they will do so again with a boat which has been purpose-built with communications very much in mind. We look forward to Inmarsat making this the most watched and most connected yacht race in the world aimed at a new online audience of people who simply love the kind of life-at-the-extreme excitement we serve up day in day out."

For the 2014-15 edition, Inmarsat will supply the network and satellite services for the FleetBroadband 500 (FB500), FleetBroadband 250 (FB 250) and Inmarsat C safety services and tracking devices on board the new one-design Volvo Ocean 65 race yachts.

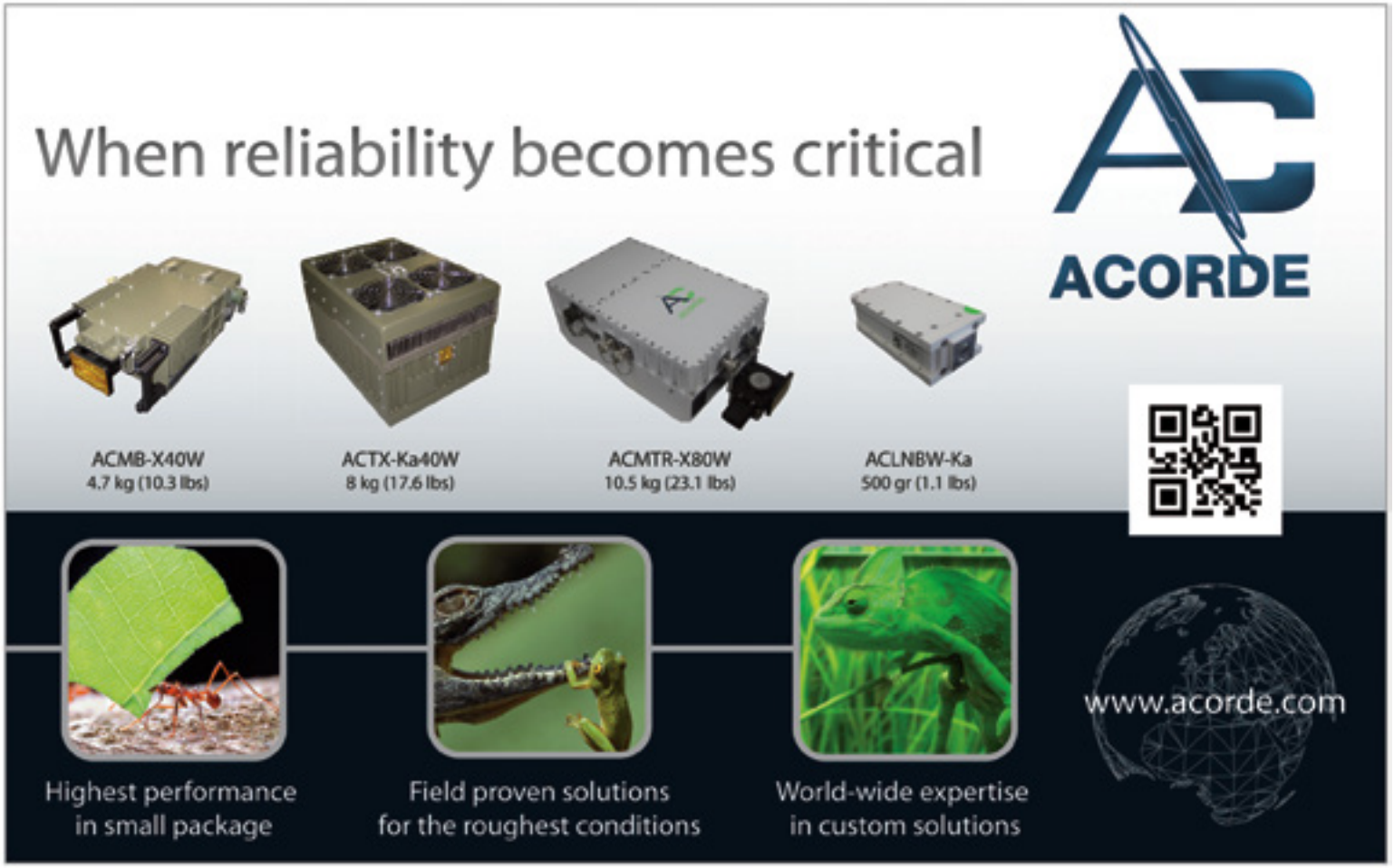
FB500, Inmarsat's flagship maritime service, delivers an always-on connection of up to 432kbps for applications such as email, Internet access, real-time electronic charts and weather reporting. FB500 also features streaming IP with guaranteed connection rates of up to 256kbps available on demand, for live applications such as high definition video streaming.

"The Volvo Ocean Race is the fastest, toughest and most technically advanced around-the-world yacht race. This is why the race organizers needed to ensure that the event was supported by the most advanced and reliable satellite communications available. They therefore selected Inmarsat again as an Official Race Partner for the 2014-15 edition, which is the fourth time in a row we have supported this world famous competition," said Rupert Pearce, CEO of Inmarsat. The Volvo Ocean Race is not just one of the world's most exciting adventures but the perfect test bed to showcase the capabilities of Inmarsat's global network to power voice and data connectivity from the most remote and inhospitable locations on Earth."

In addition to Inmarsat C safety services and tracking devices, each of the race yachts will carry an IsatPhone Pro satellite phone in their liferaft packs. On shore, Volvo Ocean Race's support teams will be equipped with Inmarsat's BGAN land terminals, enabling them to set-up a full broadband communications suite at every port the race visits. Using BGAN, the support teams will be able to stay connected to the race crews wherever they are on an ocean.

Volvo Ocean Race website: *http://www.volvooceanrace.com/*

Inmarsat FleetBroadband: *http://www.inmarsat.com/services/fleetbroadband*

## Thales Alenia Space + Visiona–Satellite Creation

**French-Italian group Thales Alenia Space (TAS) has won a contract worth about 300 million euros ($400 million) to build a satellite for Brazil's developing space program.**

The order, placed by Visiona, jointly owned by Brazilian airplane maker Embraer and telecom provider Telebras, is for a geostationary satellite for civil and military use.

Telebras said that the satellites, "high-speed Internet will be extended to the entire nation, and will ensure the sovereignty of its civil and military communications".

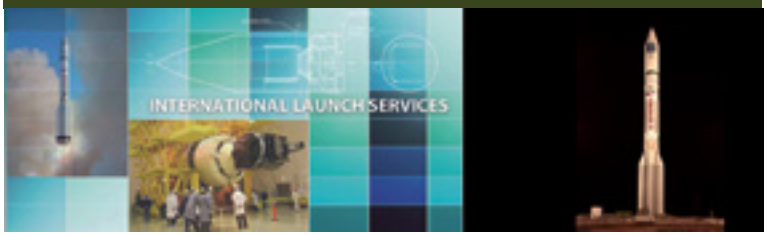
Arianespace has been selected to launch the satellite. The deal also allows for a transfer of technology between TAS and Brazil, making TAS the preferred industrial partner in building up Brazil's space program.

A spokesman for TAS said that under the agreement, the company will handle telecommunication processes as well as meteorology and Earth observation.

At the end of June, TAS chief executive Jean-Loic Galle said that Brazil planned to boost its program with 12 meteorology and observation satellites and up to three additional telecommunications satellites in the next decade.

At the time, he said local authorities planned to spend $8.0 billion (6.0 billion euros) on the project.

## International Launch Services–Anomaly Investigation Concluded



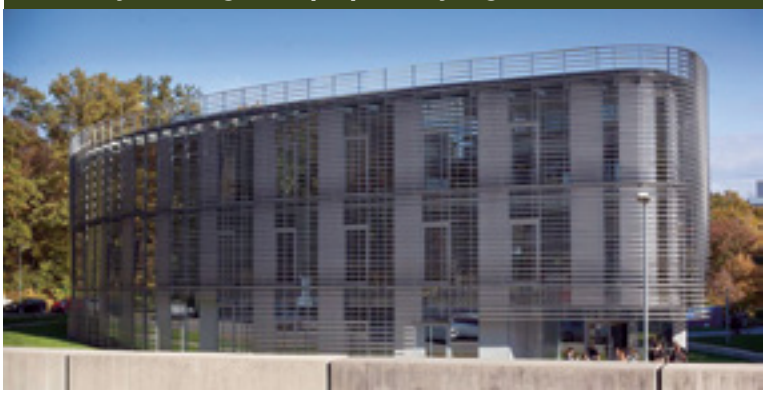

**The ILS Failure Review Oversight Board (FROB) concluded its review on August 13th. The review concurred with the conclusions of the Russian State Inter-agency Commission on the root cause and the associated corrective action plan of the July 2, 2013, Proton M/Block DM mission failure with three GLONASS navigational satellites for the Russian Federal Government.**

The members of the FROB agreed with the findings of the Russian investigation that the root cause of the failure was due to the improper installation of the three yaw angular rate sensors located on the Proton launch vehicle, which caused the vehicle to deviate from its flight path shortly after lift-off.

"We very much appreciate the time, effort and participation of our customers, the insurance underwriters and technical experts in the FROB process. They worked tirelessly with us to ensure that the review was conducted thoroughly. As we work towards the return to flight of the Proton vehicle, we thank all of our customers for their continued support," said ILS Vice President of Programs and Operations, John Palmé.

The ILS Proton return to flight mission will be the Astra 2E satellite for SES on September 15, 2013. The scheduling of the remainder of the ILS Proton near term manifest for 2013 is currently being determined.

## University of Stuttgart–Laptops To Fly Higher

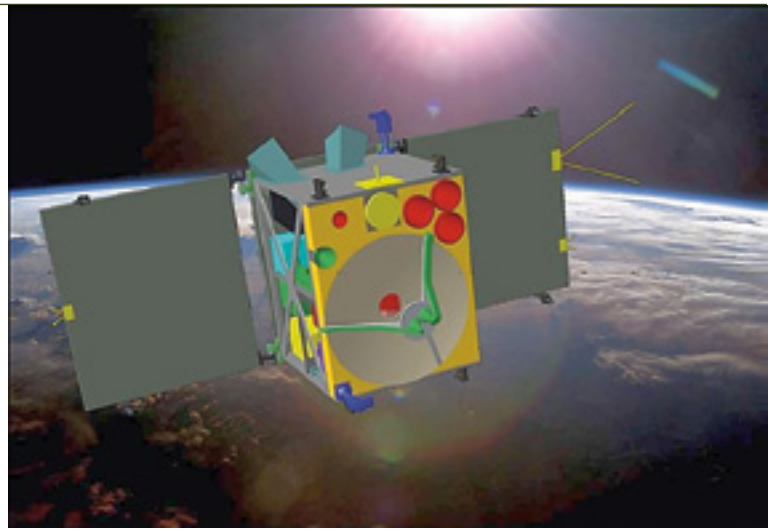


*The University of Stuttgart's Baden-Württemberg Astronautics Center (RZBW)*

**One of the fastest and most compact satellite computers in the world has been developed by students at the University of Stuttgart in Germany and will be sent into space next year on a commercial rocket.**

The computer is part of a small, 130kg satellite dubbed the "Flying Laptop," which is being developed by more than 50 students and professors at the university's Institute of Space Systems. Starting in the autumn of 2014, the satellite is to record shipping movements and measure vegetation with its three camera systems and will also test new technologies under space conditions.

The university noted that the instrument's maneuverability would enable it to photograph vegetation from various angles, thereby enabling research concerning the condition of plant life on the Earth.



*Artist's rendition of the Flying Laptop spacecraft. Image credit: IRS Stuttgart.*

While proven computers and older models are generally used in commercial aerospace projects, the Stuttgart satellite computer is state of the art, the university said, suitable for small technology satellites, for example, from the European Space Agency.

The project was launched in 2004 and has received more than 1 million euros in funding. A government agency has granted 800,000 euros ($A1.18 million) to pay a rocket company to move the Flying Laptop into orbit.

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## NASA–A Golden Anniversary + Golden Opportunities Recalled

*The Apollo 11 rocket towers at Kennedy Space Center's crawlerway May 20, 1969 from the Vehicle Assembly Building to Launch Pad 39A. Saturn V launched astronauts Neil Armstrong, Michael Collins and Buzz Aldrin on the first lunar landing mission with Armstrong and Aldrin moonwalking on July 20, 1969. Credit: NASA*

**Fifty years in an industry that is still evolving sees this structure as the homebase for prepping spacecraft for launches that send satellites soaring.**

NASA's Kennedy Space Center, Florida. Construction of the Vehicle Assembly Building, or VAB, at NASA's Kennedy Space Center in Florida began a half-century ago this summer. After serving through the Apollo and Space Shuttle Programs, the mammoth structure now is undergoing renovations to accommodate future launch vehicles and to continue as a major part of America's efforts to explore space for another 50 years.

Construction began with driving the first steel pilings on August 2, 1963. It was part of NASA's massive effort to send astronauts to the moon for the Apollo Program.

Altogether, 4,225 pilings were driven down 164 feet to bedrock with a foundation consisting of 30,000 cubic yards of concrete. Construction of the VAB required 98,590 tons of steel.

When completed in 1965, the VAB was one of the largest buildings in the world with 129,428,000 cubic feet of interior volume, and covers eight acres, is 525 feet tall and 518 feet wide.

To accommodate moving, processing and stacking rocket stages, 71 cranes and hoists, including two 250-ton bridge cranes were installed. On the east and west sides are four high bay doors, each designed to open 456 feet in height allowing rollout of the Apollo/Saturn V moon rockets mounted atop launch umbilical towers.

*The vehicle assembly building under construction in November of 1964.*

The VAB was constructed 3.5 miles from Launch Pad 39A and 4.2 miles from Launch Pad 39B. A pair of crawler-transporters, among the largest machines ever built to move on land, carried the assembled rockets to the pads. After the conclusion of Apollo in the 1970s, the building was refurbished to accommodate the space shuttle. Inside the VAB, the shuttle solid rocket boosters were stacked atop a mobile launcher platform.

The external fuel tank was attached between the two boosters and the shuttle mounted to the tank. Following three decades of flight, the shuttle was retired in 2011.

Modifications of the VAB are underway to support the Space Launch System (SLS) and Orion spacecraft, which also will result in the ability to process multiple launch vehicle types. SLS will be the agency's advanced heavy-lift launch vehicle providing a new capability for human exploration beyond Earth orbit. However, NASA also is partnering with private industry on launch vehicle and spacecraft development options for taking astronauts to low-Earth orbit and the International Space Station.

Last year shuttle-era work platforms were removed from the VAB's High Bay 3 as a project of Ground Systems Development and Operations, or GSDO, to accommodate the SLS heavy-lift rocket.

According to Jose Lopez, the VAB senior project manager in the Vehicle Integration and Launch Support Branch of GSDO, the changes are part of a centerwide modernization and refurbishment initiative in preparation for the next generation of human spaceflight.

Lopez noted that some of the utilities and systems scheduled for replacement at the VAB have been used since the facility was originally built.

This initial work is required to support any launch vehicle operated from Launch Complex 39 and will allow NASA to begin modernizing the facilities while vehicle-specific requirements are being developed.

Plans for 2014 include awarding the construction contract for new access platforms, including structures and systems required for the SLS.

Some of the current work has included removal of over 150 miles of obsolete Apollo- and shuttle-era cabling. This will make room for installation of more efficient, state-of-the-art command, communication, control and power systems needed to perform testing and verification prior to the SLS and other rockets being rolled out to the launch pad.

As plans move ahead to outfit the VAB with the new infrastructure, code upgrades and safety improvements, the building will continue in its role as a central hub for the Florida spaceport well into the future.

*Story by Bob Granath*

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With Arabsat's new generation of state-of-the-art satellites, your world is growing larger — and closer — than ever. With four orbital positions in the sky covering an ever-expanding footprint across the Middle East, Africa, Central Asia and Europe, now you have unrivalled capacity to reach farther and connect in more ways than ever before. That means all the power to meet the growing and evolving needs of large telecom companies, government entities, the military sector and VSAT or IP networks. Connect more of your world, and join the Arabsat neighborhood today!

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## NewSat Limited–Mining The Diggers + Dealers Event

**Almost 2,000 delegates converged on Australia's mining capital Kalgoorlie recently for Diggers and Dealers 2013. The event highlighted a focused optimism for Australia's resources growthe.**

This event was a perfect opportunity for NewSat to announce that the launch of satellite Jabiru-2 is not far away. Expected in orbit late 2013, Jabiru-2 is focused on the communication requirements of the Australian resource industry. NewSat's Senior Vice President of Global Sales, Andrew Matlock who was in Kalgoorlie for the three day event commented, "we are very excited by Jabiru-2 as it has fresh capacity over Australia. Providing for mobile exploration and larger bandwidth application requirements, Jabiru-2 will help to support the ongoing operations of the Australian mining sector".

NewSat's new Ku-band satellite Jabiru-2 will deliver further enhanced coverage at 216 MHz capacity to satisfy the demanding communication requirements for resource projects in and around Australia. Jabiru-2 is designed specifically for key resource regions in the Pilbara, Kimberley, North West Shelf and Timor Gap. The availability of high-powered satellite capacity, which will provide more efficient solutions to support large bandwidth applications over these hot zones, is essential for the operational efficiency, employee productivity and future evolution of the resource industry.

Jabiru-2 further strengthens NewSat's position as the leading satellite communications company servicing the mining and exploration sector. NewSat's recent developments including their new satellite trailer infrastructure, are transforming remote mine site operations, particularly in the current industry environment with increasing cost pressures and growing demand for operational efficiency.

One of the most common challenges mining companies are faced with is the delivery of communications and logistics to their remote and mobile teams. With communications of critical importance for operational efficiency as well as the safety of all personnel on and off-site, satellite technology provides the solution with fixed and mobile high-speed Internet, voice, video and data for end-to-end communication in and around mine sites.

NewSat provides a range of VSAT services including the new satellite trailers that can be deployed almost anywhere, making them ideal for business continuity and connectivity in remote, hard to reach locations or temporary sites. The satellite trailers provide maximum flexibility and are built for off-road endurance. They are self-contained quick deploy communication units that can be towed anywhere, establishing instant broadband connectivity within minutes.

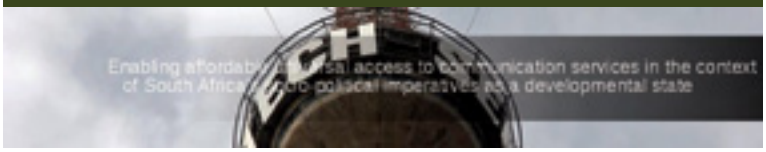
From the event, Andrew described why infrastructure developments and Jabiru-2's "new" capacity are so important for the Australian mining industry, "with 'brownfield' investment on the rise, the ability to extend communications is essential. Auto-tracking satellite trailers equipped with wireless networks, voice services and job-specific technology enable small teams to extend their area of operation, without losing the technological edge. Reliably mobile, NewSat understands and provides flexible, secure and efficient connectivity through all stages of mine site evolution from exploration and frequent site relocations to construction and established operations".

Satellite communications has played an increasingly important role in remote site evolution; from initial mobile exploration to complex mine site operations. Satellite communication infrastructure supports mining operations from on-site office requirements and welfare services, to remote asset monitoring to backup and safety systems. Never before has the need to communicate in real-time been more important and satellite has evolved with the requirements of today's resources companies.

NewSat has already partnered with one resource company, Atlas Iron, who are an independent Australian iron ore company based in Western Australia. NewSat are providing Atlas Iron exploration teams with satellite communications trailers that deliver instant mobile broadband whenever and wherever their assignments may be. The satellite trailers give Atlas Iron teams the freedom to tow their communications infrastructure for immediate connectivity at various stages of mine-site exploration and construction. The VSAT dish readily deploys and aligns with the relevant satellite, providing instant connectivity including Internet connectivity, real-time data transfer, video conferencing and information-sharing, thus maximizing efficiencies in iron-ore discovery.

Andrew also highlighted the new Australian mining landscape as observed at Diggers and Dealers 2013, "The recent investment slowdown in the Australian resources market has resulted in significant cuts in exploration spend and mining operations. The mining industry requires communications that meet their growing demand for cost effective, uninterrupted connectivity. NewSat's proven track record in the resources sector of supporting small and large mining projects is about flexible and reliable satellite solutions that are specifically designed for remote locations, ensuring the safety of all personnel on and off-site and optimizing productivity".

## Sentech–Sending Vivid Signals



**Government signal distributor Sentech is planning to launch a free-to-air satellite TV service based on its Vivid platform. This is according to a well-placed industry source. Sentech is a State Owned Enterprise (SOE) operating in the broadcasting signal distribution and telecommunications sectors and reporting to the Minister of Communications.**

These plans follow news that E-tv sister company Platco Digital has plans to launch a subscription-free, high definition (HD) satellite TV service, which appears to have lit a fire under Sentech. According to an industry source with knowledge of the project, government signal distributor Sentech is also planning to launch a free-to-air satellite TV service. Sentech already operates a free-to-air satellite TV service called Vivid, but it is understood that state-owned company wants to relaunch the platform, quite possibly under a new name.

Curiously, the industry source said that Sentech is aiming to launch towards the end of September 2013, a few days before Platco's OpenView HD is scheduled to launch.

Sentech has plans to launch video on-demand, mobile, and personal video recording functionality next year (2014), the source said.

Sentech was asked about its free-to-air satellite plans, but declined to answer questions about it. The state-owned signal distributor said it would be releasing a statement on the matter soon.

## Bridge Technologies–Breaking With Tradition

**At IBC 2013, Bridge Technologies is launching Objective QoE, a new monitoring technology for Quality of Experience (QoE) monitoring.**

In a break with tradition, Objective QoE eschews the conventional approach to QoE monitoring, by using only criteria that are appropriate to broadcast and digital media delivery. Objective QoE monitors a range of errors that typically occur in media delivery, including audio silence, color freezes, color black, and freeze frames, to detect failures affecting quality of experience. This contrasts with the traditional approach taken in many QoE systems, which are based on criteria derived from telephony, such as MOS (Mean Opinion Scores) and arbitrary values such as 'bluriness'.

"The problem with QoE monitoring to date is that it has been highly subjective, and therefore less useful than it should be," said Simen Frostad, chairman of Bridge Technologies. "Using MOS to evaluate video delivery does not provide a precise or valuable assessment of QoE. Based on MOS and 'bluriness', a full HD transmission of the Superbowl would score highly, while a transmission of Casablanca—in black and white, and with the blur and scratches of an old movie—would score badly. Objective QoE provides a far superior solution that actually delivers data and alerts that media operators really need."

**Bridge Technologies' Objective QoE is an agile, view-anywhere solution that fits any monitoring strategy thanks to the capabilities of the new VB288, an advanced server-based content extraction system with virtual videowall displays giving operators visual QoE verification of large numbers of HD channels simultaneously, from any location. Content extraction can also be implemented on individual Bridgetech probes or groups of probes with the new content extraction software option, to provide additional QoE monitoring of local terrestrial and unencrypted satellite services.**

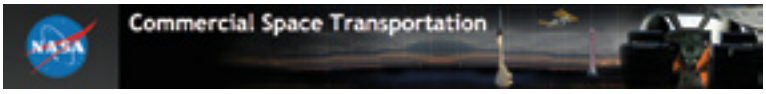
## SpaceX + NASA–Dragon Determination

*Artistic rendition of Dragon spacecraft in Earth orbit, courtesy of SpaceX.*

**NASA Commercial Crew Program (CCP) partner Space Exploration Technologies (SpaceX) recently reviewed the systems critical to sustaining crews in orbit and returning them safely to Earth aboard the company's Dragon spacecraft.**

SpaceX is one of three commercial space companies working under NASA's Commercial Crew Integrated Capability (CCiCap) initiative to develop spaceflight capabilities that eventually could provide launch services to transport NASA astronauts to the International Space Station from U.S. soil.

During the preliminary design review at SpaceX headquarters in Hawthorne, California, company engineers presented NASA representatives and aerospace industry experts detailed analyses of Dragon systems critical to keeping crews safe in orbit and during re-entry operations.




From basic life support functions, including pressurizing Dragon with breathable air, to stocking the capsule with enough food and water for as many as seven crew members, the spacecraft must be designed to protect humans in the harsh conditions of space. Company designers and NASA engineers dissected the plans carefully to make sure no details were overlooked.

"NASA has learned a lot about keeping our astronaut crews safe throughout a mission, and we don't want those lessons to be forgotten," said Ed Mango, NASA's CCP manager. "So, we're sharing a lot of what we already know, and the company is adding its own innovations to suit its needs and meet its challenges."

The review detailed equipment and software aboard Dragon that would help guide crews to the International Space Station for rendezvous and docking operations. This included discussion on SpaceX's planning for software code which, in this modern era of spaceship design, just as critical as the hardware design. The company also described how the spacecraft will be operated both by its onboard crew and by ground controllers.

While SpaceX works to further develop its crewed Dragon spacecraft, it also is preparing for the upcoming launch of the third of at least 12 cargo missions to the space station with a remotely controlled Dragon under NASA's Commercial Resupply Services contract.

The review was the seventh milestone for SpaceX under CCiCap. The company is on track to complete all 15 of its CCiCap milestones by the summer of 2014. All of NASA's industry partners, including SpaceX, continue to meet their established milestones in developing commercial crew transportation capabilities.

## EMC–Nothing Pending About This Patent

**Global (VSAT) satellite and terrestrial connectivity provider, Emerging Markets Communications® (EMC) announced today that the U.S. Patent Office has granted the company its 17th patent, extending EMC's portfolio of value-added services to its customers.**

Launched in 2011, EMC's HD Connect Satellite service is a breakthrough in tele-presence and videoconferencing, enabling high quality, cost-effective, collaboration between businesses in the most remote and harsh locations in the world.

"EMC is continually focused on developing innovative, patented, technology to give our customers the flexibility, scalability and communications performance to improve productivity," said Abel Avellan, CEO, Emerging Markets Communications. "Many of our customers are operating in rural, high-risk areas that prevent safe travel and collaboration between key executives and decision makers. HD Connect tele-presence provides a cost-effective alternative to traveling hard-to-reach areas with a high quality experience."

HD Connect customers include global enterprises, oil and gas companies, governments, and NGOs operating in Africa, Middle East, Asia and South America. Historically, video conferencing and tele-presence services were expensive and performed poorly over satellite. This patented technology solves the traditional challenges associated with using video over satellite, delivering high quality, low jitter and packet loss, connections with a steady latency for an excellent, unparalleled video conferencing experience.

The patent number 8,384,758 is for "video management system over satellite" and is described as a system that dynamically allocates satellite bandwidth and other network resources to establish a high definition video conferencing call, on-demand.

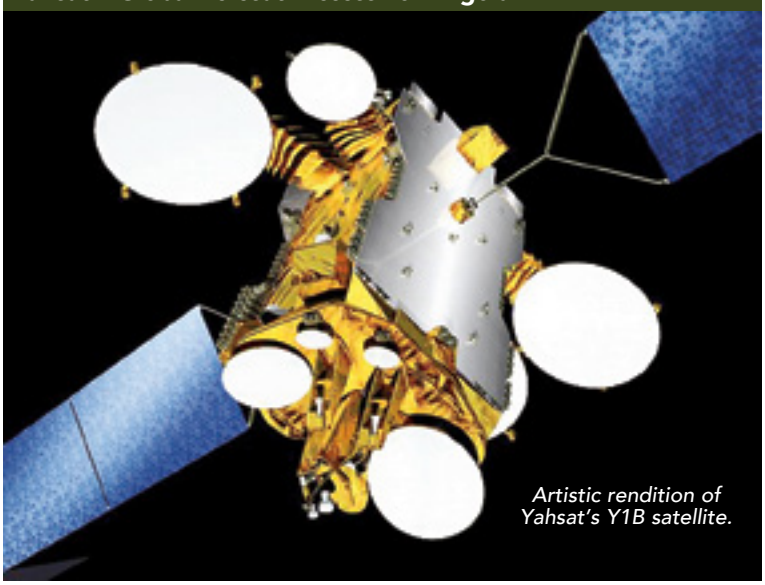
HD Connect Tele-Presence Enables:

- Availability: Secure, mission-critical, end-to-end high quality video communications deployable anywhere on the planet.
- Affordability: A revolutionary 'pay as you go' service where users only pay for the bandwidth that is used, packaged with bundled hours of monthly usage.
- High Quality Performance: Low jitter, low packet loss with predictable and steady latency for excellent videoconferencing experiences
- Ease-of-Use: Delivered via a browser in bandwidth multiples of 1MB and 5MB, the user simply goes to a portal, turns on the system and operates the videoconferencing system
- Speed of Service: Circuit turn-on takes less than 30 seconds
- Single Vendor: Providing customers the ability to interact with just one vendor to reach over 140 countries eliminates the need to depend on the local infrastructure for power and communications outside the region. Since EMC owns the entire network, EMC is a single solution provider for all satellite-served areas.

Emerging Markets Communications® is a mission-critical, network services provider for global organizations with connectivity requirements in the most remote and/or challenging areas of the world, in air, on land or sea, including Africa, the Middle East, Central Asia, Pacific Islands, Asia, Central and South America. The company operates in 140 countries, with 27 global field support centers and wholly-owned infrastructure of teleports and terrestrial pops in US, Europe and Africa.

Emerging Markets Communications® is ISO 9001 certified and is the only provider to deliver a fully integrated, end-to-end hardware solution, with 27 support centers to guarantee maximum uptime of mission-critical applications and record maintenance services.

## Yahsat + Global Telesat–Access For Angola



*Artistic rendition of Yahsat's Y1B satellite.*

**Al Yah Satellite Communications Company, Yahsat, has further strengthened the availability of its flagship service YahClick, an affordable, high-speed satellite broadband Internet service, in the Republic of Angola through a new partnership with Global Telesat, the country's established satellite telecoms provider.**

Experts in satellite communications within the Republic and the wider African market, Global Telesat will distribute YahClick across the country via two main distribution channels, namely Electrix to target home users and Multitel to targeting businesses. Global Telesat will offer cost effective YahClick service plans to suit both home and business users in urban, rural and remote locations to boost their access to a high speed and reliable Internet connection.

YahClick is designed to provide satellite broadband Internet to everyone and is set to open new business opportunities and connectivity to a wide range of industries, NGOs, government, educational organizations and home users throughout its coverage area by providing reliable, high-bandwidth Internet connectivity to urban, rural and even remote communities.

Global Telesat will offer the YahClick service and local support services to address the specific needs of business, government organizations and home subscribers. Users, including those in underserved and un-served areas, will now be able to instantly connect to the satellite broadband Internet via a small satellite dish and modem that can be pre-ordered through Global Telesat. The service is available in Angola with no further infrastructure requirements.

YahClick is beamed through Yahsat's second satellite Y1B satellite, the first satellite in the region to offer Internet connectivity through Ka-band multi-spot beams, providing a greater level of overall efficiency and cost-effective broadband solutions.

## InfoBeam

### Space Foundation–Lifetime Achievement Award Nominations

**The Space Foundation is now accepting nominations for its highest honor, the annual General James E. Hill Lifetime Space Achievement Award.**

Honoring its late, long-time chairman, Gen. James E. Hill, USAF, Ret., the award recognizes outstanding individuals who have distinguished themselves through lifetime contributions to humankind through exploration, development and use of space, or through use of space technology, information or resources in academic, cultural, industrial or other pursuits of broad benefit to humanity.

Nominations must be received by September 30, 2013, and the award will be presented at a special luncheon during the Space Foundation's 30th Space Symposium, at The Broadmoor Hotel in Colorado Springs, Colorado, in May 2014.

The 2013 award was presented posthumously to two former NASA astronauts—Neil A. Armstrong and Sally K. Ride, Ph.D.

Any person may nominate a candidate for the award, with the exception that individuals may not nominate themselves. The nomination criteria must meet at least two of the following measures:

- Significantly advanced the state-of-the-art of space technology
- Significantly advanced humankind's understanding of space or space technology
- Significantly contributed to public understanding of, or support for, space endeavors
- Significantly and positively shaped governmental policy toward space
- Effectively interpreted, through visual or other communicative arts, the majesty and importance of space
- Effectively provided—by management, advocacy or design—significant, enduring or crucial space systems or infrastructure
- Effectively employed space technologies, research systems, or space-derived data to improve the human condition through the artistic, scientific or humanistic endeavor

The mission of the Space Foundation is "To advance space-related endeavors to inspire, enable and propel humanity." Nominees must exemplify the Space Foundation mission by meeting at least three of the following criteria:

- Has written or published papers, textbooks, articles, etc., relating to the exploration, development or utilization of space, or has spoken in public forums such as conferences and symposia
- Has been active in promoting and disseminating information about space exploration, development or utilization through any medium
- Has been active with non-space-related groups -- whether professional, fraternal, industrial, academic or community based—resulting in a transfer of space knowledge to other professions or groups
- Has been active in community or public service not related to normal job responsibilities
- Has volunteered or otherwise contributed significant or extended effort on behalf of the Space Foundation and its mission

Submit a nomination in the form of a letter, not to exceed two pages, by September 30, 2013, addressed to

Elliot Pulham

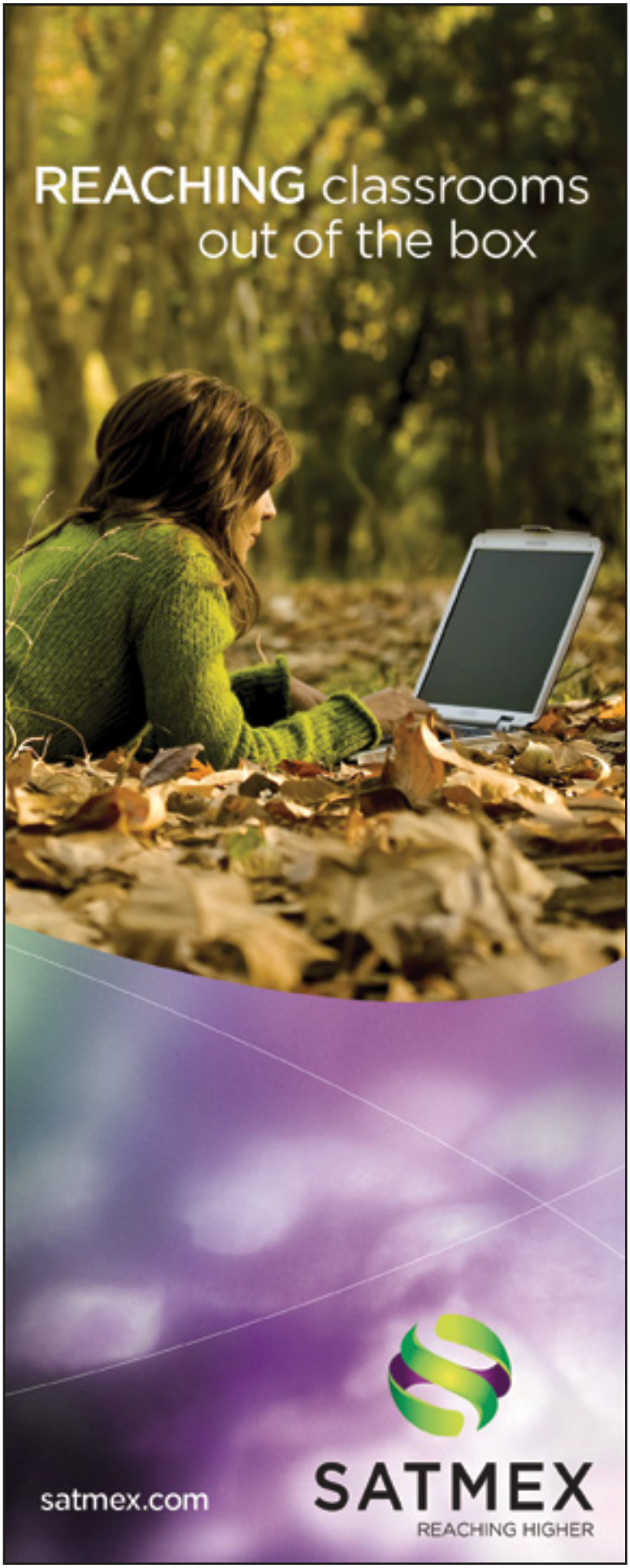
Chief Executive Officer

Space Foundation

4425 Arrowswest Drive

Colorado Springs, Colorado 80907

Upon ratification by the Space Foundation Board of Directors, the honoree will be notified immediately in writing. Questions may be directed to Space Foundation Vice President—Human Resources + Administration Kathleen Vinson at kvinson@spacefoundation.org.



## Astrium–Making Things Fly... On The Ground

**You can't take a spacecraft that needs to perform a docking maneuver while traveling at a speed of 28,000 km/hr for a test run, so how can you make sure that once it gets aloft it performs exactly as it needs to?**

The answer is simulation—effectively executing an entire mission without leaving the cleanroom.

The ATV (Automated Transfer Vehicle), the Astrium-built cargo supply craft for the International Space Station (ISS), heading for rendezvous

Take the example of the ATV (Automated Transfer Vehicle), the Astrium-built cargo supply craft for the International Space Station (ISS). It is the biggest, most complex spacecraft ever developed and built in Europe – an unmanned 20-tonne space freighter that once launched makes its own way up to the ISS where it performs a completely autonomous rendezvous and docking maneuver with a remarkable accuracy of only a few centimeters!

And there's more. The ATV is not only the space vehicle itself, but a vast interconnected system: there are ground control centers in Toulouse (ATV mission control), Moscow (supervision of docking with the Russian Zvezda module on the ISS), and Houston (ISS mission control); the ISS astronaut crew also have an ATV control panel; a satellite network relays commands and data between the ATV, the ISS and the three control centers.

The ATV program involves many companies from all over Europe, providing equipment and support services.

Astrium, industrial prime contractor for the program, is responsible for ensuring that all this comes together to create a perfect whole, and works as smoothly as clockwork, during every single phase: integration, qualification, launch, ISS approach and docking, and through out the entire mission of the ATV, right up to the craft's ultimate separation and controlled burn-up in the atmosphere.

When the ATV sets off aboard its Ariane 5 launcher, everybody and everything must be 100 percent ready. Astrium uses a highly sophisticated Functional Simulation Facility (FSF) at its Les Mureaux site near Paris to 'fly' an exact mock-up of the ATV which houses nearly all the on-board electronic equipment through all the stages of a full virtual mission (first orbit injection, orbit transfer, rendezvous and docking, attached to the ISS, undocking and leaving the Station), checking out the complete system and previewing all possible nominal and 'off-nominal' scenarios. The FSF platform, with its hundreds of cables and umbilicals, dozens of ground computers, and controlled by some 50 engineers, replicates all aspects of the functional environment that the ATV will encounter. In the simulations, which are performed at 'real' speeds, it is as if the craft is actually flying in orbit. Myriad permutations enable all conceivable anomalies and failures to be virtually introduced into the scenarios to test out and plan for all eventualities.

The ATV mock-up that is used with the FSF does not look like the spacecraft that will take to the skies. The outer structure is dispensed with for these purposes, and the parts that constitute the ATV's electronic 'brain' and 'nervous system' are connected up to the platform.

The platform models interfaces with the Ariane 5 launcher, the ISS, and with the ground and satellite communication network. Various modules delivered by industrial partners are also integrated. The core simulation software is installed and fine-tuned on more than 15 real-time simulation platforms – not just at the Les Mureaux site, but also in Moscow, Toulouse and Houston – some of which include real on-board computers and most of the real equipment to ensure electrical compatibility, flight software validation, system qualification and the development of integration procedures.

As well as the spacecraft, many of the human beings participating in the ATV program are virtually put through their paces. Real-time numerical simulations are used for training the controllers at the ATV Control Centre in Toulouse and for large Joined Integrated Simulation (JIS) exercises with the other centers. Creating a common simulation over a secured pan-European network infrastructure and involving hundreds of operators, JIS links together the Toulouse (ATV control) and the Moscow (Russian ISS module) simulators, with the Houston (ISS control) center also in the loop for the fullest, most representative simulation of the mission.

This simulation activity is a major part of the preparation of the mission and mandatory for obtaining Flight Acceptance. From ATV design to vehicle integration tests and mission qualification, each phase of the lifecycle requires simulations. Once the ATV is in flight, simulation platforms support in-depth analysis in case of any anomaly and are used to validate new contingency procedures. At the end of the mission, after the ATV has re-entered the Earth's atmosphere and safely disintegrated, simulations are a vital component of post-flight analysis … and then it's time for the next ATV mission qualification campaign!

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## Gilat Satellite Networks–Spacenet Goes To SageNet

Gilat Satellite Networks Ltd. has entered into a definitive agreement to sell its Spacenet Inc. subsidiary to Tulsa, Oklahoma-based SageNet.

The aggregate consideration for the sale is approximately $16 million, subject to certain post-closing adjustments and expenses. The transaction is subject to regulatory approval and the satisfaction of customary closing conditions and is expected to be completed within the next three (3) months. The transaction is expected to result in a capital loss of $1 million to $3 million, which includes banker's fees, legal fees and other transaction related expenses.

In fiscal 2012, Spacenet's business generated revenue of approximately $77 million, approximately $2 million operating loss and EBITDA of approximately $2 million. Upon closing of the transaction, Gilat's management objectives for 2013 will be updated accordingly. The sale of Spacenet, which currently operates as part of Gilat's Services Division, is expected to strengthen Gilat's strategic focus as a satellite communications technology company with innovative commercial and defense products and solutions for Internet access and on-the-move applications.

As a long-term operator of Gilat products and solutions and with over 20 networks and over 100,000 VSATs currently supported, post-closing, Spacenet is expected to become a major customer for Gilat and to continue to offer services based on Gilat's products as part of the expanded organization's solutions portfolio. Spacenet customers should continue to receive the same quality of service to which they have become accustomed.

"The sale of Spacenet will allow us to better focus our assets and management attention on our core business strategy and strategic target markets," said Erez Antebi, CEO of Gilat Satellite Networks. "I look forward to the combined Spacenet and SageNet organization becoming an important customer and look forward to continuing to provide them products and solutions in support of the large enterprise customer base that they service."

For Spacenet, which has transitioned over the last few years from primarily a VSAT services company into a managed network services company, the acquisition will serve to increase its position and growth potential in the market. Since 1981, Spacenet Inc. has designed, implemented and managed some of the largest communications networks for US-based business, industrial and government customers and today manages communications at more than 160,000 locations for customers including many Fortune 500 companies and major government agencies.

"This is a marriage of two exceptional companies with the ideal combination of tools, technology and talent," said SageNet President Daryl Woodard. "Both firms enjoy a proven track record for network services leadership and expertise, combined with company-wide commitments to customer service. We look forward to continuing to work closely with Gilat as we work to create North America's premier Managed Network Services provider delivering the fastest, most reliable and secure network coverage available, at the lowest total cost of ownership possible."

"It's been a privilege to be part of the Gilat organization over the last 20 years," said Spacenet CEO Glenn Katz. "We're looking forward to both a new beginning with SageNet and to a lasting strong and mutually beneficial relationship with Gilat. We believe this is a great fit at the right time that will provide added value not only for our organizations, but more importantly, for our customers."

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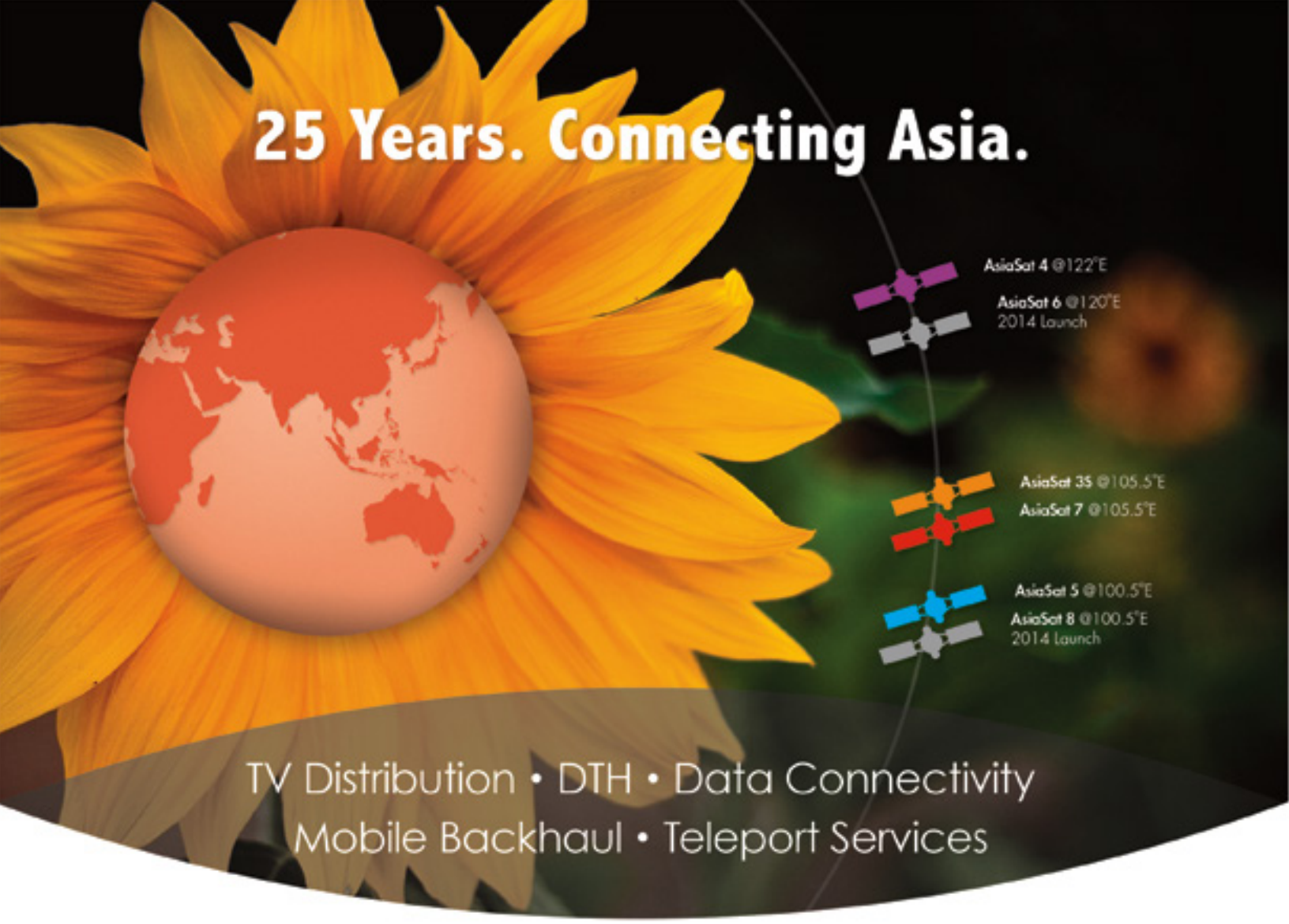


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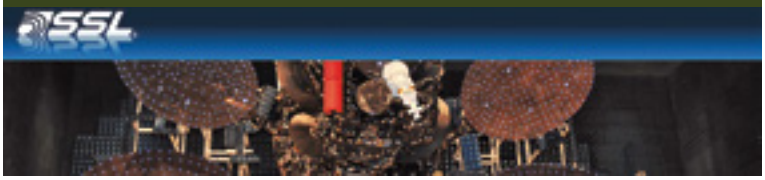
## Space Systems/Loral–The Silence Is Broken




**The company was tight-lipped for a while—it was "mum's the word"—and all that, but now the reveal...**

Space Systems/Loral (SSL), provider of commercial satellites, has named its previously undisclosed customer for a multi-mission communications satellite. The satellite is being manufactured for Brazilian satellite operator Star One, a subsidiary of Embratel, a leading telecommunication company from Brazil.

The satellite, named Star One D1, is equipped with C, Ku and Ka-band payloads and will be used for telecommunications, television broadcast, broadband, Internet access and other services such as digital inclusion in Brazil and in the Latin American region. Star One D1 will be the first satellite of Star One´s fourth generation and will support the Olympic Games in 2016 that will take place in Rio de Janeiro, since Embratel, in a co-participation with Claro, has been selected as the Official Telecommunication Sponsor for this worldwide event.

"We are very pleased to have this opportunity to help Star One provide much needed services that will improve the human experience in Brazil and throughout Latin America," said John Celli, president of SSL. "This is the second satellite that we are building for Star One, and there is no better endorsement of our success than a customer returning to work with us again. Star One and SSL share a commitment to high quality and reliability and we look forward to continuing our close working relationship."

Star One D1 is based on the highly reliable SSL 1300 satellite platform that provides the flexibility for a broad range of applications and technology advances. It will be located at 84 degrees West longitude and is scheduled for launch in early 2016. The satellite is designed to deliver service for 15 years or more.

"We are glad to announce this new satellite and to increase our presence not only in Brazil but in all Latin America´s region," said Gustavo Silbert, president of Star One. "The D1 will help transform the lives of many people in Latin America who currently do not have access to the high speed communications necessary for both economic and social well-being."

## Advantech Wireless–The Extended Family

**Advantech Wireless Inc. has extended its line of S-Band Indoor (Rack-Mount) and Outdoor (Hub-Mount) Solid State Power Amplifiers.**

The extended product line is available for a full range of output power up to 1250W in a single package. For higher power, Advantech Wireless provides phase-combined systems offering an output power up to 12kW.

Intended for indoor or outdoor operation, Advantech Wireless' S-band Solid State Power Amplifiers are built in a compact size. The design of the extended line of SSPAs is based on Advantech Wireless' proven techniques, resulting in high linearity and operating efficiency.

These S-band Amplifiers may be configured to operate in 1:1 or 1:2 redundancy modes, with built-in microprocessor controller in each unit for redundancy operation and capability for serial port interfaces (RS485) or Ethernet for remote monitoring and control.

Advantech Wireless' extended line of S-band SSPAs provides maximum flexibility for the new generation of LEO satellites on critical applications like Remote Sensing, Earth Observation, Topography, Telemetry + Control, Weather Services and Digital Imaging. Combined with Advantech Wireless' S-band Frequency Converters and S-Band LNAs, it offers a complete one stop shop solution for operators and system integrators.

## Niagara Thermal + ViaSat–A Heated Exchange

**Niagara Thermal Products has been selected by ViaSat Inc. as a key process technology supplier to bring next generation Ka-band satellite technology and architecture to the aerospace market.**

ViaSat's new technology, which enhances its award-winning Exede® Internet service, is expected to significantly improve the speed and availability of broadband services over a greatly expanded coverage area.

Drawing upon more than 25 years of product and process engineering experience in high performance vacuum-brazed products produced in its AS9100C certified facility, Niagara Thermal Products has developed proprietary braze process technology that is critical to the performance of new ViaSat products.

"We are extremely pleased that we have been able to assist ViaSat in the development and introduction of this exciting improvement in broadband capabilities for the aerospace market," said Mark Parisi, Vice President of Business and New Product Development for Niagara. "While not directly in our mainstream thermal technology area of heat exchangers, heat sinks and cold plates, this technology development is another example of Niagara Thermal Product's commitment to providing important solutions for difficult challenges in the aerospace industry."

## iGT–Speeding Up Innovation

**iDirect Government Technologies (iGT), a wholly owned subsidiary of VT iDirect, Inc. (iDirect), today announced that it is increasing its investment in product development engineers to speed innovation and develop specialized market solutions for the Department of Defense (DoD) and civilian agencies.**

The new team, located at iGT's headquarters here, will bring nearly 120 years of collective experience in management, digital, field-programmable gate array (FPGA) and software engineering disciplines to iGT. The team will develop next-generation products to meet demand for smaller, faster and more powerful mobile and portable devices. This suits the specialized needs of the DoD and government where, increasingly, troops need technologies to communicate on the move. The engineering team will research, develop, design and test new products and solutions for their feasibility and profitability.

iGT has been building its engineering base since January 2012 when the company spun off from its parent, iDirect, in order to better serve the needs of the U.S. federal government. This investment in engineering resources puts iGT in a position to ramp up products based on customer feedback and need, and to collaborate with iDirect on engineering expertise.

## ImStrat + GeoSoluciones–Imparting ISR Intelligence

**ImStrat Corporation has announced that it is expanding its Intelligence, Surveillance and Reconnaissance (ISR) training course offerings to the Chilean market through an agreement with Chile's GeoSoluciones. The company will be ImStrat Corporation's exclusive Chilean business partner for ImStrat Corporation's world class ISR courses and training programs.**

"GeoSoluciones has an excellent reputation throughout Chile in remote sensing, imagery and photogrammetry. GeoSoluciones has developed its reputation through its professional training and consulting practice to the environmental, educational, government and military sectors. We believe that our world class ISR programs will complement GeoSoluciones' geomatics training by extending an even stronger value proposition to its military clients with this business relationship" said Tom Last, President and CEO of ImStrat Corporation.

"We are very excited about this new relationship which strategically positions us to provide Geospatial Intelligence (GEOINT) training courses to military organizations in Chile. This is a good panorama to serve the Chilean market with the experience of ImStrat in remote sensing and image analysis knowledge through their original and wide-ranging training programs" said Walton Edwards, Managing Consultant of GeoSoluciones.

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## Sierra Nevada Corporation–Dream Chaser's Two New Milestones

**Recently, NASA announced that it has added additional milestones to Sierra Nevada Corporation's (SNC) Dream Chaser® Space Act Agreement (SAA) under the Commercial Crew Integrated Capability (CCiCap) initiative.**

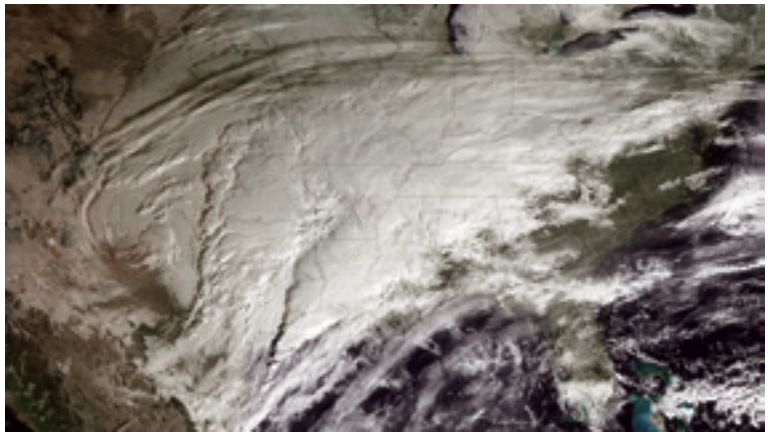
NASA amended SNC's SAA to include two additional milestones totaling $15 million, bringing the value of SNC's CCiCap SAA to $227.5 million.

The two optional milestones will extend the SNC CCiCap period of performance from May 2014 to August 2014, advancing the design and testing of the Dream Chaser Space System. Specifically, the optional milestones will fund work associated with the Critical Design Review (CDR) for the vehicle and additional testing of the reaction control system.

SNC is one of three companies funded under the CCiCap initiative to develop a next generation crew transportation vehicle and the only reusable, lifting body vehicle with runway landing capability. The Dream Chaser space vehicle is on the forefront of the commercial human spaceflight industry, offering safe, reliable, and cost effective crew and critical cargo transportation to low-Earth orbit.

## NOAA–GOES Goes

*GOES-12 captured this visible image of Hurricane Katrina on August 28, 2005, at 11:45 a.m. (EDT). At that time, the storm was at Category 5 strength and projected to impact New Orleans. Image credit: NOAA.*



*On January 29, 2010, GOES-12 captured a powerful storm developing in the U.S. mid-west. In the coming days, two blizzards hit the East Coast resulting in historic snowfall totals. Image credit: NOAA.*

**GOES-12 has seen it all, from Hurricane Katrina that hit the Gulf Coast in 2005, to the Christmas blizzard that crippled the Central United States in 2009.**

The satellite even traveled south of the equator to provide coverage for South America that started in 2010. Now, after more than 10 years of stellar service, NOAA's Geostationary Operational Environmental Satellite (GOES)-12 spacecraft is being retired.

Launched on July 23, 2001, the satellite lasted well beyond its original operational design life of two years for on-orbit storage and five years of actual operations to support forecasters and scientists in NOAA's National Weather Service.

GOES-12 captured this visible image of Hurricane Katrina on August 28, 2005, at 11:45 a.m. (EDT). At that time, the storm was at Category 5 strength and projected to impact New Orleans. Image credit: NOAA.

"GOES-12 gave the Western Hemisphere many years of reliable data as the operational eastern GOES for accurate forecasts, from small storms to those of historic proportions," said Mary Kicza, assistant administrator for NOAA's Satellite and Information Service.

Built by Space Systems/Loral, GOES-12 became operational April 1, 2003 as the GOES-East satellite, monitoring weather across the U.S. East Coast and part of the Atlantic Ocean.

On May 10, 2010, when GOES-12 was no longer able to be maintained to meet the requirements of the National Weather Service, it was shifted to a new position, where it provided coverage of weather conditions affecting South America, including volcanic ash clouds, wildfires, and drought.

On January 29, 2010, GOES-12 captured a powerful storm developing in the U.S. mid-west. In the coming days, two blizzards hit the East Coast resulting in historic snowfall totals. Image credit: NOAA.

When NOAA decommissions a geostationary satellite such as GOES-12, it is boosted further into orbit, the remaining fuel is expended, the battery is disabled and the transmitters are turned off. These maneuvers reduce the chances the satellite will collide with other operational spacecraft.

Additionally, decommissioning lowers the risk of orbital debris and stops the satellite from transmitting any signals that could interfere with any current or future spacecraft.

NOAA continues to operate GOES-13, which serves as the GOES East satellite for the United States and GOES-15, which is the GOES West satellite—both hovering 22,300 miles above the equator. NOAA also has an orbital backup geostationary satellite, GOES-14, which can be activated if any of the operational satellites experience trouble.

Kicza added, "The NOAA-NASA partnership is making steady progress toward developing and launching the more advanced GOES-R satellite series to position us into the future."

GOES-R is expected to more than double the clarity of today's GOES imagery and provide more atmospheric observations than current capabilities with more frequent images.

Data from the GOES-R instruments will be used to create many different products that will help NOAA meteorologists and other users monitor the atmosphere, land, ocean and the sun.

GOES-R will also carry a new Geostationary Lightning Mapper that will provide for the first time a continuous surveillance of total lightning activity throughout the Americas and adjacent oceans. In addition to GOES, NOAA also operates the polar operational environmental satellite (POES) program satellites, the Defense Meteorological Satellites Program series satellites and the Suomi NPP spacecraft.

NOAA's mission is to understand and predict changes in the Earth's environment, from the depths of the ocean to the surface of the sun, and to conserve and manage our coastal and marine resources.

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## USGIF–GEOINT Lightning Talks

**The USGIF Interoperability Outreach Subcommittee and Emerging Technologies Subcommittee invites participation in a session of Lightning Talks during GEOINT Foreword on Sunday, October 13th, in Tampa, Florida.**

GEOINT Foreword is the science- and technology-focused forum that runs as a preface to the GEOINT Symposium. The deadline for abstract submissions is Wednesday, August 21st, 11:59 p.m., EDT.

Lightning Talk presentations proposals are open to any USGIF Members as an opportunity to collaborate and educate colleagues on technical topics relevant to the GEOINT Symposium's theme: Operationalizing Intelligence for Global Missions.

Lightning Talks are limited to five minutes each and will be presented from 5:00 to 7:00 p.m. on Sunday as a capstone to the GEOINT Foreword event. Lightning Talks must focus on advancing the GEOINT tradecraft for scientists, analysts and other professionals.

Marketing pitches will be ignored by the proposal review process, but individuals and their organizations will be recognized for innovative efforts by GEOINT Foreword attendees and credited for their contributions within the GEOINT 2013 program guide.

This year's talks will have a focus on Interoperability + Standards as well as Emerging Technologies. We encourage you to submit an abstract. A PDF of the Submission Guidelines is available at: *http://usgif.org/eblast/geoint/lightning.pdf*.

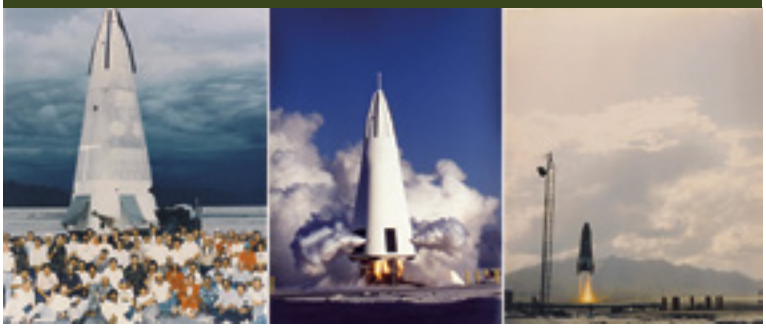
## Inmarsat Government–Miller Is New President + CEO

**Inmarsat Government has appointed Susan Miller as president and chief executive officer. In this role, Miller will be responsible for the overall business strategy and direction for Inmarsat Government, a wholly-owned, independent subsidiary of Inmarsat plc, responsible for all direct U.S. government business.**

Miller has more than 20 years of senior executive leadership experience across a wide range of technologies that serve the U.S. government and commercial sectors. Prior to joining Inmarsat Government, Miller held leadership positions in the satellite and telecommunication industries, including MTN Satellite Communications, where she served as executive vice president for strategy and corporate development; Spacenet Integrated Government Solutions Inc, where she was chief executive officer; and Intelsat General Corporation, where she held the position of president and chairman of the proxy board.

Other well-known organizations Miller worked with include LightSquared, Lockheed Martin and Hughes Aircraft Corporation. Miller holds a MS, Electrical Engineering from the University of Southern California and a BS, Electrical Engineering from the Rensselaer Polytechnic Institute.

## United Launch Alliance–Congratz To Delta Clipper Team



*The DC-X Team will celebrate the 20th Anniversary of the First Flight of the Delta Clipper Experimental on August 16-18, 2013, at Spaceport America, New Mexico, and the New Mexico Museum of Space History, Alamogordo, New Mexico.*

The Delta Clipper Experimental was constructed in 1991-93 at McDonnell Douglas' Huntington Beach facility. It was intended as a one-third scale model of a proposed SDIO single-stage launch vehicle. It first flew in August 1993 and had completed three flights when SDIO terminated the Delta Clipper program. After additional funding was procured, the vehicle flew five more flights before being returned to Huntington Beach for conversion into the DC-XA.

United Launch Alliance (ULA) congratulates the entire Delta Clipper Experimental (DC-X) team, which includes 11 current ULA employees, on their induction into the International Space Hall of Fame by the New Mexico Museum of Space History.

The DC-X was developed and built by McDonnell Douglas for the Ballistic Missile Defense Organization as an unmanned prototype for a reusable single stage to orbit launch vehicle.

"Congratulations to the entire DC-X team," said Michael Gass, president and CEO of ULA. "Delta Clipper was truly an innovated achievement 20 years ago. It was a not just about lifting off the ground and demonstrating flight, but DC-X ascended vertically, moved laterally, rotated to demonstrate flight up to an angle of attack of 70 degrees and then descended vertically to the same position it launched from, an achievement not yet replicated even today nearly two decades later."

"I am grateful I had the opportunity to be part of the team that worked on this tremendously successful program and I am grateful to the New Mexico Museum of Space History for its recognition of the anniversary of this ground-breaking achievement," said Art Breinlinger, ULA Delta II production leader. "The data we learned from that program provided the basis for initial concepts of operations for Operationally Responsive launch systems investigated in the 2000-2010 timeframe."

The innovative approach and key technical demonstrations achieved by the DC-X and DC-XA vehicle were enabled by the use of the nation's most reliable engine, the RL-10, which continues to support critical National Security, NASA Interplanetary and Earth Observation and Commercial systems on the Atlas V and Delta IV launch vehicles.

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.

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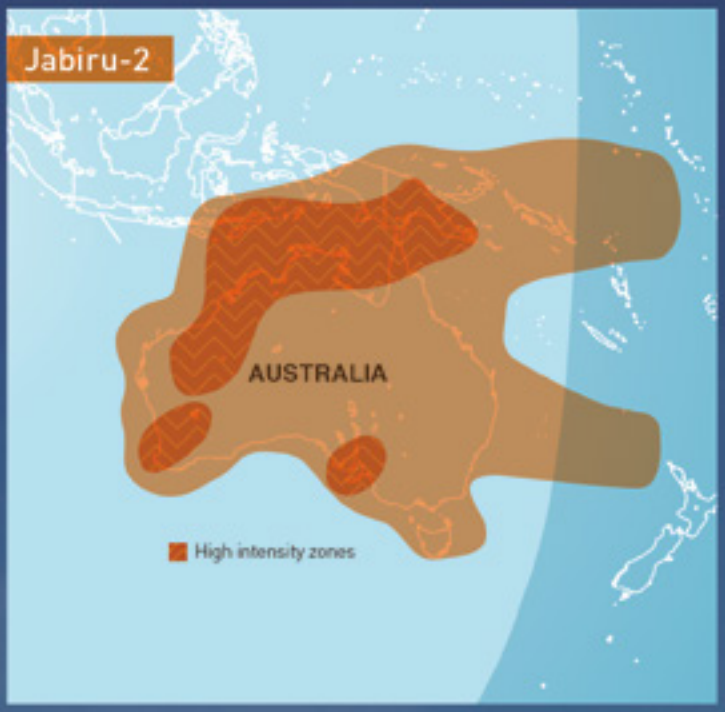


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## Inmarsat–Solar Challenge Ahead

**Inmarsat is now sponsoring the University of Michigan's World Solar Car Team, as they race across Australia this October in the World Solar Challenge.**

Inmarsat will provide the team with access to its Broadband Global Area Network (BGAN) service, a global 3G network delivered by a constellation of advanced satellites. BGAN will enable the race team to communicate and share data between team members in Australia and back in Michigan, while at the same time keeping fans, friends and families up-to-date with their progress.

The University of Michigan is the second team competing in the world's toughest solar endurance race for solar powered vehicles to be supported by Inmarsat.

The World Solar Challenge is a biennial race across the 1,864 miles of the Australian Outback and the University of Michigan's car, 'Generation', is one of 28 entrants in the 2013 competition.

The University of Michigan's solar car going through its paces. Photo courtesy of the University of Michigan.

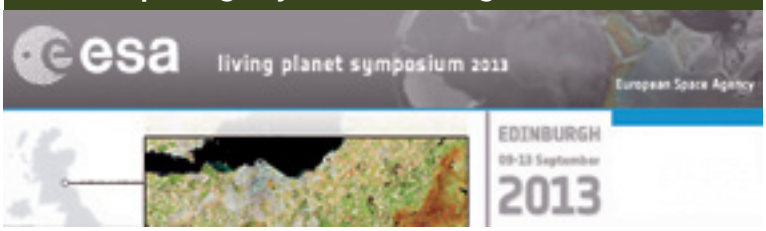
The University of Michigan's World Solar Car Team is an entirely student-run organization, which designs and builds solar electric vehicles. Since its establishment in 1990, the team has built 11 vehicles, won the American Solar Challenge seven times and has achieved third place in the World Solar Challenge five times.

For their journey across the Outback, the University of Michigan team will be equipped with three Cobham Explorer 300 BGAN terminals provided by Satcom Direct and 25 GB of data allowance from Inmarsat. During the race, the team will use the BGAN service to share information on weather forecasting, road conditions, potential hazards along the race route and details on the performance of the vehicle. BGAN will also enable the team to post images and videos and post on social media sites to keep fans and sponsors up-to-date on progress.

"Reliable communications is a vital part of the World Solar Challenge and with Inmarsat's BGAN network we have the advantage of having real time knowledge of conditions that might affect performance," said Jeffrey Cwaganberg, Director of Meteorology, University of Michigan Solar Car Team. "We are grateful to Inmarsat for their support."

Recognizing the importance of harnessing solar power as an alternative means of energy, Inmarsat has taken an active role in supporting the World Solar Challenge by providing communications support to other entrants. Together with manufacturing partner Cobham, Inmarsat is outfitting Netherland's based Team Twente with mobile satellite connectivity for their car, The RED Engine. Additionally, Inmarsat partner JSAT Mobile Communications is working with Addvalue Technologies to sponsor the Solar Car Project Team from Kogakuin University in Japan.

## ESA + UK Space Agency–Live In Edinburgh




**The Living Planet Symposium in Edinburgh, Scotland, will be held from September 9th through the 13th at the Edinburgh International Conference Center.**

Organized and hosted by ESA, with the support of the UK Space Agency, the event brings together more than 1,500 scientists and users from across the globe to present their latest findings on Earth's environment and climate. The versatility of Europe's Earth Explorer missions will be the main focus. The three missions in orbit are CryoSat, GOCE and SMOS. Over the past few years, these satellites have been providing new information on Earth's cryosphere; gravity and soil moisture; and ocean salinity, respectively, but there have also been several achievements that surpassed the original scope of these missions.

While CryoSat continues to measure the thickness and extent of sea ice and continental ice sheets, it has also proven capable of profiling land surfaces and inland water targets, monitoring sea-level changes and even contributing to the mapping of ocean floor topography.

Earth's gravity mission, GOCE, has gathered enough data to map Earth's gravity with unrivalled precision. Scientists further exploited these data to map the boundary between Earth's crust and mantle—called the Moho. GOCE also detected sound waves from the massive earthquake that hit Japan on March 11, 2011.

The Soil Moisture and Ocean Salinity satellite, SMOS, has been helping us to understand the water cycle. But the mission is also being used to monitor Arctic sea-ice extent and thickness, and can even determine wind speeds inside hurricanes.

The next Earth Explorer, Swarm, is planned for launch later this year. The three-satellite constellation aims to unravel one of the most mysterious aspects of our planet: the magnetic field.

The symposium will also see special sessions dedicated to ESA's programmes and initiatives, including ESA's key contribution to the Global Monitoring for Environment and Security programme, recently renamed 'Copernicus.' Financing for this ambitious programme was secured earlier this summer when European Parliament approved the multiannual financial framework budget for 2014–20. Copernicus relies on the provision of robust data, predominantly from Earth observation satellites. ESA is developing the series of Sentinel satellites for this purpose, and the first satellites are expected to be launched within the next year.

The latest results from ESA's missions and overview of the Earth Observation and Copernicus program will be presented during the opening plenary session on Monday, September 9th, 10:30 a.m. to 12:00 p.m. The agenda includes:

- Welcome Address by the UK Minister of State for Universities and Science, David Willetts
- Welcome Address by Jean-Jacques Dordain, ESA Director General
- "Earth Observation at the beginning of the 21st Century" presented by Volker Liebig, Director of ESA's Earth Observation Programmes
- "Copernicus, the European Union Flagship Program" by Philippe Brunet, Director at DG Enterprise and Industry, Directorate of Aerospace, Maritime, Security and Defence Industries, European Commission
- Highlights of Earth Explorer scientific results by Alan O'Neill, Chairman of ESAC

The full technical program will follow after the opening plenary session, and is open to media. The entire program is available at *http://www.livingplanet2013.org*.

## Millennium Space Systems + Sinclar–Wheel-y Good News

**Millennium Space Systems and Sinclair Interplanetary announced at the AIAA/USU SmallSat Conference held in Logan, Utah, that Millennium is the exclusive U.S. manufacturer and distributor of Sinclair's RW3-1.0 small satellite wheel.**

The company sees vertical integration as a means of reducing cost, schedule, and risk for its own satellite programs, while also bringing highly competitive satellite components onto the open market.

This agreement caps a successful technology transfer program under which Millennium has produced a batch of six reaction wheels, and tested two units to full NASA qualification levels. The arrangement also provides small satellite developers an American supplier for Sinclair's high quality, precision mechanism.

Millennium Space Systems, developer and operator of the National Reconnaissance Office's Rapid Pathfinder satellite, is currently expanding the scope of its subsystem manufacturing. The Company sees vertical integration as a means of reducing cost, schedule, and risk for its own satellite programs, while also bringing highly competitive satellite components onto the open market.

"Millennium and Sinclair make excellent partners," says Dr. Jeff Ward, Millennium's Vice President of Product Development. "We both demand the highest quality materials and workmanship, while still producing the affordable components necessary for today's budget-constrained missions."

"Millennium allows us to meet our customers' demands for high-volume, U.S.-based manufacturing for the microsatellite wheel," commented Doug Sinclair, owner and principal engineer of Toronto, Canada-based Sinclair Interplanetary. The two companies inked the agreement following a daylong manufacturing and qualification data review held at Millennium's space manufacturing facility in Torrance, California. The review covered details of the technology transfer, supply chain logistics, and the qualification test results.

## NewSat–Brown To Senior Vice President, Strategic Planning

**NewSat Limited has appointed Don Brown as Senior Vice President of Strategic Planning.**

The appointment of Don to the NewSat leadership team will further support and enhance the Company's transition from a teleport operator into a global satellite operator.

Don has more than 20 years of experience in satellite communications, with significant expertise in government solutions and defence systems. Don began his satellite career in the Satellite Systems Division of Federal Express Corporation, subsequently working for American Mobile Satellite Corporation and Quincy Jones' Qradio, before his role as Vice President of DoD Systems at PanAmSat's G2 Satellite Solutions. More recently, Don was the Vice President of Hosted Payloads and Business Development for Intelsat General Corporation.

At Intelsat General, Don led the team which won the $350 million UHF hosted payload contract with the Australian Defence Force, as well as the IP Router in Space (IRIS) hosted payload contract with Cisco. Don is a co-founder of the Hosted Payload Alliance.

As Senior Vice President of Strategic Planning, Don will lead NewSat's strategy and long-term priorities, from strategy formulation and market intelligence, to business case creation and financial analysis, through to the execution of complex cross-functional and cross-region projects. In this newly formed strategic role, Don will provide leadership and expertise to support NewSat's continued growth and expansion.

## Digital TV Research–Dishes To Appear In 1 In 4 Homes By 2018

digital TV research

**The number of pay satellite TV (DBS or DTH) homes will reach 251 million by 2018, up from 178 million at end-2012 and 103 million at end-2008, according to a new report from Digital TV Research covering 97 countries.**

From the 73 million pay satellite TV subscribers added between 2012 and 2018, India will provide 24.4 million, Brazil 9.2 million, Indonesia 6.8 million and Russia 5.9 million. However, the Global Satellite TV Forecasts report estimates that pay satellite TV subscriber totals will fall in 11 countries between 2012 and 2013 as subs convert to other platforms.

India will lead the pay satellite TV sector with 61.1 million subscribers in 2018, followed by the U.S. India overtook the U.S. in 2012 to take top slot. Brazil and Russia will take third and fourth places respectively.

The U.S. will remain DTH market leader by revenues generated, although its share of the total will fall from 43.5 per cent in 2012 to 38.7 per cent in 2018. Brazil will add the most DTH revenues ($3.5 billion) between 2012 and 2018 – nearly doubling its total in the process.

However, satellite TV revenues will decline for 20 countries between 2012 and 2018. Much of this is due to greater competition, forcing satellite TV platforms to offer cheaper packages which will lead to lower ARPUs. Furthermore, low-cost DTH packages are making a significant impact in several countries.

Including free-to-air households, nearly 400 million homes will directly receive TV signals via satellite dishes by 2018, up by almost 100 million on the end-2012 figure. India will be responsible for adding 30 million over this period. A quarter of global TV households will have a satellite TV dish by 2018, up from 21 per cent in 2012 and 14 percent in 2008.

## NASA–Temper, Temper–Showa Blows Its Top

**On August 18, 2013, a large eruption sent ash 20,000 feet (6,000 meters) above Kagoshima Bay, breaking the established pattern. It was possibly the largest eruption ever from the Showa Crater, which formed in 1946.**

These natural-color satellite images, collected by Landsat 8, compare Sakura-jima on August 19 (a day after the eruption) to the volcano on April 13, 2013. The most visible change is a field of pyroclastic flow deposits that stretch up to 760 meters (2,500 feet) from Showa Crater. On the eastern (right-hand) slopes of Sakura-jima light-colored, intertwined channels are visible on an older flow deposit. These are likely either from erosion that revealed light, unweathered material; or fresh ash deposited by short-lived streams.

NASA Earth Observatory images by Jesse Allen and Robert Simmon, using Landsat 8 data from the USGS Earth Explorer. Caption by Robert Simmon. Instrument: Landsat 8 - OLI

# SatBroadcasting™: Strategies For Introducing S2 Extensions, HEVC + UHDTV

*By Simon Pryor, Market Development Director for Broadcast, Newtec*

**There are a number of new broadcasting standards entering the market for quality (UHDTV 4K/8K), compression (HEVC) and satellite transmission (S2 Extensions). They are generating a lot of noise and hype, but underneath, there are real benefits to be gained to the user experience and business of being a broadcaster. They will only be beneficial if they are applied wisely and where they make sense.**

This article analyzes the impact of these new standards and technologies and identifies the impact and potential pitfalls, providing strategies and advice on how to benefit from these advances without getting carried away by the hype of the "next big thing."

***Putting UHDTV Into Practical Perspective***

The demos of UHDTV are alluring. I was lucky enough to see the London 2012 Olympics demo by NHK in 'Super Hi-Vision,' otherwise known as 8K TV with 22.2 surround sound. The demo certainly made my materialistic yearnings say "Ooh, I want one of those." However, I've also been around long enough for my rational side to think "Hey, here we go again, the next installment of SD->HD."

It is true that manufacturers see UHD as a huge opportunity to drive a replacement sales cycle of TVs, all packed with the latest and greatest 4K resolutions. However, where is the content going to come from? How will it be delivered to those TVs? And, who is going to pay for the content and make money in the process?

Realistically, it seems 4K is liable to become the mainstream UHDTV focus; 8K is just too far away on the horizon. Even in Japan they are looking at 4K for the 2014 FIFA world cup rather than the somewhat daunting 8K. Although 4K needs only four times the bandwidth of Full HD 1080p, most live HDTV is actually broadcast in 720p/1080i. This actually means it is more likely 16 HD channels for each 4K channel with today's compression technology.

At those large 4K resolutions and screen sizes, high frame rates become extremely important, as well, especially for high value content such as sports. This complicates things significantly and cannot be ignored.

For instance, getting 4K at 50/60fps to the TVs will require HDMI 2.0, which is not even standardized as of this writing. The current HDMI 1.4b only supports 4K to 25/30fps, which is probably not high enough. Indeed, the final distribution 'market standard' of 4K is unclear, but is likely driven by compatibility with the TV chipsets.

Recently, there have been some "real 4K over satellite" demos—however, many of these presentations at trade shows continue to use 'Quad HD' receivers, which are not identical to the ITU Rec.2020 standard for 2160p 4K.

Then there's the audio—going beyond 8 channels (for 5.1 or 7.1 surround sound) to something such as 22.2 (MPEG-H 3D) will also require HDMI 2.0, not to mention new home theatre audio systems, as well as new TVs.

For home 4K, the current generation of Blu-ray disks is not sufficient, either, as they would need to store a 200GB movie—new 8-layer disks are under discussion, but they have not arrived yet; so where is the content going to come from?

Further up the live TV production chain, the current mainstream cabling and switching infrastructure is HD-SDI. This 1.5Gbps uncompressed standard is for 720p/1080i HD. The alternative is 3G-SDI, which is required for 1080p operating at 3Gbps. The problem is that, while being increasingly used in new channel/MCR builds, the technology is still quite expensive and there are limitations in component choice and cable distances.

4K will essentially mean the end of broadcast copper and BNC connectors. Moving to 4K will require at least 12Gbps uncompressed or maybe even more, with high frame rates in the 14bit, 120fps range. This implies all OB vans, studios, production, post and asset management will move to a fully IP/Ethernet ICT infrastructure. This is something that is already happening by early adopters, but is far from mainstream today. In fact, many still have to fully make the SD to HD transition.

Even with ICT infrastructure, the current practical limit would be 10GbE, which is not enough for uncompressed 4K, so some 'light' compression would be needed even here (so called mezzanine workflows). The 40GbE and 100GbE technologies are for aggregation and core networks, not really LANs. This even ignores workflow impact, such as working with low-res HD proxies in editing and post, but the impact and cost considerations are huge.

Opinions on the likelihood of commercial success of 4K remain divided. Prices of 4K TVs are now in the $7k range and are expected to drop to around $3k by 2014. However, predictions for take-up of 4K capable TVs are only for 4 percent of the U.S. market by 2016 and 15 percent of worldwide markets by 2020.

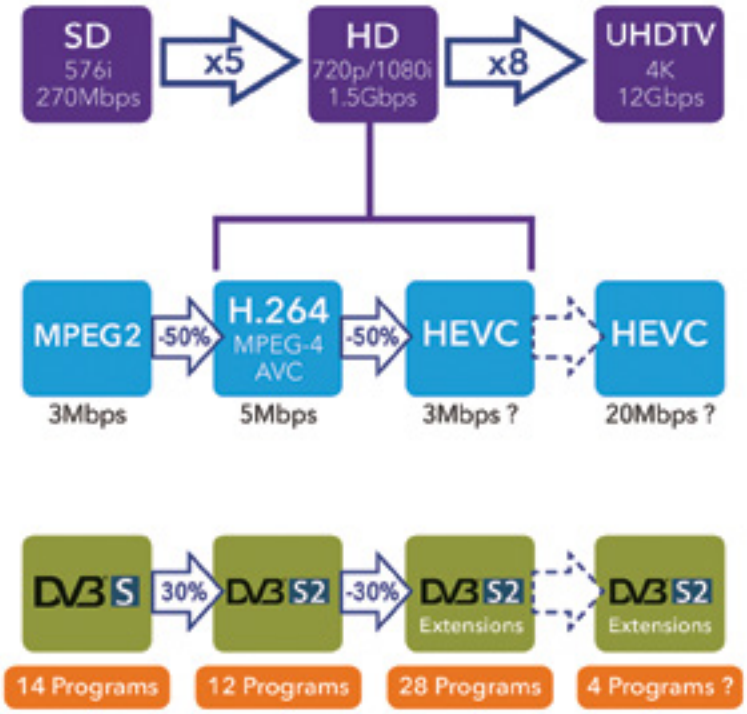



*Figure 1. TV quality, compression and satellite transmission standards: Past, present and future.*

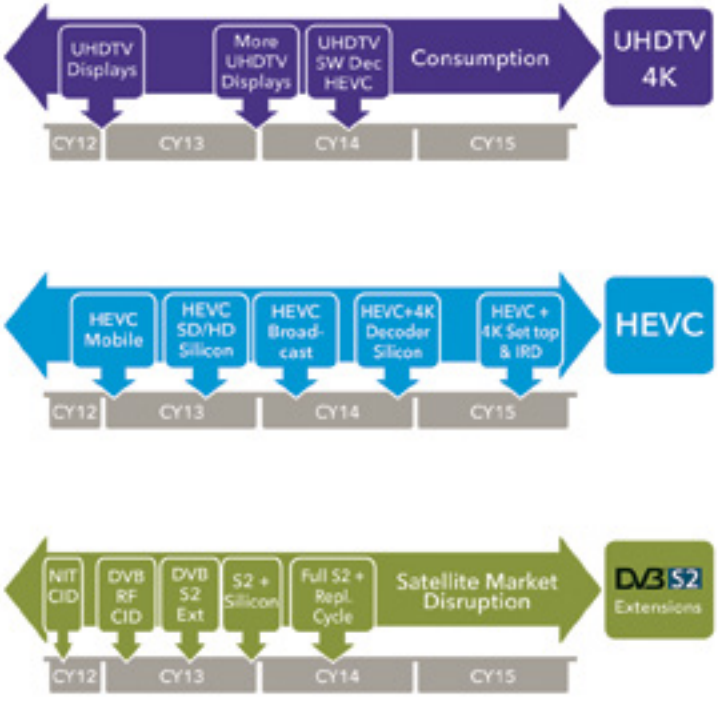



*Figure 2. Likely market timing of S2 Extensions, HEVC and 4K UHDTV*

| Area | Strategy | Enabler/Driver Technologies | | | Starting Timeframe |
|---|---|---|---|---|---|
| | | S2 Extensions | HEVC | UHDTV 4K | |
| Contribution | Unilateral & feeder links upgrade now S2x | ✓ | | | Now* |
| | Fixed contribution & high speed links 64APSK | ✓ | | | Now* |
| | S2x & HEVC in 'Lo' News contrib. (SD->720p/1080i) | ✓ | ✓ | | 2013/2014 |
| | S2x & HEVC in 'Hi' Sports contrib. (1080p,4:2:2, ...) | ✓ | ✓ | | 2014/2015 |
| | HEVC & ultra low delay contribution (HEVC Intra) | | ✓ | | 2015? |
| | 4K contribution | ✓ | ✓ | ✓ | 2014/2015 |
| Broadcast Workflows & Infrastructure | Move to 'All IP' broadcast center, studios, MCRs | | | ✓ | Now |
| | 'Mezzanine Workflows' of Master Formats | | ✓ | ✓ | 2014/2015 |
| | Distributed IP Headends with FEC | | | | Now |
| Distribution | Tune DVB-S2 DTH uplinks: CCT, Equalink, NODE | ✓ | | | Now |
| | Native 52X DTH (20-30% more efficient) | ✓ | | | 2015/2016 |
| | Primary Distribution DTT & Cable Headends | ✓ | ✓ | | 2013/2014 |
| | Wideband 72MHz to DTT towers & Cable Headends | ✓ | | | 2013/2014 |
| | DVB-T2 (Lite) end-to-end HEVC | ✓ | ✓ | | 2014/2015 |
| | 4K Distribution: 1080p high fps, up-scaled to 4K | ✓ | ✓ | | 2014 |
| | Real Commercial 4K Distribution | ✓ | ✓ | ✓ | 2016/2017 |

* Upgrade now for performance benefits, S2 Extension firmware upgrade when standard finalized

*Figure 3. Overview of the expected impact of UHDTV/HEVC/S2x*

Others believe the market will simply wait until 8K arrives, skipping 4K all together. What is definitely an emerging trend is the integration of the receiver and CA functionality into the smart TV, with the STB more than likely to disappear in many situations.

One of the issues with a move to 4K is that this is just the 'static resolution.' What is important for adoption of an improved TV standard is the quality of moving images, free from interlacing or jittery temporal interpolation; the 'dynamic resolution.' The case for higher frame rates is certainly part of this story, with the argument being that transmitting in 1080p120, and upscaling to 4K in the TV, would offer a better dynamic quality than 4K at low frame rate, and require less bandwidth to transmit.

When and how 4K will happen beyond World Cup and Olympic demos is still debatable. What is certain, though, is that for 4K TV broadcasting capabilities, key considerations such as compression (e.g., HEVC) and transmission (e.g., S2 Extensions on satellite and other fiber and terrestrial efficiency improvements) will be key to making it 4K actually happen.

***Saving Bandwidth With MPEG HEVC (H.265)***

The promise of sending the same quality TV signal at half the bandwidth is driving great interest in HEVC (High Efficiency Video Coding). The improved processing capacity of the latest devices, thanks to Moore's Law, allows more sophisticated algorithms to be applied to video, increasing the compression performance. HEVC typically needs 10 times processing capacity in encoders, compared to MPEG-4, AVC, H.264, and three times the capacity in the decoders.

For UHDTV, it is certainly envisaged that to make it feasible to transmit live 4K over satellite, terrestrial and cable, HEVC will be a necessity to reduce throughput to around 20-30Mbps.

However, such is not only for UHDTV. Delivering mobile TV, Internet TV over xDSL, and OTT, are all drivers where the need to preserve bandwidth is key to the business models; increased video traffic will otherwise overwhelm global networks. Indeed, it is for these profiles and SD/HD distribution applications that the initial standard of HEVC was approved in January 2013. However, the increased battery drain in mobile devices, caused by the more complex decoder processing, may well negatively impact adoption of HEVC for Mobile TV/video.

Professional contribution applications (12 bit and higher, 4:2:2/4:4:4 chroma), 3D and support for 4K UHDTV are targeted for completion in a HEVC revision due by January 2014. However, for low latency contribution applications such as stand-up news with talkback and other interactive feeds, HEVC adoption may arrive much later. An example of this is with AVC, where Intra profiles and ultra low delay encoders have only recently entered the market, meaning MPEG-2 is still often used. High compression and low delay is a trade-off.

While HEVC will be an enabler for UHDTV, its adoption will happen much sooner due to the bandwidth savings. Being able to squeeze 720p/1080i HD into 4-5Mbit/s, SD into 1Mbit/s, and upgrade a 720p/1080i HD channels to full HD 1080p, are attractive enough reasons to platform providers, be they satellite or terrestrial in scope.

In terrestrial DVB-T2 deployments, HEVC will be quickly used for the primary distribution over satellite to the terrestrial towers, with considerable OPEX savings. Availability of HEVC chipsets in 2013 for consumer DTT receivers will allow the secondary T2 distribution of SD/HD to be in HEVC, as well. The improved business and ROI will make this a 'no brainer' in selecting HEVC for 'green-field' DTT deployments within a year or two. Similarly, live content distribution to cable head-ends will benefit from these bandwidth savings, with the adoption driven by the business case.

***Improved Satellite Efficiency: 'S2 Extensions'***

The efficiency of satellite transmission continues to improve beyond the existing DVB-S2 standards. Currently, extensions and new standards are being specified and tested. For satellite businesses, the creation and adoption of new S2 Extensions will translate into better efficiency, higher speed and improved service robustness. These extensions have the potential for up to 37 percent improvements on top of the current standards. This jumps up to 64 percent or more with 72MHz wideband transponders They are being resolved now in DVB, with the standard due to be released before the end of 2013. Pre-standard efficiency gains are available today, with a firmware upgrade to the final standard.

It is not only for contribution applications and high-speed links, where 'S2 Extensions' modulators and demodulators will be installed, gaining maximum improvements. Even for a 'brown-field' base of installed Set-Top Boxes (STBs) or IRDs (Integrated Receiver Decoder), tests have shown that some of these extensions (10 or 15 percent roll-offs, advanced pre-distortion) can be deployed today, increasing throughput by as much as 20 percent, or increasing availability to reduce downtime, or expand the service area, without any degradation.

The aforementioned issues of installed base of STBs will limit adoption of native 'S2 Extensions' DTH technologies. However, when the receivers become available, higher efficiency gains will be possible at typical DTH operating points.

***Timescales For Combining 'S2 Extensions', HEVC + UHDTV***

When evaluating strategies for deployment of tomorrow's 'S2 Extensions,' HEVC and UHDTV, it is useful to compare with today's (DVB-S2/AVC/HD) and yesterday's (DVB-S/MPEG-2/SD) technologies. They typically entered the market at the same time, being driven by similar factors such as quality when moving from SD to HD, efficiency (DVB-S2, AVC) and cost.

Unfortunately, these different nexgen standards (S2 Extensions, UHDTV, HEVC) will likely enter the market at different times and integrated receiving devices, either professional IRDs or consumer STBs will lag behind until all of the standards are available and are confirmed stable for use. (*Please see Figure 2 on the previous page.*)

***Recommendations for Adoption of UHDTV, HEVC + S2 Extensions***

It is clear the three new technologies will make an impact on TV transmission. However, the main goal of this article is to understand which combinations of them will gain market traction, for which applications, and when. An overview of the projected combinations is shown in *Figure 3* on the previous page.

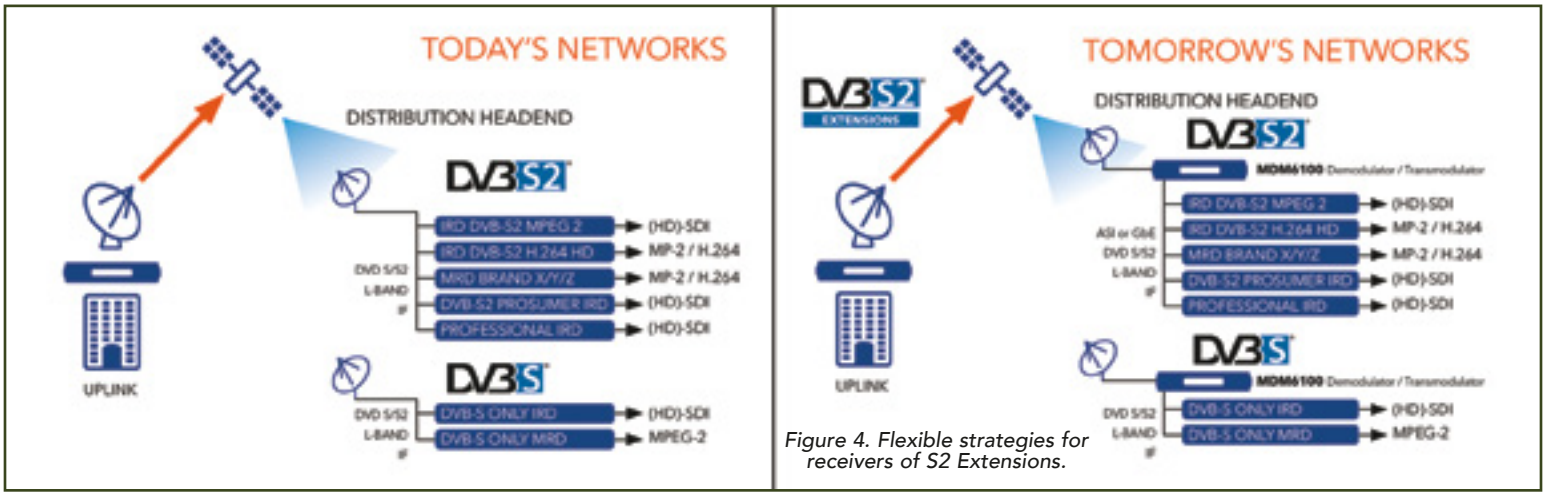



*Figure 4. Flexible strategies for receivers of S2 Extensions.*

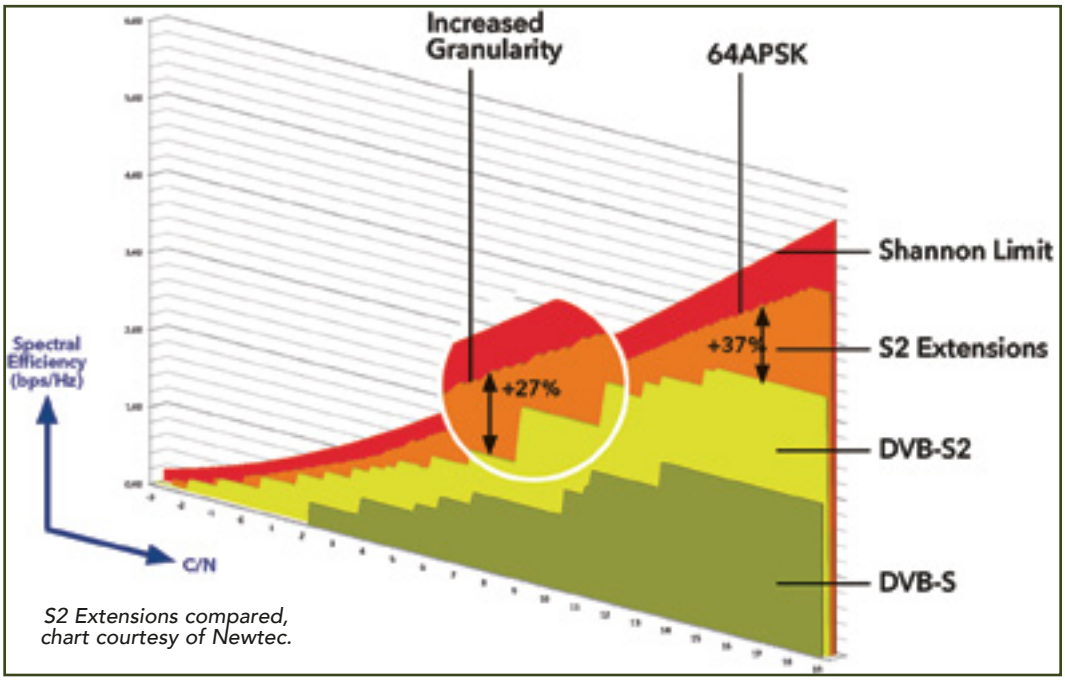
Recommendations to benefit from these new S2 Extensions, HEVC + UHDTV, without getting carried away by the hype of the "next best thing," are as follow:

- You can upgrade existing DTH and other satellite distribution platforms to S2 Extensions today, to get tangible benefits and ROI, with an installed base of STBs.
- You can start using S2 Extensions modulators, receivers and modems now, for contribution and high speed links (higher throughput or less satellite bandwidth), with a software upgrade to the final S2 Extensions in 2013.
- HEVC will make an impact in 2013/2014 in distribution of mobile, SD and HDTV, where the installed base of receivers (e.g., updates for software or FPGA based decoders) does not limit rollout.
- S2 Extensions + HEVC will have a big impact during 2013/2014 in primary distribution of DTT DVB-T2 and to cable head-ends. Most new 'green field' DVB-T2 deployments will be looking to use HEVC end-to-end in the 2014/2015 timeframe. Additionally, there will be increased OPEX benefits by using wideband 54 and 72MHz transponders for primary distribution, with increased market adoption.
- Contribution and live feeds using HEVC and S2 Extensions for HD (up to 1080p, 8-14bit, 4:2:0-4:4:4), where longer latency is acceptable, will have an impact in 2014/2015.
- Low latency contribution with HEVC (such as interactive news stand-ups with talk-back) will only really happen in 2015/2016; meanwhile, the latest ultra low latency Intra profile AVC codecs will dominate this market segment.
- HEVC will quickly be used for IP Fast News Gathering (FNG) applications (e.g., over Internet, 3G, VSAT), or for small bitrates for reasonable quality (but longer delays), or for smaller file sizes that will have operational benefits.
- 2014 FIFA World Cup and 2016 Olympics will drive demos of live 4K UHDTV.
- 4K UHDTV will first be adopted in production, special events and special niches (like super slowmo HD from 4K). Full commercial live 4K TV broadcasting will take considerably longer, but premium content and early adopters will ensure some limited services. Most of the 4K capable TVs will just display up-scaled HD for many years, which, while better than today's 720p/1080i HD-Lite, may provoke a consumer backlash. Distribution of 1080p HD at high frame rates (with upscaling to 4K in TVs) will be an intermediate step before full 4K distribution becomes technically and economically prevalent.
- 4K will necessitate the adoption of All-IP broadcast infrastructure and mezzanine compression for master formats. This will facilitate distributed broadcast head-ends, which will increase the importance of (ProMPEG COP3) FEC to eliminate packet loss (e.g. between playout and uplink).
- Due to difference in market adoption timing of S2 Extensions, HEVC and UHDTV, it is recommended to split professional IRD functionality into separate units (receiver and decoder), to obtain the benefits of the evolutions (especially S2 Extensions + HEVC for SD/HD) in a timely and flexible way—4K will be introduced when the technology is stable and becomes mainstream. This can often be done in a cost-effective way for primary distribution by re-using existing IRDs and using techniques such as transmodulation, shown in *Figure 4* above.

While it is true that a large part of the drive to introduce UHDTV is to sell more TVs, it is not just a gimmick. Advancements in video encoding (HEVC) and satellite transmission (S2 Extensions) will provide tangible cost savings for adoption with today's TV standards and will be a prerequisite for UHDTV.

As is the case with all new technologies, superior technical performance or features do not guarantee commercial adoption or success. Hopefully, this article has analyzed the real impact and limitations of these new technologies and has attempted to identify what will really happen in the market—and when—and has recommended the winning combinations.

Please visit ***http://www.newtec.eu*** for further information.




*S2 Extensions compared, chart courtesy of Newtec.*

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# Executive Spotlight: Gary Carter, V.P. + CTO, International Datacasting

**Gary Carter has many years of experience in the communications technology field. He is responsible for innovation and technology migration in future satellite distribution products and solutions addressing the needs of the radio broadcasters, television broadcasters, and cinema delivery solutions. The scope of which covers the delivery of live streams and files over DVB + IP satellite networks to traditional and cutting-edge applications. Current efforts are focused upon adding functionality to radio networks which drives incremental revenue or enhancements to the listener experience through receiver insertion of targeted of ads and programs.**

Mr. Carter joined International Datacasting (*http://www.datacast.com*) in 1987 as Director, Systems Engineering and later held position of President of IDC's U.S. subsidiary. At IDC, he has been involved with most of the world's major government radio networks from Voice of America and61

1 Radio Liberty to Emergency Warning networks in Korea. He has contributed to the establishment of innovative and pioneering radio networks in Europe, Australia and Latin America distributing sports, religious, agricultural and off-track betting.

***SatMagazine (SM)***

*Mr. Carter, your career within the broadcasting environs is most compelling. Would you please tell our readers how you became involved in the world of broadcasting and how satellite broadcasting attracted your professional attention, beginning with your background?*

***Gary Carter***

Beyond the excitement of the Race to the Moon of the late 60's, I first encountered satellite communications as a university student while working for Raytheon Canada. A visit to Telesat's Allan Park facility made space and satellite communications feel real. I was initiated to satellite hardware with uplink systems and space qualified TWT's and, later, participated at General Instruments in an early DBS startup called USCI. Satellite distribution of television channels to cable headends was where conditional access started. I have the arrows in my back to prove it.

***SM***

*Is satellite radio here to stay? Are more and more terrestrial stations becoming more digitally enhanced and providing their programming via satellite?*

***Gary Carter***

The use of satellite to deliver radio programming from production studios to distant AM, FM and DAB transmitters is here to stay. No other medium can deliver high quality digital audio as reliably, to so many diverse locations, as satellite. Satellites deliver radio programming for 100's of radio programmers 24 hours a day to 10,000's of locations across the USA and Canada... Many more around the world.

***SM***

*Is IDC undertaking any work with government agencies in response to their need for secure broadcasting capabilities, from radio to video to live feeds?*

***Gary Carter***

IDC supplies a range of security and encryption solutions that provide for the secure transmission of audio, video and data services to government and commercial customers interested in protecting ability to monetize their valuable content.

***SM***

*What role does IDC play within the digital cinema market segment? What sort of growth do you feel is realistic for this technology across the globe?*

***Gary Carter***

In the digital cinema marketplace, IDC is, far and away, the market leader. The company supplies a fully integrated satellite solution for the delivery of movies, DCP file packages up to 325GB, as well as live content in 2D and 3D. Satellite distribution provides for the fast and reliable delivery of the latest movies to theaters around the world.

We provide satellite receivers that are installed in cinemas that fully integrate with modern electronic projectors and storage systems. Live content distribution is growing for sports, music and stage performances. Sometimes, it truly is better than being there. You can be a lot closer to the action and actually hear what's being presented, possibly from the other side of the world. The last FIFA games were presented in 3D in hundreds of theaters world wide.

There can be no question that the most exciting technology for satellite right now is the combination of DVB-S3 and High Efficiency Video Coding (HEVC). This combination will significantly reduce the cost to transmit a television channel via satellite, as it reduces the bandwidth required for a television channel by as much as 50 percent. It also reduces the cost of entry into the satellite television business and frees up bandwidth, which, in turn, allows people to start more satellite TV channels. HEVC and DVB-S3 are the fundamental enablers of economical 4K television transmission by satellite.

***SM***

*What technology or recent advances does IDC bring to satellite broadcasting that is unique to the industry?*

***Gary Carter***

IDC's LASER™ Targeted Ad Insertion Platform has created a new paradigm for advertisers and satellite broadcasters. The product dramatically increases their revenue opportunities by better targeting ads to user demographics. LASER now allows the satellite receivers of large regional broadcasters to implement network driven local ad insertion within the satellite receiver. One user reported a 30 percent increase in ad revenue, all in one cost effective box.

***SM***

*Which of your current product lines is the most deployed?*

***Gary Carter***

Our most deployed products are audio receivers as used by broadcasters to feed AM/FM/MW/SW radio broadcast facilities. Data receivers continue to be strong in the financial, VOD, digital cinema and military markets. On the consumer side, we have designed, built and supplied services and equipment into the DTH market. The most recent is a DTH system in Africa which uses more than 200,000 satellite receivers to-date.

***SM***

*Do you see certain satellite technologies that are already entrenched in certain regions of the world now taking off in others?*

***Gary Carter***

We see DTH growing at a strong rate in Asia and Africa. These classically underserved markets have a rapidly growing middle class of consumers and minimal terrestrial infrastructure. In the not too distant future, DTH operators will begin to implement DVB-S3 and HEVC to reduce costs and free up bandwidth to increase consumer programming choices.

***SM***

*What are the top technical challenges that the satellite industry must overcome to ensure its future success?*

***Gary Carter***

The top technical challenges primarily relate to the cost of bandwidth and the amount of available bandwidth in order to effectively compete with terrestrial alternatives. HEVC and DVB-S3 are the short term game here. Viable and low cost components to allow cost effective use of Ka-band plus hybrid network implementations that bring more services to users are absolutely necessary.

***SM***

*Looking back over your career, what project or projects truly bring a sense of satisfaction to you?*

***Gary Carter***

The company was an early entry development partner and supplier to the WorldSpace organization who implemented a satellite direct to user radio service. Satellite delivered radio to portable and fixed radios, much the same as Sirius/XM does to-day. The advanced thinking and the great teamwork yielded advanced technical achievements which were exciting, as was the ability of the system to impact the daily lives of people across Africa. Recently, we completed the first phase buildout of the Zuku DTH platform in Kenya with Wananchi Group. Again, the ability to reach hundreds to thousands of people is extremely rewarding. We have customers using IDC equipment that is now more than 20 years old and still going strong.

# YAMAL-402
## SATELLITE

**Russian satellite operator – Gazprom Space Systems – presents the new Yamal-402 satellite opportunities to the International Market.**

**Yamal-402 satellite**, built by Thales Alenia Space (France), was launched in December 2012. Its capacity is 46 Ku-band transponders (66 equivalent transponders per 36 MHz each). Together with Russian and Northern beams the satellite includes:

- **European Beam** having four transponders per 54 MHz each covers the territory of Western and Central Europe, the Middle East and Northern Africa;
- **Southern Beam** having 8 transponders per 54 MHz each covers Africa to the south of Sahara;

  Southern and European beams have cross-connection ability.
- **Steerable Beam** having up to three transponders per 72 MHz each can be pointed over African or Asian continent upon the customer request. Steerable Beam can be cross-connected with Northern Beam.

# OPPORTUNITIES
## FOR INTERNATIONAL MARKET

GAZPROM SPACE SYSTEMS

# Eliminating Rain Fade Issues In The Ka-Band

*By Dr. Gerhard Mocker, Director SATCOM Technologies, WORK Microwave GmbH*

**Consumer demand for high-bandwidth telecommunications and broadcast services is increasing, causing the satellite industry to look for additional capacity beyond the Ku- and C- satellite frequency bands that have been traditionally used to support these services. The little used Ka-band, which encompasses the frequency area between 26.5 and 40 GHz, offers a solution to the industry's current capacity and bandwidth limitations, but is not without its own shortcomings.**

Being situated in a higher frequency range than the Ku- and C-bands, the Ka-band is impacted more by weather effects such as rain, wet snow, and moisture, which is shown to cause higher temporary attenuation, otherwise known as rain fade, than what is typically experienced in lower frequency bands.

Next-generation satellite and communications technologies are helping to mitigate the effects of rain fade in the Ka-band, enabling it to support the growing requirements of broadcast, professional, and consumer services. This article provides a comprehensive overview of the satellite and communications technologies designed to eliminate attenuation issues caused by weather, maximize efficiencies, and optimize the quality of service for satellite services delivered via the Ka-band. The article also examines the key applications for those services.

*Figure 1. Frequency range scale.*

### *Methods For Minimizing Rain Fade Issues In The Ka-Band*

While the Ka-band is more sensitive to rain fade than the Ku- and C-bands, there are mitigation techniques available to ensure wider adoption of the satellite spectrum. For instance, antenna gain in the Ka-band is about 4 to 6dB higher than for Ku-band antennas of the same size, helping to compensate for the increase in rain fades.

Spot beam coverage is another effective technique. When used over wide-beam satellite coverage, it enables a higher concentration of power in a specific area on Earth in addition to supporting an increase in receive sensibility on the satellite. This ensures that terminal costs are reasonable while providing sufficient data throughput and appropriate service availability.

Gateway site diversity, or creating two gateway sites for the same application, is another popular technique. If one site is impacted by rain fade, the other site may not be and would therefore be the optimal choice. The location of the sites and distance between them can make this method more or less effective.

Strategic positioning of the satellite gateways can maximize or minimize rain fade. For example, a gateway located in a region that experiences heavy annual rainfall would be less ideal compared with a drier region, such as a desert.

For full transponder applications, automated level control (ALC) technology at the transponder automatically compensates for uplink rain fades to a certain level without requiring a major change in power from the uplink station. The uplink station only needs to provide enough power to the satellite to where the ALC operates within its dynamic range. In the case of heavy rain fades, an increase of power from the uplink station may be applied temporarily until such heavy rain fade has finished. Uplink power control as described in the following can be used for this purpose.

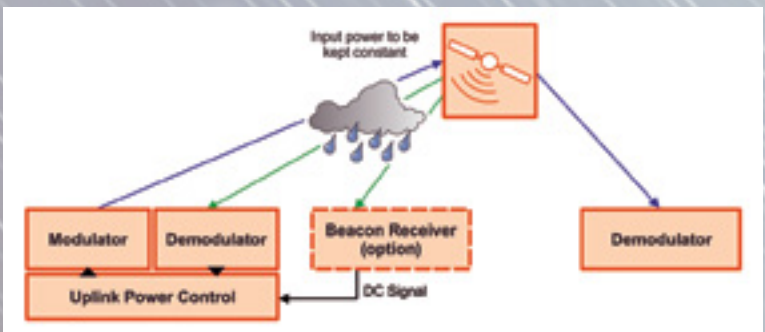


*Figure 2. Integrated uplink power control*

Shared transponder applications typically rely on the use of fixed transponder gain settings, requiring uplink stations to keep a constant input power at the transponder to achieve acceptable service availability.

Without technology intervention such as uplink power control, this can be extremely challenging. Uplink power control allows operators to increase transmission power automatically based on the presence of an uplink fade, making it a great tool for reducing rain fade in Ka-band services, like point-to-point links for data transmission (including Internet data) and TV contribution. (See *Figure 2*.)

Scalable video coding (SVC) is another technology that enables satellite operators to provide the best quality of service in the Ka-band. SVC allows operators to transmit compressed video in partial bit streams for higher and lower resolutions with lower and higher signal margin. During rain fade only the high resolution layers may be interrupted, allowing still ongoing video reception with only reduced video quality.

By enabling such type of graceful degradation in lossy Ka-band transmission environments, SVC helps satellite operators ensure they are still able to provide the best possible video quality also under adverse conditions and keep the overall service availability at a high level. The multistream feature of DVB-S2 allows an efficient separation of the different layers of SVC. SVC can also compensate for individual temporary high downlink fade and is by that specifically suited for broadcasting applications. (See *Figure 3* below.)

Last, but far from being least, Adaptive Coding and Modulation (ACM) allows for the maintenance of link connectivity also under rain fade situations. Using ACM, operators can adapt the FEC and modulation of a satellite transmission to the end-to-end link quality. Some return information from the receive location is required to do so, which is a relatively easy task to be realized in two way systems.

ACM helps to compensate for disturbances in the satellite link due to physical conditions such as humidity and atmospheric precipitation by providing real-time adaptation of transmission parameters according to the link conditions. Supported by the DVB-S2 transmission standard, it can be applied efficiently for all point-to-point data transmissions, while data for several destinations can be merged within one multiplex. By reducing the data rate, ACM increases the protection level of the transmission under fade situations, making it ideal for applications like pure data services, which can tolerate a temporary slowdown in throughput or reduced response time.

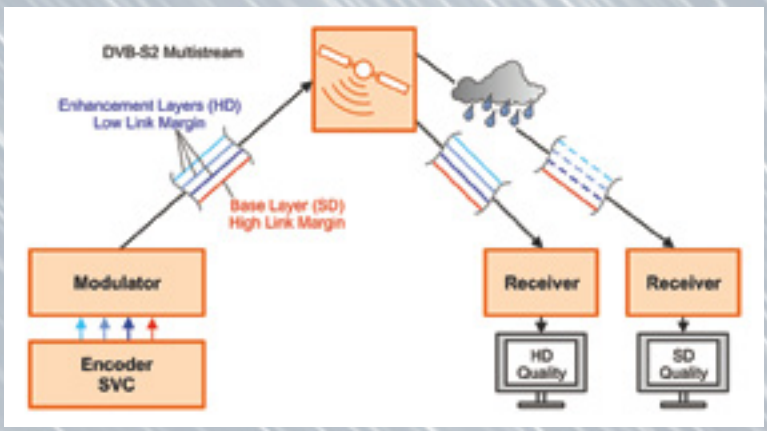


*Figure 3. Typical broadcast application using SVC and DVB-S2 Multistream.*

For pure real time services like voice and video with fixed data rate this may be less applicable. But for combined services with only a small portion of fixed rate real time services ACM is still well applicable. In this case, prioritization of these services over pure data services allows to keep the connectivity for these real time services to a big extend also in combination with ACM. Additionally, with some special hooks into the encoders used for voice and video, it is possible to reduce the data output in a coordinated way with the ACM operation, allowing a graceful degradation for these types of services under rain fade situations. (See *Figure 4* on the next page.)

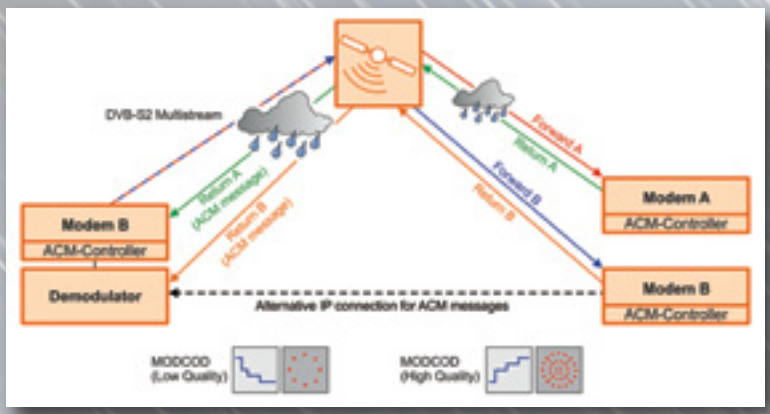


*Figure 4. Typical bi-directional point to point using ACM.*

### *Ka-Band Applications*

Many within the satellite industry originally viewed the Ka-band as being ideal for high-speed Internet and data services given its susceptibility to rain fade. However, using the advanced transmission and satellite technologies discussed above, satellite operators can easily mitigate rain fade issues, opening up the Ka-band spectrum to television services, including high-bandwidth services such as ultra high definition television (UHDTV).

With that being said, today Ka-band is primarily being used to support two-way professional or consumer data and Internet services in areas of the world that lack a strong terrestrial infrastructure such as DSL, cellular radio, or fiber. Through satellites operating in the Ka-band, which has a much higher available capacity than other satellite bands, people living in those regions can achieve a similar speed of service.

Given the amount of bandwidth that was recently freed up after the migration from analog to digital television, the Ku-band appears to have sufficient capacity to support Direct-To-Home (DTH) television applications for some time. However, a growing demand for HDTV and UHDTV may lead operators to look at the Ka-band as a viable resource for the supporting the increased bandwidth requirements of these advanced service

### *Conclusion*

A number of Ka-band satellites or satellites having some Ka-band transponders on board are already in orbit. To capitalize on the capacity and bandwidth offered by the Ka-band spectrum, satellite operators may implement advanced technologies designed to reduce the effects of rain fade, and increase the service availability, while keeping the services cost-effective.

DVB-S2 modulators and modems that feature technologies like uplink power control, ACM and DVB-S2 multistream help satellite operators optimize the use of satellite capacity. With rain fade being a minor issue, operators can confidently roll out high-bandwidth digital satellite television and data services operating in the Ka-band. For further infomartin regarding the company, access their website at ***http://ww.work-microwave.de***

**About the author**
*Since 2001, Dr. Mocker has been with WORK Microwave GmbH, in Holzkirchen, Germany, serving as the Director, SATCOM Technologies. From 2000 to 2001, he worked at Deutsche LANDTEL GmbH as that firm's Head of Network Planning. From 189 to 2000, Dr. Mocker gained additional experience at ANT Nachrichtentechnik GmbH as the System Engineer for satellite ground stations; at Bosch Telecom GmbH as the Technical Manager, Satellite Networks; at GE Capital Spacenet Services-Europe GmbH as the Manager of Engineering and Development, and at Gilat Europe GmbH as the Director Engineering.*

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# Satélites Mexicanos S.A de C.V. Absorbed With Aplomb

*By Chris Forrester, Senior Contributor*

Paris-based Eutelsat is, currently, the third-largest satellite operator in the world (directly after Intelsat and SES) and the company is absolutely determined to grow.

This time last year, Eutelsat expanded to the East through the acquisition of a satellite business from GE, which is now named Eutelsat 172A and generating revenues from the APAC region, including part of Australia.

On July 30th, the company announced it would build a giant satellite (Eutelsat 65 West A) to serve the Latin American market, and, in particular, Brazil, from a recently awarded orbital slot at 65 degrees West. Then, on July 31st, came the major announcement: Eutelsat would buy Mexico's SatMex system and tap even further into the dynamic Latino market—the forecast growth by the company is 7.3 percent (2011-2016) and they'll have in-hand a market that compares to Western Europe in terms of potential customer size.

Satmex is the 4th-largest Latin American player (with an 11 percent market share and covers 90 percent of the region). Intelsat leads the market with a 40 percent market share.

The deal with Satmex was only wrapped at 7:30 a.m. on the morning of July 31st. Eutelsat is paying "an enterprise value of $1.142 million" for Satélites Mexicanos, S.A. de C.V. ("Satmex") which, by any measure, will mean Eutelsat is now a major player over Latin America. In hard cash, Eutelsat is paying $831 million and is absorbing Satmex's net debt of $311 million. Eutelsat also owns 33.7 percent of Madrid-based Hispasat (since 2001), which also has interests over the Americas. This could mean some aggressive competition between the two Eutelsat entities. The Satmex purchase will wrap by the close of this year.

However, early in the morning on July 31st, trading on the Paris bourse didn't care for the news. Eutelsat shares fell badly by 6 percent to 21.07 euros for the operator. Some observers also wondered whether the Mexican purchase now eliminates the potential Optus purchase, where Eutelsat was a reported bidder.

Other worries were focussed on the amount Eutelsat had paid for Satmex (at 9.7 times EBITDA), which seems somewhat expensive when compared to the amount paid for GE-23 last year (a bargain at 4.5x EBITDA).

However, as investment bankers Jefferies pointed out in a note to clients, if you calculate the value expressed as an enterprise value paid per transponder (both those in operation and about to be launched), then the multiple would be 9x for Satmex and an expensive 10.6x paid for GE-23. Arabsat's recent purchase of HellaSat would have been an expensive 14.9x based on this calculation method.

Satmex operates three satellites at contiguous positions 113.0 degrees West (Satmex 6), 114.9 degrees West (Satmex 5), and 116.8 degrees West (Satmex 8)—this is coverage of 90 percent of the population of the Americas. The company also benefits from frequency rights in C and Ku-bands and was granted Ka-band rights in 2012.

### SatMex Highlights

- Three orbital positions
- C, Ku and Ka-band frequency rights
- Three sats in orbit*, two on order
- 69 percent network services
- 22 percent video

** One satellite, SatMex-5, is in inclined orbit*

### Who covers the Latino market*

| | | |
|---|---|---|
| 1 | Intelsat | 40% |
| 2 | StarOne | 17% |
| 3 | SES | 12% |
| 4 | Satmex | 11% |
| 5 | Hispasat | 11% |
| 6 | Telesat | 6% |
| 7 | Venesat | 2% |
| | Others | 1% |

** market share/Euroconsult*

### Transaction Multiples

| | Satmex | GE-23 | Hellas Sat |
|---|---|---|---|
| Active satellites | 2 | 1 | 1 |
| Planned | 2 | 0 | 0 |
| Blended age (yrs.) | 1.0 | 6.5 | 9.7 |
| Revenue (local)* | 137.3 | 50.0 | 32.8 |
| EBITDA (local)* | 107.0 | 39.0 | 25.2 |
| EBITDA margin | 77.9% | 78.0% | 7.68% |
| Proceeds (proxy for EV, in local)* | 1,042.0 | 228.0 | 157.0 |
| EV / EBITDA | 9.74x | 5.85x | 6.23x |
| Active transponders | 124 | 38 | 30 |
| Revenue per transponder (€m) | 0.84 | 0.99 | 1.09 |
| EBITDA per transponder (€m) | 0.64 | 0.77 | 0.84 |
| EV / transponder | 8.4x | 6.0x | 5.2x |
| EV / transponder (age-adjusted) | 9.0x | 10.6x | 14.9x |
| EV / active satellites (€m) | 393.2 | 172.1 | 157.0 |

*Source: Jefferies estimates, company data*
**Satmex revenue and EBITDA for 2012*

# ABS-2

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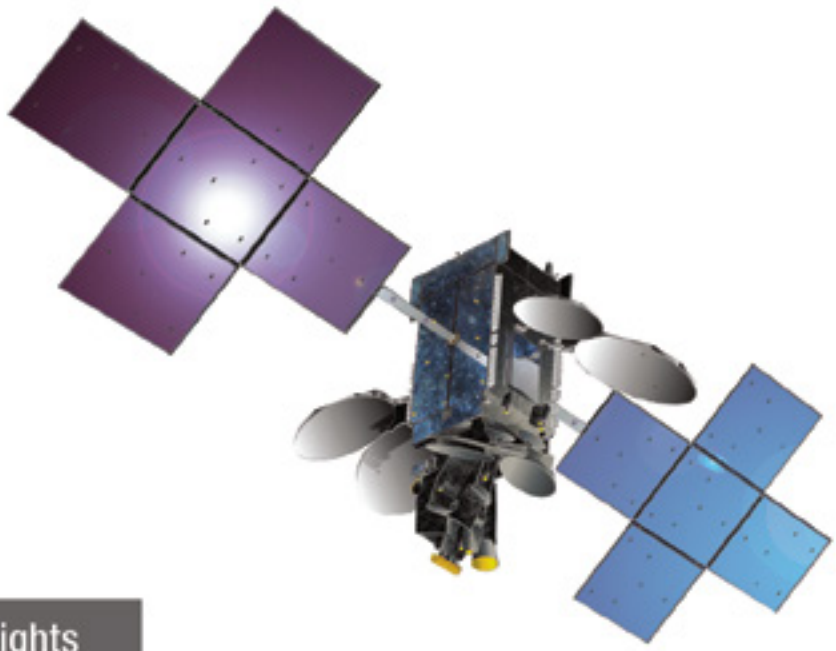

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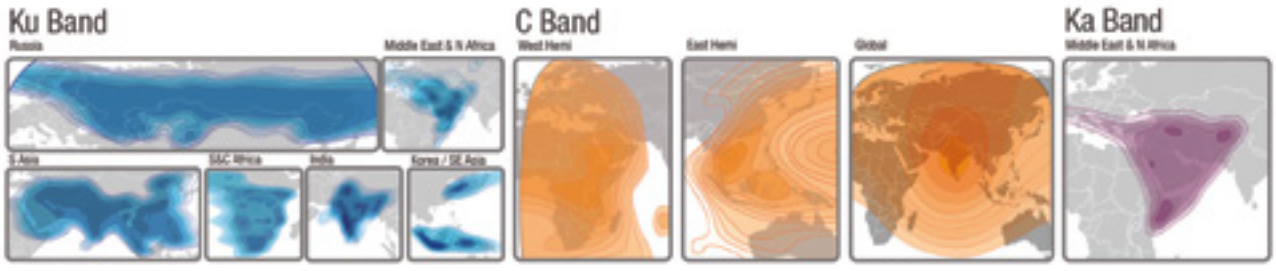


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Satmex has an 11 percent market share in Latin America, where it enjoys a strong franchise in corporate data networks and cellular backhaul. Last year (2012), Satmex generated revenues of $111.8m and EBITDA of $89m. There would be very useful synergies operationally and in terms of sales, said deputy CEO Michel Azibert.

This is all good news—especially for Satmex and its owners. The company exited bankruptcy in May of 2011, assisted by a $325 million loan. Back in 2010, Denver-based Echostar was close to an acquisition of Satmex. However, at the end of the day, Echostar boss Charlie Ergen walked away from the deal, grumbling that Satmex's bond-holders were too demanding and that some of the satellites had been bought on less than attractive terms.

SatMex exited bankruptcy via a Pre-Pack arrangement approved by the Delaware Bankruptcy Court. In papers filed at that time, SatMex said it would raise $325m of fresh financing through high-yield debt, as well as $96.2m in new equity. SatMex's bankruptcy position was that it had declared assets of $441.6m and liabilities of $531.6m. Part of its obligations were a 4-transponder agreement in favor of Space Systems/Loral on SatMex-6. Unclear is as to what the position is on these obligations, and whether they extend to the life of the craft. No doubt the eventual transfer agreement will offer clarification on this aspect.

Eutelsat was also an earlier bidder for Satmex back in 2007 when (along with two Mexican co-investors) the company attempted to purchase 100 percent of the business. At that time, SatMex was in disarray, said De Rosen, and Mexico's state-owned portion of the operator meant that there would be difficulty for a European company to acquire control.

Those conditions are now changed. Indeed, Space Systems/Loral may still have certain rights over Satmex-6' capacity. SatMex has no DTH clients, but it has cable clients as well as the Mexican government and data clients.

Eutelsat will benefit from SatMex's accumulated tax-losses (worth around $450m), which it has translated into a value of $100m at the end of the day.

While the deal will not close much before the end of this year, Eutelsat is looking forward to continued growth in he Latino DTH region, especially in terms of HD and even Ultra-HDTV. Eutelsat is forecasting HD channel growth of 25 percent per annum over the period 2011-2016. With the 2016 Olympic Games taking place in Rio, Eutelsat is anticipating Ultra-HDTV to start kicking in and make demands on capacity. Those demands will be on core digital infrastructure as well as OU and longer-term digital delivery.

Eutelsat also released its end of year (to June 30) financial report after the market closed on July 30th, and the 'success' message was stressed in line after line of positive news. The message was needed to counter what was, in effect, a profits warning in the previous quarterly report. This time, Eutelsat pressed all the positive buttons, attempting even greater transparency and saying: Revenues up 5.1 percent to 1.284 billion euros; "high level of profitability" with EBITDA of almost 1 billion euros (995.3 million euros), a margin of 77.5 percent; an order backlog that stands at 5.4 billion euros (up 2.5 percent) and worth 4.2 years of revenues, and perhaps the best news of all for investors—the company was increasing its dividend payout by 8 percent to 1.08 euros a share. However, this payout—while welcomed—was less than some observers had expected to be delivered.

### *22,000 Channels By 2022*

Euroconsult said that growth in EMEA and Latino markets will mean that, by 2022, there will be 22,000 DTH channels, with HDTV penetration at 32 percent in EMEA and Latin America.

Certainly Eutelsat can claim to have had a good year in 2013. Three satellites launched: Eutelsat 21B, 70B and 3D, and the already mentioned GE-23/ Eutelsat 172A, embraced into the fleet. The 7-8 degrees West position is going gangbusters (see separate panel) and Eutelsat has signed long-term relationships ("partnerships") with Russia's RSCC at 36, 140 and 56 degrees East. Plus,the company is buying 65A for the Latin market.

Eutelsat admitted that this year's revenue growth is not brilliant (at 2.5 percent). However, the next two years would experience an average growth of more than 5 percent until June 2016.

The official line from CEO Michel de Rosen, however, did deliver a warning: "Our industry is continuing to grow, albeit at a lesser pace than in the past decade. Several markets are still developing at a high pace—notably Russia, Central Asia and Africa—where we already enjoy strong positions—and Asia Pacific and Latin America, where we are actively developing our footprint, both organically, with, for example, the procurement of Eutelsat 65 West A.

De Rosen quoted new Euroconsult data which suggested a slowdown in demand in the EMEA region, but this decline in demand was more than compensated for by high growth in markets such as the Pacific Rim and the new Latino purchases.

De Rosen added that "targeted acquisitions" remain a clear objective for Eutelsat, although, perhaps this statement (from the accounts), was overtaken by the Satmex acquisition. "Our focus will be on expanding our presence in the markets and applications with the highest potential for growth on the back of a targeted fleet development plan, complemented where appropriate by external growth opportunities," he added.

Eutelsat revealed some useful data on its KA-SAT craft, saying that it has now had some 91,000 terminals deployed. A new team and solutions had addressed earlier problems. This new momentum was now strong in Europe and was nascent in countries such as Turkey and Russia. Moreover, Ka-Sat was not cannibalizing Eutelsat's other VSAT and Ku-based businesses.

About the author

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

### *Eutelsat+Nilesat growth up 24 percent*

***One region that has consistently outperformed the rest of the world is the MENA region, and at 7 and 8 degrees West, the combined might of Nilesat and Eutelsat are working together to grow the market to spectacular levels. Eutelsat said on July 30th. that the number of channels carried grew by 24 percent y-o-y to 662 (up 128).***

***Eutelsat said that the location has benefited from refreshed and expansion capacity on the Eutelsat 7 West A satellite, launched in October 2011, which has generated additional business with clients that include Al Jazeera, Gulfsat, MBC, Nilesat and Noorsat. "Resources at this neighborhood will be further reinforced in the first half of fiscal year 2013-2014 with the redeployment of HOT BIRD 13A to 7/8 degrees West (and to be renamed Eutelsat 8 West C). This neighborhood also contributed significantly to the company's strong backlog, with significant multi-year, multi-transponder contracts signed with anchor customers on Eutelsat 8 West B, well in advance of its launch in 3Q/2015."***

***As far as the rest of the Eutelsat fleet is concerned, Eutelsat said it is now carrying 4,661 channels, up by 400 channels y-o-y, or 9.4 percent growth). The number of HDTV channels reached 419 (as at June 30th), up 21.1 percent, from 346 a year ago. HDTV transmissions now account for 9 percent of Eutelsat's channels.***

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# Saving Time + Money With Used Uplink Antennas

*By Dan Freyer, AdWavez Marketing*

**Used satellite uplink antenna systems can offer tens of thousands of dollars in capital savings when compared to new units, especially when considering the purchase of large antennas. Through the application of pre-owned systems, service providers can also rapidly launch new services, sometimes within weeks, when new gear could require months to install.**

On the other hand, with used equipment buyers are also concerned about the risk of degradation due to previous wear and tear, malfunctions and failure, or the equipment failing to perform to advertised specifications. How do you manage such a risk? What makes a dish "good" versus simply purchasing a rusted piece of junk?

### *Big Savings + Big Benefits*

In addition to the potential for speedier delivery, the cost of pre-owned equipment typically costs about 50 percent less than the pricing for brand new systems. The recent experience of Santander Teleport is one example of how buying used antennas can help save time and money, all the while managing risk.

Santander Teleport offers commercial and government organizations access to C-and, Ku-and Secure X-band services from a single strategic location that covers all of the satellites in GEO orbit from 60 degrees West to 65 degrees East—that's a region that is broad in beam, from Western Australia to North America, the Mediterranean Sea, as well as the Indian and Atlantic Oceans.

Santander Teleport needed to acquire and rapidly install pre-owned uplink antennas and RF equipment in order to quickly support new antenna services. The company turned to New Era Systems, a leading provider of used Earth station equipment. According to Mónica Delgado, Technical Director for Santander Teleport, in Santander, Spain, "Many customers request services that need to be on air very quickly. If we do not have an antenna available, or if the RF equipment is not available in house, we normally contact the manufacturers. Sometimes, manufacturer delivery times for new antennas and RF equipment are too long to allow us to commit to our customers' requested in-service dates. The delivery time for a new 9-meter antenna from the manufacturer can be three to four months," she explains.

### *Money Savings Plus Fast Delivery*

"With pre-owned antennas from New Era Systems, we were are able to receive the antenna within a month and install it within 1.5 months, so normally we can get them up and running in less than three months. We have even put up pre-owned antennas within weeks," says Delgado.

Santander Teleport has purchased two large, 9 meter, antenna systems, as well as pre-owned RF equipment such as TWTAs from New Era Systems.

### *Buying Smart*

Smart buyers such as Delgado say that the combination of choosing reliable suppliers and a thorough testing process can ensure used systems are satisfactory.

"In the case of the large antennas, we change out the motor, add new RF gear, and as long as the antenna is checked out and tested, there should be no problem," explains Delgado. "The two antennas we purchased from New Era System were certified by Eutelsat and in perfectly good condition."

**Pre-Owned Antenna Points To Consider**
This article explains what to look for in used antennas, with some successful examples.

- *Cost-savings: used C- and Ku-band satellite uplink antenna systems can offer large capital savings (e.g. 50 percent-plus discount) compared to new units.*
- *On top of the cost-savings, pre-owned systems can usually ship fast, and be installed in weeks, as compared to months for installation of new systems from original equipment manufacturers.*
- *Ask your pre-owned satellite equipment supplier about testing, packaging and their delivery guarantees.*
- *In addition to permanent services, pre-owned antennas can work for business cases including: temporary services, low-budget services, test and trial services, Occasional Use or ad-hoc services, disaster recovery systems, short-term contracts (i.e., 1-3 years).*

*Photo of the Santander Teleport*

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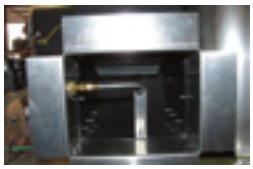

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**Questions To Ask Your Used Antenna Supplier:**

- *What do you certify?*
- *Who else has purchased systems from you?*
- *What do you test and guarantee?*
- *What will you replace if the system fails testing, and under what conditions?*

***Reputable Suppliers***

Reputable pre-owned equipment providers will also conduct performance or compliance testing and share the results and equipment records before shipping out stock.

Explaining why her organization turns to New Era Systems' Delgado added, "It's the trusted experience we have with New Era Systems—we know used equipment can have failures, and these are normally detected during early operation. That's why we like New Era Systems, as they provide solutions. We know they'll provide a solution if a component has issues. We like that type of response from a provider."

How do you assess the risks in buying a used large antenna? While most buyers would prefer new antennas, frequently, the cost-savings opportunities and customer requirements can make the risk / reward ratio of purchasing a used antenna extremely worthwhile. When making a price comparison, it is advisable to include the costs for refurbishment and for the pre-testing that would not need to be performed with a new antenna. If the cost savings are beneficial, then the used antenna option should be considered.

- Environmental Conditions: The specific structural and civil construction standards and conditions of your local site are important.

  "The first lesson I learned was that you have to consider your local conditions for operating your antenna, such as the effect of humidity and air salinity on corrosion," says a Middle Eastern operator. "We had an old antenna outside and the paint looked fine, but we found that the inside of the tube was completely rusted. Now we prefer flat iron antenna supports so we know if it's corroded or not."

  Humid, saline environments can place more stress on an antenna's structural components. Paint thickness, galvanization of the structure to resist corrosion, both can be extremely important.

- De-icing: In icy, snowy and rainy areas, de-icing systems may be required for continued operation. What is your de-icing system, or de-icing system options, and how will they work with your antenna?

- Wind survival: Wind tolerances are also key specifications. In high-wind, hurricane and typhoon-prone regions, very high wind resistance is critical. In addition, for large systems, the foundation pad supporting the structure and bolting system to keep the antenna intact during wind are also crucial considerations.

- Mechanical systems and motors: A key question with a used antenna is "Do the motors work mechanically, and with the control system?" The mechanical system reliability in your particular environment is important over the lifetime of the antenna.

  Test the motors to ensure they are in good working condition before they ship. The motor can be rusted from use, or lack of use, depending on the antenna's original, local conditions.

  "We check the motor for AZ/EL (azimuth and elevation) and also the motor for polarization switching," says New Era Systems' Phil Thomas. A new motor may be required, but even with such a need, the speed of delivery and cost-savings with a used system can be considerable.

  Some buyers replace the motor/drive/tracking with new subsystems. Even with a new motor system, a pre-owned antenna is still typically much less costly than the purchase of a new antenna.

- Hardware Kit: After antenna take-down, the de-installers should have collected buckets of nuts, bolts and washers that are to be sent with the antenna. Depending on the previous location of the antenna, its age and the climate, the hardware may be corroded, or in good condition. The items most subject to deterioration are the two rubber boots that protect the elevation and the azimuth screw jacks.

  "We typically replace anything that looks to be in poor condition, but with some clients that is not sufficient, and they order a completely new hardware kit," says Thomas. "When necessary we replace the boots before shipping the antenna." In some cases, a replacement hardware kit can be ordered from the original manufacturer and costs as much as $8,000 for large antenna systems.

- Electronics: Big antennas can have outdoor systems, usually in a shell enclosure, e.g., the AZ/EL motor controls and polarization controls. Your supplier should test the controllers and guarantee they work as well, or a new controller will need to be added to the solution.

- Test Patterns: Have your supplier make a full set of test patterns with the antenna prior to shutting it down. When the antenna is re-installed, a new set of patterns should be produced to compare the "before and after" patterns and to confirm that the antenna has been assembled correctly and will comply to all specs and needs.

- De-Installation/Re-Installation: There must be an equal amount of care during the de-installation as there is when the antenna is installed at the new site. "We have seen reflector panels damaged during faulty take-down, sloppy packing leading to shipping damage and motors rusted solid," says Thomas. "In nearly all cases, we only buy antennas where we can use our own crew to remove them, with quality control as the first priority."

- Shot-in or Bolt-Together?: Large transmit antenna reflectors typically come in one of two types—the "bolt-together" or the "shot-in" theodolite (a precision instrument that measures horizontal and vertical plane angles) variant. The bolt together is far easier to install, as the reflector panels bolt into pre-made holes in the radials. The shot-in has panels that rest on radials that have adjustment screws along their length—each screw must be adjusted to give each panel the exact curvature called for in the specifications.

  As antennas get larger, the exact shape of the reflector surface is critical. Typically, reflectors greater than 7 meters need to be "shot in." This is a process where a theodolite is placed at the center of the antenna reflector. Then, markers are placed at exact locations on the reflector surface and the reflector surface is adjusted to the exact shape recommended by the manufacturer using the theodolite.

  Manufacturers have a device called a drill tape that allows accurate positioning of the reflector panels. Unless the original manufacturer is performing the re-installation, the drill tape is typically not available for used systems. In this case, your supplier must make a new data set before taking down a standing antenna. This data-set is sent with the antenna to the new owner, and it is this data that allows the exact replication of the antenna transmission and receive characteristics.

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Taking theodolite measurements is a time-consuming process and requires considerable technical skill and expertise. When performed by an original equipment manufacturer, it can incur a $20,000 bill. Another technique is a system called Photogrammetry (*The determination, from photographic imagery, of an object's geometric properties*).

- Civil Works, Pad and Foundation Kit: A foundation kit usually consists of a series of large bolts, matching nuts and a template to show the exact placement of the bolts in the concrete foundation. As the bolts can often be ordered directly from a local machine shop, some used antenna buyers choose to purchase their own foundation kit(s). In certain countries where hardware is not readily available, the buyer will ask suppliers to sell them a foundation kit for the antenna re-commissioning.
- Packing and Shipping: Careless packing can ruin all of the careful work of take down and refurbishing a pre-owned antenna system. A king post can weigh as much as 10,000 pounds and can roll over and damage other antenna components if packed improperly in a shipping container. To avoid this, shipping containers need to be built out with wooden supports and shelves that will hold the components safely in place for transportation. High quality packing ensures that, in most cases, there is no damage to the antenna when in transit.

  "When we sell an antenna, the terms of payment are full cash price prior to shipment. The client's price includes careful loading of the antenna into their custom-built shipping container. This is a crucial step in the overall sale," says Thomas. "As we guarantee our products, we make every effort to ensure perfect condition prior to shipping.

*Installing a VSAT System, from left to right: Installer starts the assembly of an Andrew 4.5m antenna—the foundation for the base is excavated—the concrete for the base is poured. Photos courtesy of New Era Systems.*

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- Installation: Successful installation depends on the skills of the installers. The same care and accuracy required for a new installation must be followed with a pre-owned antenna, as well even if it only costs fifty percent of new price. Typically, installations require a crane, a man-lift, as well as skilled installer/technicians. If theodoliting is required, the installer will need to re-align all reflector panels and the sub reflector.

- Pre-Install Prep: "When we send our team to handle antenna installation we expect that certain work has been completed in advance. For example most of the antennas are set on concrete pads with the bolts already in place. Conduit for AC voltage and signal cables needs to be run underground or if overhead waveguide trays are used they should already be in place," says Thomas.

- Satellite operator's authorization: Satellite carriers require transmission tests that measure transmit parameters for side lobes, cross-pol, and other signal characteristics. After such testing on a satellite, the operator will record the patterns of the transmit antenna to accept or deny authorization to transmit. Assuming all civil works are done before arrival on site, it can typically take a week or so for the completion of acceptance testing.

***Supplier Terms + Due Diligence***

Not surprisingly, used Earth station antennas are not always trouble free. Torn boots, broken tracking receivers, and non-working electric motors, are just some common problems experienced when inspecting used equipment. It is clearly important to perform some due diligence on your potential supplier—it is good practice to ask your used satellite equipment suppliers what testing they perform and what guarantees they offer on the items they ship.

"When New Era Systems sells pre-owned antennas, it ensures that the units we ship are rigorously tested, and guarantees the items' performance," says Thomas. "We certify the tested results prior to shipment and provide full documentation."

"For us, New Era Systems is a good provider as we can rely on the quality of the products and we have confidence that the equipment they provide will be good quality. It is very important for us to have that confidence," says Santander's Delgado.

"It is our intention to ship only known working components because we have a policy of guaranteeing our products, and a failure costs us money. We have to ship a replacement at our cost and have the damaged item returned, also at our cost," Thomas explains. He recommends that "The greatest piece of advice we can offer to anyone buying used antennas is to know your supplier. Be sure that they will stand behind anything that could go wrong, because if you have to go back to the manufacturer for help, it would be very costly and time consuming."

***Consider The Savings***

When a savings of more than 50 percent is possible through the purchase of a used antenna, taking a quick look at your options with these products makes a great deal of sense. With something as specialized as large Earth station transmit antennas, your best bet for acquiring used systems is to work with an experienced, reputable supplier, one that follows test procedures, and one that provides delivery and performance assurances upon which you can rely.

**About the author**

*Dan Freyer is the principal of AdWavez Marketing (www.adwavez.com), an agency focused on providing marketing services to the satellite industry. He can be reached at dan@adwavez.com. He has helped top satellite manufacturers, operators, service providers, equipment suppliers, and associations develop their businesses for over 20 years. He is the author of Liftoff: Careers in Satellite, the World's First and Most Successful Space Industry (SSPI 2010), a contributor to The Satellite Technology Guide to the 21st Century, among numerous other industry publications.*

**Antenna Buying Best Practices: World Teleport Association (WTA)**

Recommendations from a recent report from the World Teleport Association (WTA) when buying pre-owned uplink antennas include:

- *There can be hidden faults in the dish. Performance can change after it is disassembled and moved and re-assembled. When possible, test the antenna at its first site to ensure you have benchmarks for performance before it is disassembled.*

- *The ability to taking field measurements for compliance with specs requires special expertise. A manufacturer's team or certified testing engineer/team with expertise in field measurements and the equipment may be the best choice, even if your staff has the engineering knowledge.*

- *If you don't have the available staff resources, then you need to go to outside consultants. Factor this into calculating your savings compared to purchasing a new system.*

- *Evaluate the antenna performance mechanically (mount, steering, pointing, control), not just electrically (i.e., Cross-Pol Isolation, Port-to-Port Isolation, gain).*

- *A transmit antenna must comply with satellite operator guidelines and regulatory limits. An acceptance test is standard for a new transmit antenna at most operators, and just as a new antenna's feeds and performance are tested initially for factory acceptance and site acceptance, the testing needs to be performed on a used antenna.*

- *Ensure you have acceptance testing requirements as part of your delivery contract.*

- *Manufacturer extended warranty: Try to negotiate extended manufacturer warranties. One operator purchased a used transmit antenna and negotiated a series of extended manufacturer warranties from Andrew, in addition to pre- and post-relocation testing to ensure full specs were met.*

- *If the system is being disassemble and moved, insist that the system be taken down by a qualified technician, previously certified to work on the brand of antenna being removed and packaged for shipment.*

- *A new set of assembly hardware should be made available to reinstall the antenna, with a certified technician available for the reassembly.*

The full report is available for purchase at

***www.worldteleport.org***

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# HTS—Risks, Challenges + Opportunities

*By Doran Elinav, Vice President of Business Development, Gilat Satellite Networks*

**High Throughput Satellites (HTS) promise to bring new opportunities to the satellite industry. However, as with any change in paradigm, there are also challenges and associated risks to the ecosystem that need to be heeded and handled. In this article, we will explore these issues from the viewpoint of the satellite operator.**

***Opportunities***

HTS promises to bring far more capacity at much lower prices, enabling new services at higher data rates. This is possible by implementing multi-spot beam (MSB) satellite architecture, similar to cellular networks. By implementing frequency reuse, a satellite is able to provide tens of Gbps of capacity as compared to only a few Gbps of capacity possible with standard, wide-beam satellite architectures. While the higher throughput of multi spot beam satellites comes at an increased cost, it is still much lower when compared to the dramatic increase in capacity—providing a x4-x10 improvement of the cost per bit.

HTS will enable the satellite industry to grow and expand beyond what is possible today, by:

- Enabling satellite to meet the growth in demand for data services; there is an insatiable demand for data, especially Internet data and current satellites simply do not have enough capacity to meet this growth. HTS will bring a ten-fold increase in capacity.
- Expanding to new markets that currently could not afford to use satellite communications as the costs were just too high. The new economics of HTS will open opportunities that were not possible before.
- Competing with terrestrial, which was the anathema of satellite communications, will be possible in many regions. So while fiber and high speed services will expand, there will be new opportunities for satellite even in areas where DSL services are available.

Gilat's VSAT technology is already providing cutting-edge services, including high speed broadband, video and VoIP services over MSB and Ka-Band satellites. With experience from around the globe, Gilat is helping customers to realize business opportunities in their markets.

***Challenges***

The new architecture of HTS is more than 'just' a change in the economics of satellite communications. HTS is intrinsically different from legacy wide-beam satellites. Here are a few points to consider:

Network topology is usually hub-and-spoke; therefore HTS architecture is mostly applicable for Internet and similar cloud-based applications. The topology is fixed so traffic from a specific beam is terminated in a specific gateway. Support for applications such as cellular backhaul, or enterprise specific connectivity requires significant augmentation of the standard multi-spot beam architecture which must be planned in advance by the satellite operator. There are exceptions to this rule and some of the solutions have more flexible multi-spot beam design that enables mesh and beam-to-beam connectivity.

Coverage is obtained via many small beams that blanket the region, each with its own capacity. The architecture is optimal for unicast transmission, but it is not efficient for multicast/broadcast services. Another impact is that bandwidth cannot be shared between beams, so unused capacity in one beam cannot reduce the pressure of higher demand in other beams.

In many cases, the satellite operator needs (or chooses) to invest in VSAT technology, populating the gateways with baseband equipment for VSAT service. This is sometimes a strategic decision of the satellite operator to 'move up the value chain' and offer additional services. The main drive in many cases is a pragmatic decision, to enable lower barriers of entry for local ISPs and resellers to offer the satellite broadband services.

All of these changes translate into new challenges for the satellite operator.

One of the main challenges is how to design the HTS capacity in the most optimal way in terms of cost per bit, in terms of the amount of capacity over geography, and in terms of flexibility to add capacity in higher demand areas while the satellite is in orbit.

Wide-beam satellites provided more flexibility to the satellite operator. Capacity could be used in different countries or for different applications, with no change in the satellite design—in the new HTS architecture, these changes are not always possible.

The evolution of the satellite ecosystem is yet another new challenge. Legacy wide-beam satellites provided good support for the existing ecosystem of teleports, service providers and system integrators. The new HTS paradigm is different.

Typically, there is a large initial investment in VSAT baseband equipment to support all of the beams in the desired service coverage. As a result, the satellite operator or its strategic partner(s) make this investment—such leaves little room in the value-chain for other service providers or independent teleport owners.

***Risks***

As in any business decision, there are two elements of risks associated with this opportunity—those stemming from taking action, and those from inaction.

The biggest risk for satellite operators comes not from taking action to address the market shift that is already underway. The growth in the HTS revolution promises that, in a few years' time, there will be abundant capacity over most of the world. If this occurs as expected, a portion of the current FSS revenues will be lost to the HTS. A satellite operator that does not have an HTS strategy may face a situation of not being able to compete in price and in capacity for the growing demand for data in its market. Spillover may also impact the legacy broadcast market, as the TV industry shifts to OTT and VOD types of services.

Implementation of HTS is not simple, and there are risks when choosing this path.

- Financing such a large project is a big risk to most satellite operators, especially as these are often larger and more expensive than typical wide-beam satellites. One way to mitigate or reduce this risk is by designing a multi-mission satellite that comprises standard wide-beam and spot-beam architectures. While the spot-beam capacity increases the cost of the satellite, the incremental addition is much smaller than a dedicated multi-spot beam satellite.
- Planning capacity for HTS is complex—the operator always faces a risk of not having the right capacity in the correct place to meet demand. For example, should the capacity be located over densely populated areas (where there are more potential customers but also more competition), or should it be placed over more remote regions (where there is less competition but also less demand or inability to pay for the higher grade service)?

There are several options to mitigate this risk, such as adding RF switching capability to the satellite in order for the beams to be 'lit up' on demand. Advanced switching mechanisms also enable changing the default gateway location as well as support of in-beam connectivity. Another option is steerable beams, which enable shifting capacity from one region to another, mitigating the risk of shifts in demand. Many HTS operators effectively become network operators by deploying VSAT baseband in the gateways. Therefore, satellite operators need to add new skill sets and shift their business focus from selling MHz capacity to selling Mbps. This change is not trivial and carries risks.

One way to mitigate the risk is in selecting a VSAT technology partner who is able to assist in this transition. Another way is to forego this path, selecting partners who can operate the VSAT baseband equipment, for a transition period, to enable recruiting and training operations people without risking the core business.

Gilat has significant experience providing broadband connectivity to a range of customer requirements including consumer, enterprise, government, media and telecom. Gilat's expertise includes the provision of complete ground solutions, planning service packages, hub operations and more.

***Summary***

HTS is changing the satellite industry—satellite operators need to embrace a strategy for facing this transformation. While there are big opportunities in the field, they also come with new challenges and risks. However, satellite operators cannot remain oblivious to the revolution in the market and the time for action is now. Gilat is an excellent choice for an experienced partner to help you mitigate risks in making the transition to HTS.

For further information: ***http://www.gilat.com***

**About the author**
*Doron Elinav serves as Gilat's Vice President of Business Development. Mr. Elinav is responsible for leading the company's business development efforts.*

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# SatBroadcasting™: Now Playing On Transponder 3

*By Stewart Schley*

**With help from Deluxe/EchoStar, a Hollywood coalition is taking movies from the skies.**

In the Walt Disney Pictures movie "Chicken Little," a piece of sky falls on the head of the animated protagonist voiced by actor Zach Braff, setting off the dramatic progression that delighted fans of the 2005 release.

It's fitting that the sky plays a significant role in the film, because behind the scenes, the animated 3D feature broke new ground by becoming not only the first commercial picture to be delivered at scale to theaters digitally, but the first to make extensive use of satellite communications technology. Of the roughly 80 theaters that had converted to digital projection systems in time for the "Chicken Little" debut, about 40 went an extra step—they installed satellite antennas that allowed them to capture an encrypted data stream that was delivered by Microspace, an early pioneer in satellite cinema. The remainder of the theaters received the movie via physical hard-disks.

"Disney had some very forward thinking people," recalls Joe Amor, the Microspace Vice President and General Manager who helped to organize the movie's satellite delivery network. "They went out and said, 'Okay, in six months we're going to release Chicken Little, the first 3D movie.' And 3D had to be digital. So, that was the industry's 'why go digital?' moment."

The movie's success helped trigger a wider march to invest in upgraded digital projection systems that now prevail across the theater exhibition market. Although the capital costs are significant, at around $70,000 to $100,000 per screen, the migration to digital projection has yielded enormous savings for studios compared with the old-school method of printing and shipping 35mm films to theaters in hulking, heavy metal cases. According to estimates from industry analyst MKPE, 70 percent of U.S. theaters were expected to be outfitted by 2012 with digital projection systems, many of them financed—at least partially—by movie studios themselves.

### *The Satellite's Role*

Now, eight years after the "Chicken Little" premiere, a second revolution in movie exhibition is taking hold. Thanks to a convergence of technological and economic influences, satellite communications is poised to overtake legacy distribution practices as the predominant method of getting high-resolution digital movie assets to the majority of first-run theaters in the U.S.

The satellite cinema category received a significant vote of confidence in April when a coalition of large theater owners and movie studios announced they would work with a joint venture of satellite operator EchoStar Satellite Services L.L.C. and film industry production specialist Deluxe Digital Cinema Inc. to create "a state of the art digital network open to all content providers and exhibitors for delivery of movies and other content to theaters in North America."

The Digital Cinema Distribution Coalition (DCDC) is comprised of AMC Theaters, Regal Entertainment Group, Cinemark Theaters, Universal Pictures and Warner Bros. The group will rely on satellite transmission capability supplied by EchoStar to help lower the costs of delivering and receiving movie files on hard disk drives. Importantly, the DCDC platform will enable theaters to receive films from both of Hollywood's two dominant processing and distribution companies, Deluxe and Technicolor Inc. (Technicolor currently provides satellite delivery of films for close to 1,100 U.S. and Canada theaters. Microspace also handles satellite distribution for a number of major Hollywood releases.)

"Our secure digital satellite delivery system will allow theater owners to leverage their substantial investment in digital exhibition and expand their programming offerings while stabilizing the cost of distribution," said Anders Johnson, president of EchoStar Satellite Services L.L.C.

The DCDC's embrace of satellite technology reflects an essential contribution of satellite technology: The ability to efficiently accommodate point-to-multipoint delivery of signals in a highly reliable manner. On a 36MHz satellite transponder, it takes roughly 10 to 12 hours to send a feature-length motion picture from EchoStar's Gilbert, Arizona, broadcast center to theaters across the continental U.S. Those films are encoded at a dense bit rate and low-loss compression scheme that's spelled out in the movie industry's digital specification. Movie industry experts believe the sheer size of the files—a typical movie ranges from 250 to 350GB—coupled with the need to accomplish simultaneous delivery to hundreds of theaters just days before a movie's debut, all but excludes any thought of terrestrial network delivery.

"The essential problem is cost, availability and scale, and trying to equalize those three things over a (terrestrial) network in the U.S. is pretty challenging," said Brad Jackson, Vice President of Satellite Operations for Deluxe Digital Cinema Inc. which manages digital assets for studios and their distributors. "That's where satellite is the equalizer: You can send from one point to many points with scale, with availability and affordability over a broad geographic area."

That should translate to significant savings from the prevailing reliance on hard disks, said Technicolor Vice President of Strategy and Operations, Greg Mandel. He points to the ability to eliminate "physical handoffs" for content as a big argument for satellite delivery of movies. However, he also sees benefit from the ability to quickly deliver smaller files to theaters, such as trailers and supplemental packages.

The 1,200 or so U.S. theaters that have already installed satellite receive systems now routinely capture encrypted movie files to their "catch servers" using automated processes that replace the manual transfer of data from hard-disks sent back-and-forth via overnight couriers. With the formation of the DCDC, a majority of the roughly 5,000 U.S. theaters are expected to have satellite receive capability by mid-2014.

### *Secure Delivery*

Digitally encoded movie files traverse the satellite network in the form of Digital Cinema Package (or DCP) files compliant with the 2007 movie industry digital specification authored by Digital Cinema Initiatives LLC, a joint venture of Disney, Fox, Paramount, Sony Pictures Entertainment, Universal and Warner Bros. The coalition's interoperable open architecture is designed to create a framework for digital film delivery that creates interoperability among various components, but allows for competitors to innovate in the space. Not surprisingly, a large portion of the specification is devoted to a proprietary encryption technique designed to thwart would-be pirates.

The selection of the Deluxe/EchoStar joint venture confirms not only that satellite transmission can reduce the expenses associated with receiving DCP files, versus hard-disks, but that Hollywood studios—notoriously cautious about guarding against theft of content—are confident about the Deluxe/EchoStar joint venture's ability to protect their investments in intellectual property while leveraging the more favorable economics of satellite delivery.

### *New Content Possibilities*

Satellite delivery doesn't just improve the economics of exhibiting traditional movies. For a growing number of theaters, it's also an enabling agent for in-theater promotional and advertising material, plus a new breed of "alternative content," such as live concerts, sports events and special-interest offerings that promise to help theater owners capture incremental revenue from patrons.

Ironically, the use of satellite technology to support live events for theaters borrows from earlier generations of satellite communications applications. Boxing fans who attended popular "closed circuit" broadcasts of marquee bouts in the 1970s and 1980s saw the action on the screen, thanks to C-band satellite Earth stations that were set up specifically for these high-dollar, one-time events.

However, the costs associated with rigging a one-off satellite receive infrastructure limited the range of events theater owners could realistically offer. Competition from in-home, pay-per-view and premium television alternatives vanquished the closed-circuit marketplace.

Now, the presence of a dedicated satellite network for theater owners via EchoStar opens up more economical possibilities for importing specialized content into theaters on a more regular basis. One popular theatrical event, "The Met: Live in HD," generated $2.8 million in U.S. theater attendance revenue during its one-day run in December of 2012, according to box-office researcher Nash Information Services, exemplifying the revenue possibilities of alternative content.

The economic upside from alternative content exhibition is one ingredient within a recalculated Hollywood spreadsheet that favors satellite delivery. Another important ingredient is predictable, assured access to dedicated satellite transmission capacity. The absence of dedicated satellite capacity historically prevented studios and theaters from going all-in on satellite delivery, said Deluxe's Jackson. Now, with EchoStar dedicating transponder availability whenever studios require it, the economics tilt squarely in the satellite's favor, with some industry analysts estimating satellite delivery will cost studios one-third of what they now spend, per theater, to deliver movies on hard disks.

"In the past, satellite providers didn't want to reserve a transponder for just a day or two of occasional use," Jackson said. But he added that EchoStar's willingness to "step up" by committing capacity to a dedicated "digital cinema neighborhood" was key. "That was the tipping point," Jackson said. "It became an easier economic puzzle to solve."

**About the author**
*Stewart Schley writes about media and technology subjects from Denver, Colorado.*

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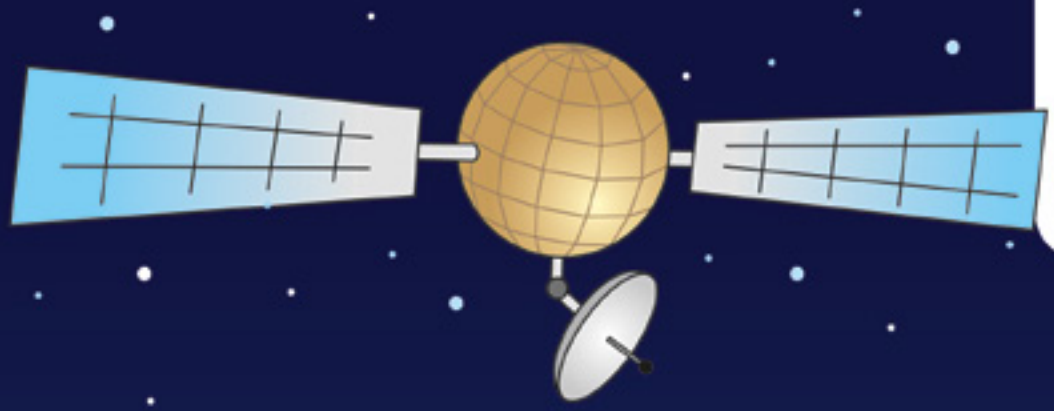

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# The SES Success Story

*By Jos Heyman, Senior Contributor*

**Setting the scene—the small European nation of Luxembourg has been involved in commercial broadcasting since December 19, 1929, when the government passed legislation that allowed a small society known as La Société Luxembourgeoise d'Etudes Radiophoniques to start transmitting radio programs to many nations in Western Europe. To do this, the society created the Compagnie Luxembourgeoise de Radiodiffusion, to be known as Radio Luxembourg.**

Using a range of frequencies, Radio Luxembourg transmitted in the German, French, English and Dutch language over many years via radio as well as by long wave bands. In these language zones, broadcasting was operated by government sponsored, non-commercial stations. It was the entry of radio Luxembourg that allowed commercial undertakings in those countries to advertise their products on the air. In particular, the author remembers listening to the English broadcast on 208m to enjoy programs and music not provided by the (Dutch) state controlled broadcasters. Although the programs were pre-recorded in the United Kingdom using, on occasion, original American stars DJ-ing their records, they were transmitted from the Luxembourg territory.

In 1954, Radio Luxembourg was renamed Compagnie Luxembourgeoise de Télédiffusion (CLT) and started commercial television broadcasts adopting the same approach used for radio and television broadcasts. Eventually, the company became known as RTL for Radio Télévision Luxembourg (in French) or Radio Television Luxemburg (in German) and currently has interest in 54 television and 29 radio stations in Germany, France, Belgium, the Netherlands, Luxembourg, Spain, Hungary, Croatia, India, and Russia.

### *SES*

It was in this commercially focused climate that it came as no surprise that, in 1985, the Société Européenne des Satellites (SES) was established in Luxembourg as the first European private satellite operator. The company had the full support of the government and the Luxembourg state remains a major shareholder.

The company started operations with the Astra series of satellites, the first of which was launched on December 11, 1988. The satellite had been built by RCA using the Astro 4000 platform and, from a geostationary position at 19 degrees East, used 16 Ku-band transponders for television program broadcasting.

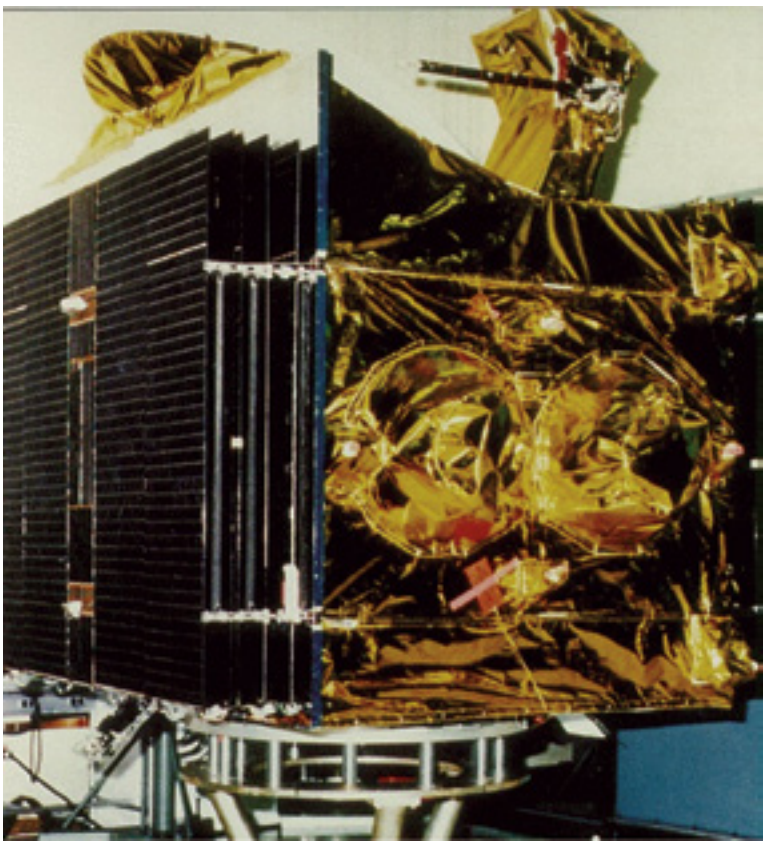
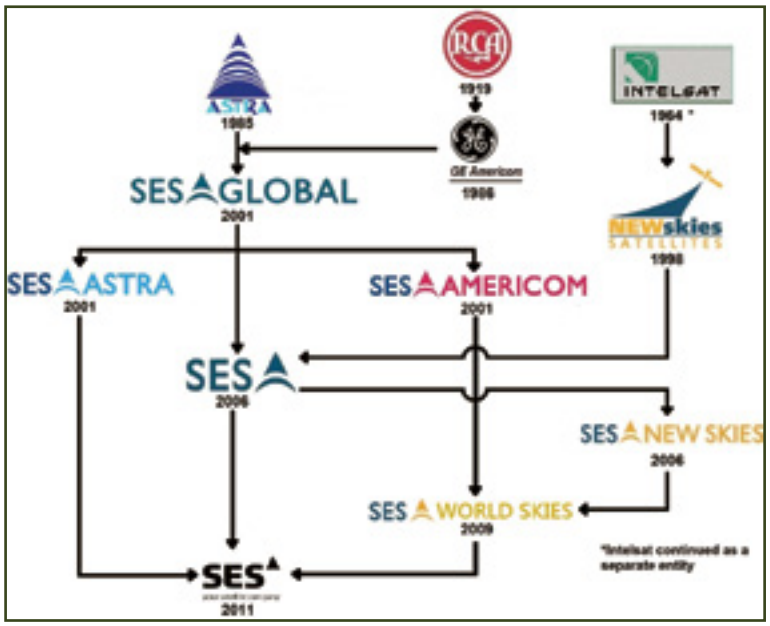


*Photo of the Astra-1A satellite during the satellite's build.*

Eventually the company expanded across the globe. In 1999, SES acquired a 34.13 percent interest in Hong Kong's AsiaSat, thereby gaining a foothold in the APAC regions, although AsiaSat continued to operate its satellites independently.




*The corporate development of SES.*

In 2000, SES acquired half of the Norwegian satellite broadcaster Nordic Satellite AB (NSAB) and renamed that company Sirius, while, still in 2000, SES acquired a 19.99 percent interest in the Brazilian Star One system. The following year, SES purchased a 28.75 percent interest in Argentina's Nahuelsat.

### *SES Global*

However, the most significant acquisition occurred on October 2, 2012, when SES purchased U.S. satellite broadcaster GE Americom.

GE Americom had its roots in the Radio Corporation of America (RCA), which had been established on October 17, 1919, by the General Electric Corporation (GE) through the purchase of the Marconi Wireless Telegraph Company of America, a subsidiary of the British-owned Marconi Company.

*Artistic rendition of the AMC-21 satellite.*

RCA was involved in a wide range of radio and radio related products, including marketing radio equipment manufactured by GE as well as gramophone records. The company was also involved in international telecommunications services through its subsidiary RCA Communications, Inc., later the RCA Global Communications Company. Through the anti-trust legislation of 1930, RCA was separated from GE and continued to function as an independent corporation.

During the late 1960s and early 1970s, by which time the company was known as the RCA Corporation, they became involved in a range of diversified projects that had little to do with the firm's main electronics and communications markets.

By then, RCA had also been involved in the building of communications satellites, in particular, the RCA Satcom system of which the first satellite, RCA Satcom-1, was launched on December 13, 1975, through a subsidiary named Americom. The services provided were used by the major U.S. television networks ABC, NBC and CBS to distribute their programs to affiliate stations.

Due to business and financial conditions, GE purchased RCA in 1986 and broke up the conglomerate by selling parts of it to other interests—except for the government services unit and the National Broadcasting Company (NBC). The satellite network continued to operate as GE Americom.

The acquisition of GE Americom by SES resulted in the formation of SES Global that had two operating companies known as SES Astra and SES Americom. SES Americom continued to operate the satellites as AMC satellites.

SES Global continued to expand its interest in other satellite operators, such as the Canadian Ciel satellite operator and Mexico's Quetzsat. SES' interest in Nordic Satellites was increased to 75 percent and later to 90 percent and eventually, in 2010, to 100 percent ownership. On the other hand, the SES Global interest in Nahualsat, AsiaSat and StarOne were divested.

SES Global also gained interests in other companies operating in industries related to satellite communications. SES Global was renamed as SES in 2006.

***SES New Skies***

The full acquisition of New Skies Satellites (NSS) in March of 2006 led to the establishment of SES New Skies in September of 2006 with another six satellites added to the SES fleet.

New Skies Satellites (NSS) was originally established on November 30, 1998, as a commercial subsidiary of Intelsat and was registered in The Hague, The Netherlands. At that time, several Intelsat satellites were transferred to NSS.

***SES World Skies and SES S.A.***

In July 2008, SES Americom merged with SES New Skies, under the latter's name until, on September 7, 2009, the company was rebranded as SES World Skies. In May 2011, SES Astra and SES World Skies were merged into the single SES S.A. company.

SES currently operates a fleet of 45 geostationary communications satellites carrying, at the close of 2012, 5,546 TV channels and 1,486 HD channels using 1,068 of the available 1,436 transponders. SES services 276 million homes with television programs through local service providers, as well as 68 million homes with direct-to-home (DTH) services.

| Name | Int'l Des. | Launch | Location | Notes |
|---|---|---|---|---|
| **Active** | | | | |
| NSS-703 | 1994 064A | 6-Oct-1994(_) | 47W | Launched as Intelsat-703 |
| AMC-1 | 1996 054A | 8-Sep-1996(_) | 103W | Launched as GE-1 |
| AMC-2 | 1997 002A | 20-Jan-1997(_) | 10.2E | Launched as GE-2 |
| AMC-3 | 1997 050A | 4-Sep-1997(_) | 87W | Launched as GE-3 |
| NSS-5 | 1997 053A | 23-Sep-1997(_) | 50.5E | Launched as Intelsat-803; also known as NSS-803 |
| Astra-1C | 1997 070A | 3-Dec-1997 | 31.5E | |
| NSS-806 | 1998 014A | 28-Feb-1998(_) | 40W | Launched as Intelsat-806 |
| Astra-2A | 1998 060A | 30-Aug-1998 | 28.2E | |
| AMC-5 | 1998 063B | 27-Oct-1998(_) | 81W | Launched as GE-5; also known as Nahuel-1B |
| Astra-1H | 1999 033A | 18-Jun-1999 | 19.2E | |
| AMC-4 | 1999 060A | 13-Nov-1999(_) | 67W | Launched as GE-4 |
| AMC-7 | 2000 054B | 14-Sep-2000(_) | 137W | Launched as GE-7 |
| Astra-2B | 2000 054A | 14-Sep-2000 | 10.2E | |
| NSS-11 | 2000 059A | 1-Oct-2000(_) | 108.2E | Was GE-1A, AMC-1 and Worldsat-1 |
| AMC-6 | 2000 067A | 21-Oct-2000(_) | 72W | Launched as GE-6; also known as Rainbow-2 |
| AMC-8 | 2000 081B | 20-Dec-2000(_) | 139W | Launched as GE-7, also known as Aurora-3 |
| Astra-2D | 2000 081A | 20-Dec-2000 | 28.2E | |
| Astra-2C | 2001 025A | 16-Jun-2001 | 19.2E | |
| Astra-3A | 2002 015B | 20-Mar-2002 | 23.5E | |
| NSS-7 | 2002 019A | 16-Apr-2002(_) | 21.5W | |
| NSS-8 | 2002 057A | 19-Dec-2002(_) | 95E | |
| AMC-9 | 2003 024A | 6-Jun-2003(_) | 83W | |
| AMC-10 | 2004 003A | 5-Feb-2004(_) | 130W | |
| AMC-11 | 2004 017A | 19-May-2004(_) | 131W | |
| AMC-15 | 2004 041A | 14-Oct-2004(_) | 105W | |
| AMC-16 | 2004 048A | 17-Dec-2004(_) | 85W | |
| NSS-10 | 2005 003A | 2-Feb-2005(_) | 37.5W | Also known as Astra-4A and AMC-12 |
| Astra-1KR | 2006 012A | 20-Apr-2006 | 19.2E | |
| AMC-18 | 2006 054B | 8-Dec-2006(_) | 105W | |
| Astra-1L | 2007 016A | 4-May-2007 | 19.2E | |
| Astra-4A | 2007 057A | 17-Nov-2007 | 5E | Was Sirius-4 (Name reused) |
| AMC-21 | 2008 038B | 14-Aug-2008 | 125W | |
| Astra-1M | 2008 057A | 5-Nov-2008 | 19.2E | |
| NSS-9 | 2009 008A | 12-Feb-2009(_) | 183E | |
| SES-7 | 2009 027A | 16-May-2009 | 108.2E | Was PhotoStar-2 |
| NSS-12 | 2009 058A | 29-Oct-2009(_) | 57E | |
| SES-1 | 2010 016A | 24-Apr-2010(_) | 101W | Ordered as AMC-6R |
| Astra-3B | 2010 021A | 21-May-2010 | 23.5E | |
| SES-3 | 2011 035A | 15-Jul-2011(_) | 103W | |
| Astra-1N | 2011 041A | 9-Aug-2011 | 28.2E | |
| SES-2 | 2011 049B | 21-Sep-2011(_) | 87W | Ordered as AMC-6R |
| SES-4 | 2012 007A | 14-Feb-2012(_) | 22W | |
| SES-5 | 2012 036A | 9-Jul-2012(_) | 5E | Also known as Astra-4B |
| Astra-2F | 2012 051A | 29-Sep-2012 | 28.2E | |
| SES-6 | 2013 026A | 3-Jun-2013(_) | 41.5W | |

*Artistic rendition of the SES-3 satellite.*

**About the author**

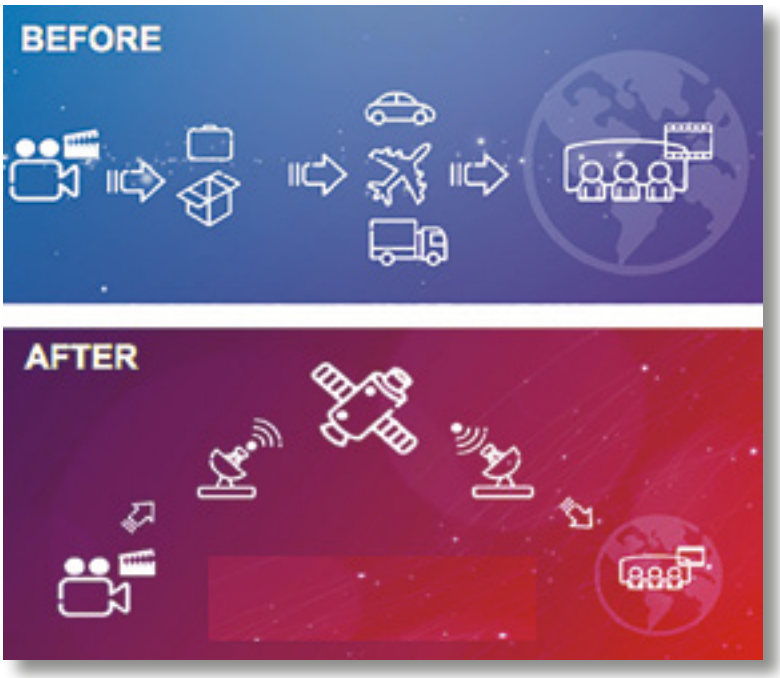
*Jos Heyman is the Managing Director of Tiros Space Information, a Western Australian consultancy specializing in the dissemination of information on the scientific exploration and commercial application of space for use by educational as well as commercial organizations. An accountant by profession, 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.*

# Satellite Revolutionizes Film Distribution

*By Ignacio Sanchis, CCO, Hispasat*

**There have many changes in the cinematographic industry since the era of the large celluloid rolls, immortalized in Giuseppe Tornatore's Cinema Paradiso: Technicolor, Dolby Digital, Real 3D...**

Film distribution has remained immutable—the traditional means of the hard disk blockbuster distribution for transportation to the screens, that is—until today.




HISPASAT has taken a revolutionary step further in the distribution network: Satellite distribution of films.

The innovative system driven by HISPASAT represents a significant streamlining of the distribution process to movie theaters, allowing all of them the simultaneous reception of a film, with vast improvements in efficiency and security. This new method of cinema broadcasting takes care of all of the logistical problems associated with film distribution and exhibition. Satellite film represents the best film distribution option, as the diverse geographical conditions and the high number of cinemas that need to ensure film projection with superb visual clarity, surround sound immediacy, and ease of operation. Satellite cinema distribution dematerializes the process, doing away with the previously required and expensive hardware support as well as reducing waste.

Imagine the positive change this means for film companies. Until now, film companies have had to maintain a distribution system that was based on a digital medium, the DCP (Digital Cinema Package). This package is delivered to each and every one of the cinemas in which the film will be shown across the globe. Required are thousands copies of the master film, which are sent in highly protected packages, given the medium's fragility, to the different theaters.

Once the DCP has arrived, the film is downloaded to the hard disk projector's server, and then the DCP must be returned to the distributor for reuse. This requires the deployment of complicated logistics that are definitely not without risks—plus, the turnaround times for copies ranges from six hours to several days, depending on the location of the theaters and the location of the distributors.

This process may be replaced now by a single transmission of the film from the headquarters of the distributor to all of the subscribed theaters simultaneously. The satellite collects the signal, amplifies the data, and forwards the film to the downlink centers. Once that is accomplished, the data can be captured simultaneously by all of the antennas that have been installed in the theaters. In order to protect the contents, the projection locations are emailed a password that allows them to decrypt the digital film.

The technological advances that comprise the new distribution system offer significant advantages—the process is streamlined and the time spent to receive the films in the theatre is significantly reduced. Additionally, security and efficiency are increased and logistics are simplified—loss or damage to the material is avoided and deliveries are no longer delayed.

The power, flexibility and functionality of the satellite makes such possible for this form of distribution to be used for all types of content, from HD and 3D to the future Ultra High Definition format that is currently being developed.

Only a few elements are required to carry out this process: A broadcasting antenna and a management system at the content provider; a receiving antenna at the cinemas themselves; digital projection equipment (that is probably already in use by most cinemas); a computer for downloading the film; and a password to make this highly preferable distribution process possible.

HISPASAT has committed to the development of this service in Europe, Africa and America; and is involved in the development of different projects with leading companies in the market to offer this solution.

In Spain, one of our customers will be able to distribute 20,000 film copies and 30,000 trailers per year to 2,000 movie theaters all over the country, using the Hispasat 1E satellite and without the need of hardware supports. Thanks to the high levels of power on the HISPASAT fleet, which allow for transmission speeds of more than 115Mbps, all of the cinemas will be able to download a medium-sized film—approximately 200GB—with secure delivery onto their projectors in approximately three hours—a trailer will take just a few minutes.

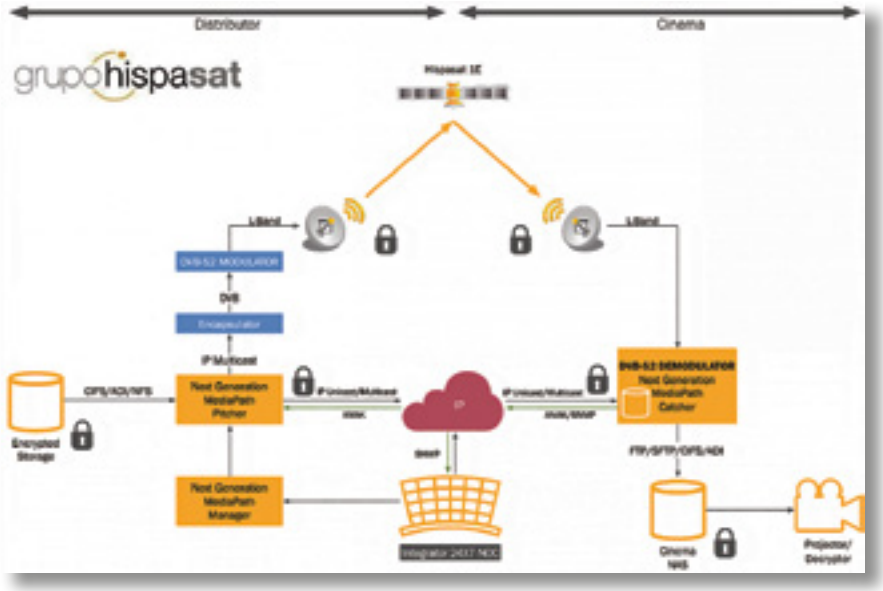
In America, another customer has implemented a satellite network to distribute live HD content and digital movies to cinema complexes throughout Mexico, the USA and LATAM using Hispasat capacity on the Amazonas 2 satellite.

To help attract new audiences and offer existing audiences more variety, exhibitors in the region are looking to turn their cinemas into multi-arts venues that offer a range of live and recorded events. In addition to broadcasting movies, this kind of solution can use its network for opera, sporting events and other HD content. Thanks to satellite distribution techniques, HISPASAT is the only operator in Mexico that transmits live broadcasts of the Metropolitan Opera Season to 40 cinemas with HD quality and Dolby audio.

Once again, the satellite appears as a key element in a broadening sector for the provisioning of advanced and renewed services to a variety of customers. This technology affords effective solutions with a high added value.

**About the author**

*Since January of 2013, Ignacio Sanchis has been Hispasat's Chief Commercial Officer. In this role, he is responsible for sales, marketing, client engineering and service quality at the Hispasat Group. Before joining Hispasat, he spent five years as General Manager for Spain and Portugal of Nagravisión, leading development at this company and at affiliates of the Kudelski Group in the Iberian audiovisual market. During the 10 years prior to that, Ignacio worked at Philips, where he took on different responsibilities in the areas of sales and marketing of the Telecommunications and Consumer Electronics divisions. He directed the business unit Philips Home Networks in Spain and Portugal, which encompasses Set-Top Box, telephony and network businesses.*



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# SatBroadcasting™: Satellites Ready To Serve 4K Demand + Beyond

*By Peter Ostapiuk, Vice President of Media Product Management, Intelsat*

A recent, successful demonstration of 4K Ultra High Definition (UHD) delivery shows that Intelsat is capable of delivering the higher quality signals to consumers using transponders that are in service today. However, to take advantage of this potential opportunity, the broadcast sector must avoid repeating some of the mistakes that led to customer backlash against 3D and the subsequent shutdown of several, high-profile 3D channels.

4K UHD is the next evolutionary step for television broadcasting. Just as Intelsat supported the smooth transition from SD to HD, so, too, will the company be ready to support the transition to full-time distribution in this new format. In June, Intelsat and Ericsson demonstrated true 4K, end-to-end video transmission via satellite. This was the first transmission of a UHD signal over satellite in North America, and the demonstration proves that the satellite delivery chain can accommodate the next-generation signals as soon as broadcasters are ready to offer them.

The demonstration delivered a 4:2:2 10-bit, 4K UHD signal at 60 frames per second, or p60, to Turner Broadcasting's facilities in Atlanta, Georgia. This transmission of a live-encoded 4K UHD signal over satellite in North America was achieved using Intelsat's Galaxy 13. The 100 Mbps video feed was encoded and decoded in real time by Ericsson using its AVP 2000 contribution encoders and RX8200 receivers. Newtec provided the modulation and demodulation hardware, featuring Clean Channel Technology®, and the satellite downlink antenna was provided by Turner Broadcasting.

The 36MHz transponder, typical for C-band distribution, allowed us to increase the transmission rate to 100 megabits per second. There were two tests—one to see maximum throughput on a 36MHz transponder, in which we achieved 140Mbps, and one for a 100Mbps data rate, which is optimal for the 4K signal being encoded. The technical process of preparing for and transmitting a 4K UHD signal is not much different than for other high-speed transmissions; however, carrying 100Mbps on a single C-band transponder demonstrates that the satellite ecosystem is innovating to stay at the forefront of media distribution.

The transition from SD to HD took almost 10 years, so it is important to be realistic about the 4K timeline. In order to support the mainstream adoption of the technology, the entire industry must work to ensure that we have all of the right pieces and that technology does not get ahead of consumer demand.

### *The Popularity Of 4K/UHD Will Be Driven By Content Availability*

Compared to 3D, broadcasters are viewing 4K as more compelling and customers, anecdotally speaking, seem to better appreciate this format. The migration to 4K will not be immediate. Intelsat believes 4K will enable a new premium tier of programming to be made available by selected large programmers. Not everything will be in 4K in the short term. That is in part related to cost, but it is also customer-driven. Some content simply will not work well in 4K.

Having said that, Intelsat does not believe the transition from HD to 4K will be en mass—there will be more demand for managed services. Rather than just buying a transponder, customers will want an entire transmission chain. In many instances, delivery of 4K will be over satellite and over fiber, and the Intelsat network is prepared to do both.

Ultimately, it will all start with content, and there is little content available today in 4K. If you remember the introduction of 3D television, lack of content was a huge barrier to consumer acceptance. Media companies must, therefore, make certain content is available in large quantities for consumers to watch on 4K screens and that services will be available through payTV operators.

This transition will require time and everyone will have to be patient. There have been many lessons learned from previous experiences and the company wants to get it right with 4K, as we see the tremendous potential of the technology. All parties need to work together to ensure 4K success.

### *Intelsat To Demonstrate Live 4K Delivery With Partners BT + Ericsson At IBC*

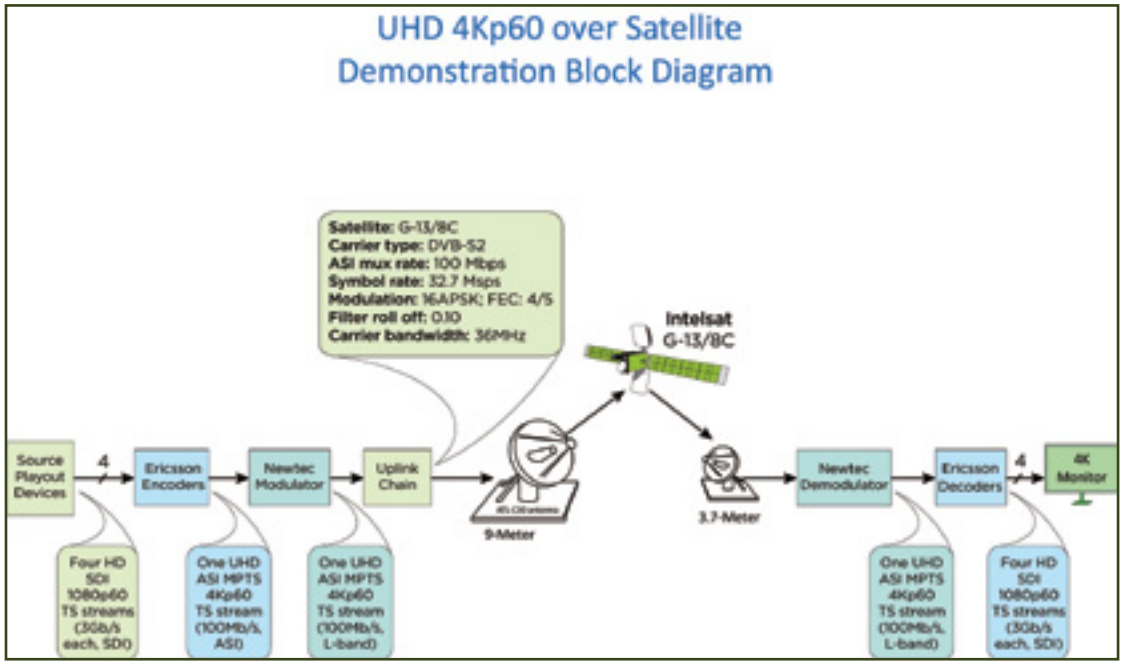
Going forward, Intelsat plans to conduct more demonstrations with a number of broadcasters and DTH providers. As the technology improves, new elements of the delivery chain become available. Company efforts will continue to ensure the provisioning of the end-to-end delivery of the content to owners all the way to their homes.

As a pioneer of next-generation compression systems and a long-time partner, Ericsson was the obvious choice for the Atlanta demonstration. Intelsat was delighted to work with them on this project, and believe that the mutual cooperation enables Intelsat to lead the way for UHD TV over satellite. The two companies have a wealth of expertise that allows broadcasters' and programmers' needs to be fully anticipated—the support will be present for them when they transition to UHD.

Intelsat will offer a demonstration at IBC that will include live content and more partners at booth 1.C71 where visitors can experience 4K broadcasting via satellite.

**About the author**

*Peter Ostapiuk is responsible for management and development of Intelsat's media products portfolio. He manages a global team of marketing and product-management professionals that is responsible for management of media satellite neighborhoods and managed IntelsatOne video services that include fiber, teleport and MCPC products. Mr. Ostapiuk is also responsible for Intelsat's Occasional Use business and development of Intelsat EpicNG media applications. Prior to his current position, Mr. Ostapiuk served as Regional Vice President, Sales where he managed Intelsat's sales efforts for its North America Media products and services. Those efforts targeted broadcasters, cable programmers, value-added resellers and service providers, DTH platforms and IPTV customers, as well as other emerging media sectors. Mr. Ostapiuk has 20 years of experience as a sales professional, including 17 years in the telecommunications and satellite industries. Prior to joining Intelsat in October 2008, he held a range of international and domestic sales-management roles with Cisco, Scientific-Atlanta and EchoStar International.*



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# Downlink: Intelligent Redundancy

*By Simen K. Frostad, Chairman and Co-Founder, Bridge Technologies*

Black box solutions for redundancy switching have been somewhat limiting in their effectiveness. Redundancy switching between two parallel production chains is an important function that provides any broadcaster with the reassurance that, should a fault occur in one chain, the signal can still reach its destination with little or no noticeable interruption to the viewer.

Current solutions for this vital function have provided some switching automation, however, this has been based on a dumb black-box approach, with switching usually triggered on simple detection of ETR290 alarms or similarly all-or-nothing tests.

Such is unsatisfactory for a number of reasons, primarily because ETR290 as a standard is, in some important respects, inadequate for the task. The simple ETR290 analyzers used in satellite redundancy switchers, to date, do not possess the sophistication to compensate for this inadequacy. As a result, incorrect and unnecessary switching may occur, or, conversely, switching may not occur when it is genuinely needed.

The criteria used in ETR290 to test the health of a signal can misleading to most ETR290 analysis engines, generating spurious alarms in commonly-occurring scenarios which may occur quite naturally as part of the broadcaster's planned operations. Other conditions which can lead to signal degradation or loss are not catered for by a standard implementation of ETR analysis.

Redundancy switching solutions based on relatively crude ETR analysis are, therefore, a less than perfect answer to the broadcaster's requirements. Such solutions may, even themselves, cause problems and increase costs by generating 'false positives' and fail to provide the hands-off assurance of trustworthy switching.

Bridge Technologies now offers a carrier-grade intelligent redundancy switching solution for satellite uplinks, the VB273 Intelligent Satellite Redundancy Switcher. This unit monitors a much wider range of key criteria, uses a sophisticated decision engine to trigger switching, and allows the user to create rule-based templates to ensure correct automated decision-making for any operational scenario.

As the developer of the most powerful and nuanced ETR290 analysis engine on the market, Bridge Technologies has recognized the potential to drive a far more useful satellite redundancy switching system.

In the Bridge system, fully-featured ETR analysis feeds a flexible decision engine, which compares error condition results against user-defined rules. Due to the greater scope and subtlety of the Bridge Technologies ETR engine, spurious alarms can be eliminated—conditions that would otherwise have been undetected can be taken into consideration by the decision engine.

The conditions which will trigger an automated switch can be customized by the operator using rule-based templates: This allows the broadcaster to tailor the response of the system to a wide range of operational situations. Equipped with these advanced capabilities, the VB273 Intelligent Satellite Redundancy Switcher provides secure automated redundancy switching when the broadcaster really needs it and is much more proactive in anticipating and forestalling potentially service-interrupting failures in the chain.

The value to the broadcaster can be measured in the greater security provided as well as in the cost reductions achieved by running a more intelligent solution, one that can be trusted to operate with a greater degree of autonomy.

The VB273 Intelligent Satellite Redundancy Switcher is a compact 1RU system based on three main components or modules:

- The VB273 module provides the physical switches and interfaces
- A VB272 module provides dual-channel multi-purpose monitoring of satellite broadcast signals and runs the ETR290 analysis engine and decision engine. The VB272 includes a high-performance RF monitoring module and supports high-throughput 16PSK and 32PSK operation as well as today's commonly-used QPSK and 8PSK. The module provides full implementation of DISEqC v1.2 RF switch control, cue tones and a GPI interface.
- A VB120 chassis and control unit.

In use, the VB273 Intelligent Satellite Redundancy Switcher integrates readily into the Bridge Technologies monitoring ecosystem, providing all the usual advanced data analysis functions through rich graphical displays and full reporting capabilities to external network management systems. The data from the system is made available for remote monitoring via the built-in web server—engineers and maintenance staff can be constantly aware of operating status and can interrogate the system from any location.

The VB273 Intelligent Satellite Redundancy Switcher has been developed in response to a major operator's request for a superior redundancy switching solution, and is already installed by the same operator, with general availability to the market in September 2013.

For additional details, please access the company's website:

*http://www.bridgetech.tv*

About the author

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

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# SatBroadcasting™: The New News Mobility

*By Henrik Nørrelykke, Vice President, Land Systems, Cobham SATCOM*

**A Royal occasion in the United Kingdom was a significant catalyst for the development of outside broadcasting (OB). The BBC deployed eight miles of cable around London as well as a 10 ton precursor of today's satellite news truck as the production unit in order to show television owning Brits the Coronation of King George VI in May of 1937. It was a mammoth, ground breaking operation that played an important part in moving television out of the studio.**

Fast forward 70 years and we think little of broadcasting from the eye of a storm in nothing more than an equipment-rich family SUV. Or perhaps reporting from the side of an active volcano, or the corner of a block in any number of war torn and crisis hit cities countries around the world. Our ability to be so mobile when reporting the news live is squarely down to the ability of satellite communications and the equipment that enables the delivery of sound and pictures of good enough quality for broadcast for millions of viewers to digest. While, of course, satisfying advertisers of their investment in quality broadcasting.

We've come a long way since those early days of outside broadcasting—where can the improvements come from, now that we have fast, compact, lightweight and highly mobile systems to stream and deliver media to anywhere, from anywhere?

***Where Next?***

Perhaps a good starting point would be the application of more speed. Satellite operator Inmarsat is betting on this with their forthcoming launch of High Data Rate (HDR) streaming on BGAN, which was officially announced to the world during NAB 2013 in April of this year.

HDR is planned to come online in the autumn, giving journalists and production companies a significant boost in live streaming capabilities. Its full channel option will provide broadcasters with an expected streaming rate of around 650kbps with guaranteed Quality of Service (QoS), which, even by the standards set by BGAN X-Stream on its 2009 launch, will deliver a step-change in video quality.

What the media does with this new capability is not really for Inmarsat, or the satellite terminal manufacturers, to say, however, the potential to deliver higher quality video and audio from compact and lightweight devices will enable production companies to offer more value to networks and advertisers.

As of this writing, the only satellite terminal compatible with HDR is the new EXPLORER 710 from Cobham SATCOM. Inmarsat unveiled this new unit on its stand alongside the HDR service at NAB 2013 and the unit will become available in the market this September. The headline for EXPLORER 710 is undoubtedly HDR compatibility and the associated streaming benefits. Plus, a number of new features have also been added to make life easier for production teams in the field.

Though EXPLORER BGAN terminals are hardly heavyweight in any form, EXPLORER 710 has become the world's smallest and lightest Class 1 BGAN terminal. The benefits of mobility in the field cannot be underestimated, especially when following unfolding situations as they happen, so the extra weight savings make highly mobile outside broadcasting a little bit easier for people on the ground. Terminals, and indeed other professional equipment have become so light now, that one man broadcasting is not just a possibility—it is a reality. Of course, camera man plus presenter is the ideal streamlined team and both can now carry all equipment needed, on foot, with ease.

Mobility is further improved as EXPLORER 710 can operate without the need for a laptop. It introduces Smart Phone apps to the world of BGAN connectivity, enabling users to connect their own devices for configuration, voice calling and connectivity. Other features include built-in automatic bonding of two or more EXPLORER 710s facilitating an aggregate 1.3Mbit/s guaranteed QoS channel capable of delivering crisp HD images. Not to mention the large LED display, which facilitates set-up and configuration without being connected to a PC, Smart Phone or tablet.

***The VSAT Picture***

While HDR covers the issue of increasing bandwidth on highly Mobile Satellite platforms, namely BGAN, Ku-band VSAT is also a preferred satellite carrier for OB. While the streaming and data transfer capacity of VSAT is already sufficient for the delivery of SD and HD media, it doesn't offer quite the same mobility or practicality of a BGAN set-up.

Alongside the classical SCPC (Single Channel Per Carrier) carrier set up, shared, on-demand, QoS enabled IP services are rapidly gaining momentum in the broadcast world. Finally, the pieces are coming together in support of true IP broadcast production—end-to-end. IP has come to stay in the broadcast world, which might lend a helping hand to close the discussion of BGAN vs. VSAT for mobile news gathering.

There's no getting around the fact that VSAT antennas, although shrinking in size, are bigger, hence less mobile, than a BGAN terminal. In the real world though, the two technologies do not compete—most outside broadcasters will have both systems ready to go, and will select the appropriate unit, based on the job at hand.

Though the bandwidth and coverage is in place, mobile VSAT for outside broadcast is still under constant development. The EXPLORER range, traditionally BGAN only, expanded significantly in March with the introduction of four new families of Ku-band VSAT terminals. This was made possible through the continuing integration of the constituents that make up Cobham SATCOM—in this case, Cobham's existing TracStar terminals were brought under the EXPLORER brand, a natural evolution following Cobham's acquisition of Thrane + Thrane in July of 2012.

Not just a re-branding exercise, the new shape of EXPLORER is that of specialist mobile and vehicular SATCOMs terminals, regardless of the carrier, MSS or VSAT. Two leading terminal manufacturers have come together under the EXPLORER banner and the new VSAT terminals ensure greater choice for news gatherers and the ability to build sophisticated mobile broadcasting platforms from products derived from a single manufacturer. The potential for cross development is high—ultimately, the introduction of VSAT to the EXPLORER range will see the lessons learned in the development of compact and lightweight BGAN terminals benefiting future VSAT terminal developments.

The range is planned to expand even further. Cobham SATCOM has become an official launch partner of the Inmarsat Global Xpress® (GX) Ka-band VSAT network. Several forthcoming EXPLORER products will be developed specifically for operation on the GX commercial and military networks upon service introduction in 2014.

***Forthcoming Developments***

GX will undoubtedly be a boom for broadcasters. The technology offers transfer speeds comparable to existing Ku-band solutions with the advantages of smaller antenna packages topped up by the global coverage that has made the Inmarsat network stand out in the world of mobility. Add to that the ease of use so well known to regular BGAN users, GX is expected to instantly deliver high quality footage from anywhere on the planet, making Inmarsat's new service likely to be adopted early by the media.

Whether HDR or even the bonding of multiple HDR channels is the pinnacle of what BGAN can offer, in terms of speed is up for debate. Inmarsat has, to date, continued to develop BGAN. Think multi-voice or X-Stream; the company has certainly poured resources into developing value-adds. GX is coming though, and the possibilities it offers for OB are extremely interesting.

Regardless of the service, the delivery of high quality outside broadcasts will always be dependent on reliable SATCOM hardware. Mobile SATCOM is no longer an art but is becoming an everyday tool thanks to clever network and terminal designs—such is now a tool that helps promote the development of broadcast formats that were unheard of just a couple of years back. In order for the broadcasters to continue this quest of constantly making television more relevant for audiences presented with a wealth of alternative entertainment choices, SATCOM stakeholders such as Cobham Satcom must stay focused on making the use of satellite communication as straight forward and as easy as picking up the phone. When you have selected your services, BGAN, VSAT, GX or others, selecting the correct terminals can significantly add value and help to make it all the more worthwhile for television viewers to—stay tuned.

Speaking of developments, Stuart Brown follows with his article that offers some insight into a suitcase-sized production and connectivity solution that allows for the freedom to "go anywhere" to capture news and events, all in the next feature...

**About the author**
*Henrik Nørrelykke is Cobham SATCOM's Vice President, Land Systems.*

***The EXPLORER 710 Class 1 BGAN Terminal. Photo courtesy of Cobham.***

***The Explorer 3075. Photo courtesy of Cobham***

# SatBroadcasting™: The Suitcase Solution

*By Stuart Brown, Broadcast Systems Director, Cobham Broadcast*

**The freedom to 'go anywhere' to capture news and events has never been more crucial—journalists and broadcasters have always needed to be mobile, but never at the pace expected today. To meet those expectations, their comms systems have to be portable enough to enable them to get to a scene, set up, and be transmitting in minutes, something that is not always possible with OB trucks, triax cable, and where there may be terrain obstacles, or even the general public.**

This has now changed with the advent of highly mobile, lightweight field newsroom devices.

Cobham recently introduced MediaMesh to the market. This is a new IP-based platform for lightweight, rapid set-up field newsrooms—I can honestly say that I have never had such an overwhelmingly positive response to a product launch.

MediaMesh uses groundbreaking wireless technology developed by Cobham that eliminates traditional restrictions on live production and enables journalists in the field to establish, almost instantaneously, everything required for a live broadcast. The MediaMesh transmission system includes a broadcast quality path for live two-ways; remote camera control; high quality file transfer; and a high-capacity Internet connection with access to base newsroom computers and cell phones, all from a single, easily transportable case. The fast and foolproof package is designed to be unpacked and in operation within a few minutes from virtually anywhere. Try that with an OB truck!

Apart from the technology in the box, what enables MediaMesh to perform in a way that is useful for SNG (Satellite News Gathering) and DSNG (Digital Satellite News Gathering) applications is MediaMesh has the ability to take full advantage of Ka-band uplinks. Demand for traditional Ku-band access can at times outstrip capacity, which can make it expensive. However, the development and deployment of number of large, multi-transponder Ka-band satellites and networks are increasingly offering a viable and economic alternative to Ku-band. These satellite networks have become highly reliable, secure, and provide high speed connectivity comparable to more earthly fiber-based networks.

What the rapidly increasing availability of reliable high capacity Ka-band broadband-over-satellite services means to producers is that dishes of less than one meter in diameter can confidently transmit genuine HD live video—previously, such has not been possible. MediaMesh can operate with satellite antennas as small as 75cm and is compatible with all major Ka-band services, including Inmarsat's super fast Global Xpress satellite broadband service, which is being launched this year.

Small dishes and low power consumption make the logistics of transporting and getting on air with breaking news almost embarrassingly easy. The fact that MediaMesh is an IP-based platform means that file transfer, Internet/email, and newsroom IT facilities access can be incorporated in a single package. The technology and satellite time are also significantly less expensive than traditional DSNG systems.

I've been talking about smaller, faster, lighter in terms of mobile newsrooms, but it's fair to say that the miniaturization of other wireless technologies are having a similar positive impact for production crews around the world.

Take, for example, our SOLO7 Nano TX, the world's smallest HD COFDM camera transmitter. This is a matchbox-size addition to Cobham's SOLO range that features a unique ultra mobile video link (UMVL) communications protocol for highly stable, very low latency transmission of HD pictures and sound and is available as a camera back or a standalone unit that can be, for example, mounted on vehicles for on-the-go viewpoints, again—yet another way to get closer to the action.

Of course, the ability of these miniaturized transmitters to reliably transit those images, especially HD images, is dependent on transmission stability, and this little beauty is as solid as a rock. The SOLO7 Nano TX provides vital transmission stability and can also encode and transmit live broadcast quality HD video from any location with broadband access. Its ultra-low latency High Profile H.264 encoding provides outstanding image quality. This means viewers can experience news, entertainment and drama from vantage points never before possible. An SD version of the SOLO7 Nano TX is currently available for those who haven't yet quite made the leap to HD.

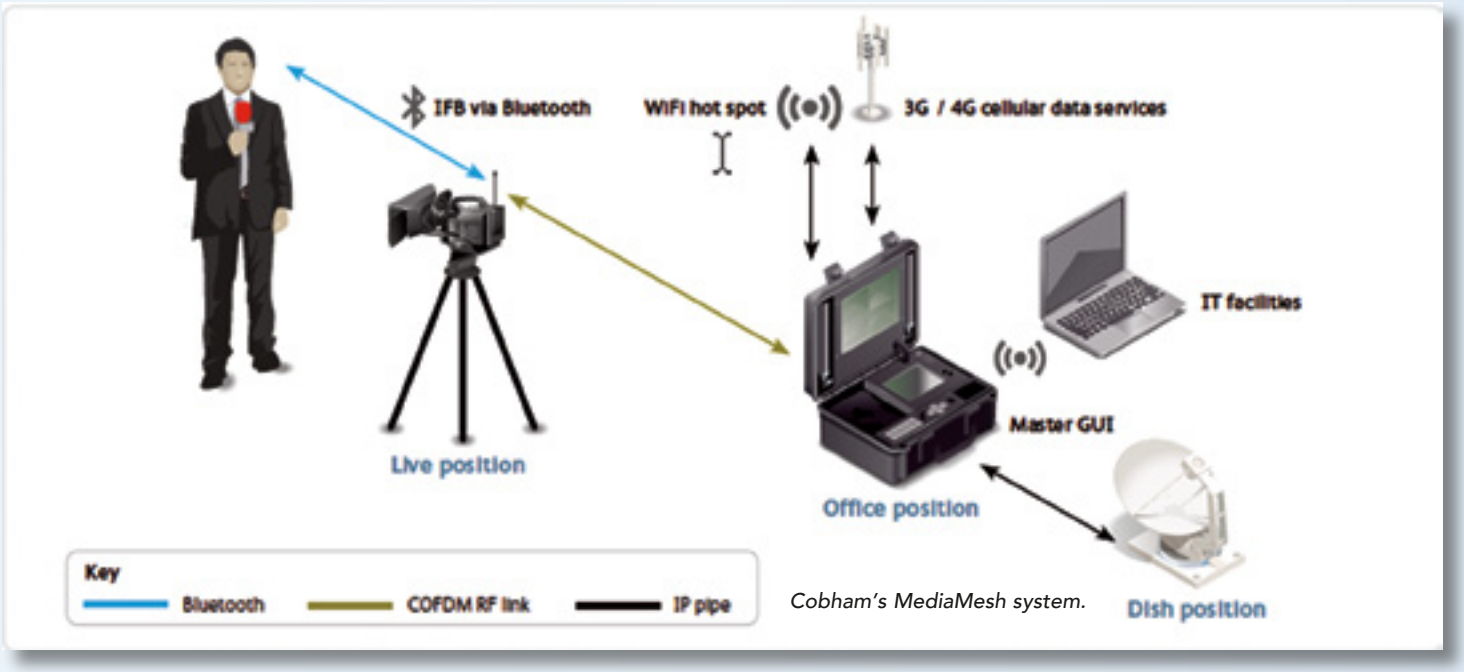
Cobham also recently introduced a lightweight HD MPEG4 IP Encoder that offers camera operators the ability to establish bi-directional connectivity via broadband as well as the ability to encode and transmit live broadcast quality HD video from any location. The encoder can be easily connected to virtually any camera and includes balanced audio inputs with integral broadcast-standard IFB talkback. The encoder was specifically engineered for broadcast applications and its high capacity, 3G capabilities should ensure access to super-fast wireless 3G Internet connections from even the most remote locations.

All of the above is to provide a framework as to what is now possible in satellite connectivity as well as wireless transmission of various stripes. The drive is to be smaller, fast, cheaper and—most important—extremely reliable. Cobham has a strong pedigree of success with a history of delivering all three for applications as diverse as surveillance and defense applications.

We are now bringing that depth of proven-in-the-field experience and reliability to the broadcast world—those who decide to mesh their media connectivity into a single unit and go where they've never gone before should strongly consider a unit that says "MediaMesh" on the box. It does what it says it can do on the label.

**About the author**

*Stuart Brown has been a broadcast systems engineer for nearly 30 years and is currently Broadcast Systems Director at Cobham Broadcast.*




*Cobham's MediaMesh system.*

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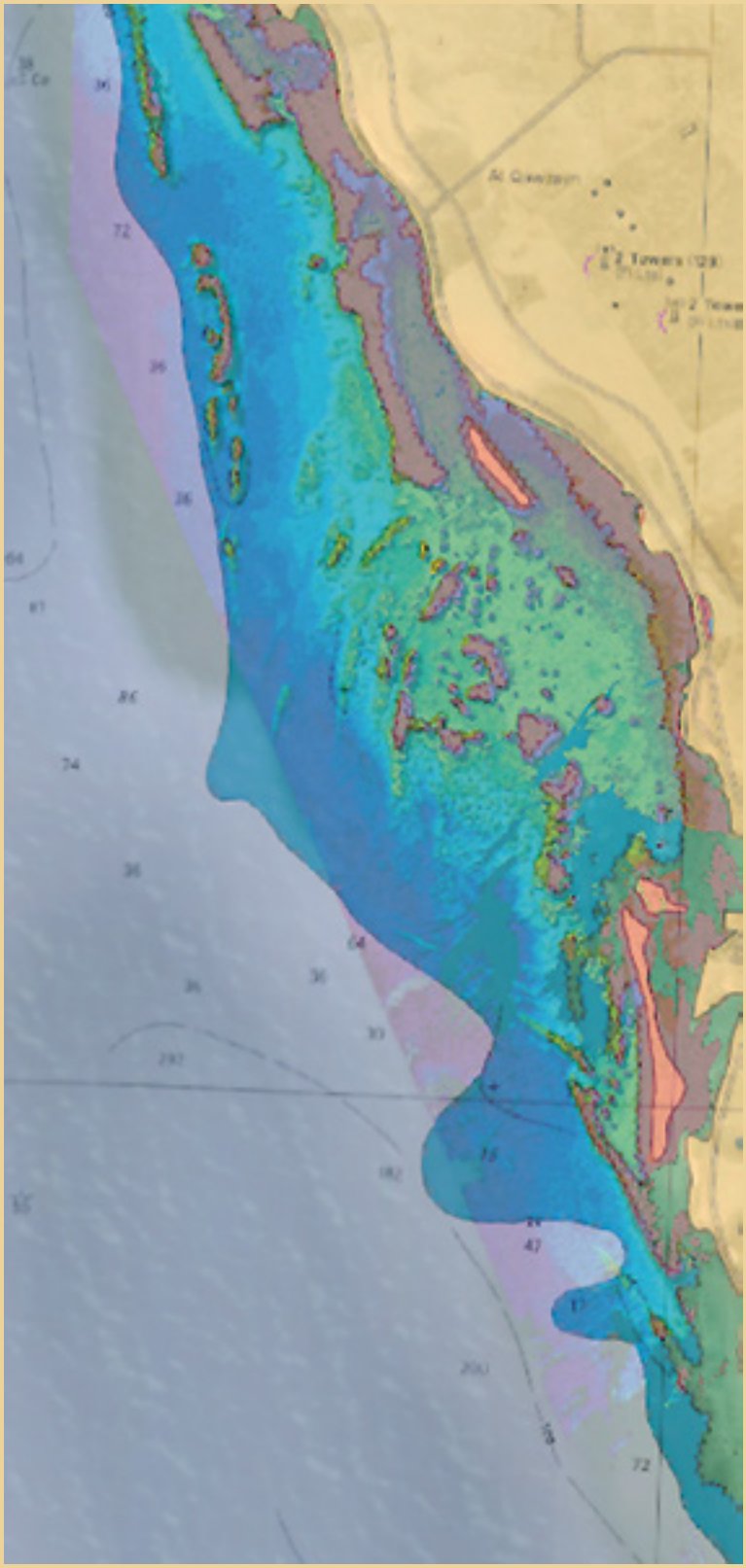
# Marine Mapping's Paradigm Changes

*By Kevin P. Corbley*



*Depth ranging from 0 to 18m, Red Sea Coastline of Kingdom of Saudi Arabia.*

**For decades, mapping subsurface coastal zones has relied upon expensive ship-borne sonar and aerial laser scanning techniques. Recently, however, a new company named Proteus has changed the paradigm of monitoring the near-shore marine environment by offering satellite-derived bathymetric and seafloor mapping services.**

"The shallow-water coastal zone is as commercially valuable as it is environmentally sensitive," said David Critchley, Proteus' CEO. "Accurate mapping is absolutely critical for applications as diverse as ensuring safe ship navigation and protecting vital marine habitats."

Critchley explained that sonar and laser scanning (called LiDAR) have traditionally performed the lion's share of bathymetric and seabed mapping despite drawbacks because there simply wasn't a viable alternative…until recently. The launch of the eight-band high-resolution WorldView-2 satellite by DigitalGlobe in 2009 ushered in a new era in marine cartography, according to Proteus.

"Subsurface mapping with multispectral satellite imagery is an emerging technology that's been around for 10 or 20 years," said Helen Needham, Proteus Hydrographic Director. "However, the combination of sub-meter spatial resolution and advanced spectral bands on WorldView-2 made the technique practical and commercially viable for the first time."

In 2011, Proteus opened its doors and partnered with DigitalGlobe to build a business around accurately mapping water depths and classifying seafloor habitats using multispectral satellite imagery. Based in the United Kingdom and United Arab Emirates, and offering a variety of land mapping services, Proteus also formed a key alliance with EOMAP, a German firm that has developed a proprietary suite of marine mapping tools for the extraction of subsurface information from satellite imagery.

After several proof-of-concept projects for commercial clients in the Caribbean and Middle East, the Proteus-led team has won major mapping contracts in Ireland, the Red Sea, Mediterranean, and the Arabian Gulf.

### *Evolving Marine Mapping Capabilities*

Needham has worked in the marine mapping business for 20 years, including stints at the U.K. Hydrography Office and international engineering firm CH2M Hill. She's watched the evolution of subsea mapping methods as faster, safer and less expensive technologies have emerged.

Going back many decades, sonar is probably the most well-known of the traditional technologies. Typically, this involves an echo-sounder or multi-beam system attached to the bottom of a boat or towed behind it in the water. The sound waves generated by these systems yield accurate measurements of water depths up to thousands of meters and the 'back-scatter' of the signals differentiates some seafloor cover classes.

Not surprisingly, airborne LiDAR began grabbing market share from sonar for some coastal mapping applications when it became widely available about 10 years ago. A LiDAR system is a laser scanner that emits thousands of light pulses per second from the underside of an aircraft. Similar to sonar, LiDAR measures distance to ground surfaces by the time it takes to receive a return signal. While

*High resolution bathymetry from WorldView-2, Wexford, in Ireland.*

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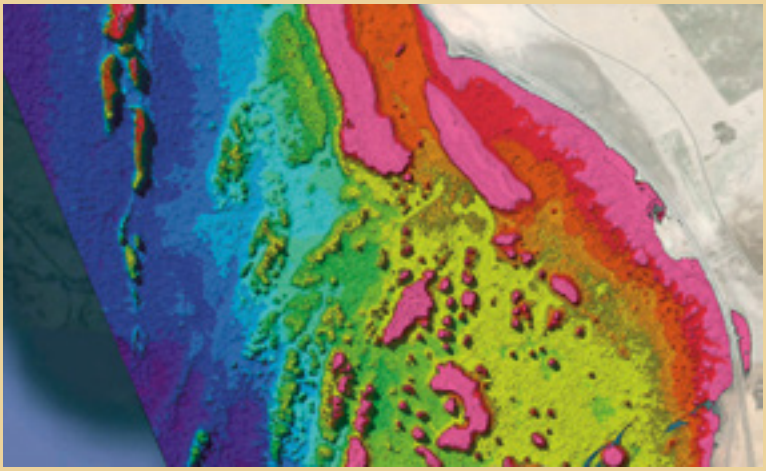


*Bathymetry illustrating coral outcrops, Red Sea coastline of the Kingdom of Saudi Arabia*

the technique is used primarily for accurate elevation mapping of the ground, the laser signals can penetrate water and provide depth measurements.

Operationally, satellites offer several advantages. Most importantly is cost, especially for large areas where satellite images can be purchased and processed far more cheaply than a ship or aircraft deployment. Although ground truthing crews may be required for some coastal zone projects, satellite-derived mapping projects generally pose little, if any, danger to the local environment or the personnel involved. Satellites can also cross national borders without permits, covering extremely large geographic areas in a matter of seconds.

"Overall, we calculate that bathymetric mapping and seafloor classification data capture can be performed faster than sonar or LiDAR at a fraction of the cost," said Needham. She explained that while various marine mapping algorithms have been available for extraction from multispectral satellite imagery for at least 10 years, accuracy and depth limitations hindered commercial competition with sonar and LiDAR. Two technology breakthroughs, however, turned the tide in favor of satellite imagery.

### *Coastal Blue Band Introduced*

The first of these game changers was the launch of DigitalGlobe's WorldView-2 satellite. Based in Longmont, Colorado, DigitalGlobe expanded its already impressive role in the commercial remote sensing market earlier this year by its combination with GeoEye. The company now has five optical imaging satellites at its disposal: WorldView-1, WorldView-2, GeoEye-1, QuickBird and IKONOS. A third WorldView satellite is slated for launch in fall 2014.

WorldView-2 represents a departure from the multispectral capabilities of other commercial imaging satellites. In addition to its 46 centimeter panchromatic band, the satellite captures eight multispectral bands at 1.85 meter resolution. That's twice the number of multispectral bands of QuickBird or GeoEye-1. The wavelengths of the additional bands—Coastal Blue, Red-Edge, Visible Yellow and Near Infrared—were carefully selected to maximize feature classification both on land and in the coastal zone.

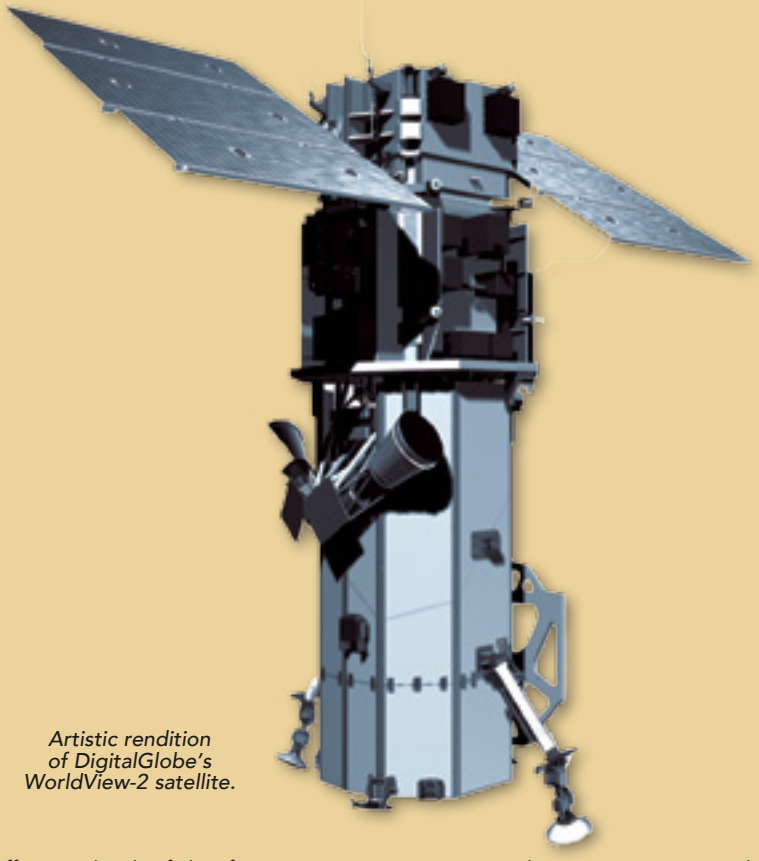
"The additional bands available from the WorldView-2 satellite can help derive a better solution for subsurface applications," said Needham.

The Coastal Blue band has a relatively short wavelength of 400 to 450 nanometers when compared to other technologies. The Coastal Blue band wavelength enables it to travel further into the water column without absorption, resulting in greater vertical accuracy in bathymetric measurements and more detailed seabed classification information. Needham is quick to point out that all of the eight spectral bands are used in the process developed by EOMAP, which represents the second major breakthrough in subsurface mapping derived from satellite imagery.

EOMAP combined several multispectral processing algorithms into an in-house processing suite called the Modular Inversion and Processing System (MIPS). This system is capable of extracting seafloor reflectance values of multispectral data and converting the information into water depth and seabed classes. The technique works with many sources of multispectral imagery, but the WorldView-2 data provides the accuracy needed for commercial viability. "The bathymetric measurements are accurate to within 10 percent of the water depth," said Needham. "At a 20-meter depth, the measurement would be accurate to within two meters."

Operations depend on the clarity of the water, however, Proteus has successfully delivered bathymetric data to depths of 30 meters. With turbidity playing a major role in penetration by the spectral bands, the team prefers to use imagery captured on low-wind days when the water is relatively calm with a flat surface.

The MIPS process delivers bathymetric data and seabed classification information as integrated data sets. One is not generated without the other. However, Proteus



*Artistic rendition of DigitalGlobe's WorldView-2 satellite.*

offers two levels of classification services, one using, and one not using, ground truth data. When ground truth data is available, either newly collected or archived, the success of the classification improves. In the clear waters of the Caribbean, Proteus recently delivered 10 seafloor classes to the client.

"In some projects such as the one now underway off the coast of Abu Dhabi, we have partnered with an environmental management firm that will send divers into the water to collect ground truth data," said Critchley.

A major advantage of working with DigitalGlobe on these projects is its worldwide archive of data. In just four years, WorldView-2 has collected a massive archive of image data that gives Proteus the opportunity to see what data is available and what water conditions typically exist in a particular geographic location before the firm even bids on a proposal. This informs the end as to the quality and accuracy of the deliverables. "The archive also helps us determine whether to use new acquisitions or archived data in our actual project, depending on the timeline," said Needham. "We also use the archived imagery to establish baseline mapping from the past few years."

### *A Promising Future*

Although the Proteus team is actively engaged in major commercial coastal zones and onshore mapping projects this year, Proteus, EOMAP and DigitalGlobe agree they may only be scratching the surface of what satellite imagery can do in marine applications. Proteus expects the EOMAP algorithms currently being used for seafloor classification and water depth measurements will be further refined to soon provide better and more accurate information.

On the satellite side, DigitalGlobe is encouraged by the commercial progress already made by Proteus in the coastal zone applications. After the launch of WorldView-2, the Colorado company sponsored an international contest to find new uses for its eight multispectral bands—DigitalGlobe was overwhelmed with the number of submissions that related to marine applications. The company's internal laboratories are working on expanding the offshore uses of the data.

DigitalGlobe already has WorldView-3 in manufacturing—the satellite will have broader and more detailed imaging capabilities than its immediate predecessor. Plans call for adding eight more short-wave infrared bands and 10 atmospheric correction bands at 3.7 meter spatial resolution. Such will yield an unprecedented amount of visible and invisible data. The pan band will be sharpened to 31 centimeters and the other eight multispectral bands will operate at 1.24 meter resolution. "Within the next few years, we expect to see another enormous leap forward in the capabilities of satellite-derived marine mapping service," said Critchley.

**About the author**
*Kevin Corbley is a business consultant in the geospatial profession. He may be reached through* ***www.corbleycommunications.com****.*

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# Careers: The Road To The Future—Writing The 2013 Résumé

*By Bert Sadtler, Senior Contributor*

**Companies today must re-assess their talent needs in order to remain competitive and drive growth. The satellite communications industry faces challenges and remains ripe with new opportunities. The right talent can make a huge impact. Employers need to get it right and make a "great hire."**

To assist with career searches, we asked Bert Sadtler of Boxwood Executive Search to discuss various aspects regarding the processes of recruitment and hiring as well as how Companies can retain crucially-needed talent. Boxwood is located in the Washington DC region and has success in senior level recruitment in satellite communications, government contracting, and within the intelligence community. Boxwood also provides a consulting solution for the analysis and improvement of the employer's current recruitment process. If you would care to submit a recruitment, hiring, or retention question for Bert to answer, please email your question to BertSadtler@BoxwoodSearch.com.

### *Writing The 2013 Résumé*

As consulting-recruiters, we at Boxwood frequently are asked questions about what makes a good résumé today. Candidates remember the interviewing process in the past and mistakenly try to follow those same steps today. In the past, hiring managers took a deep dive into a résumé. Much has changed. Recruitment at the senior level is giving the résumé a smaller seat at the table. Today's résumé requires an adjustment in expectations, philosophy and execution.

When writing your résumé, think about the purpose, which is to attract an interest in you and your ability to solve an employer's business problem. After all, the target audience is the employer/hiring manager who is busy with very limited time. Be succinct.

The expectation of a résumé should be a simple one. The best résumé is the one that got the meeting, which then landed the job. Beyond that, there is no absolute answer on measuring a great résumé itself. Nor should there be any more of an expectation. No one gets hired on a résumé alone in 2013.

### *Observations: Past Vs. Present*

The marketplace is changing. Therefore, the value, purpose and expectations of a résumé are changing.

In the past, a job seeker could try to differentiate himself with a résumé written on expensive paper. Employers appreciated the original, creative approach. Prior to the Internet, the résumé carried more weight for a prospective employer to learn about a candidate.

Today, hiring managers are glancing at an electronic display of a résumé and seeking specific facts. They spend as little as 10-15 seconds on each résumé. The résumé now serves as simple data point among many to obtain information about a candidate.

In the past, many professionals retired from the same career after 30 years.

Today, professionals change jobs an average of every 3-5 years.

In the past, what you accomplished and what information you possessed was very credible to an employer.

- Today, information is universally accessible through the Internet. Professionals need to be capable of accessing data to solve a business problem through critical thinking. The employer's focus is more about what can the talent do and less about what have they done. In other words: "Can you?" not "Did you?"
- In the recent past, professionals would post their résumé and take a "passive" approach to job seeking.
- Today, the marketplace is cluttered with qualified talent. Candidates must take an "active" approach to job seeking.
- In the past, expectations of a résumé were that a good one might get you hired.
- Today, a résumé is an admission ticket to schedule a live conversation and should be written to provide enough factual information that the reader wants to know more.

### *Formatting Today's Résumé*

- Consider that if your résumé is viewed via PC screen, only the top 1/3 may be in view on a small screen. Therefore, any fluff makes it hard for the reader to see the "meat".
- Develop a document that contains only empirical data about professional accomplishments and education. This establishes candidate credibility. It says that all listed items are factual, nothing is subjective. It sets an important tone.
- Write it in chronological order of employment. "CHALLENGE-ACTION-RESULTS". Most recent to least recent followed by education and certifications.
- Eliminate: Objective and Profile Summary. The Objective is irrelevant and the Profile Summary is subject to interpretation. These are not a depiction of empirical data.
- At the top of the page: List your name as you are known. No need for legal name, just the name you use. (It is a résumé, not a death certificate). Make it easy to be contacted. List one phone contact, one email address and home address (optional). Start listing employment history right below contact information.
- Total length of pages is not important

### *Executing Today's Résumé*

- In the past, an employee was very likely to remain in the field of work where they originally started. (Example: Engineers)
- Today, employees change fields frequently and the résumé needs to be applicable for an unlimited number of new directions. Using only empirical data will make this easy.

- Creating today's résumé as a template of historical work experience provides the professional with a 360 degree view of employment opportunities. Note: This is a significant shift in the paradigm of job seeking.
- In the past, résumés were sent to job boards, job postings and to destinations through a cold-call approach.
- Today's marketplace is unreceptive and unresponsive to cold-calls. Warm-calls have become a requirement.
- Executing today's résumé requires:
  - » Take an active role in researching the prospective employer.
  - » Can you identify the hiring manager?
  - » Do you know someone who works there or knows the hiring manager?
  - » How much can you learn about: "What business problem will be solved by hiring critical talent?" Do you know the business problem?
  - » Do you posses the ability to solve the business problem?
  - » Use a well-written, brief cover letter to address how your qualifications and capabilities make you interested and interesting. Do not write your life history. It is about solving the employer's problem, not regurgitating your autobiography.
  - » Use the cover letter to make a warm connection, if possible.
  - » Use the cover letter to establish a time and method for you to follow-up and schedule a phone or in-person meeting.
  - » Use the cover letter to leverage your historical employment history as having relevancy.

***Worth Noting***

- Job seeking today is an active event, no longer a passive one.
- Confident and poised candidates do well. Desperate candidates struggle.
- Interviewing is an active event. Good candidates ask good questions during an interview and are interviewing the employer as well.
- The individual hired will be a combination of: "Meeting the minimal technical requirements and also having the maximum chemistry or cultural fit".
- If another candidate has one percent more chemistry then you, with everything else equal, you are not going to be the first choice, and there is little you can do about it. Be a professional, thank the employer for their interest in you and realize that you only need one "yes" in a sea of many "noes".
- The only way to overcome a hiring outcome you cannot control is to have multiple qualified opportunities working and never slow down or relax active job seeking until you have started the first day of a new job.

In summary, Best Practice Hiring is a multi-step process. Today's business climate is challenging with employer needs that are changing. Employers have to get it right. Candidates need to spend time understanding what the employer will accomplish through a critical hire.

Candidates should position their résumé with the hiring manger in mind and use it as an entrance ticket to the overall hiring process. In a tough hiring market, candidates need to take an active role in developing multiple qualified employment opportunities.

**About the author + Boxwood Search**

*Bert Sadtler is the President of Boxwood Search and a Senior Contributor for SatMagazine—There is a 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*** *for more information.*

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# SatBroadcasting™: Struggling To Monitor

*By Roger Franklin, CEO, Crystal Solutions*

Satellite interference, as most readers are already aware, is a big—indeed, growing—problem in our industry. Interference affects the entire industry, from manufacturers to satellite operators, and, naturally, the end user. Monitoring has been proven to be an effective weapon in detecting and mitigating interference. However, the challenge for a great many users is how do you monitor for interference while on a restrictive budget.

### *Monitoring To Stop Interference*

There are a number of tools and initiatives being implemented to help mitigate satellite interference. Monitoring and control (M+C) is one of those and this technology is extremely effective. A large percentage of instances of interference are, in fact, caused by human error. The more we automate error checking, the less potential for errors. M+C systems can stop a carrier or send alerts if something is not setup correctly—the better the system, the less training needed for the operatives.

### *Tier 2 Monitoring*

There are different levels of monitoring and, in an ideal world, every single user across the globe should be monitoring for interference 24 hours a day, 7 days a week. There are some great Tier 2 monitoring tools available, some of which are supplied by Crystal. Such tools enable a whole host of great functionality, allowing the user to monitor and to deal with any issues that have been discovered. For some of these tools, too often the complexity is such that the user really needs a trained staff operating the M+C, which can throw another spanner into the works.

For the larger broadcasters, that's terrific—it makes absolute sense to have those level of tools in place to deal with complex interference issues, immediately in-house. These higher level tools work for the larger broadcasters, as they generally have the time, money, and resources to install Tier 2 monitoring systems and can have someone expertly trained and then watching for interference anytime of the day or night.

### *The Smaller Guys*

The situation is quite different for the smaller users. However, similar to their larger counterparts, they also want to solve interference as it affects them just as negatively. The problem is that without a monitoring tool, how would anyone know interference has struck the operation? Is it simply to await calls from disgruntled customers, or be unceremoniously switched off by the satellite operator? In fact, how many instances of interference may actually be occurring without notice?

The latter dilemma is exactly why the Crystal Solutions Spectrum Monitoring and Recording (SMR) Tier 1 monitoring product was developed. The product is essentially a monitoring solution on a smaller scale, inexpensive enough for most users to run it 24/7. SMR Tier 1 offers a number of high-end features, such as a spectrum analyzer and the ability to set alarms, as well as the ability to record and export moving traces. The product can also be used for multiple carriers—there is no need to purchase multiple systems.

### *Resolving Issues*

With Tier 1 monitoring, the user will be alerted when there is an issue—however, resolution may require a call for external help. Such help may be in the form of one more high-end carrier monitoring system, which can be wheeled in to a given carrier to resolve issues as and only when needed. For many, this will be a solid workaround, when Tier 2 monitoring just isn't an option. In those cases, the issue would need to be escalated to the satellite operator.

As mentioned previously, satellite interference is an industry-wide issue. Most of the major and many smaller satellite operators are working together to combat satellite interference. They have systems and initiatives in place to mitigate and eventually prevent interference and are always willing to work with conscientious users to resolve it. They are also working on better and more efficient ways of reporting interference to help them reduce the time affected.

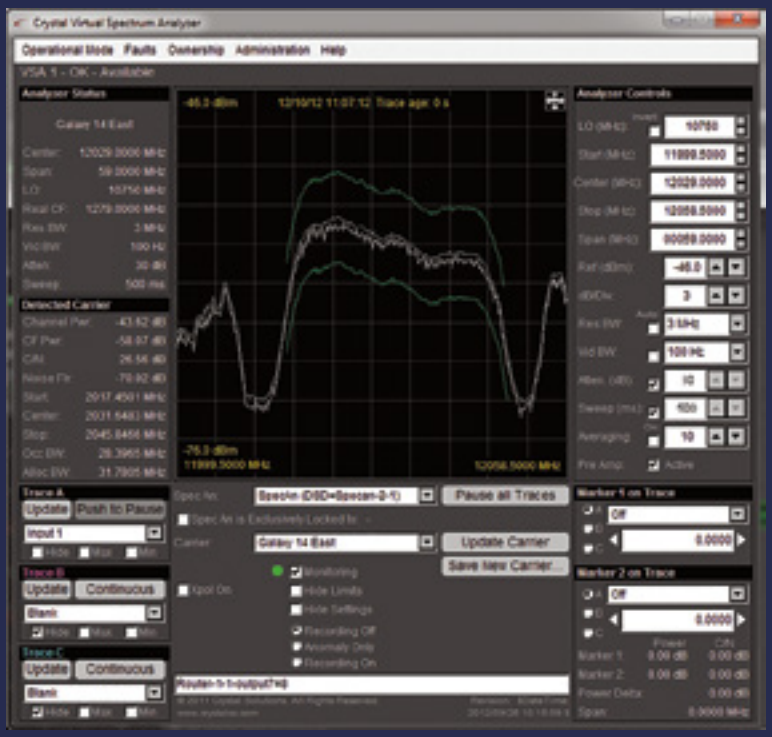
### *The Way Forward*

There are a number of practical initiatives to combat interference. None of these initiatives can work by themselves—that requires a combination of tools. M+C is extremely effective and, if all systems were controlled, it would arguably remove a major portion of interference that is currently caused by human error.

High end monitoring systems have their place. For the smaller user, a light, inexpensive, Tier 1 monitoring system will dramatically reduce the impact of interference, and that will ultimately save time and money. If we all work together as an industry, who knows, perhaps we can eventually even eliminate interference once and for all.

About the author

*Roger Franklin is the President + Chief Executive Officer of Crystal Solutions. He began working for Crystal Solutions at 15 years of age. By age 17 he had exhausted the mathematics offerings of high school and, before completing his senior year, enrolled at Oglethorpe University. Transferring to the Georgia Institute of Technology, he graduated in only three years. Roger has remained with Crystal Solutions and holds a number of positions with increasing responsibilities. He gained experience in all facets of the business, with particular emphasis on product development. Roger acquired the business in 2007.*



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# The World Wants More Than 10,000 Shakers

*By Noel Brown, Solutions Manager, Brüel + Kjær*

*Satellite vibration testing on a shaker, photo courtesy of INPE.*

**Change, as many great philosophers have said, can be positive and negative. However, for customers of the LDS shaker range, change is all about improving value.**

In January 2009, LDS Test and Measurement made a highly positive change when five decades of history and a global customer base saw that firm become part of Brüel + Kjær. This dream team saw the world-leaders in vibration test systems integrate with the world-leaders in sound and vibration data acquisition and signal analysis. In the process, we have developed into a global supplier with unrivaled technical and service capabilities.

Royston is the UK home of Brüel + Kjær and the largest vibration test system factory in the world. All LDS R+D and custom projects are handled at that location, which facilitates extremely easy communication. With the incorporation of the LDS range, Brüel + Kjær is now the largest vibration test system provider in the world, and since the merger, the LDS range has gone from strength to strength.

In spite of the persistent global financial crisis, Brüel + Kjær is producing more LDS vibration test systems than ever before. 2012 was the most successful year for LDS orders, reflecting an enduring and growing global confidence in the brand. "We manufacture about 900 shakers a year and this number is rapidly increasing," explains the Head of R+D and Engineering for the LDS range at Brüel + Kjær, Alex Williamson. In fact, more than 3500 vibration test systems have been installed since the 2009 merger, taking the total number of individual LDS shakers in use around the world today well over 10 000.

### *Long-Term Investments*

All over the globe, the majority of the LDS vibration test systems are in near-constant use. Day in, day out, for 25 years or more, they exhaust the life out of any test object, by condensing a lifetime's stresses into a few hours. In these intense test schedules "where downtime is very expensive," vibration test systems need to be tough on a level that most equipment doesn't have to even start to come close to equaling.

As the Head of Operations Andrew Turner said, "Durability is highly important and the longevity of the shakers is an important part of the value proposition."

Even controllers and amplifiers typically wear out before the shakers do, and that kind of long-term durability is what Brüel + Kjær believes customers should receive with an investment on this scale. Since 2009, the company has invested hugely in people and infrastructure and such is still ongoing—it's about more than just higher productivity and reduced lead times.

### *More Scope To Customize*

The added resources of Brüel + Kjær has boosted the firm's ability to customize LDS vibration test systems, which is a key part of the value offered. "About two-thirds of our shakers business is customized," said Alex Williamson, "and our ability to tailor a shaker to customer-specific requirements is a great advantage. Our sole aim is to focus on solving customers' challenges."

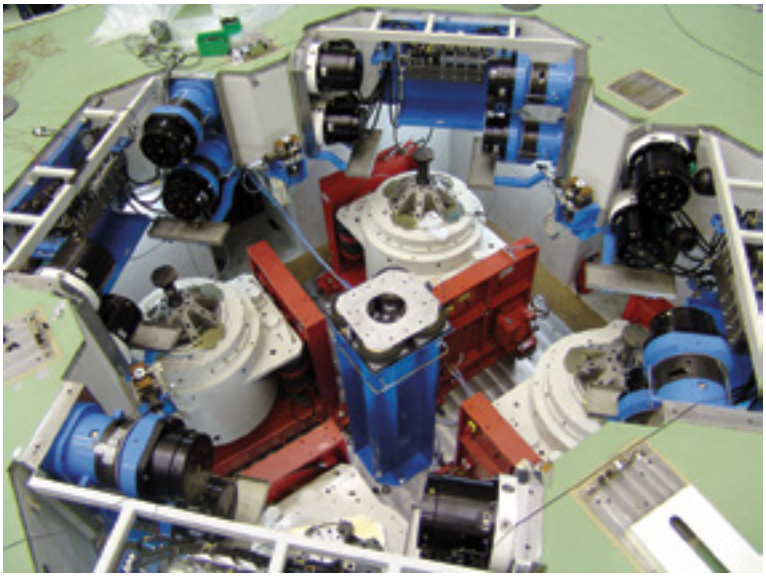
As well as dual and quad shaker configurations, typical customizations include slip tables, guided head expanders, bespoke mounting fixtures, environmental chamber interfaces, and specific cooling or noise reduction arrangements. The shakers are customized for use in space, aerospace, defence, automotive, oil drilling industries, consumer products, package testing and more.

The biggest differentiating factor "force input"ranges from 9N up to the largest we have made to date—a quad V984 system of 640 kN used for satellite testing at ESA-ESTEC. Given this range of shakers, there is no vibration test application that Brüel + Kjær products can't cover.

### *Complete Systems From One Supplier*

A great example of the synergies arising from the merger of LDS Test and Measurement and Brüel + Kjær is one of the satellite qualification test systems that was delivered to Brazil's National Institute for Space Research, INPE. This system, which connects Brüel + Kjær LAN-XI Data Acquisition Hardware with an LDS vibration test system, is a concrete example of the benefits from combining LDS products with Brüel + Kjær's range. Here, the test safety and the avoidance of over-testing is critically important—the Brüel + Kjær solution gives closed-loop control and integrated data acquisition from hundreds of channels. Each channel gives accurate information on force or vibration levels at any point on a satellite, ensuring its fragile and expensive structure isn't over-tested, and providing valuable data for correlation with Finite Element (FE) models.

*There are more than 10,000 individual shakers out in the world today—more than 3,500 of which were installed since the merger with Brüel + Kjær in 2009. Pictured is a V994 unit being assembled at the Royston, UK, factory.*



*ESA-ESTEC has a quad-shaker satellite testing system capable of 640 kN force*

*A customized shaker in the factory being moved out to a customer.*

For such a system, the customer was able to deal with one dedicated organization to supply a complete system, manage the entire project, and deliver the necessary support and service. As the company's Vice President of Strategic Marketing, Alun Crewe, said, "Customers appreciate our high-performance project management and 'can-do' attitude."

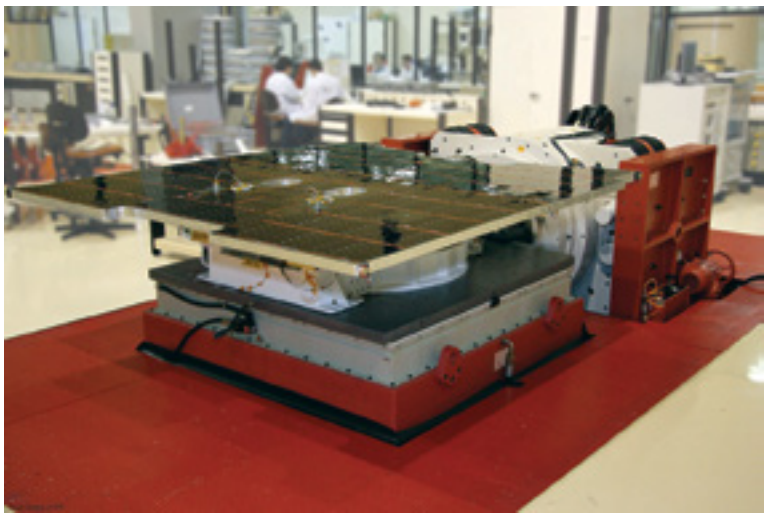
***Commitment To Change***

Remaining at the top requires an ongoing dedication to improvement, which is part of the culture on the LDS factory floor. "We're committed to continuous change," said Andrew Turner. "The LDS brand is the ultimate in vibration test systems, and our job is to keep it there."

Reflecting the investment in the LDS range since the merger, in September of 2011, the Royston factory received a Highly Commended Award for Best Factory in the Electrical and Electronics category. "I've seen positive changes since the integration with Brüel + Kjær," said Alex Williamson. "These are especially apparent in R+D, where the LDS range has inherited process tools that have helped enormously to improve design efficiency."

Continuous Improvement, Lean and Production Engineering are the focus of David Auty, who has been working for Brüel + Kjær since June of 2011. Shortly after joining the company, David introduced an award system to mobilize the many minds at work on the LDS range and to publicly recognize positive changes. These are Before, After, Result, Next Awards (B.A.R.N.), which motivate everyone to improve processes wherever they see the potential—everyone takes a part in creating the best possible products.

"We encourage input from anyone," said David Auty. Each of the more than 100 B.A.R.N. awards issued since June of 2011 recognizes an improvement that benefits shaker customers, coming directly from the people who build them.



*Satellite undergoing a shaking test.*

"I've seen positive changes since the integration with Brüel + Kjær. These are especially apparent in R+D, where the LDS range has inherited some process tools that have helped enormously to improve design efficiency" Head of R+D and Engineering for the LDS range at Brüel + Kjær, Alex Williamson

As Assembly Technician Richard Oakley said, "Seven of my B.A.R.N. projects have been adopted to date. The management really listens to us and we have terrific pride in what we do. I get a huge kick out of knowing that something I have put together tests a satellite before it's launched."

***Improvements For Customer Service***

The merger between Brüel + Kjær and LDS has enabled the company to invest heavily in global organization—this allows for the provision of consistent, top quality service throughout the world. The direct sales network has grown and has reduced the number of distributors used. Distributors that specialize in vibration testing have been partnered with, and are large enough in scope to offer coverage that can benefit the customers. For clients, this means more direct access to Brüel + Kjær.

A range of service and maintenance plans are offered. By enlarging, pooling and spreading company resources efficiently, the capacity to assign resources anywhere they are needed, without the danger of becoming exhausted, is assured.

Right now, the company is working hard to take the knowledge and expertise of employees out into the field, offering comprehensive service plans to protect customer investments. Thanks to the considerable resources and expertise of Brüel + Kjær, work is more efficient and smarter systems are developed that are easy to use, simplify procedures, offer solid test guidance, and help avoid misuse. All to ensure highly reliable testing.

Brüel + Kjær is excited about the synergies that are continually developing, and will continue to improve the value offered. All in all, the future looks extremely bright for the LDS range of shakers.

**About the author**
*Noel Brown is the Solutions Manager for Brüel + Kjær*

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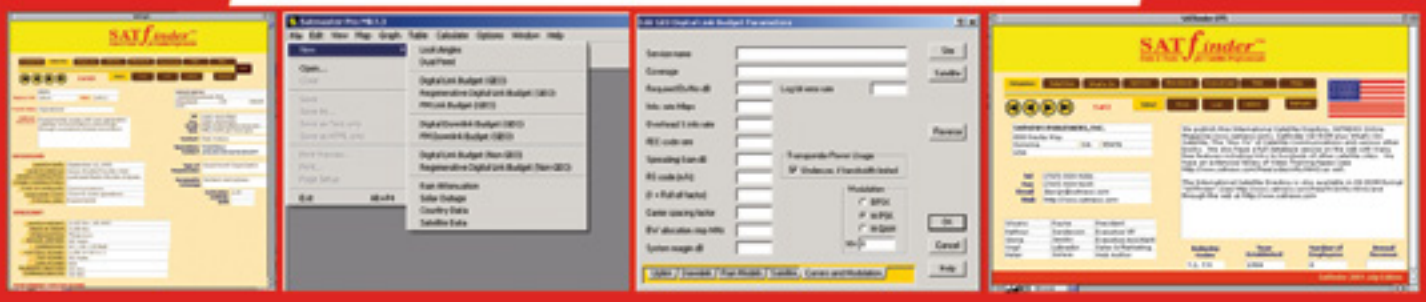


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# The European SATCOM Blanket

*By Jacob Keret, Sr. Vice President Sales, Europe, North America and ME, Spacecom*

**Moving into the second half of 2013, Spacecom, the operator of the AMOS satellite fleet and purveyor of the AMOS brand, is moving ever closer to becoming a global satellite operator.**

Spacecom's AMOS fleet currently consists of the AMOS-2 and AMOS-3 satellites co-located at the 4 degrees West orbital location that serves Central and Eastern Europe (CEE), the Middle East and the U.S. East Coast, and AMOS-5 located at 17°E serving Africa and the Middle East. Just launched is the AMOS-4 to the 65 degrees East prime orbital position where it will serve Russia, China and South Asia with valuable Ku-and Ka-band capacity.

Together, these satellites offer a wide range of communication and broadcast services via Direct-To-Home (DTH) and Direct Broadcast Satellite (DBS) operators, Internet Service Providers (ISPs), telecom operators, network integrators and government agencies.

Europe is a key market for Spacecom. During two decades of operation in the CEE region, long-term cooperations and partnerships have been developed with key players and major media groups. AMOS-2 and AMOS-3 provide satellite services to three DTH platforms in the region: T-Home SatTV (Magyar Telekom) in Hungary and Magio TV (Slovak Telekom) in Slovakia—both are subsidiaries of the Deutsche Telekom group—and Xtra-TV in the Ukraine.

In addition, Israel's Yes DTH platform also operates via AMOS-2 and AMOS-3. Over the past 18 months, cooperation has been furthered with Magyar Telekom, with new follow-on, multi-million dollar, long-term contracts to add greater bandwidth to these platforms. These DTH operators anchor Spacecom's business in Europe. With one of the strongest satellite presences in CEE, AMOS works with leaders such as HBO for its European cable and IPTV distribution needs, the Ukraine's Inter Media Group and MTV channels, among others.

The AMOS constellation beams over Europe enables the company to provide excellent, strong broadcast neighborhoods. Business plans for the future include continuing the pursuit of broadcast and emerging broadband opportunities within this crucial region. The Ukraine and the Balkan region are seen as a strong growth markets for Spacecom.

AMOS-6 is the next satellite on track for launch for European coverage. To be co-located at the 4 degrees West orbital position, AMOS-6 will be larger than AMOS-2 and AMOS-3 combined and will include Ka-band spot beams as well as Ku-band services. As a larger satellite, AMOS-6 will strengthen the AMOS brand by serving Western Europe in addition to CEE. It will also extend the brand to regions of Africa that will provide inter-connectivity between the continents. Scheduled for launch in 2015, the satellite will replace AMOS-2 when its service ends later in the decade.

AMOS-6 will be well prepared for the market with one of the most important and latest technologies to grace the satellite industry—the Ka-band spot beam. This technology will be used for broadband Internet services for the consumer market. With AMOS-6 to be located at the 4 degrees West orbital position, markets in Western, Eastern and Central Europe as well as Africa can be approached. The opportunities being raised due to Ka-band service are exciting and will bring new clients to the AMOS brand.

AMOS-4 over Asia expands our service area to reach nearly 80 percent of the global population. Customers are offered DTH, video distribution, VSAT communications, and broadband Internet services via the satellite's multiple Ku- and Ka-band transponders.

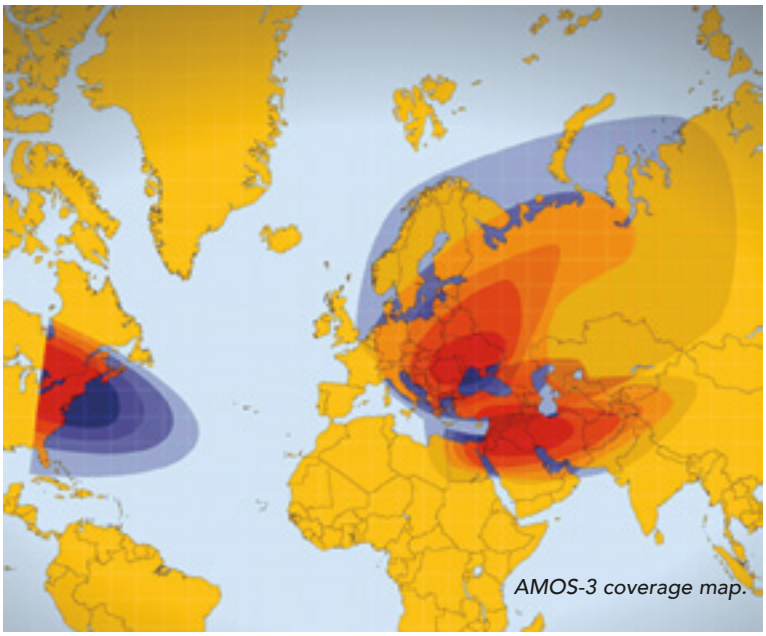
The company's pre-sales efforts went well and two long term agreements in two major markets were secured in the Chinese and South Asian regions as well as Russia. These two contracts will enable service to be delivered over a wide geographical range and will provide an excellent economic lever for Spacecom partners to offer a broad array of advanced services. New contracts will be added to fill capacity on the AMOS-4.

AMOS-5, serving Africa with connectivity to Europe and the Middle East, has also been a powerful driver for the company. Since its launch in 2012, the satellite's C- and Ku-band capacity have been meeting the needs and requirements of a large number of African and European broadcast and data service operators.

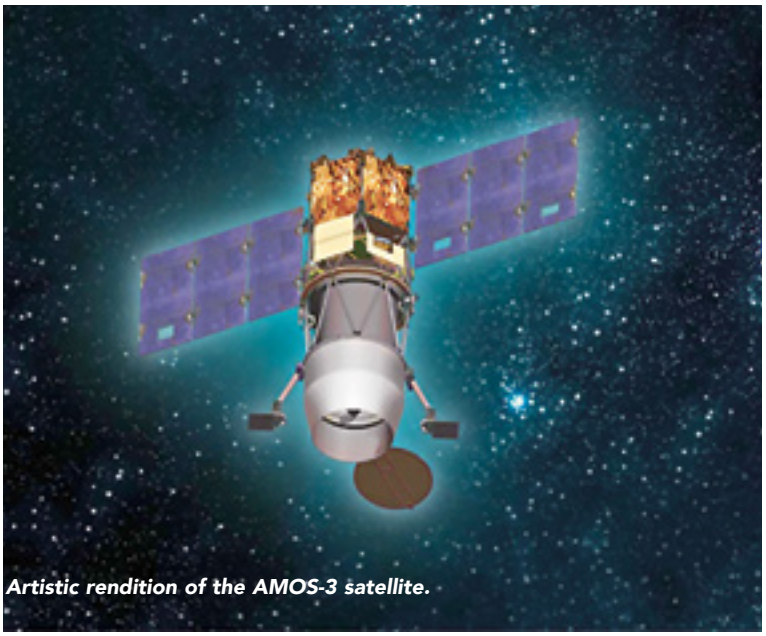
From its 17 degrees East orbital position, AMOS-5's beams supply broadcast and data services to the entire African continent, making it a prime carrier of African satellite communications traffic in broadcast and data services. Spacecom clients in this region include Vodaphone, Orange Business Services, Infrasat, France 24, African government agencies, and many others.

**About the author**

*Jacob Keret brings to his position more than 20 years of global business and management experience in the aerospace and telecommunications arena. Jacob served for six years as vice president of marketing and sales at Starling Advanced Communications, an innovator in satellite communication systems. Prior to that, Jacob co-founded Spacecom Satellite Communication Services, a service provider for AMOS satellites. In his role as vice president of marketing and sales at Spacecom, he led a team that generated several dozen million U.S. dollars in sales within a few years, and helped build the company into a leader in several European markets. During his nine years of service at Spacecom, Jacob was personally responsible for the successful AMOS 1, 2 and 3 satellite project businesses. Previously, he held the position of marketing manager in the MBT Division, Space Directorate of Israel Aircraft Industries (IAI).*



*AMOS-3 coverage map.*



***Artistic rendition of the AMOS-3 satellite.***

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# A Case In Point: TV Teleport For Turkmenistan

*By Rainer Lorger, General Manager, Sales + Marketing, DEV Systemtechnik*

**The recent selection of Turkmenistan's capital city Ashgabat to host the 2017 Asian Indoor and Martial Arts Games has accelerated expansion of a massive new sports complex—this complex will become the largest such facility in Central Asia. Part of the project is a new state-of-the-art satellite communications teleport. The critical signal-switching and transmission subsystem between the space-to-Earth antennas and receivers at the new satellite facilities employs state-of-the-art technology from DEV Systemtechnik, which is based in Friedberg, Germany.**

In 2002, Turkmenistan, flush with oil and gas resources, opened the hyper-modern Ashgabat Olympic Stadium. In 2009, the Turkmenistan government decided to expand the spectacular architectural site with additional sports parks. A new winter sports complex was inaugurated in 2011.

Following the selection of Turkmenistan's capital as the official host of the Asian Indoor and Martial Arts Games, 2017, a US$1.4 billion project was initiated to expand the multi-purpose sports facility. The Turkish construction firm, Polimeks, was selected as the prime contractor for the project, which includes the construction of a new broadcasting center for Turkmenstan's National Television with facilities to receive signals from international communications satellites such as Yamal and Turksat.

Polimeks tasked its subcontractor, Istanbul-based broadcast technology systems integrator Bilgipark, with building the new satellite transmission facilities.

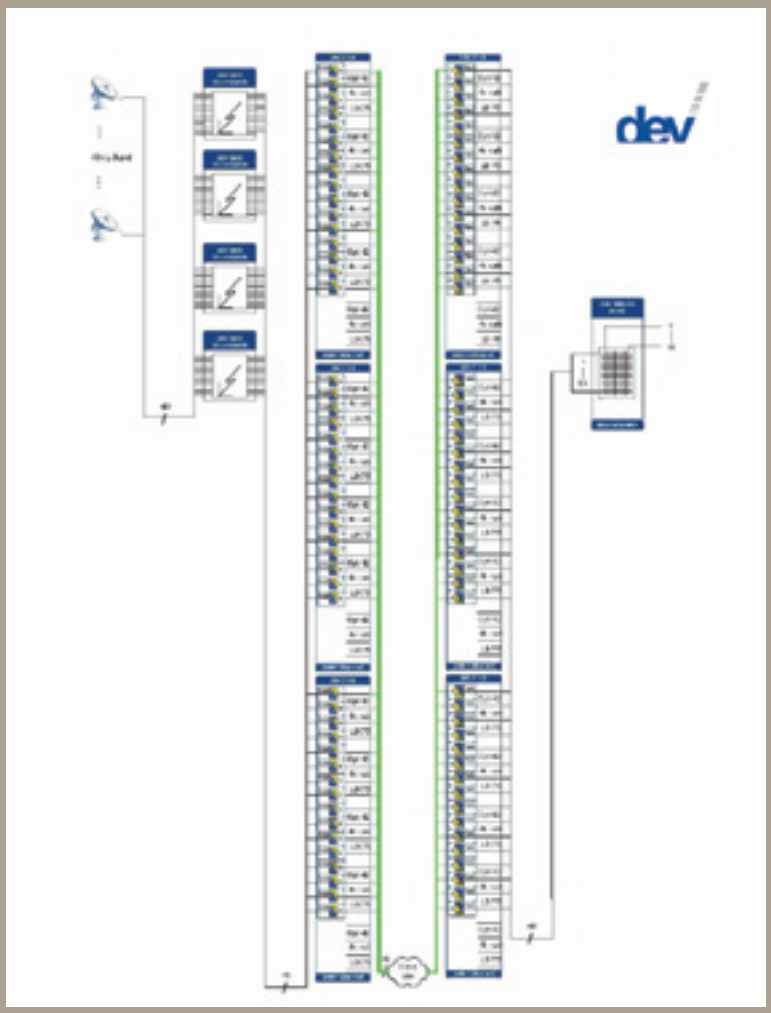


*Figure 1. Front-end of the teleport. The electrical RF signals from the satellite antennas pass through DEV's lightning protection units to the DEV 7113 Optribution® systems, which consist of transmitters and receivers. The RF signals are converted to optical signals by the DEV 7113s, and transmitted to the separate receiver building via fiber optic cable. There, signals are converted back to electrical RF format and distributed to the TV program receiver/decoders (IRDs) by a DEV 1996 matrix.*

### *The Challenge*

Bilgipark's plans called for a satellite antenna farm with 13 antennas as well as the ability to redundantly receive, route, and distribute 10 television channels. To address the complex critical path system between the satellite antennas and the separately located indoor signal reception equipment, Bilgipark selected DEV Systemtechnik of Friedberg, Germany.

The project required an easily expandable and future-proof matrix-based solution. After assessing different options on the market, and cost and performance trade-offs, Bilgipark turned to DEV for its technology and due to the firm's expertise in RF signal transmission as well as coaxial and fiber optic cable distribution.

The antenna signals are transmitted by an optical transmitter and receiver system DEV 7113 and distributed to 10 professional Harris multi-channel receivers by an L-band matrix DEV 1996 with 64 x 16 ports (*Figures 1 and 2* on this page).

Operators can easily switch, route and distribute incoming program feeds at the click of a mouse.

The DEV 1996 is an L-band signal switching and distribution matrix that is modularly expandable from 16 x 32 to 1024 x 1024 channels. The product's advantages include superior RF performance, a robust, proven design with full fan-out matrix distribution, hot-swappable modules for interruption-free operation and expansion, and an easy, intuitive, and flexible graphical user interface (GUI) control system. For control via the web interface option, DEV is providing free iPads to configure, monitor, switch and manage DEV 1996 systems with 32 x 32 or more channels.

Only 3RU high, the DEV 7113 offers a chassis with 20 optical module slots. A maximum of 20 twin cards at two channels per card may be equipped and the chassis is able to transmit as many as 40 optical signals. The unit can be completely controlled and monitored via a user-friendly web interface. Two 300W power supplies deliver sufficient power to feed up to 40 LNBs. DEV offers transmitter and receiver modules in three different ranges of cost and performance. These modules are designed to meet the requirements for a variety of transmission distances and technical specifications. All modules occupy only four-depth units, allowing for an extremely high system packing density.

### *Performance Beyond Expectations*

At the start of the acceptance tests, Bilgipark engineers had difficulty believing the signal quality measurements they were taking were accurate. "We actually

*Figure 2. Installation in the receiver building. The rack with DEV equipment (not fully visible) is on the far left side, adjacent to the receiver rack the engineers are working on.*

thought our instruments were defective or needed re-calibration as the signals received were so strong and clean," said Bilgipark's Nuriye Gungor. "However, it turned out that such was simply the excellent transmission characteristics of DEV's systems."

"This was another case of what sets DEV solutions apart according to our customers: the superior RF performance that our Optribution® transmission and distributions deliver," says DEV Area Sales Manager Joerg Sommerschuh. "That is because whether it is billions watching TV for sports like Olympics, or a single local broadcast, we understand that signal quality and uptime are the name of the game."

Continuing plans for the teleport at Ashgabat Olympic Village include adding satellite uplink capabilities, says Bilgaprk's Gungor, "And, of course, we will partner with DEV again."

**About DEV Systemtechnik**

*DEV Systemtechnik (www.dev-systemtechnik.com), Friedberg, Germany, develops and produces a complete range of leading-edge, high-performance products and systems for the optical and electrical transmission of Radio Frequency (RF) signals via coaxial cable or fiber for satellite, cable, and broadcast television head-ends. DEV products include distribution amplifiers, splitters and combiners, switching systems, distributing matrices, routing products, multiplexers, and fiber-optic RF signal transmission systems—all built to meet the highest standards of system availability, reliability and controllability. Named several times to the Deloitte Fast 50 list, DEV has achieved a compound growth rate of 462 percent over five years.*

**About Bilgipark**

*Bilgipark (www.bilgipark.tv), Istanbul, Turkey, is a broadcast system integrator which was founded in 1997 by Askin Erdemir. Bilgipark is distributor for Avid, Harris, Vinten!sachtler, Litepanels, and other international broadcast technology companies in Turkey. Bilgipark has designed the first HD Outside Broadcast van in Turkey, and supplied the server and automation solution for the HD transition of Digiturk, a major Turkish satellite broadcaster, using Harris equipment. Mr. Erdemir and his son Burcin Erdemir are the company's shareholders.*

**About the author**

*Rainer Lorger is DEV's General Manager Sales + Marketing —his main responsibility is the management of the continuously growing company's national and international sales structure. He started his career in 1983 as a sales representative with Hewlett-Packard, where he became District Sales Manager. In 1998, Lorger joined Tektronix, one of the leading electronics test and measurement businesses, as Sales Director, Europe, to implement a new European distribution structure. Before entering DEV Systemtechnik, he served as a Division Manager with Hydrotechnik, a medium-sized company in the field of electronic data acquisition systems. Together with his team, Lorger has set clear signs in the market to expand DEV's top ranking as a global supplier of leading RF technology from the antenna to the receiver.*

***A Gift For The President!***

*For the birthday of Turkmenistan's President Gurbanguly Mälikgulyýewiç Berdimuhammedow, a driving force behind the sports sites expansion program, some of the contractors wanted to present him with a special gift: The high-quality TV transmission of the ceremony from the ice sports palace to the broadcast center.*

*On extremely short notice, DEV established an optical link over a distance of 120km without the use of repeater amplifiers. For that purpose, DEV's Top Performance Optical Link was selected. This solution is comprised of a DEV 7233 transmitter module and DEV 7333 receiver module.*

*This solution delivers a high-performance optical transmission channel with a noise figure of 10dB or less, a dynamic range of 85dB (-70 to +15dBm), an optical budget of 35dB maximum, and a variable link gain of -10 to +35dB in the Extended L-band. This allows users to optically bridge up to 170km without amplification. For medium and short distances, as well as less demanding technical specifications, DEV also offers an Advanced Solution Optical Link and a Basic Optical Link.*


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# Downlink: High Power GaN Ku-Band SSPA Systems

*By Cristi Damian, V.P. Business Development, Advantech Wireless, Inc.*

**Taking into account the latest achievements in the digital signals processing, encoding techniques, IP-based communications systems, new modulation and FEC techniques—the satellite communications systems today are moving away from Multi-carrier Transponder usage to a Single High Data rate carrier per transponder.**

All services sharing the common carrier (TV channels, radio channels, VoIP services, data channels and so on), are multiplexed into a common high data rate stream which is transferred through the communications channel and separated at a receive site based on their packet identifiers in real-time.

The main advantage of this approach is the Single-carrier Transponder usage which allows using of the Satellite Transponders close to their saturation point (instead of 4 to 5dB output back-off in multicarrier mode). This way of using them allows for much smaller receiving antenna dishes (40 to 80cm in Ku-band systems), improved system margins and link availability figures, resulting in better quality of all of the services.

Even by significantly improved satellite transponder parameters, the requirements to ground station HPAs have increased rapidly in the last few years—even the highest power SSPA units (up to 500W Ku-band SSPA single units) appear to not be equal to the task of meeting large teleport requirements.

***Advantech Wireless High Power Phase Combined Systems***

*Outdoor Vs. Indoor solutions*

One the most important factors by Earth station design considerations is the required EIRP of the Earth station, which is calculated by a simple formula:

EIRP = A + Pout – FL [dBW],

where A is Antenna Gain [dB], Pout – HPA output Power [dBW],

**FL** – Feed Loss [dB] -the loss in the waveguide system between HPA output and Antenna input

In order to increase the Earth station EIRP, the system designer should try to minimize the FL as much as possible. Especially in Ku-band, where the losses in the waveguide are about 0.16dB/m to 10m of waveguide path between HPA and antenna are already 1.6dB less EIRP.

In the case of high power systems, 1.6dB is a significant loss which costs a lot in terms of HPA output power. For example, 2KW HPA (63dBm) will drop to (63-1.6=61.4dBm (1380W)– 620W of expensive RF power in Ku-band, lost in the W/G system (10m long). In the case of a 20m W/G system, more than half of the HPA power will be just wasted in the feed.

The example above shows how important (especially in Ku-band systems) it is to minimize the feed loss. Strongly recommended is to install the HPA as close as possible to the antenna input. That is why outdoor systems, which minimize the feed loss, are much more suitable for high power Ku-band applications.

A few practical examples include:

1. 900W phase combined redundant system ( 3 x 500W SSPAs GaN operating in configuration 1: 1+1) was installed less than 3m away from the antenna input—the measured feed loss was below 0.4dB for the installation as shown in *Pictures 1* and *2* on this page.

   The considerable reduction in size, weight, and energy consumption achieved when using GaN technology as opposed to any previous solid state technology, makes this new architecture the only viable solution today.

   In the case of indoor equipment (installed in a shelter), a 1300W minimum HPA would be required to achieve the same EIRP—in this case, a 900W outdoor system is equivalent to a 1300W indoor system (both systems deliver identical Earth station EIRP).

2. 1600W phase combined system (8 x 250W Ku-band GaN SSPAs) was installed in the same way on a special mobile platform just behind the 13m antenna input. Feed losses reported were below 0.5dB. Similar indoor systems installed in a weatherized container under a 13m antenna will have at least 1dB more feed loss.

3. 2400W phase combined systems (8 x 400W Ku-band GaN based SSPAs) were installed on the same mobile platform behind the main reflector of a 13m Ku-band antenna. When operating 2 x 2400W Ku-band, one unit per each polarization, all transponders of an existing satellite were saturated, taking maximum advantage of bandwidth and power. Prior to the GaN technology introduction, this never was possible with any of the existing SSPA or HPA technologies.

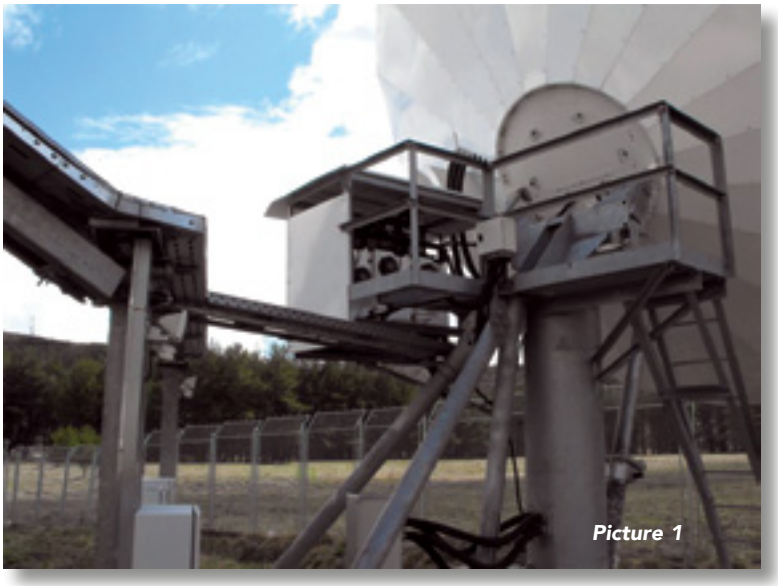
Another serious disadvantage of the indoor systems is the need of a powerful and sophisticated air-conditioner system to extract the generated heat out of the shelter. This affects the whole system's reliability and power consumption/efficiency.

*Phase Combined Systems Vs. Standard 1:1 and 1:2 Redundant Systems*

In all Redundant systems (1:1,1:2), one of the HPAs is always operating on a dummy load. That means that half of the installed RF power is not really used, it is there simply to provide redundancy in case of unit failure. This leads to a twice lower efficiency of the system and a real waste of produced RF power. Additionally, the losses in equipment and maintenance cost will be significant.

Another serious disadvantage of these systems is the switching time of the W/G switches (about 0.2s), which will cause a significant amount of information to be lost in the payload data streams and, quite probably, loss of synchronization at the system's receive site due to each redundancy engaging in a switching event.

Via the newly developed Advantech Wireless GaN based SUMMIT technology, the High Power SSPA consists of as many as 16 SSPA modules operating in a phase combined system, where all units in the system are constantly delivering



Picture 1

Picture 2

their output power to the antenna. There is no waste of installed RF power in the system, which results in much higher system efficiency. The system does not contain any W/G switch, so there is no service interruption by unit failure event. An example of a High Power Phase combined system is shown in *Figure 1* below.

The system consists of 8 x 400W SSPAs delivering 2400W on the output. The system is equipped with 1:1 redundant up converters in order to have a convenient L-band input. Some of the main system characteristics are:

All modules are factory pre-set to equal gain and phase characteristics, and the system allows hot-swappable unit replacement without any tuning and adjustments procedures required.

By unit failure—the maximum output level degradation is 1.2dB, which can be automatically compensated by increasing the input level of the system by system controller (adjusting the up converter output level). The 1.2dB short term drop is actually within the system margin and should not affect communication system performance.

Minimized maintenance cost—the spare unit (recommended) is only 1/8 of the total power of the system. In a 1:1 redundant system, the spare unit (recommended) needs to be same as the unit in operation—able to maintain full output RF power—there are much higher spares cost, in this case.

***GaN-Based SSPAs And Phase Combined Systems***

The latest achievements in SSPA technology implemented by Advantech Wireless are through the use of the highest efficiency GaN FETs-like output stage of the SSPAs. This leads to the most compact SSPA units and allows Advantech Phase combined systems to deliver the highest possible output power level on the market today.

For example, we can analyze a similar system such as the one shown in *Figure 1* using 8 x 400W GaN based SSPAs. Some of the major system characteristics are:

- Minimum output power in saturation: +64dBm (2500W)
- Linear output power: +61dBm (1250W) – IMD level -25dBc measured by two tone method.
- Usable output power in multicarrier mode: +60dBm (1000W)
- Frequency band: 13.75—14.5GHz

*Figure 1*

A similar system in X- and C-band will achieve 6.6 KW total RF power. As of this writing, SSPA, TWTA, or Klystron HPAs can not meet the specifications as listed above. The power levels specified are close to the practical and theoretical limits for antenna feed capabilities and the system offers the maximum usable HPA power in Ku-band SATCOM systems.

If higher linear power is required, a multiple antenna solution would be recommended—splitting the payload to two or more antennas depends on the system's requirements.

As a comparison, the maximum available TWTA (1250W) on the market, as of this writing, can not deliver more then half of the proceedings specified above linear power—the limit for this tube is 470W max at -25dbc IMD level by using a linearizer.

*Note: The output power of this amplifier is limited up to 500W maximum, even if it is designated 1250W (which is actually the power of the tube itself, not the power on the output flange of the amplifier).*

Klystron HPAs are usable in very narrow frequency bands (72MHz). In order to cover the full band—13.75 to 14.5Ghz—multiple Klystrons must be combined through the use of a very complicated frequency dependent upon combining circuits, which makes such a solution without much practical usage. The linearity performance of these amplifiers is also poor, so special linearizers should be used for each particular tube.

Phase linearity and group delay ripples are yet another problem presented by Klystron tubes. The performance under higher level modulation schemes (higher than QPSK) will also be limited—special group delay equalizers should be used.

GaN and GaAs based SSPAs and phase combined systems developed by Advantech Wireless are able to deliver the highest possible EIRP in SATCOM systems today. These EIRP values touch the theoretical and practical limitations that are established by waveguide components and the power handling capabilities of antenna feeds.

For further information, please visit the company's website:

***http://www.advantechwireless.com***

**About Advantech Wireless**

*Since 1998, Advantech Wireless, an ISO 9001: 2008 certified corporation, is a leading-edge wireless broadband communications solution provider. Advantech Wireless designs, manufactures and deploys networking for broadband connectivity, broadcast solutions, video contribution and distribution, mobile 2G, 3G, LTE backhaul and DTH + DTT video distribution, using satellite and terrestrial wireless communications. Products include: Next Generation VSAT Hubs and Terminals, World-leading GaN technology High Power Amplifiers, SSPAs, Block-Up Converters (SSPB), Frequency Converters, Satellite SCPC Modems , Fixed and Deployable Antennas, Antenna Controllers, Terrestrial Microwave Radios, Routers and Ruggedized Products. As winner of Canada's 50 Best Managed Companies Program for three consecutive years, and winner of the Best Overall Company of the Year and the best R+D company in Quebec (PME) at the Mercuriades Award, Advantech Wireless' R+D program has benchmarked some of the industry's most innovative products. Offices are located in Canada, the United States, the United Kingdom, Russia, Brazil and Venezuela.*

# SatBroadcasting™: Broadcasting In Europe—Meeting The Needs Of Diasporas

*By Eran Avni, CEO, European Communication Services (ECS)*

**New opportunities are opening to broadcasters who are willing and ready to create audience-specific businesses. We are not talking about meeting the lowest denomination of entertainment or reality programming that piques the interest of a large number of anonymous people. We are, however, talking about how to meet the needs of specific audiences that are highly interested in something special: Themselves and their individual cultures. At ECS we call this specialty: Diaspora World Broadcasting.**

We have uncovered three major trends in Diaspora broadcasting that makes this service an exciting as well as a quickly changing marketplace.

First, immigrants to a new region seek news, entertainment, sports and culture from their homeland. Additionally, social networks, TV and Internet broadcasts are the first places they search for updates from their home regions. This makes TV an attractive audience for advertisers, especially those from the viewers' home markets.

Second, immigrants often create their own channels to serve joint interests. These ventures can be based either in the homeland (partnerships with those living outside the country of origin), or in the new areas or regions where they live.

Third are the successful immigrant entrepreneurs who have done well in their new countries and wish to create bridges between the old and the new worlds.

ECS has developed methodologies to penetrate this market with special attention to the three segments described above and to create a viable business opportunity for these broadcasters. We understand the way people access content is not the same everywhere—differences exist between countries and even between various regions within a country.

To meet this variety, we created a multi-platform broadcast solution to maintain and build communities. By understanding the intricacies and subtleties of language, faith, cultures and technology, our solutions can reach the largest possible number of viewers in a target market who want to watch, listen or surf for information.

Together with our partners, we explore various options, map out the requirements for each solution, and then build the required distribution and contribution connections. Often, we are able to produce an offering to our client that comes in under the budget they originally set.

One key question is how to reach the audience and meet them on a daily basis. For broadcasters that do not have the means or resources to invest in multiple platforms or run advertising campaigns reaching audiences that are spread over large regions, this question is critical. ECS invests time and resources to find the right lever that empowers the channel to become an integral part of a community's culture.

With dozens, hundreds and, in some regions, thousands of channels available on a viewer's remote control for immediate surfing, it is vital to locate the channel at the correct neighborhood to make it easy for the audience to find the broadcaster's location during regular channel surfing.

Another ECS expertise is in the creation of a cost-effective, thorough and reliable Internet-based platform to reach potential audience members and open up the channel for additional income opportunities. For meeting audiences at more places, more often, and with additional services, we enable VoD, EPG, Catch Up services as well as archiving content using smart and easy to recover methods. We develop modular scalable solutions that meet broadcasters' needs when they initiate operations as well as when they grow their business.

For resource-constricted broadcasters, a modular approach that includes various distribution options works well. At ECS, we assist in bringing communications resources to a level commensurate with the broadcaster's needs. Our job, as quickly as possible, is to take the channel to as many viewers as possible to grow that base. Our abilities to create smart play out and distribution programs make it easier for a broadcaster to then focus on content and business growth.

Some diaspora broadcast operations have few employees. In addition, some channels are started by entrepreneurs with minimal broadcast experience. For these businesses, we provide a full service and operations package from play out and studio space to station links and backhaul satellites to fiber or Internet transmission for directly reaching homes.

With 24/7 monitoring and feedback setups, including tech and engineering support, we enable broadcasters to reduce their costs while finding the voices that resonate with audiences. To complete the network, we create the proper package for transmitting the television broadcast over the Internet. Again, this frees up the broadcaster to focus on branding and market penetration efforts.

A new service, OTT (Over the Top), is a cloud-based platform offering broadcasters multi-screen distribution on multiple devices, from tablets to smartphones, laptops to PCs, online TVs to IPTV. Now viewers can browse, chat and interact, all simultaneously, via a superior viewing experience. This brings the audience even closer to their co-patriots, locally and in their homeland markets.

A key point is that our system automatically analyzes the network and adapts the service to a user's available network bandwidth and characteristics. With OTT, audiences can connect easily and quickly with the broadcaster to create communities and bring themselves closer—a win-win situation for all concerned.

Reaching and incubating far-flung audiences will accelerate as the world continues to move into a Diaspora environment. For broadcasters, these migrations are an important backbone of business growth. ECS will continue to bring our firm's talents and deep understanding to the market with solutions that provide access and links between communities.

There's additional information at the ECS website:

***http://www.ecs-tv.com/***

**About ECS**

*European Communication Services is a top provider of End-to-End TV and radio distribution services through premium satellite packages and leading cable operators enabling broadcasters to strengthen their market footprints. Specializing in broadcast solutions for DTH, DTT and IPTV, we offer TV Channels and broadcasters secure access to satellites, cable operators and terrestrial packages throughout Europe, Africa, the Middle East, North and South America, Asia, and Australia. Being able to provide these services in a world in which immigration and emigration change local populations is especially important.*

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# Executive Spotlight: Vern Fotheringham, Chairman + CEO, Kymeta

**Vern Fotheringham has been a serial entrepreneur in the broadband wireless and satellite communications industry for more than 25 years. He has created and built numerous successful ventures and contributed to large scale projects for major service providers, system vendors and software solution suppliers. He has also been a public policy and regulatory advocate for new telecommunications service rules and standards, and an inventor and creator of now globally adopted standards, innovative new products and services.**

Previously, he was the President and CEO of ADAPTIX, Inc., a leader in the development of the OFDMA technology that is now the core of the Mobile WiMAX and LTE broadband radio systems. Career highlights include: pioneering the wireless broadband industry as the founder of both Advanced Radio Telecom Corporation and WavTrace; direct participation with the international development of the cellular telephone industry in the US, Canada, Mexico, Germany, Sweden, Hong Kong, Brazil, Argentina, Venezuela and Bangladesh; creation and development of the mobile satellite, satellite radio broadcasting, and the direct to user broadband satellite industry with the following organizations: Omninet (MSS and RDSS L-Band), OmniTRACS (now Qualcomm Ku-Band mobile data), AMSC (now LightSquared L-Band MSS), NORCOM Networks (now Wireless Matrix L-Band mobile data), Digital Satellite Broadcasting Corp (S-Band BSS), Pentriad (Q-Band FSS), and IPB Satellite Services (IPStar Ku-Band DTH).

***SatMagazine (SM)***

*Good day, Mr. Fotheringham…given your more than two decades of experience within the communications industry, what prompted you to move your career to Kymeta? How did your previous company experiences prepare you for your role at Kymeta?*

***Vern Fotheringham***

I was introduced to Dr. Nathan Kundtz early in the recruitment process that was conducted to find a CEO for Kymeta. As he shared with me the essence of his remarkable technical advances in the field of antenna design, the massive benefits to all forms of satellite communications were instantly obvious. Subsequently, it has been my great honor to be selected to lead Kymeta through its formative years. I have been privileged to participate in the creation of a number of game changing technologies across the expanse of the field of wireless communications, and the sum total of those experiences I believe combined to lead to my selection as the leader of this incredible opportunity.

***SM***

*How did your work within pioneering cellular technology firms create the venture avenues into SATCOM?*

***Vern Fotheringham***

Actually , it was the other way around. My career began at Omninet Corporation, where we pursued the original MSS and RDSS licenses in the US. In search of an early entry strategy, we created the OmniTRACS solution leveraging spread spectrum CDMA techniques in concert with Qualcomm as their first commercial customer. Ultimately, Omninet was merged into Qualcomm and that core technology became the foundation upon which their extraordinary success in transforming the cellular industry was based.

Subsequently, I spent a number of years with The Walter Group in Seattle, which provided me access to a wide range of cellular projects around the world. One of my clients was American Mobile Satellite, and as fate would have it their management was interested in divesting their L-Band packet data hub, and I founded Norcom Networks to acquire those assets and launch a nationwide mobile data service in concert with Telenor, the PTT of Norway. Norcom was ultimately acquired by Telenor, and continues today as Wireless Matrix.

I also founded Digital Satellite Broadcasting Corp. the early Satellite DARS technology leader that left the field post losing the FCC auction for the S-band spectrum. From there I pioneered the millimetric microwave industry with the creation of both a pioneering hardware solutions company called WavTrace that was sold to Harris, and a nationwide broadband wireless CLEC called Advanced Radio Telecom which we took public as ART. Post that time I pioneered a number of technologies including nationwide VoIP services, high elliptical orbit Q-band satellite architectures, and then the pioneering development of OFDMA technologies that now form the core of LTE wireless broadband systems.

***SM***

*What role does Kymeta play within the satellite communications segment of the satellite broadcasting industry?*

***Vern Fotheringham***

The core Kymeta technology has application in virtually every aspect of the satellite industry including both ground systems for fixed, portable and mobile applications, as well as onboard spacecraft to enable reconfigurable beam patterns and beam switching to future proof and add flexibility to on-orbit platforms. Kymeta is developing a range of software defined electronic beam forming antenna technologies. I believe our solutions may ultimately transform and expand the satellite industry by opening up inclined orbit architectures of all types and altitudes for commercial exploitation. This will result in massive new frequency reuse capabilities to increase on-orbit capacity, while also enabling reduced latency services via LEO and MEO orbital architectures.

***SM***

*What is Kymeta's mission and why is it so significant? Why is Kymeta being described as "disruptive?" What, exactly, is the technology that elicits this descriptive phrase for the firm?*

***Vern Fotheringham***

Kymeta has developed some specific techniques to create dynamic electronic beam forming capabilities without the use of power consuming phase shifters or alternatively moving parts. Our new approach will dramatically reduce the cost of beam forming antenna solutions, and open a wide range of new market opportunities across the entire span of the satellite industry. So when we are described as disruptive, I would prefer we simply be viewed as a harbinger of innovation and dramatic new and profitable opportunities for every segment of the satellite industry to leverage. We are positioning Kymeta to be an enabling technology supplier to any incumbent satellite system operator, solution provider or equipment supplier that wants to leverage our metamaterial antenna components and technology into their own products. Kymeta will also offer its own branded products in selected markets that we identify as promising to address with our new solutions.

***SM***

*Which markets could be impacted by Kymeta's technology and how?*

***Vern Fotheringham***

The following market segments and the added value Kymeta plans to bring include:

Fixed: VSAT / DTH – Self-acquiring and self-aligning connections to satellites – eliminates expensive truck rolls for installation or future antenna re-pointing service calls.

Portable: BGAN size and equipment cost parity, with broadband VSAT data rates, and capacity pricing equivalent to terrestrial alternatives.

Mobile: Enabling mobile services over what have traditionally been Fixed Satellite Services – aeronautical, maritime, rail, land mobile – mass market consumer services to the connected car, and ultimately to the individual.

***SM***

*What are metamaterials? What is Kymeta doing with them?*

***Vern Fotheringham***

Kymeta uses a number of technologies developed over the last decade in the field of metamaterials. People are often confused and want to see "the metamaterial," but that is a misnomer, as the word actually defines a field of endeavor rather than a "thing." A good parallel is the field of nanotechnology, which covers a wide range of tools and techniques to address numerous opportunities. Metamaterials, broadly defined, has to do with using man made materials to modify the performance of the electromagnetic spectrum to enable any number of previously elusive capabilities that to date have been either too expensive to be commercially viable or impractical.

***SM***

*What solutions/specific products do you offer?*

***Vern Fotheringham***

First to market will be a Portable Satellite Terminal (PST) which is an easy-to-use, laptop sized device with high speed Internet connectivity and worldwide coverage through Ka-band satellites. This product benefits customers such as news reporters in the field, disaster recovery and aid organizations, oil and gas exploration professionals, as well as consumers. The Kymeta Portable Satellite Ka-band Terminal combines the best of two worlds: the portability of a BGAN L-band terminal, with the high data transmission speed and low data costs of a VSAT Ka-band terminal.

We also signed an agreement with Inmarsat to develop an Aero-antenna slated to enable business- and commercial jets of any size to access high-speed broadband connectivity globally through Inmarsat's Global Xpress (GX) service. The advanced and proprietary Kymeta Aero Antenna will be available to GX users and opens up new opportunities for collaboration in the rapidly expanding aviation market. We are also looking into several additional market segments and satellite terminal solutions that may significantly broaden the reach of key market segments for the near and long term.

***SM***

*When will your products be introduced to the market?*

***Vern Fotheringham***

We anticipate that our first Kymeta branded product, the rapid deployment Portable Satellite Terminal, will be commercially available in early 2015. We are on schedule to deliver our initial Aero antenna modules to Inmarsat by the end of 2014.

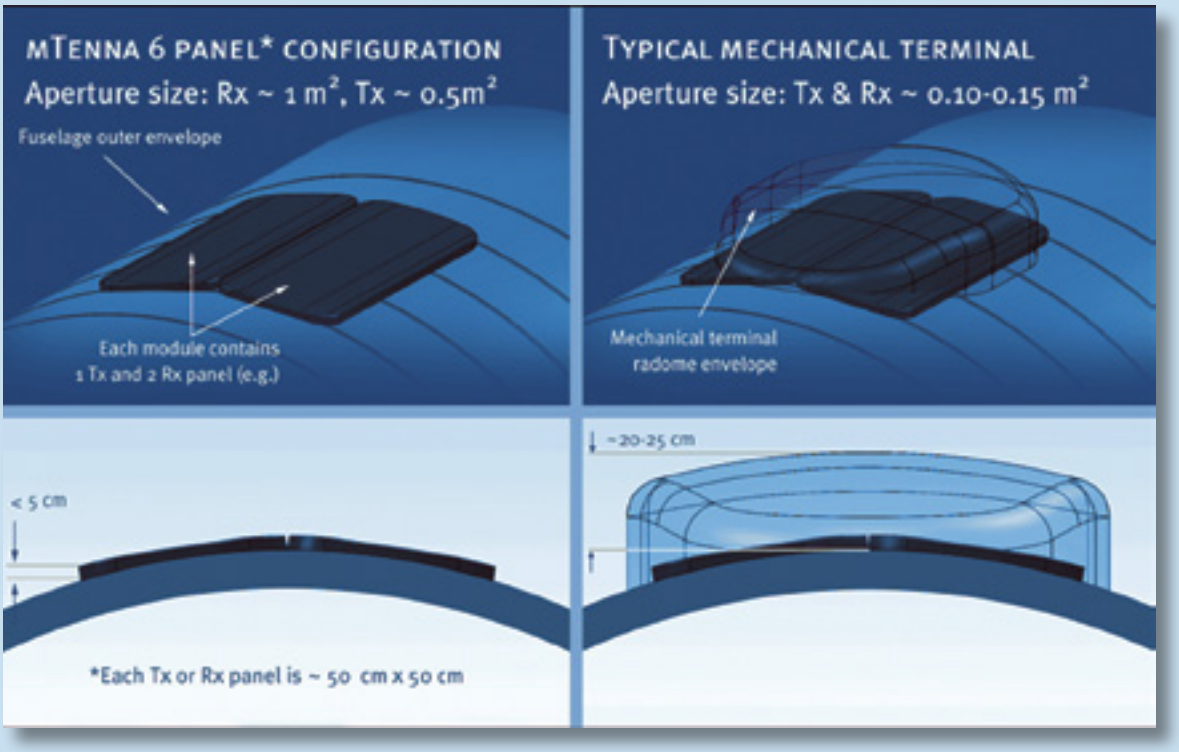
***SM***

*Kymeta recently announced a partnership with Inmarsat—what are the details and goals of this combining of talents and resources?*

***Vern Fotheringham***

The agreement with Inmarsat is to develop a satellite antenna that will enable business and commercial aircraft of any size to access high-speed broadband connectivity globally through Inmarsat's Global Xpress (GX) service. The advanced and proprietary Kymeta Aero Antenna will open up new opportunities in the rapidly expanding aviation connectivity market.

The Kymeta Aero Antenna under development is a lightweight, flat-panel device, which will enable new levels of efficiency in delivering broadband services not previously enjoyed by commercial and business aviation. In addition to having a substantial advantage in the size of the useful aperture the Kymeta solution




also avoids the interference issues plaguing gimbaled aero antennas when in proximity to the equatorial plane.

***SM***

*How does Kymeta differ from its competitors?*

***Vern Fotheringham***

Unlike the vast majority of mobile satcom terminals in the market today that rely on mechanical gimbals or phased arrays to point an antenna beam, Kymeta antennas do not require moving mechanisms of any kind to dynamically steer the antenna beam using its software controlled metamaterials-based antenna panel. Kymeta antennas have the beam steering performance of a typical phased array, but it is achieved without the use of expensive and power-hungry phase shifting components. As a result, Kymeta products are expected to deliver a dramatic reduction in cost compared with mechanical terminals and even greater cost advantage over phased array products.

Additionally, for products such as the Portable Satellite Terminal, the key value proposition of the Kymeta solution is true portability and ease of use with the next generation high speed Internet speed and affordable pricing plans – which is unique in the industry.

***SM***

*Some prognostication, please… the advent of megapixel displays, such as 4K (UltraHD), will require major extended capacity agreements with satellite transponder owners. Will agreements between fiber, terrestrial and satellite content delivery become more frequent?*

***Vern Fotheringham***

I think we are on the cusp of a major transformation of the traditional satellite industry. The expansion of the traditional FSS mix of wholesale services will include a wide range of new innovative managed services to both business and consumer markets for fixed, portable and mobile opportunities. This evolution will embrace every aspect of the stratified telecommunications ecosystem that will be essential to leverage the most valuable elements and capabilities of each domain. The integration of previously autonomous networks into hybrid broadcast-broadband infrastructures will be an inevitable by-product of the rapidly expanding demand for digital information worldwide at ever-increasing volumes and at constantly increasing data rates.

***SM***

*What will we be seeing over the next year as far as technologies are concerned that could bring satellite broadcasting to the forefront of content delivery?*

***Vern Fotheringham***

A key justification for the deployment of the new generation of High Throughput Satellites (HTS) was in response to underserved markets for consumer broadband Internet access. The delivery of broadband unicast TCP-IP Internet access is an important opportunity for our industry, but it is far from the most significant of the many opportunities that will emerge to consume our new generation of HTS Ka-band and Ku-band capacity. The ability to exploit the higher value-added revenue potential of mobile broadband communications is going to eclipse even the most optimistic financial forecasts for fixed broadband access used to justify the launch of these new constellations.

The traditional approach to content delivery using the unicast Internet for the delivery of Over The Top (OTT) content is poised to meet the massively more efficient one-to-many capabilities of the new HTS networks. Although conceived as unicast platforms, as satellite systems these spot beam based networks will quickly prove to be the lowest cost method for the mass-market distribution of popular OTT and streaming IP content.

Kymeta is pioneering new ground segment solutions to unlock the massive potential of our rapidly expanding on-orbit digital capacity to serve new applications for IP content delivery to virtually every type of digital platform and screen serving the consumer, business and government markets.

***SM***

*Is Kymeta doing any work within the digital cinema arena? If so, would you please tell us about such efforts?*

***Vern Fotheringham***

Not at present. I think Scott Calder of Mainstream Data has that one well covered. Our primary market objective is to extend the availability of virtually all forms of digital media into every corner of our new digital economy at unprecedented levels of efficiency and cost effectiveness for content delivery to the literal edge of the network; the consumer or enterprise or in-the-field operative

***SM***

*Given some of the setbacks for satellite radio in the past, exactly how healthy is the satellite radio broadcasting segment? What do you foresee for this content within our industry?*

***Vern Fotheringham***

I was one of the pioneers in Satellite DARS and watched with sadness as the FCC obsession with misguided auction policies at that time led to a 50 percent reduction in the S-band spectrum allocation that was originally dedicated for the service, and then wasted on the ill-conceived WCS auction. The severe limitation to the S-DARS industry from having only 25 MHz of spectrum bandwidth will increasingly pinch their business potential. The poignancy of this situation will become obvious as Kymeta and others begin to exploit the potential for mobile services via the new HTS service providers leveraging hundreds of MHz of bandwidth.

Ultimately, I believe we will see a convergence of both traditional channelized linear audio services with new on-demand unicast or pre-positioned audio and rich media content delivered via both terrestrial and satellite service providers. The "connected car" is a huge opportunity for the satellite industry to address, as demand for telematics, infotainment and regulatory burdens on the auto industry continue to grow dramatically over the coming years.

***SM***

*With your wealth of industry experience, when you look back over your career, what project or projects truly bring you a deep sense of satisfaction?*

***Vern Fotheringham***

That is a really difficult question for me, as the arc of my career has allowed me to be at the creative end of the development cycle for many new services and technologies that have ultimately come to be widely adopted by industry. However, I have a deep sense of unfinished business to see the practical implementation of ubiquitous broadband services at the affordable prices required to ultimately drive widespread consumer adoption on a global scale.

What provides me with a continuous sense of satisfaction is the opportunity to continue to participate in the creation of innovative game changing technologies and services. A key part of that satisfaction comes from the privilege of organizing and leading a team of incredibly talented and dedicated people who come together to work hard to change the world for the better.

For more information regarding Kymeta, their website URL is:

**http://www.kymetacorp.com/**

***About Metamaterials***

*Intellectual Ventures has granted Kymeta an exclusive, fully-paid, perpetual global license for all satellite and related applications of its Metamaterials Surface Antenna Technology (MSA-T), providing Kymeta with commercial protection for this cutting-edge technology.*

*For nearly a decade, Intellectual Ventures has explored the potential of metamaterials – a new class of synthetic materials engineered to have properties not found in nature. For example, metamaterials can manipulate incoming electro-magnetic radiation such as light or radio waves to redirect it in a variety of potentially useful ways. While there are many exotic applications of metamaterials like cloaking devices that could make an object invisible, our current focus is on more practical applications of the technology:*

- *Satellite user terminals to connect boats, planes, cars and other vehicles to broadband service*
- *Dynamic cellular base station antennas to expand cell phone service*
- *Dynamic antennas for home and office wireless routers*
- *Collision avoidance radar systems for vehicles*
- *Advanced medical devices for focused surgical procedures*
- *Imaging systems for non-destructive testing of composite materials*

***About Kymeta's Aeronautical Terminals***

*One of the most compelling product opportunities for Kymeta is the mTenna aeronautical terminal. This terminal will address the growing demand for affordable broadband internet access for passengers on commercial airlines.*

*For the first time, the form factor advantages of the mTenna terminal will enable the delivery of affordable broadband Internet access to passengers on all categories of aircraft, including small regional aircraft, small private airplanes and jets. Similarly, the mTenna aeronautical terminal can address the government's existing requirement for high speed, beyond line-of-sight uplinks from large Remotely Piloted Vehicles (RPV), and also enable a comparable capability for much smaller RPVs.*

*Kymeta and Inmarsat have signed an agreement to develop a satellite antenna enabling business jets of any size to access high-speed broadband connectivity globally through Inmarsat's industry transforming Global Xpress (GX) service. The advanced and proprietary Kymeta Aero Antenna will only be available to GX users and opens up new opportunities for the two companies in the rapidly expanding business aviation market.*

*The applications are expected to include:*

- *Lightweight (few kg per panel)*
- *Low profile (large available aperture)*
- *Modular, can be sized as need*
- *Very low drive power*
- *Compatibility with composite fuselages*
- *No beam skew issues due to square aperture*
- *Lower life-cycle costs*

# SatBroadcasting™: Challenges Into Opportunities For Satellite Operators

*By Adina Eckstein, Vice President of Sales, Tvinci*

**As consumers develop a further understanding of what their payTV subscriptions could provide them across additional screens, satellite and cable TV providers now have an opportunity to leverage their content, brand and relationship with consumers to create competitive OTT (Over-The-Top) TV offerings.**

There is already a precedent for traditional—and by this, I mean satellite, IPTV and cable—payTV operators adding OTT services to their proposition; a great example is BSkyB in the UK with Now TV. Just last month, Tvinci announced that Eutelsat KabelKiosk—a German 100 percent subsidiary of Eutelsat SA, providing more than 300 payTV operators in Germany with cable infrastructure and content—had selected the Tvinci 2.0 platform to power their OTT offering to their customers.

OTT TV presents a huge opportunity for payTV operators, and there are a number of key points to consider at each stage of the OTT deployment:

***Devices***

Unlike traditional payTV services which rely on a set-top-box (STB) within the operator's network, OTT payTV services must be suitable for use on the different connected devices within a household. This poses a number of challenges for the service provider who no longer controls the firmware updates, and where the market includes a range of devices with different operating systems, screen sizes and update frequencies.

When selecting vendors for an OTT project, it is crucial that the platforms are attuned to the trends in the CE market so that deployments are not slowed down as more supported devices are added to the service. Legacy platforms created for satellite and cable payTV will not be able to navigate the gamut of challenges in the OTT space—this can only be achieved with a nimble partner who understands the market and the opportunities in providing TV services on a broad range of devices. A partner must be selected that possess the proven relevant experience in pay OTT TV deployments. Eutelsat's platform from Tvinci is a great example of a solution which demonstrates technological acumen, as the platform will support iOS and Android smartphones and tablets, PCs, connected TVs, proprietary client on STB and—crucially for the German market—HBBTV STBs.

***Business Rules + Content Protection***

By its very nature, OTT is a disruptive market force and is a catalyst for incumbent operators to innovate and enhance their existing product line up with a cutting edge, flexible offering. When competing with network agnostic newcomers, it is crucial to support multiple business models so that consumers do not need to leave their traditional payTV supplier when they're looking for TVOD.

Toggle is the leading OTT TV service in Singapore, offered by MediaCorp, the country's largest media company, and is a great case in point for a multi-screen TV service which implements Tvinci's multiple usage models. The content is supplied through a variety of business models (AVOD, SVOD, TVOD, freemium, coupons and discounts, etc.) and the content bundling is performed manually (i.g., categories and genres) or editorially. Metadata tags allow the service provider to bundle the content by parameters including actor, director, genre, and so on.

***Monetization***

While content is indeed king, and the quality of the content will significantly contribute to service revenues, OTT provides operators with many opportunities when it comes to monetization. A solution must be selected that will support enhanced options for monetization—e.g., adding additional devices to the subscription, providing "offline mode," monetizing the number of users per household —and which is flexible enough to accommodate market changes as the service grows and the market matures.

A superb example is Netflix's announcement last month that it will be charging for individual user profiles, or Sky offering "offline mode" for a fee. Tvinci has implemented individual profiles for Eutelsat and our deployment for EpicTV—a product of Elisa, a leading Finnish telco—includes an offline mode.

***User Experience Management + Personalization***

Many vendors will talk about "personal and social TV," and upon further investigation will be referring to integrations with social networks. It's important to remember that to create a truly personalized TV experience with a valuable social element, the TV service must cater to each individual within the household. Every end user will have their own preferences, their own viewing history, and their own social networks. In addition, once a service relates to each household member as an individual, the account administrator can also monitor their VOD (Video On Demand) budget and their access to restricted content or particular devices.

***Agility + Flexibility***

Delivery of video over-the-top is fraught with challenges, all of which can only be addressed by partners with the agility to nimbly navigate these challenges. Typically, legacy platforms for payTV do not include the necessary components for launching OTT TV services. Vendors with existing platforms tend to bolt on the added features in order to keep their platforms relevant for today's market. These backend solutions tend to slow down the launch time for service providers and, as the market changes, to meet consumer expectations—services become outdated quite rapidly.

Time to market is crucial. With low barriers to entry, the OTT TV market is wide open and there are a number of high profile disruptors who are expanding their global footprint. By launching a service quickly, and by using a platform with developers who work with a holistic methodology to constantly keep the service operating efficiently and reliably, a service provider will gain a large market share and will future proof their service for years to come.

***Proven Success***

When undertaking the research to investigate the viability of platforms to power an OTT TV service, operators must ensure that the platforms which are being considered have a successful track record. Part of the research must be undertaken as an end user; can you enter an app store and access an application which is powered by the platform? Can you see that the user experience is reflected adequately in the front end? What is the uptake and how successful are the services which are powered by their platform?

Video consumption, at its heart, is a passive experience for the end user. There is a delicate balance between meeting the consumers' expectations for an immersive multi-screen TV service which is both social and personal while retaining a lean back feel. From the perspective of the OTT payTV operator, the TV service should be immersive and sticky, with monetization features and the ability to scale up the service. From the end user's perspective, the TV service should serve their preferences and allow them to enjoy an uninterrupted video consumption experience as well as allowing them to interact with their friends.

Tvinci's second generation platform—as deployed for Eutelsat KabelKiosk—for OTT TV does just that—the operator controls the users, content, devices and user experience. Simultaneously, the consumer enjoys an immersive TV experience which is truly personal, with the ability to interact with the largest screen in the home, the TV.

The OTT 2.0 platform was designed with an understanding that no two consumers are identical. By using Tvinci's backend platform, service providers can design multiple usage models with a variety of business rules so that they can monetize their service effectively. In addition to monetizing their content, Tvinci customers can also monetize other parts of the service including the ability to stream content concurrently on more than one device (subject to the movie studio's requirements), and the ability to add more devices to a household subscription.

The 2.0 platform demonstrates, for the first time, how a backend can manage much more than just content and devices; it can also manage a sophisticated user experience, which includes a social feeds. Tvinci's SocialHub is built into the platform and filters and aggregates social network interaction to provide a relevant real time feed of social activity around the content. For the end user, the social feeds provide an unparalleled interactive and sticky TV experience where they have no need to leave the service provider's eco-system, where the content is enriched by the social network activity. On the service provider side, these social interactions provide invaluable insights into consumer behavior and preferences.

The Tvinci OTT 2.0 Platform also includes a multi-DRM (Digital Rights Management) solution where all of the main DRM providers' solutions are used to great effect, allowing the seamless transition of a piece of content from one device to another.

The 2.0 platform was designed with the ability to monetize all parts of the service—this means that a service provider could provide incentives for social interactions (e.g., share the service with your friends and receive one free movie), the option to send gifts to friends using the service, to name but a few. The platform also supports multiple languages for dubbing and subtitles and multiple currencies for billing. More information at: *http://www.tvinci.com*

**About the author**
*Adina joined Tvinci in 2008. Previously, she led the successful expansion of a non-profit organization as it entered into new territories, while raising sufficient funds for the process. Adina established and formed the Delivery department at Tvinci and currently maintains the global pre-sale and accounts efforts as active member of the company management from its London based office.*

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