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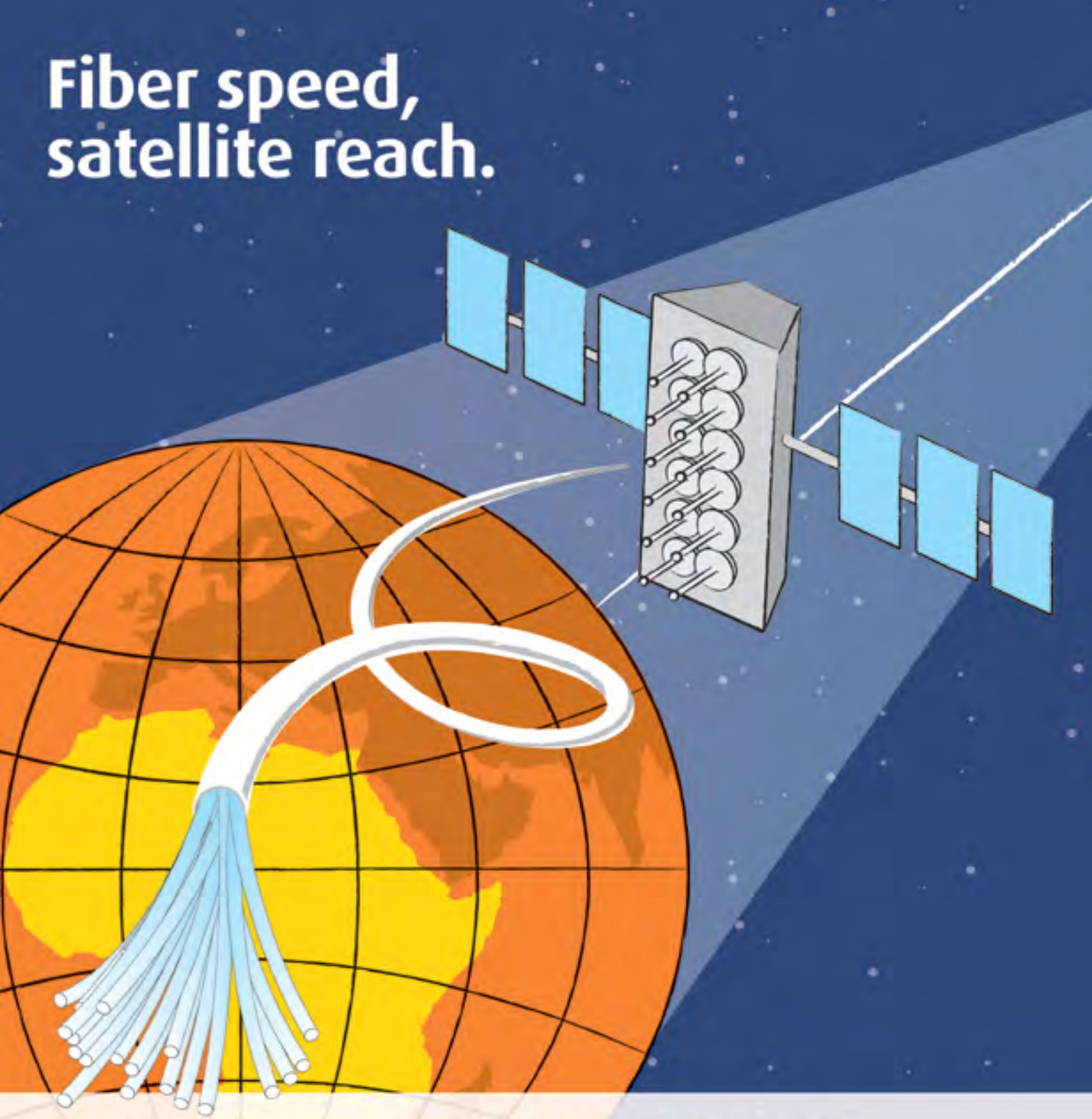

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Testing 1, 2, 3DTV

SES WORLD SKIES trials shedding light on television's new dimension

With a full year of end-to-end 3DTV tests under its belt, SES WORLD SKIES is uncovering some eye-opening results. Blue chip networks and television manufacturers are gleaning valuable insight from the first-of-its-kind collaboration.

"The who's who in 3DTV content production, infrastructure and flat screens are gaining tremendous benefits from their participation in the trials," said *Steve Corda*, vice president of market development for SES WORLD SKIES. "Our thorough evaluations are tracking the effects of compression and the complete transmission path on the quality of 3DTV programming," he added, noting the tests scrutinize everything from the content source to the display.

Enabling Best Practices In 3DTV

SES WORLD SKIES is testing a broad range of 3DTV programming – from sports and live events to movies and theatrical productions. The content is delivered to the advanced test lab at the company's U.S. headquarters in Princeton over an advanced uplink facility in nearby Vernon Valley, New Jersey.

As phase two of the trials kick in, content producers are finding that tweaks in production techniques can ultimately make a big difference in the viewer's 3DTV experience. Taking SES WORLD SKIES up on its open invitation, top producers are bringing their own programming to the test platform.

"Content producers have the opportunity to review their own programming over a broad range of network configurations on the end-to-end transmission system," explained *Alan Young*, SES WORLD SKIES CTO. 3DTV evaluators have rated reels of content — the good, the bad, and the ugly. "Bad two-dimensional television is just bad, while bad 3DTV is relatively painful to watch," noted *Young*. "We're drilling deeper and broader into everything from production techniques and the effect compression can have on content to the inconsistencies in 3DTV displays," he added.

From left: Alan Young, CTO; Steve Bunke, Vice President, North America Sales; Brian Mengwasser, Associate; Ramiro Reinoso, Principal Sales Engineer; Steve Corda, Vice President, Market Development.

The company has developed patent-pending transmission methods that enable a higher quality picture with lower processing requirements. "Virtually all of the end-to-end distribution chain participants have been solely focused on their components, their piece of the 3DTV delivery puzzle," explained *Steve Bunke*, vice president of North America sales for SES WORLD SKIES. "Until now, no one has taken the comprehensive, end-to-end system approach to optimize the overall viewing experience," *Bunke* added.

End-to-End Findings

Production quality and even viewer positioning can have an impact on the product that ultimately hits the screen. "Where the viewers sit in relation to the 3DTV screen can have a dramatic impact on the effectiveness of the 3D experience," explained *Ramiro Reinoso*, principal sales engineer for SES WORLD SKIES. "While it's not an issue in movie theaters with their giant screens, we've discovered a 3DTV viewing sweet spot for home audiences," *Reinoso* said.

Home viewers sitting "outside the edge of the TV" will miss out on much of the 3DTV effect, according to *Corda* and others involved in the trials. "We moved chairs in our viewing lab to three and four deep instead of three or four wide, because we found many viewers couldn't see the 3D as intended by the producers," explained *Young*. Various contrast ratios across TV brands, according to the findings, can have an important influence on the 3D experience.

"We're testing multiple types of 3D televisions, content, encoders and compression configurations to uncover the successful combinations and any potential issues that could cause degradation of the on-screen product," *Corda* said. "We're finding that while most content looks great in the studio, it can fall short of a quality viewing experience if it's not transmitted effectively."

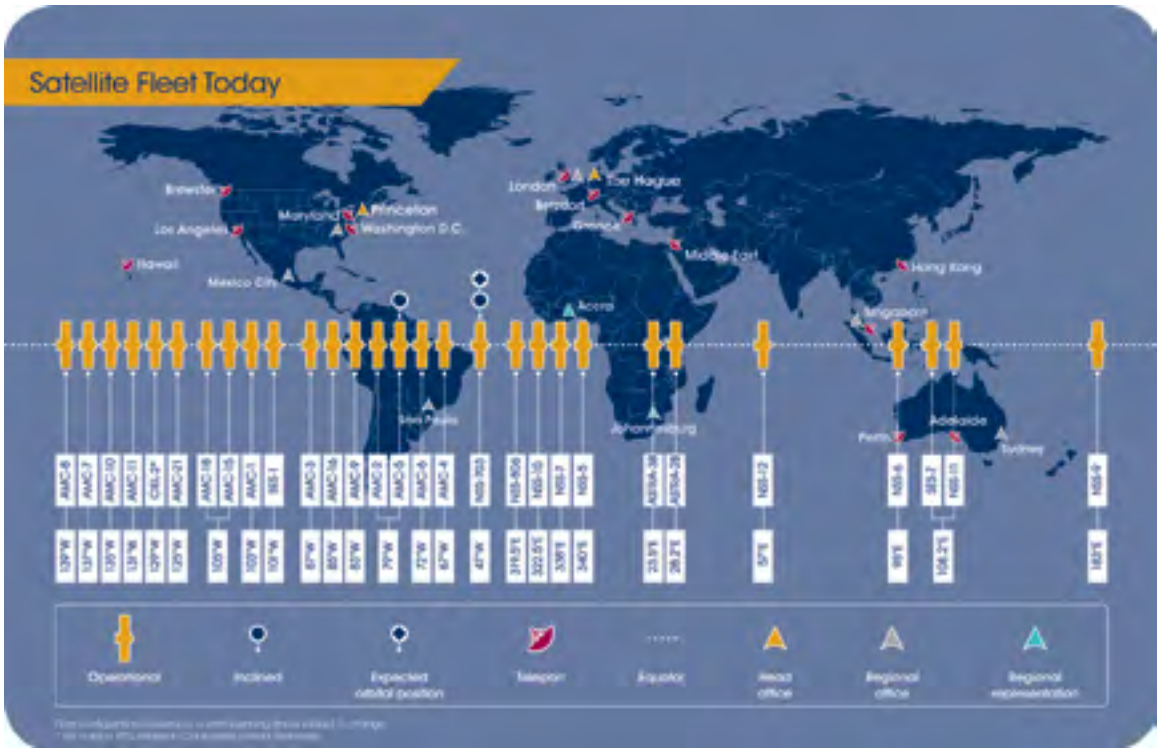
Finding just the right compression balance is proving to be an important element in successful 3DTV delivery. "The consensus among producers and the testing team is that over-compression can flatten and degrade the image to the point where 3D no longer looks 3D," explained *Young*. "We're studying ways to prevent that from happening during transmission."

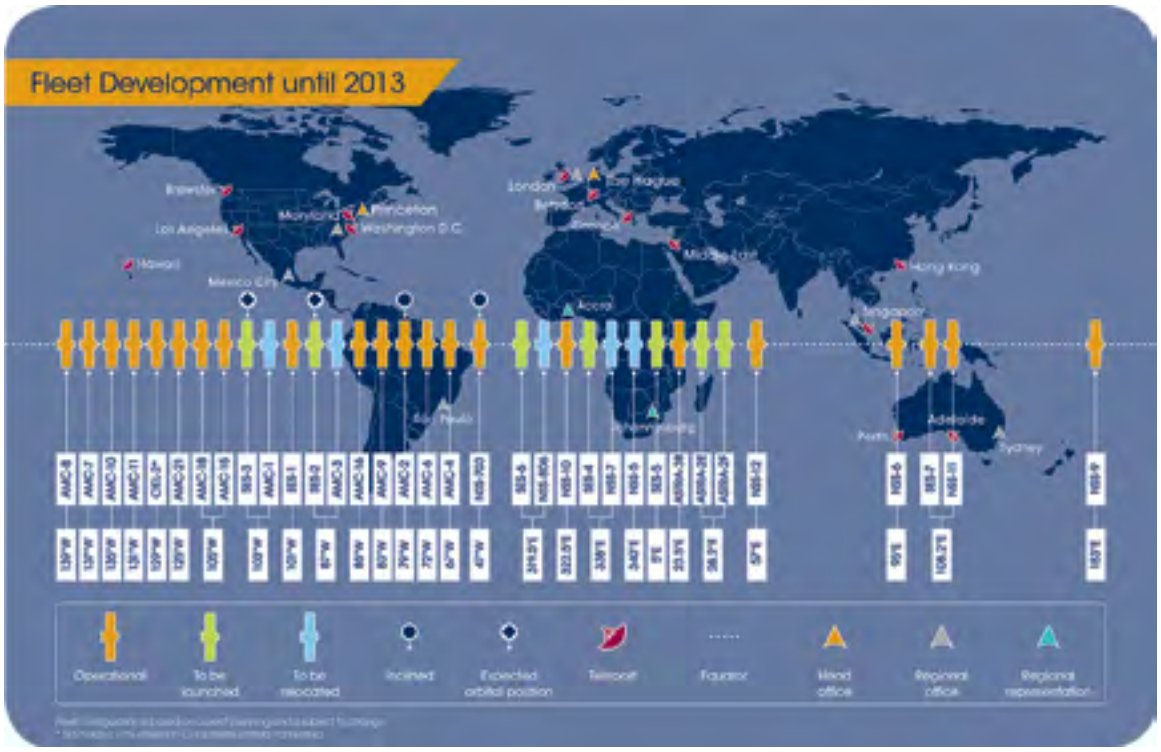
The Test Of Time

A deeper and more expansive view into 3D formats, sources and open versus proprietary platform debates are expected to reveal even more details and breakthrough discoveries.

"We have opened the test bed to content producers from across the industry," said *Bunke*. "We will see the effects of the transmission and distribution chain on their content. And we are further delving into the different types of sources, including 720p versus 1080i and 1080p, top/bottom versus side-by-side, and getting beyond frame compatible to frame sequential and other emerging technologies," he noted.

"Here's the bottom line," explained *Young*. "Bring your content to us, and you'll either reinforce your current direction and strategy or you just might learn something completely new about 3DTV," he added. "Either way, your content will end up leading the way to a great 3DTV viewing experience capable of withstanding the test of time."





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GlobeCast Australia Setting Records Down Under

GlobeCast Australia has started 2011 with a record level of live global transmissions. The records being set range across sport, entertainment and news events. From global delivery of dramatic floods footage to more than 20 key broadcasters, to an enormous slate of live sport and entertainment, it is the Broadcast Services provider's biggest ever start to a year.

Apart from *Occasional Use*, the growth is also due to the committed global carriage of full time channels: *Direct to Home* (**DTH**), *Free To Air* (**FTA**) Broadcast and Subscription Television channels. There is increased interest in both HD and 16:9 requirements for full-time channels; and as Australia's leading DTH operator, the Company is impressed by the dedication of global operators to continue discussing expansion of their offerings in this region.

Growth in multi-channelling including specialty channels and their spin offs, along with new methods of reaching and entertaining audiences are all pushing demand for bandwidth. Audiences with sophisticated home entertainment systems now expect live coverage in high quality audio and video.

Technological advances such as HD and 3D, combined with growth in areas such as *Mobile TV* and *Cinema Live Broadcasting*, along with the globalization of live sport, are all contributing to a wave of new demand for GlobeCast Australia.

One of the channels new in 2011 on the Company's global fibre network is the ***Tennis Channel***, and discussions are indicating the launch of at least half a dozen new broadcast channels in to the region in the first half of 2011. Also new to the global delivery list is an HD channel for **MTV** from London to **FOXTEL** in Australia and also MTV channels across the Tasman Sea to New Zealand.

To cope with the demand, the company has increased its satellite leases capacity domestically and on ***AsiaSat 5*** from 2011 onwards, and is successfully operating a new fibre network it commissioned last year to quadruple its global delivery capability from London, through the U.S., to Australia and New Zealand. AsiaSat has welcomed the capacity expansion.

"We are proud that AsiaSat 5 has been taking a key role in delivering major sports and news content within Asia and between Asia and the rest of the world. In collaboration with GlobeCast Australia, AsiaSat is pleased to have provided once again flawless delivery of such important events, including flood coverage, Australian Open Tennis and the recent Asian Cup. By doubling the capacity it uses on AsiaSat 5 in the new lease, GlobeCast Australia is enabling major broadcasters in the world to receive more comprehensive HD and SD coverage, wherever they are based," said *Sabrina Cubbon,* Vice President, Sales and Marketing of AsiaSat.

Apart from the records being set in broadcast hours, there are significant firsts being achieved by GlobeCast Australia:

- ◊ **The Australian Open Tennis was broadcast globally in HD for the first time in January 2011.**
- ◊ **Across January, a record more than 35 days of live tennis coverage was delivered by GlobeCast Australia to domestic networks including FOX Sports and the Seven Network, and to global rights holders.**
- ◊ **Germany's version of the Granada reality show, "I'm a Celebrity, Get Me Out of Here" ("Ich Bin Ein Star") achieved ratings records in January 2011; after the UK version was broadcast in HD for the first time.**
- ◊ **SKY Sport News committed to unilateral coverage of the Tour Down Under Cycling, featuring Lance Armstrong, a first to supplement its BSkyB main broadcast in January 2011.**
- ◊ **A full Summer of Ashes Test Cricket and One Day Internationals between Australia and the UK was broadcast globally in HD for the first time through February 2011.**
- ◊ **A doubling of capacity leased on AsiaSat5 for 2011.**
- ◊ **A new permanent 9Mhz domestic lease added to the Company's capacity to provision additional live news requirements for Network TEN Australia in 2011.**

GlobeCast Australia is proud of the reach it has earned, due to the trust placed in its team by broadcasters around the globe. For the flood coverage, broadcasters across Europe, Asia, the U.S. and, of course, Australia, were booking via GlobeCast Australia's domestic and AsiaSat satellite leases and on its global fibre, to cover the mounting death toll from the worst flooding in the Australian state of Queensland in almost 40 years.

For example, flood disaster coverage from **ABC-TV** was being delivered live to **RTL Germany** and coverage from the **Nine Network** to **BSkyB News** London. **APTN London** has taken fibre feeds from both the ABC and Seven Network. Other global networks booking with GlobeCast Australia included **CNN**, **Fox News New York**, **CCTV China**, **ARD** and **ZDF Germany**, **Orf Vienna Turkey**, **Channel 2 Israel**, **TV Asahi Japan**, **ITN** and **Reuters**.

For domestic broadcasts, Network TEN was drawing on its GlobeCast Australia provisioned satellite lease and supplementing its extensive coverage with ad hoc bookings; while ABC News 24 was being transmitted live in HD to FOXTEL and Austar on GlobeCast Australia's owned and operated capacity.

SKY News Australia also deployed its satellite vehicle to the flood zone and was taking regular live satellite slots with GlobeCast Australia. And the Nine Network was booking space as well.

An impressive and varied global reach was also achieved with the ***Australian Open Tennis***, with GlobeCast using its expanded AsiaSat 5 leases, and also taking a Summer-long lease on ***Intelsat 5*** to cope with demand for sport and entertainment television. Australian Open World Feed Takers included **ESPN Star Sports**, **Supersport (MNet)**, **SKY New Zealand**, **Fiji TV**, **Abu Dhabi Media Co**, **Al Jazeera** and a suite of Asia broadcasters via IMG China including **CCTV**, **Shanghai TV**, **Beijing TV**, **Guangdong TV** and **CN Sports**. Highlights and play-outs were also booked by various companies, including the **Perform Group UK**, **BT** and **Fuji TV** — for a Japan pool.

With 2011 off to such a strong start, the Company is well into planning its involvement in delivery of major global events from the region throughout the year. In particular, the Rugby World Cup to be held in New Zealand in September and October, will have GlobeCast Australia involvement at various levels in the region and globally.

GlobeCast Australia is a leading provider of services for International

Broadcasters in Australia, New Zealand and the Pacific Islands, operating facilities and links that span the World — specializing in live digital delivery, SD and HD, and also at the cutting edge of 3D in 2011.

About the author

John Graham joined GlobeCast Australia in mid 2008. He has worked for several major Australasian broadcasters in key News, Programming and Production roles, including the Australian Broadcasting Corporation, Optus Television, Television New Zealand and Network Ten.

For more information on GlobeCast Australia, please select this direct link

SENCORE @ NAB 2011 With...

SENCORE will be displaying and demonstrating a number of products of interest to satellite broadcasters during the upcoming NAB 2011 in Las Vegas, Nevada. Some of the products on display include...

- **SMD 989 DVB-S2 Modulator, which is packaged in a two-channel 1RU chassis, offers unprecedented efficiency and flexibility for modulating two independent DVB-S2 RF transmissions. The platform is capable of VCM multi-stream satellite video delivery as well as advanced modulation such as 16APSK and 32APSK, minimizing overall transponder usage and reducing operating expenses. The SMD 989 comes standard with ASI and IP inputs.**
- **Integrated Receivers Decoders — The IRD 3000 series of receivers/decoders are cost-effective solutions for distributing video services on IP, satellite, and ASI networks for terrestrial, satellite, cable, and IPTV broadcast environments. SENCORE's line of integrated receiver decoders (IRD) is designed to support SD applications, allowing operations to leverage their existing SD infrastructures while ensuring an easy software upgrade to HD for future expansion. The IRD 3000 family supports satellite, MPEGoIP and ASI inputs, and SDI and composite outputs, and comes standard with BISS and DVB-CI based decryption.**

Also to be highlighted at NAB 2011 is SENCORE's ***VideoBRIDGE*** family monitors transport packets on IP, ASI, and RF interfaces for continuous quality assurance of streaming media in a variety of compression schemes, including MPEG-2 and MPEG-4.

The VideoBRIDGE product line includes advanced core monitoring systems for national networks, edge-specific, and even customer-premises applications.

More info at SENCORE's website...
http://www.sencore.com

Euroconsult Examines Video Transmissions Via Satellite

In its recently released report, Euroconsult, the leading international consulting and analyst firm in the satellite sector, forecasts that the market value for video transmission services over satellite including video distribution services for TV channels and contribution services for permanent and occasional use is expected to reach $27 billion in 2020, up from $15.8 billion in 2010.

"The anticipated revenue growth for video transmission services in the coming years is based on strong market drivers such as the multiplication of channels, the launch of new formats and the takeoff of digital TV in emerging regions," said *Pacôme Revillon*, CEO of **Euroconsult**. "Furthermore, demand for increasingly complex video transmission solutions will push service providers to create end-to-end solutions with satellite remaining a key part of the delivery network."

TV channel distribution: A core market, new standards and emerging regions driving growth

The video transmission market is mainly supported by the distribution of video content on pay-TV platforms, with TV signals delivered to viewers either directly by satellite or through the head-ends of terrestrial networks.

According to the Euroconsult's just-released ***Video Transmission Services over Satellite, Global Market Analysis & Forecasts to 2020***, an estimated 25,000 TV signals were transmitted by satellite by year-end 2010. While the North American and European markets remain the largest markets, the takeoff of digital TV in emerging regions, such as India, Russia and Brazil, could make those

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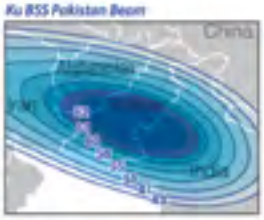

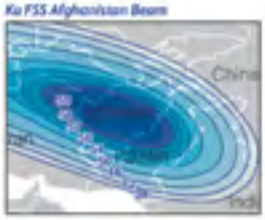

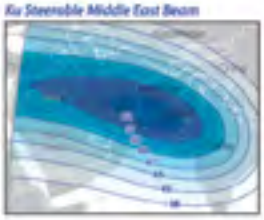

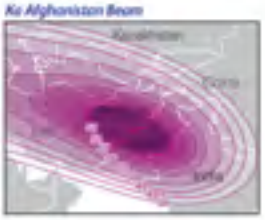

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markets the most important growth engines over the next 10 years.

Technological improvements are profoundly transforming the market for video transmission, with more complex and diverse requirements offering new revenue opportunities to market players. The migration to HD and 3D transmission formats, the roll-out of fiber and 3G/4G networks, the development of linear and non linear usage and the multiplication of video screens all play a critical role in this phenomenon.

Innovation Boosters

Meanwhile, video contribution services, with the transmission of raw video material, are also growing with a 24 percent CAGR in terminals deployed in the last five years. The need to broadcast live programming and cover global and local events is fueling TV-channel demand for occasional video services. Innovation is playing a major role in the current market growth in satellite newsgathering (SNG) for sports, news and other programming. The introduction of cheaper and lighter and more portable terminals is, for example, a key driver for the multiplication of content captured and transmitted. Innovation here includes the recent introduction of MSS terminals, the current use/roll-out of 3G or 4G network terminals and the likely introduction of terminals using Ka-band satellite systems in the near term.

According to the Euroconsult report, global traffic on occasional use terminals was estimated at close to 5 million hours in 2010 for around 22,000 terminals deployed. The increase in terminals per channel and technical improvements are expected to drive growth in this market in the coming decade, with Ka-band transmission being seen as a real opportunity to increase both traffic and terminals, due to a potential decrease in transmission costs.

Changes expected in the value chain: broadcasters increase outsourcing, consolidation among service providers

The video transmission market is highly fragmented with specialized service providers, satellite operators, telecommunication companies and broadcasters each managing a part of the transmission. Broadcasters still currently capture the bulk of the estimated market value of video transmission, as they continue to perform a large part of the transmission activity in-house. However, with growing demand for end-to-end services and increasingly demanding viewers, the management and transmission of video content is becoming increasingly complex. Some in-house broadcasting units and smaller providers may find it difficult to maintain a position in the market, due to resource and network limitations. This may lead to more vertical integration, and outsourcing to specialized companies will also become more commonplace. The continuing negative economic climate may accelerate this trend by pushing broadcasters to optimize their costs and investments.

Likewise, industry consolidation is likely to increase due to the increased complexity of the solutions. While the leading specialized service providers (**Globecast**, **Arqiva** and **RRSat**) currently capture around 6 percent of the total market value of video transmission services, new players are expected to emerge alongside the market consolidation and reorganization of historical market players. Recent transactions, such as the acquisitions of **Ascent Media** activities and **Crawford Communications** by **Encompass**, may be followed by further M&A activities in the next few years. This will be required to take advantage of growth opportunities and reach the critical size needed to manage more complex content management and transmission requirements.

For further information, select the following URL for a direct link to the report's infopage at...

http://www.euroconsult-ec.com/research-reports/digital-broadcasting-reports/video-transmission-services-over-satellite-40-43.html

A Dive Into Watermarking With A Difference

Irdeto, a global software security and media technology company, has announced its head-end-based watermarking technology for set-top boxes (STBs) was awarded three patents from the United States Patent and Trademark Office, officially making it the only interoperable, backward-compatible watermarking solution available on the U.S. market.

Eight additional patents are pending on the company's watermarking technology, positioning Irdeto as the ideal security partner to satisfy the requirements of Hollywood studios and enable early-release premium entertainment.

According to a study by **Adams Media Research**, DVD revenues have plummeted 27 percent since their 2004 peak of $12 billion. In an effort to build new revenue streams, studios are exploring on-demand delivery of theatre movies direct to consumers' homes, confident that the service will not impact traditional theatre and DVD releases — that is, unless the business model is disrupted by piracy. As such, studios are requiring additional security measures to mitigate potential threats

of piracy and new software must be deployed to every STB offering early-release entertainment, at a minimum.

The only fully server-based solution of its kind, Irdeto's watermarking technology allows content owners to trace illegally distributed content to individual users. Uniquely watermarked content can be prepared centrally, enabling ease of deployment and scalability without requiring integration with the VOD server or STB.

"As content owners and operators continue to explore possibilities to deliver premium content services into the home to drive new revenue and growth, the technology needed to manage digital piracy becomes a critical part of the equation," said *Andrew Wajs,* chief technology officer for Irdeto. "The more valuable the content, the more rigorous the security measures applied to it must be. Irdeto's watermarking technology is unique in that it can be applied to any broadcast receiver or set-top box currently in use as well as work with all legacy and already deployed conditional access systems, meaning content owners can almost instantaneously identify illegally distributed content, effectively police offenders and ensure the premium content business model remains viable."

Irdeto's solution can detect pirated content on peer-to-peer sharing networks by applying an invisible "watermark" that ties redistributed content back to any set-top box from which it originated: From there, content owners can identify and shut down illegal distribution networks. In the event of an attack, the solution can be renewed from the head-end almost instantly without requiring updates to the box itself, enabling unparalleled renewability, scalability and ease of deployment. For operators, these benefits translate into head-end implementation cost savings, a faster time to market and better overall security in the long term.

For additional information, head over to the Irdeto infopage at http://www.irdeto.com/en/irdeto-in-motion.html

More Mobility

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The iNetVu® mobile self-pointing antenna systems have been deployed around the globe supporting mobile operations that require broadband connectivity in remote locations.

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Gathering, Mining, Construction, Bookmobiles, Mobile Offices, Recreation Vehicles and many more.

More info at C-COM's website:
http://www.c-comsat.com

THORsome

The Telenor ASA Board has approved investment in a new expansion satellite to be named *THOR 7* and is expected to be ready for launch towards the end of 2013, with a lifespan of 15-20 years.

The satellite is intended to provide capacity for broadcasting requirements within Central and Eastern Europe and additional capacity for maritime services. THOR 7 will join the established THOR fleet at the orbital position of 1 degree West, which already serves nearly 17 million cable and satellite households throughout Europe. It will provide much-needed growth capacity for TV services, specifically in Central and Eastern Europe. The new satellite will also be equipped with additional capacity that allows Telenor Satellite Broadcasting

(TSBc) to strengthen its maritime service proposition, providing data communication services in areas including the North Sea, the Baltic Sea and the Mediterranean.

Additional information regarding Telenor Satellite Broadcasting
http://www.telenorsbc.com/

India's Welcome Mats Are Out For Dish TV DTH

Asia Satellite Telecommunications Co. Ltd. (AsiaSat) is making India's households happier. Asia Satellite announces that Dish TV India Limited, part of the Zee Group, will be utilizing four 54 MHz Ku-band transponders on AsiaSat 5 to enhance its HD and SD Direct-to-Home (DTH) offerings in India.

Dish TV is the largest DTH operator in India and serves more than 9.5 million subscribers with an expanding bouquet of some 270 channels and services. Additional transponder capacity on ***AsiaSat 5*** will enable Dish TV to significantly increase its DTH offerings to more than 30 HD and 320 SD channels.

Further details at AsiaSat's website:
http://www.asiasat.com/asiasat/index.php

Eyeing Market Potentials

Globecomm Systems Inc. has entered into a strategic teaming agreement with Fujitsu Frontech North America Inc. (FFNA).

The agreement will be to provide a wide range of advanced technology digital media solutions for commercial and government markets. The teaming of Globecomm and FFNA includes a strategically focused co-marketing and sales effort between the two companies. It provides potential customers with a new level of capability in solutions and services, based on Globecomm's managed service platforms and system design expertise and the extensive advanced technology in FFNA's digital media hardware and software products. Fujitsu products are recognized by leading media organizations for technical superiority, quality and value. Among these are the field proven IP series of H.264/AVC encoders and decoders, servers and advanced video recognition technologies. This Globecomm-Fujitsu agreement further expands Globecomm's continuous goal of increasing our range in "best of breed" advanced technology solutions, while adding to our suite of hosted managed service offerings.

More info at Globecomm's website:
http://www.globecommsystems.com/index.shtml

See us at Satellite 2011, Booth 709

ABILITY to do more.

The way we see it, you shouldn't be forced to invest in and manage two separate technology platforms to support your customers.

Now iDirect's new iDX 3.0 software brings TDMA and SCPC together for the first time on one platform.

You gain the adaptability to support every application most efficiently. And more scalability to grow your network on demand. Building on the power of the industry-leading Evolution® platform, iDX 3.0 is loaded with all the abilities you need to thrive in any industry, any network configuration.

No more tradeoffs, *more choices.*

iDIRECT

See for yourself. Visit idirect.net/ability or call +1.703.648.8000 to learn more.

More For NSS-6

SES WORLD SKIES, a division of SES S.A. has signed an agreement with Supernet Limited, Pakistan's leading satellite service provider, for high powered Ku-band transponder capacity on the NSS-6 satellite at the orbital location of 95 degrees East.

This capacity will support a large VSAT network for corporate customers in

Pakistan. Supernet is already a customer of SES WORLD SKIES for 52 MHz of C-band transponder capacity on the NSS-12 satellite, which supports a 60 site GSM backhaul network for one of the leading GSM operators in Pakistan. With more than 16 years of experience, Supernet has deployed a number of satellite-based networks including four large GSM backhaul networks operating in Pakistan. Supernet also operates multiple VSAT hubs on different satellites to support corporate customers.

SES WORLD SKIES information
http://www.ses-worldskies.com/worldskies/

Educational Enhancements

Delivering a world-class education to children at thousands of schools located in remote communities throughout Guatemala is attainable and affordable – thanks to the power of the Internet and the global reach of satellite communications.

This was the central theme of the January 25th ***Bringing Education to Rural Communities through Internet*** summit hosted at Campus TEC in Guatemala City by **Guateconnects**, a project being driven by the education-focused non-profit FunSEPA to improve education throughout Guatemala.

It was also the message delivered by *Jaime Dickinson*, President of NewCom International, a U.S.-based global satellite communications firm committed to fostering education and economic growth throughout Latin America and Africa.

NewCom, which specializes in bringing connectivity to rural developing communities around the globe from its world-class teleport in Miami, Florida, recently teamed with private contractors and government officials in Colombia to bring high-speed Internet access to nearly 2,000 rural schools, hospitals, government offices and businesses scattered throughout the country.

Further InfoCom details at...
http://www.newcom-intl.com/

X Marks The New BUC

Comtech Xicom Technology has debuted a new 50 watt solid-state X-band SATCOM BUC, the Model XTS-50X1-B1 X-BUC, which takes advantage of new X-band capacity on Xtar and *WGS* satellites.

System integrators can offer much higher data-rate uplinks with rugged, compact, transportable, SATCOM terminals. The X-BUC provides 50 Watts of 1 dB compressed output power in a self-cooled, feed-mountable, package specifically designed to operate in harsh environments and meet the stringent RF requirements of today's X-band systems. This high performance design provides more than 32 watts of linear output power as defined for the WGS system.

The new X-BUC is packed full of performance features including temperature compensation, gain control, harmonic filtering, and an output isolator, all in a compact outdoor unit weighing 10.5 pounds and measuring only 10.58 inches long x 5.68 inches high x 4.43 inches high.

Product info... http://www.xicomtech.com/products/documents/XTS-50X1-B1%20Rev%205.pdf

NewSat

Global Satellite Solutions

Undisrupted services to Afghanistan, Iraq and Korea

In 2010, NewSat delivered 100% Teleport availability to customers, providing secure, reliable, uninterrupted connectivity.

As Australia's leading independent satellite service provider, NewSat provides secure, efficient and cost-effective solutions throughout the Middle East, Europe, Africa and Asia. NewSat's two Australian Teleports provide access to an extensive range of satellites, a greater choice of tailored solutions and increased redundancy. NewSat adopts the latest technology and provides 24 x 7 x 365 days support ensuring optimal up-time and efficient throughput.

To learn more about NewSat's satellite communication solutions contact us today

Telephone
+61 3 9674 4688

Email
sales@newsat.com

newsat.com

InfoBeam

Saudi Studios Setup

Harris Corporation has been awarded a contract to supply products spanning its entire HD broadcast portfolio to Saudi Arabia's Ministry of Culture and Information (MOCI) at four new HD studio facilities.

The new studios — to be built in the cities of Arar, Al Joaf, Najran and Al Baha — add to the number of Saudi Television HD facilities using Harris broadcast equipment, with additional studios and transmission projects currently underway. Harris is working with Riyadh-based dealer and systems integrator **First Gulf Company** (FGC). The new HD studios will incorporate control rooms and playout facilities and feature interoperable solutions from Harris including:

- ◊ **Videotek® TVM test and measurement devices to maintain signal integrity**
- ◊ **Fiber optic solutions for inter-/intra-facility transport of HD signals**
- ◊ **Predator II and Predator II-GX multiviewers for monitoring**
- ◊ **Inscriber® G-Series graphics products for live production**
- ◊ **Platinum routers for processing video and audio signals throughout the facility and across different sites**
- ◊ **NEXIO® servers for content acquisition, production, distribution and media management**
- ◊ **A range of Harris core processing technology including up/down/cross converters and multiplexers/demultiplexers to ensure all content is processed at the highest quality HD**

ⓘ

MENOSatisfaction

ASBU, Arabsat and Newtec are offering extended services and products for fast news gathering (FNG) and HDTV contribution and exchange on the *Multimedia Exchange Network Over Satellite* (MENOS™) platform for existing and new customers throughout the MENA region.

FNG on the MENOS platform offers a range of benefits that bring FNG within reach of any broadcaster or

news agency. MENOS FNG opens up the opportunity for any broadcaster to procure an FNG capability at a very attractive total cost of ownership. MENOS FNG is also based on open standards, such as DVB-S2 and MPEG-4 AVC SD. The rapid rate of development of MPEG-4 AVC equipment ensures that quality for a given bit rate will continue to improve, making it a very competitive and future-proof environment for broadcasters investment. MENOS supports a unique capability of multilateral live FNG: The contributing flyaway FNG can choose to multicast the live content to a selected list of MENOS TV and FNG receivers, gaining the capability to simultaneously contribute live to multiple news rooms.

Newtec details at their website
http://www.newtec.eu/

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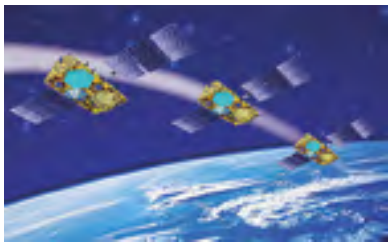
Add In Six More

Globalstar, Inc., a provider of mobile satellite voice and data services to businesses, government, and consumers has released information regarding the launch of its new 2G satellites.

Globalstar expects to conduct the next



launch of six satellites in May, plus two additional launches of six satellites per launch within 60-90 days following the previous launch. All three launches will use the Soyuz launch vehicle and each will be conducted from the Baikonur Cosmodrome in Kazakhstan. In October, Globalstar successfully launched six new 2G satellites using the Soyuz.

More info at Globalstar's website
http://www.globalstar.com/en/

ⓘ

Liberty Is Afoot

ATK and Astrium are working together in response to NASA's Commercial Crew Development-2 (CCDev-2) procurement.

The team is offering NASA launch services with the ***Liberty***™ rocket. This new launch vehicle combines two of the world's most reliable propulsion systems, with a collective heritage of nearly 150 successful flights. ATK would supply the human-rated first stage, which it developed under NASA's Space Exploration Program. The five-segment solid rocket first stage is derived from the Space Shuttle's

Image : The new Liberty launch vehicle will use existing infrastructure at Kennedy Space Center, such as the Mobile Launcher shown here. (PRNewsFoto/ATK)

four-segment solid rocket boosters (SRBs) which are built by ATK and have flown 107 successful missions since 1988 (encompassing 214 SRBs).

ⓘ

Capturing A Crisis

Stratos Global has been providing integrated media solutions that are enabling many of the world's largest news organizations to broadcast ongoing coverage of the Egyptian political crisis.

The solutions include Inmarsat BGAN mobile broadband satellite services with GuaranteedAccess managed end-to-end IP network connectivity. These organizations began broadcasting reports of the crisis from Cairo and other Egyptian cities on January 25th. Days later, the Egyptian government shut down all terrestrial Internet connectivity and mobile phone service. BGAN enabled these broadcasters to

continue newsgathering in Egypt and transmitting live reports to their studios, without interruption. BGAN from Stratos streaming services are being used by the BBC, Fox News and others for live video streaming from the protest sites. The broadcasters also are using BGAN for Internet connectivity, store-and-forward video clips, and audio streaming for radio broadcast. All BGAN traffic from these organizations is routed via the Stratos global IP network, known as StratosNexus, into the broadcasters' studios worldwide.

As it did for last year's Haitian disaster, Stratos is continually monitoring its BGAN network and StratosNexus during this period of heightened usage in Egypt — and is providing frequent status reports to its media customers. Inmarsat also is taking measures to ensure the usual high level of availability and reliability of its Inmarsat-4 satellite network during this crisis. BGAN from Stratos enables media organizations to perform at optimal levels at any remote location. Journalists can effectively use BGAN services with minimal training. The premium BGAN X-Stream service allows a guaranteed minimum symmetrical video streaming rate of 384 kbps, with up to 450 kbps expected under optimal conditions.

The BUC Stops Here

Teledyne Paradise Datacom has released their, new 80 watt X-band Block Up-Converter (BUC).

The Model VBUCX80A is housed in a lightweight enclosure that weighs 11 pounds and delivers 56 watts of WGS Linear Power, making it the most powerful X-band BUC in its weight class. This full-featured BUC includes Ethernet, FSK and Serial M&C, Output Power Detection and Output Isolation.

The internal converter will automatically detect and synch to 5, 10, 20, 25 and 50 MHz reference signals. Based on the latest Gallium Nitride transistor technology, Teledyne Paradise Datacom's line of vBUC amplifiers includes 80 watt C- and 40 watt Ku-Band models in the same package, with a 10 watt Ka-band version soon to follow. GaN devices operate at higher power levels and at higher temperatures and are more efficient than their Gallium Arsenide counterparts.

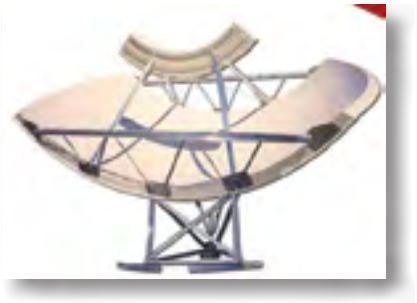
Download the product infosheet
http://www.paradisedata.com/collateral/datasheets/208796_Rev-.pdf

A Glutton For Receptions

Antenna Technology Communications Inc. (ATCi), a provider of satellite communications systems, introduced at the CABSAT Conference in Dubai, its Simulsat Multibeam antenna system specifically designed for Middle East Market applications.

Simulsat is the world's only multiple satellite antenna that is capable of receiving satellite transmissions from 35+ satellites simultaneously without adjustment or degradation in performance from one satellite to the next. For more than 20 years, ATCi has been the world leader in multibeam technology and the ATCi proprietary Simulsat Multibeam has been providing programming to over 30 million cable subscribers in the U.S. market and abroad.

ATCi's President Gary Hatch noted that the company's Simulsat Multibeam was specifically re-engineered to handle the unique applications that are specific to broadcasters in the Middle East. "It is a testament to ATCi's continuous commitment to our customers that the Company was able to re-engineer the legacy Simulsat Multibeam system to meet the unique needs of Middle Eastern broadcasters," he said. "It is



a validation of our engineering, and we are honored that broadcasters throughout the EMEA region can now rely on ATCi's Simulsat to provide the essential C and Ku Band downlink capabilities essential to their business."

Product info... http://www.atci.com/datasheets/Multibeam_Earth_Station/Simulsat_CKu.pdf

Super Bowl For Leathernecks

Encompass Digital Media, Inc. joined forces with the U.S. military's Defense Video and Imagery Distribution System (DVIDS) for the first, HD satellite feed for Camp Leatherneck, Afghanistan.

This resulted in the delivery of video coverage to deployed U.S. service members of the big game. Live footage aired via Fox's exclusive broadcast of Super Bowl XLV at Cowboys Stadium in Arlington, TX. Since 2004, Encompass has been an essential partner for DVIDS' media operations. As a result, the military has been able to produce broadcast-quality video, still images and print materials. These packaged products offer real-time distribution 24/7/365 via Encompass' satellite and fiber infrastructure.

Encompass info at
http://www.encompass-m.com/

A CABSAT Triple Play

VT iDirect, Inc. (iDirect), a company of VT Systems, Inc. has announced that Sky-Stream FZ LLC, a Dubai-based provider of connectivity and satellite service solutions, has launched a satellite IP-TV streaming service over the iDirect platform.

The recreational service, which uses the Apple TV platform, allows customers in the Middle East and Africa to immediately access on-demand programs in remote locations where such services are not accessible. Sky-Stream's IP-TV service provides on-demand, high-quality streaming for movies as well as news and sports shows offered through Apple TV. The new offering is an expansion of Sky-Stream's standard Voice over IP (VoIP) and Internet service that it provides to military and civil defense customers in Iraq, Afghanistan and parts of Africa.

The new service is powered by iDirect's satellite platform, providing built-in TCP acceleration on an IP-based system that allows Sky-Stream to offer high download speeds to customers for immediate access to the programs they want.

More info at iDirect's homepage
http://www.idirect.net/

Going Totally Global

Global Crossing (NASDAQ: GLBC), an IP solutions provider with the world's first integrated global IP-based network, has announced that the broadcast and media services offered by its Global Crossing Genesis Solutions unit are available across its high-performance IP network in Argentina, Brazil, Chile, Colombia, Ecuador, Panama, Peru, Mexico, Venezuela and the Caribbean region.

Global Crossing Genesis Solutions' timing could not be better. As Latin America prepares to host the 2011 Pan American games in Guadalajara, Mexico; the 2014 FIFA World Cup in Brazil; and the 2016 Summer Olympics in Rio de

Janeiro; the HDTV subscriber market is experiencing rapid growth in this part of the world. Global Crossing Genesis Solutions uses a proprietary customer interface called uCommand/IRIS, which provides a unique "on-demand" capability that gives customers direct access and control over their global media distribution network and enables self-provisioning and monitoring of all aspects of their transmission services.

The Global Crossing Genesis Solutions homepage
http://www.globalcrossing.com/genesis/genesis_landing.aspx

A Merging Of Interests

Canadian Satellite Radio Holdings Inc. (CSR), the parent company of Canadian Satellite Radio Inc. (XM Canada) (TSX: XSR), ihas announced that CSR's shareholders have overwhelmingly approved the merger of XM Canada and Sirius Canada at CSR's annual and special meeting of shareholders that was held in Toronto.

It is expected that a combined XM Canada and Sirius Canada will yield synergies of approximately $20 million (on an annualized basis) within 18 months of closing by allowing the combined company to better manage costs through improved efficiencies and greater economies of scale. With an expected total subscriber base of more than 1.8 million, the combined company will benefit from a highly experienced management team with extensive industry knowledge in media and broadcasting operations, consumer electronics, customer care and subscriber management, automotive engineering and information technology. The combined company will create a stronger platform for future innovation within the audio entertainment industry through key content and programming relationships and distribution agreements with every major automaker and retailer nationwide. Automakers are responding to customer demand for in-vehicle entertainment and the combined entity will lead to 50 per cent of vehicles sold in Canada having factory installed satellite radios as an option. This further demonstrates how important satellite radio is becoming to Canadians. The consummation of the merger remains subject to the satisfaction of, or compliance with, certain conditions, including receiving all necessary regulatory approvals (including CRTC approval) and the successful refinancing of the Company's indebtedness. The transaction is currently expected to close during the third quarter of the Company's 2011 fiscal year.

XM Canada homepage
http://www.xmradio.ca

A Step Ahead

Intorel has launched a new edition of Visionic Professional, Visionic 5; a brand new; Internet based M&C solution for satellite, broadcasting or any other telecom system.

Among its many novelties, ***Visionic 5*** offers an Internet based GUI designed to be flexible, easy to use and to reduce time and money investments to minimum.

Visionic Professional is a reliable and flexible, cost effective, M&C platform, already well established in broadcasting and satellite industry. This latest edition is an Internet-based solution developed to make a process of system design more flexible than previously possible, allowing users to monitor and control the telecom system locally or over the Internet.

While inheriting all its reliability and stability from previous editions, Visionic 5 now introduces a variety of new features — available online, convenient, stores files in a central repository, and requires no programming experience. As a *commercial, off the shelf* (**COTS**) product, Visionic 5 requires no special equipment, user training, installation time or costs. Visionic 5 cooperates with heterogeneous equipment and hundreds of device drivers and also supports a variety of interfaces (Serial, Lan, Snmp, Modbus, and many others).

For the first time ever, it is possible to design a system online and run it on your local network. This is a far easier easy method to draw designs for a technical system, regardless of complexity or size. Once the system is designed, it can be downloaded to a local computer and executed as a real time system on a local network. An Internet connection is not required in order to use the system. To simplify making changes in design, demo versions and design files are maintained online. Meanwhile, the data itself is retained securely on the local network. This central repository allows for the management of all projects in one place, 24/7, from any physical location.

Beta testing is scheduled from the 25th of January to the 1st of June; anyone interested can take part in the beta by registering at the Visionic 5's website, http://www.visionic5.com. For those who may be interested, Intorel offers a ***Visionic 5 Enterprise*** server, designed to be used in a local network environment. Introle's Visionic solution is one of the most uniquely future-proof systems available for satellite monitoring and control, Earth station control and other industrial and SATCOM applications.

Further details at...
http://www.visionic5.com

Acquiring Minds Wish To Know...

EchoStar Corporation and Hughes Communications, Inc. have an agreement pursuant to which EchoStar will acquire all of the outstanding equity of Hughes and its subsidiaries including its main operating subsidiary, Hughes Network Systems, LLC ,in a transaction valued at approximately $2 billion, including Hughes debt expected to be refinanced in connection with the transaction.

Under the terms of the transaction, which has been approved by the Boards of Directors of both companies, Hughes' shareholders will receive $60.70 per share without interest, which represents a premium of 31 percent over Hughes' unaffected closing share price of $46.43 on January 19, 2011. The transaction is expected to close later this year, subject to certain closing conditions including receipt of federal regulatory approvals. Investment funds affiliated with Apollo Management IV, L.P., who own a majority of Hughes' outstanding stock, have approved the transaction by entering into a written shareholder consent.

EchoStar homepage...
http://www.EchoStar.com

Doing Unto DTH

SES WORLD SKIES has entered into a multi-year, multi-transponder agreement that covers all 12 Ku-band transponders on the India beam of the SES-7 satellite.

The capacity on SES-7 will be used to support the growth and expansion of India's thriving DTH market.

Deepak Mathur, SES WORLD SKIES Vice President of Sales for South Asia and the Middle East, said, "SES provides significant satellite capacity for the explosive growth in the Indian media, DTH and telecommunications industries. SES currently supplies capacity to the Indian market via four of its satellites NSS-12, NSS-6, NSS-11 and SES-7, and we are committed to meet the growing demand requirements of the Indian DTH market, which is the fastest growing DTH market in the world with an estimated 30 million subscribers and is projected to overtake the US as the largest DTH market".

SES WORLD SKIES homepage
http://www.ses-worldskies.com/worldskies/

Certifiably So...

International Communications Group's (ICG's) NxtLink ICS-400 has successfully completed the Iridium Compatible Equipment Certification (ICE) testing, conducted by Iridium Communications Inc., and is approved for operation on the Iridium constellation and network.

The ICS-400, which combines four Iridium channels with an internal cabin telecommunications unit (CTU), offers global voice service coupled with telephone services similar to those found in contemporary office PABX systems. The NxtLink ICS-400 can be integrated with conventional telephony devices, other satcom systems or legacy CTU systems through standard 2- Wire "Tip and Ring" circuits, 4-Wire audio connections or CEPT-E1 digital circuits. Standard CTU features include intercom calling, call transfer, conferencing, follow-on dialing and voice prompts.

Designed into a 4 MCU Line Replaceable Unit (LRU), the ICS-400 can be installed on any size aircraft as the sole communications facility or as an additional/restorative communications system. The system architecture permits installation on any size airframe or aircraft model, providing flexible connectivity options and solutions for all communications requirements. The NxtLink ICS-400 also provides ARINC 429 connections and a dedicated Short Burst Data (SBD) transceiver to support ACARS messaging. The device is simple to operate offering standard dialing conventions and PABX operations with familiar call progress tones.

Product brochure download here
http://www.icg.aero/Document_Manager/ICG%20NxtLINK%20Series%20ICS-400%20Rev%20D.pdf

3D Makes The "Scene"

3net, the joint venture television network from Sony Corporation, Discovery Communications and IMAX Corporation, have announced that DIRECTV will be the first distributor to launch 3net, the 24/7 3D network, starting on February 13th, 2011.

3net will initially be available to millions of DIRECTV customers across the country and will go live at 8:00 PM ET on DIRECTV (channel 107) with a primetime slate featuring world premieres of new, one-hour, native 3D original programs CHINA REVEALED and FORGOTTEN PLANET, in addition to the world 3D television premiere of INTO THE DEEP 3D. Throughout February, the network will offer an unprecedented rollout of original 3D series and new program debuts every night at 9:00 PM ET.

DIRECTV 3D infopage
http://www.directv.com/DTVAPP/content/contentPage.jsp?assetId=P6820033&footernavtype=-1&_DARGS=/DTVAPP/global/component/cmpt_v.jsp&_requestid=1380934

Sustaining Sea Services

AST Australia has installed the first Thrane & Thrane SAILOR 90 satellite TV antenna in Australian waters on Offshore Unlimited's vessel, Limitless.

Offshore Unlimited required an on board satellite TV system for their vessel believing it is essential to keep their crew and clients in touch with world news, sport and entertainment, especially as their crews work a five week on, five week off rotating roster. AST Australia provided a Thrane & Thrane SAILOR 90 antenna to fulfill Offshore Unlimited's needs.

Offshore Unlimited services its clients' needs in Australian waters, with its modern fleet of offshore support vessels operating from the ports servicing Australia's oil and gas

industry. They provide a comprehensive range of offshore services, including offshore installation re-supply, survey, seismic ship re-supply, standby, dive & ROV support, crew transfer, scientific research and chase boat services. Their latest vessel is Limitless which is a 28.7m catamaran built for offshore support and is based at Exmouth, Western Australia.

Company homepage link
http://www.asta.net.au

Satellite Supported Streaming

SatStream is providing a live 24 hours stream to francophone channel, Montagne TV.

Montagne TV is a France-based channel dedicated to broadcasting every facet of mountain life, from daily life for those who live there, to sporting activities. SatStream is providing the live stream using ChannelStream, which the company launched at IBC last year. The feed is taken from Montagne TV in France and transcoded into multiple web formats at SatStream's specialist facility in the heart of London, then streamed live via SatStream's Content Delivery Networks (CDNs) to Montagne TV's dedicated website at http://www.montagnetv.com.

Thanks to Channel Stream's use of optimized satellite capture combined with quality streaming technology, viewers of Montagne TV across the globe are able to enjoy a seamless viewing experience, without buffering. ChannelStream also supports delivery to popular mobile devices, such as Windows, Android and Symbian-based mobile phones and the iPhone / iPad.

More info at
http://www.satstream.com/

Entertaining Connections

Panasonic Avionics Corporation (Panasonic), a provider of state-of-the-art in-flight entertainment and communications (IFEC) systems, has signed a Letter of Intent (LOI) with Scandinavian Airlines (SAS) to deliver full broadband connectivity and mobile phone service on SAS' domestic, pan-European and intercontinental flights.

While final terms are still being negotiated, the LOI allows the parties to immediately begin developing the plan to deploy Panasonic's eXConnect solution, and its eXPhone product delivered in collaboration with AeroMobile, across SAS' fleet with installations to begin in fall 2011. Panasonic's eXConnect system provides two-way broadband connectivity to an aircraft. It supports a wide range of passenger and crew applications, and SAS will use the solution to provide in-flight broadband Internet access over WiFi to passengers. The company's eXPhone product, offered in collaboration with AeroMobile's inflight mobile phone service, will allows SAS passengers to use their mobile phones, smart phones and BlackBerry® devices onboard to make and receive voice calls if selected by the airline, send and receive SMS text messages, and use GPRS services such as email and internet access.

Additionally, the Company has announced the first test flight of its eXTV service. During the flight, which took place on January 26, 2011, the company used eXTV to successfully deliver a live television feed to a Boeing Business Jet equipped with Panasonic's eXConnect service. Panasonic's eXTV television network will use the company's eXConnect in-flight Ku-band communications service to deliver high quality television programming to passengers during their flight. It will provide live, uninterrupted content to aircraft flying all over the world, even over oceans. The service will offer several baseline channels in addition to optional, premium programming.

More details here
http://www.mascorp.com/Products/XSeries.aspx

Hot Bird Happening

Elettronica Industriale, the network operator of Italy's Mediaset Group, and Eutelsat Communications (Euronext Paris: ETL) have signed a 12-year contract for capacity at the HOT BIRD™ video neighborhood.

The new contract for one transponder further consolidates a 20-year relationship between the two companies, increasing Mediaset's HOT BIRD™ resources to five transponders. It will support Italy's nationwide transition into a fully digital broadcasting environment, particularly addressing Mediaset's requirement to deliver chann.els to its network of Digital Terrestrial Television (DTT) transmitters

Eutelsat's infopage link...
http://www.eutelsat.com/

Getting Their New Act Together

The Satellite Broadcasting and Communications Association (SBCA) has launched the SBCA Foundation. The SBCA Foundation will place emphasis on health, welfare and education projects that benefit specific communities and populations where the consumer-based satellite industry has a presence.

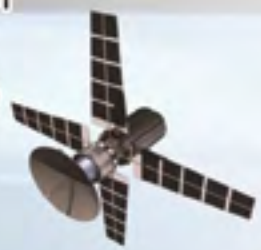
The amount of money or goods allocated to grants will be based on need and will be implemented in areas where similar efforts are not already underway, so as to reflect the unique purpose and character of the consumer-based satellite industry. Grants will be awarded on a schedule and according to a set of guidelines to be established by the Board of the Foundation and implemented by SBCA staff. Particular emphasis will be given to projects and needs in areas of the U.S. where the satellite industry is a well known and valued service.

The SBCA Foundation will rely on feedback from the network of manufacturers, distributors, instillation providers and retailers who all have a part in providing satellite services to the customer. They recognize that these businesses are important in their local communities and understand their needs best. SBCA plans to have an inaugural event in the summer of 2011. More details will be released closer to the event date. The initial Board of Directors are Andrew Reinsdorf of DIRECTV, Jeffery Blum of DISH Network, and Joseph Widoff of SBCA.

The SBCA infopage...
http://www.sbca.org/

Intelsat / GVF Type Approved

- Original designer of patented rolled edge reflector
- Production capacity(≧ 1 Million units per month)
- High performance
- Highly accurate reflector surface(RMS≦0.1mm)
- State of art test equipments and facilities



VSAT Antenna System
DTH Antenna System
Fly Away, Movable Antenna

AZURE•SHINE

AZURE SHINE INTERNATIONAL INC.

No. 1000, Gwang Fu Road, Pa Teh City, Taoyuan, 33455, Taiwan R.O.C.
Http://www.azureshine.com.tw/ E-mail: azure.shine@azureshine.com.tw
Tel: 886-3-3611393 Fax: 886-3-3615877

Forrester's Focus

European Pay Radio — Getting Ready!

By Chris Forrester, Editorial Director, RapidTV

The past couple have years have not been good for pay-radio's prospects in Europe. We've seen the Worldspace catastrophe, now well over two years into its Chapter 11 bankruptcy (WS filed in October 2008) and with legal bills still running into the hundreds of thousands of dollars a month.

Worldspace's European and other international operations were also wound up as part of the failure, and left suppliers, content partners and staff out of pocket. The greater risk was that the whole concept of European pay-radio would prove to be a non-starter especially given the somewhat downbeat view from many industry experts that Europe's multilingual challenges were too great and that its high-quality public and commercial radio was quite sufficient for its audience.

It is now known that Worldspace's founder *Noah Samara*'s latest involvement is in a company seeking to acquire **TerreStar**, but there also remains his ownership of the actual Worldspace satellites as part of his $5.5m purchase of assets via his **Yazmi** vehicle in October 2010.

Meanwhile, **Liberty Media** and, in particular, *John Malone*'s name keeps cropping up on assorted penny share blog sites as "...being up to something." This might be total wishful thinking, of course.

AfriStar, the first Worldspace craft to be launched, is fast approaching the end of its design life. Launched in October 1998 with a 12-year operational design life (and fuelled for a 15-year orbital station-keeping life), the formal end-of-life is now very close. AfriStar also has known solar array problems. So far, so bad.

But there remains a strong undercurrent of support from a couple of potential pay-radio service operators, as well as platform providers. Indeed, it could now fairly be said that there may, at long last, be light at the end of the tunnel.

First up, although not necessarily the first to market, is **Ondas Media**, which talks of a service launch in the coming two years and that they are making solid progress. They say they are also working closely "with the two transmission license holders, namely Solaris Mobile and Inmarsat."

Solaris Mobile has its satellite payload waiting in orbit, while Inmarsat has yet to announce its plans to occupy the frequencies allocated to it by the *European Commission*, and the delay might see a push from **Solaris** to be allocated the **Inmarsat** spectrum if forfeited.

This past October saw Ondas demo a working version of its radio reference technology to **BMW**, for example. During 2011, Ondas says "we plan to extrapolate that demonstration to include new car makes and models, and to have live content over the air."

Ondas has an exclusive radio development contract with radio technology specialists **Delphi**. Ondas already has commitments from automakers BMW, Renault, and Nissan. Test transmissions were also undertaken last year in Italy to showcase satellite and terrestrial signals to test vehicles. Ondas says this year's efforts will focus on building out the terrestrial repeater networks in the main European high-value markets.

Ondas is also quietly building its support from broadcasters, and while it would be comforting to see these publicly renewed, and extended, we understand that Saudi billionaire Prince Alwaleed bin Talal's **Rotana** music group is still on board, as is **RTL** and the UK's **Jazz FM**.

The past two years have not been the best for raising fresh venture capital, and Ondas Media's CEO *Dave Kruger* says that, as with any start up, getting their hands on early access to cash would have made progress easier, "but we are comfortable living within our means during these challenging times with the global economy.

Investor interest remains very high for European satellite radio, tempered of course with the rational measures any investor must take in uncertain financial conditions. With the support of the car companies, we've managed to smooth the buildout of the system to facilitate the capitalisation of the project."

Specifically, *Kruger* says the car companies — in giving their support — have permitted a road map to be created whereby Ondas' radio specification (*ETSI Satellite Digital Radio*) can be integrated into vehicles for the 2013-2014 time-frame.

Forrester's Focus

The second major player in this space is France's **Onde Numerique**, headed up by *Franz Cantarano*, a former VP at Worldspace and committed to supplying more than 50 radio channels, "tailored to a French audience." Last July, Onde partnered with **Actia Sodielec** for the procurement of SDR transmitters in France and elsewhere in Europe. Onde had already acquired some of Worldspace's liquidated assets in France from the bankruptcy court in Toulouse.

As an aside, telephone chipset giant **Qualcomm** had secured a chunk of L-band capacity in the UK, no longer needed for their now abandoned FLO-TV plans. Qualcomm seems to want this spectrum re-allocated away from media usage to telco. This is a decision **CEPT** (*European Conference of Postal and Telecommunications Administrations*) will have to make in due course, no doubt with strong opposition from the likes of Ondas and Onde. Mr. *Cantanaro* says he had hoped to get his French system up and running before expansion into other markets.

It seems both would-be broadcasters are seeking to make announcements at the *Mobile World Congress* in Barcelona (February 14-17) and certainly Solaris Mobile says it expects to be "busy" and very much present at the giant show.

About the author

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.

Key Date For Sirius and Liberty Media

The blogosphere is full of gossip and speculation that an upcoming key date, March 7, could be instrumental in taking pay-radio outfit **Sirius XM** onto its next — perhaps global — stage.

Currently, the situation is that *John Malone*'s **Liberty Media** is, in effect, in control of 40 percent of Sirius XM (Liberty injected $530m in loans two years ago, convertible into 40 percent equity). But the deal came with a number of restrictions. Malone/Liberty is subject to a 'standstill' until the second anniversary of the cash injection date, *i.e.,* March 6 2011. After March 6, Liberty can increase its stake to 49.9 percent if so desired, or go beyond 49.9 percent but with the obligation that it must offer to buy all the remaining stock. On March 7, if it wishes, Liberty is free to sell or, more importantly, transfer its existing stake in Sirius-XM to another entity.

One well-placed U.S. commentator is suggesting that one option would be for Malone to do as he has done many times before, which is to then exploit the Sirius-XM losses in a tax-efficient manner and spin the business off with other Liberty Media assets.

Which is where the conspiracy theorists come in: *Malone*, and a Liberty subsidiary (**Liberty Satellite Radio**) owns a very large chunk of net operating losses at Worldspace, now in the end-game as far as its Chapter 11 bankruptcy is concerned. Some close observers are watching (hopefully) the potential for a Sirius and Worldspace link-up, with *Malone* exploiting those Worldspace losses to help fund new facilities for a global operation. Certainly, new satellites will be needed (although some U.S. capacity is being freed up as new **Sirius/XM** craft come onto stations serving the USA and Canada). There's a new Sirius (***FM-6***) satellite slated for launch later this year, for example.

Now, all of this is pure speculation, of course, and Dr. *Malone* might leave everything exactly as is, and just celebrate March 6th with a cherry soda and a remembrance of a good, and profitable, deal done!

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3DTV Is Coming... There's No Stopping It Now!

By Andy Marken, President, Marken Communications

After attending so many CES (Consumer Electronics Show) events, you'd think we'd resist being swept away by the buzz. Sure, after last year's show, all we saw was 3D.

'They' swore all the pieces were in place. And we believed it.

Darn!!!!

Realistically... we knew better.

We're still as optimistic and enthusiastic about the long-term success of 3D TV as we were before; but this time, we're going to be a little cautious.

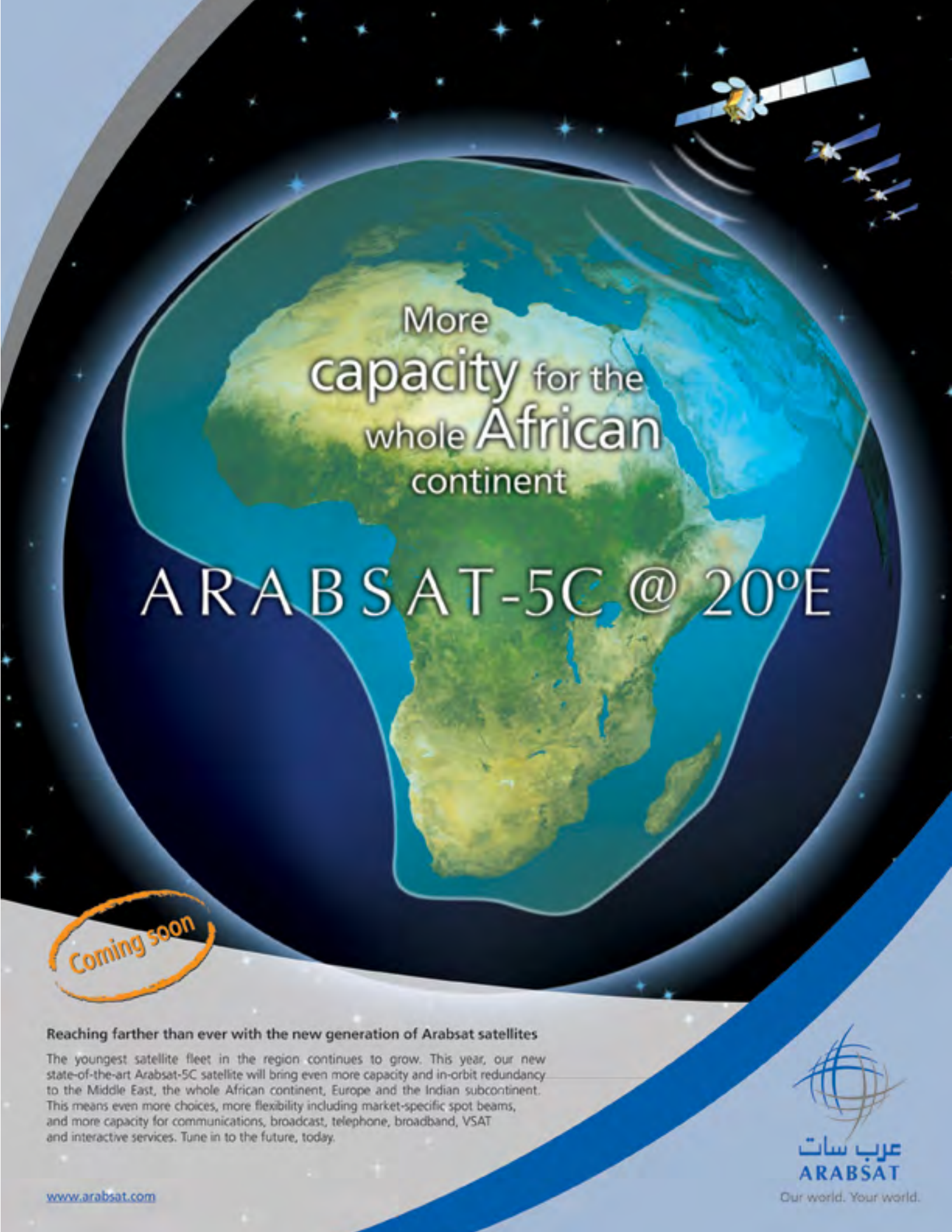
The motion picture industry is really all over 3D. Some good, like ***Avatar*** and ***Megamind***.

Some a real waste of time, money — theirs and ours — like ***Clash of the Titans 2010***, ***Saw 3D*** or ***Jackass 3D***, ***Piranha***.

Last year, Hollywood produced twenty-five 3D movies. This year, they expect to double that number. 3D screens worldwide have gone from **6,700** last year to nearly **20,000** this year. And, according to **NATO** (*National Association of Theater Owners*), that number should quadruple by the end of 2011 to eliminate the strain on available 3D screens and scheduling.

> ***"Politicians from around the world will see it. Of course, they'll want to use it as a weapon. As a scientist - no, as a human being - I can't allow that to happen!" Dr. Seizawa, Godzilla (1954), Toho Films***

Recent releases such as ***Tangled***, ***Dawn Treader***, ***Yogi Bear***, ***Tro,*** and ***Gulliver's Travels*** all revealed that 3D works in the closed/controlled Hollywood environment — production/viewing.



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Lookin' Good

Dreamworks CEO *Jeffrey Katzenberg* thinks glasses for viewing 3D movies are great. He should — his video masterpieces have consistently brought in millions of viewers and hundreds of millions in ticket sales this past year. With more screens available and 3D sets becoming more popular, the future looks rosy — with or without glasses.

No wonder *Katzenberg* loves his glasses so much!

But we were kinda' expecting the stuff to be ready for the home by now.

O.K., we drank too much Kool-Aid.

We forgot the basic fundamentals of the content industry. Penetration requires:

- *Technology — device, infrastructure components; processors*
- *Devices — V, PC, smartphones, cameras*
- *Infrastructure/networks — broadcast, Hollywood/ theaters, cable/wireless, storage*
- *Service providers — business models/revenue*
- *Content — movies, sports, user content, series*
- *Users — what they want, how they want it, where they want it, what they're willing to pay*

Yeah, we glossed over "a few things," last year.

This year, we put down the cup, stepped away from the bar and thought about what we saw. Don't give us that "Hey, you shoulda' known better!" routine.

You're right, and there were still a few things that needed to be ironed out:

- *A bigger investment had to be made in content production/distribution*
- *Standards for distribution/viewing had to be finalized*
- *Sufficient quantity of 3D TV sets had to be installed*
- *Viewer pricing had to be worked out*
- *A real 3D consumer video solution would appeal to lots of people*

Back to Screens

When the brother-in-law decided he needed to upgrade from his four-year-old HD projection screen, he looked at the new flat screen iNet connected TVs. But he decided it was better to leap forward two improvements and get a premium 3D set (and two pair of glasses).

Why?

ESPN had the events he wanted in 3D and **Discovery** is cranking out several show series. Everyone is trying to figure out how/when they can do it and make money.

Good, Not Great

As with most 'new' technologies, fortune tellers saw 3D TV set sales taking off like the proverbial hockey stick. They overlooked the fact that we just invested in a new HD screen and there was only a minimum volume of decent 3D content available to watch at home. But over the next two years, the picture will change. *Source* - ***ABI Research***

We 'might' have been one of the 3.4 +/- M folks who paid the premium, but didn't see that many 3D TV shows that interested us (O.K. — ZERO).

We're just not into watching disc movies over and over.

Golf and football won't win us over.

We're going to wait for our 3D set until 2014.

Why?

Quite obvious — there's a new ***3D Godzilla*** movie in the works and it will be available in... 2014! The early, badly dubbed, B&W Godzilla movies were masterpieces. The new one? We can hardly wait!!!!

The AMOS-5 Satellite is Coming to Africa

Spacecom is expanding coverage to the farthest reaches of Africa with the launch of the AMOS-5 satellite in the third quarter of 2011.

Located at the 17°E orbital position, the AMOS-5 satellite will offer enhanced capabilities, expanded coverage areas and high-power C-band and Ku-band capacity throughout the African continent.

Spacecom has long served the U.S. DoD through its systems integrator partners. And, thanks to the AMOS-5 satellite, we will soon be able to meet the burgeoning satellite connectivity needs of a variety of fast growing vertical markets across Africa like the oil and gas industry.

Additionally, Spacecom serves Direct-To-Home (DTH) platforms in Europe and the Middle East, TV broadcasters and programmers, government organizations, VSAT service providers and telephony operators.

With AMOS-2 and AMOS-3 at the 4°W orbital "Hot Spot" for European and Middle Eastern coverage, AMOS-4 launching in 2012 to serve Asia, and AMOS-6 in 2014, the AMOS satellite fleet is perfectly positioned for performance.

Pan-African C-band and Ku-band capacity on AMOS-5 is now selling.

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space to expand

Not enough to convince you to go full 3D? The new ***Avatar*** movie will be released then, too, and will be even more spectacular than *Cameron*'s original.

All of the 3D heavyweights were at **CES** to discuss the investments, improvements being made in every sector — production, post-production, programming, distribution and viewing. Content momentum is building:

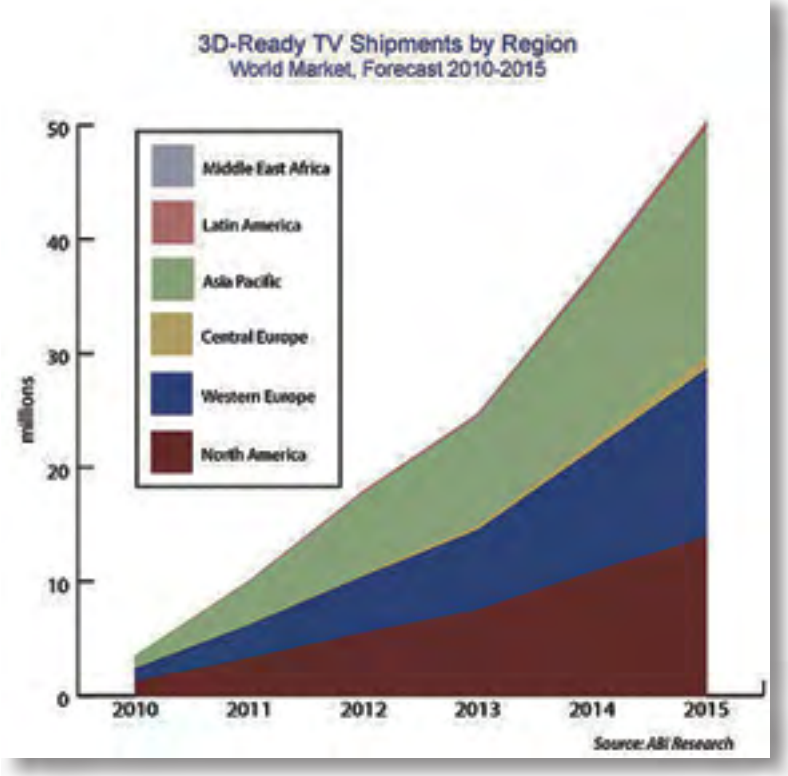
- *CGI (Computer-Generated Images)*
  - ◊ *10 percent of games last year, 20 percent this year, 50 percent in 2012*
- *Live action*
  - ◊ *Prerecorded*
- *Real time*
  - ◊ *2D - 3D conversion*

A lot of the research conducted is being done to understand how the mind handles, processes images in our 3D world.

It's similar to the work done in perfecting psychoacoustic sound.

Knowing there's a single audio source and yet 'feeling' the sound go in one ear, pass around your head to the other ear is mind-blowing.

The same is being perfected on how the mind processes, handles, and responds to stereo images.



Source: ABI Research

The great thing is, every standards organization is developing their set of standards:

- *SMPTE (Society for Motion Picture and Television Engineers)*
- *DVB (Digital Video Broadcasting)*
- *CEA (Consumer Electronics Association)*
- *ITU (International Telecommunications Union)*
- *And more... lots more*

A big buying chasm, of course, is the glasses. Not that you have to wear glasses, but that folks offer you a choice:

- ◊ *active shutter or polarized system*
- ◊ *manufacturer or universal shutter*
- ◊ *streaming or Blu-ray resolution*

Each technology has its champions and its detractors. The problem is, people don't go to movies, buy TV sets or rent new smart devices based on technology. They make the decision based on the experience. No consumer wants to choose the wrong 'right' solution.

3D Photos, Home Video

Fuji's stereo camera is a good first-generation solution, but it's not just the camera. Being the first, Fuji had to supply the total ecosystem — camera, processing and viewing frame.

It needs to be instant, universal like all of today's digital photos.

Personal 3D Video

A number of decent image quality, economic 3D cameras and camcorders have been introduced that require no glasses for viewing,... as long as you view the images/content on the unit's viewer. If you can get the content to your PC, 3D TV set, active or passive glasses will be required. There are technology reasons for this, so for the foreseeable future... ***live with it***!

There were some reasonably priced 3D camcorders introduced. You didn't even need glasses, as long as you used your camcorder's viewer or display.

Of course, it would be neat to play your 3D family movie on your 3DTV set. They're working on that... soon!

The 3D PC

Our youngster wanted the 3D TV to play his games on — but heck, he's already had real 3D platforms to burn.

He has his notebook, desktop, active shutter, passive polarized glasses, special gloves — more stuff than we ever dreamt of when we were his age.

And he's not alone. 3D computers are moving very well because other options are 'a little behind the curve.'

Just as gamers lead the party in getting HD screens, more than 75 percent of the gaming systems fully support 3D.

Glasses don't bother gamers when they play stuff like ***WoW* (World of Warcraft)** for hours on end.

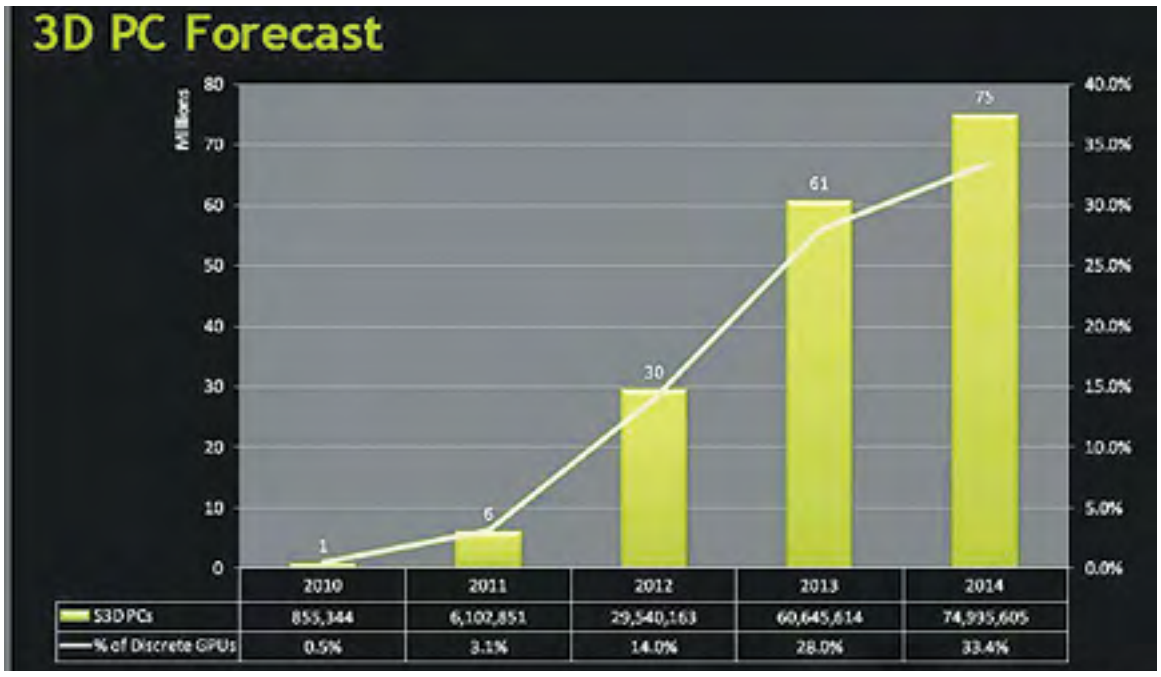
Gamers are actually better off than the rest of us, because they already have more than 425 games to immerse themselves in — and most are multiplayer.

This year, we'll see more games, more 3D screens in homes, more TV events/shows, more good/bad movies in theaters.

It will take a couple of years for all the parties to figure out how each is going to make a buck... or two.

Cutting Up The Pie

Content producers, providers and delivery services are all working hard to deliver a complete array of 3D content to the home user. The challenge is not technology but determining who gets paid how much for the materials you enjoy. *Source* - ***InStat/DisplaySearch***



But by 2014, everything will be in place/worked out and we'll be able to sit spellbound watching Godzilla on our even bigger 3D screen.

Dr. *Serizawa* was right in holding back, "If my device can serve a good purpose, I would announce it to everyone in the world! But in its current form, it's just a weapon of horrible destruction."

Game On

Most of the new single and multiplayer games are brilliantly executed in 3D with breathtaking action, photo-real play and everything the adrenalin junkie could ask for. *Source* - ***Jon Peddie Research***

About the author

Andy Marken is the President of Marken Communications

Executive Spotlight

Mark Brender, Executive Director, GeoEye Foundation

Mark Brender manages all facets of the foundation's affairs. He has held this position since GeoEye established its foundation in March of 2007. From January 2006 until October 2010, he also served as the Vice President of Communications for GeoEye.

Prior to joining GeoEye, he was the Vice President of Communications and Washington Operations at Space Imaging. Mark has more than 25 years of experience in public affairs, broadcast journalism, government relations, business and the military.

In 1998, prior to joining Space Imaging, Mr. Brender was a broadcast journalist for ABC News, spending 16 years at the network as an assignment editor, national security editorial producer, and radio correspondent. Before his ABC career, he served in the U.S. Navy as a public affairs officer and is a retired Naval Reserve commander. As a naval office, he also served as a White House Military Social Aide to the President of the United States.

Mr. Brender began writing and speaking about high-resolution commercial Earth observation as early as 1985 when he established the Radio and Television News Directors Association (RTNDA) Remote Sensing Task Force. The task force helped clear the way for high-resolution imagery to move from the defense and intelligence sector to the commercial sector.

SatMagazine (SM)

Good day, Mr. Brender. Many readers have certainly heard of, and know about, GeoEye. Would you please explain exactly what the GeoEye Foundation is, it's primary goals, and what it has already accomplished?

Mark Brender

GeoEye, Inc. established the **GeoEye Foundation** in March of 2007 with the belief that the company should share its technology to help those doing research on many of the world's pressing problems. Satellite imagery and geospatial technologies can help university students with their research across many academic disciplines. The Foundation provides a limited amount of no-cost imagery over a student's or faculty member's study area.

In January 2011, the Foundation provided imagery to the University of Kentucky to study the type of ground water discharge to surface streams, to the University of Wyoming to map a wildlife habitat in West Africa, to Simon Frazer University to study coral reef ecology and conservation around St. Lucia in the Caribbean, to University of Cambridge to model fish communities and coral reef habitats over areas in the Indian Ocean and to the University of Hawaii for a study of possible archaeological sites in Crete. Those are just a few. In all the Foundation has awarded some 150 imagery grants since 2007. When it comes to research, satellite imagery brings the 'death to distance' and provides an 'avalanche of content' to those doing research.

SM

With 25 years of experience within the broadcasting environment, including 16 years at ABC News, and as a social aide to the President of the United States while you were a U.S. Navy officer, what prompted you to rework your career within the satellite — or, more specifically — the Earth Observation and Imagery environs?

Mark Brender

As a network producer I always understood the 'value of the visual'. In the early '80s when I started working at ABC News I began thinking about the possibility of commercializing spy satellite imagery and the impact that would have on the news gathering process. After all, journalists have cameras all over the globe to cover news, like we've seen in Egypt most recently, so where is the next logical place for the media to have access to a camera? In outer space.

Satellite imagery provides the ultimate high-shot over an area of interest such as an Iranian enrichment facility, a North Korean missile launch site, damage from an earthquake or tsunami, a Presidential Inaugural on the National Mall, or for many other journalistic uses.

Working with the ***Radio Television News Directors Association*** in Washington DC, we began lobbying the Congress and the Executive Branch of government to enable this technology to move from the black world of intelligence to the white world of commerce. It's taken a long time, but now high-resolution satellite imagery is part of a tool kit of information that we use to make decisions in business and government. And it's an ideal tool to help those doing research or help non-governmental organizations fulfill their missions for humanitarian relief. That's why GeoEye's CEO, *Matthew O'Connell*, established the **Foundation**.

SM

An area of concern for the satellite industry in general is the seeming lack of technical education being offered to young students... without a competent pool of trained professionals, satellite and space companies are already feeling the pinch in filling crucial positions. How can the industry improve the conditions for such training at all levels of education? Is the GeoEye Foundation committed to assisting in this regard? If so, how?

Mark Brender

One of the main goals for the **GeoEye Foundation** is to increase awareness regarding satellite imagery and its many uses. Most recently, the Foundation helped sponsor a youth program at Quantico Virginia's *Marine Corps Museum* that taught more than 500 school children about satellite imagery, its uses and career options in geospatial technologies.

The Foundation also sponsors $5,000 per year scholarships at **George Mason University**, **University of Missouri** and the **University of Colorado**. In addition to providing imagery, we are actually supporting students who will graduate one day and, hopefully, come to work at GeoEye. By providing satellite imagery to faculty and students to support research and scholarship money, we're helping educate a next generation of users who will come up with even more ways to use geospatial technologies in the future.

Executive Spotlight

SM

The number of disasters throughout the world seems to be on the increase, with massive loss of life and injuries, health issues, and property destruction. How does the GeoEye Foundation assist NGOs and government relief teams? How does imagery play its substantial role in finding solutions for these huge challenges?

Mark Brender

Now that satellite technology is becoming widely used and digital archives are so immense, it is easier for companies such as GeoEye to donate some of its imagery to schools, non-governmental organizations and other groups to investigate human rights violations and environmental issues, as well as for disaster response. From 1995-2005, the UN estimates that 2.5 billion people were affected by disasters with a loss of 890,000 lives and at a cost of $570 billion. Any technology that will help governments prepare for disasters and more efficiently respond to them, will save lives and money.

Regarding human rights, the Foundation has a role, too. For example, GeoEye Foundation recipient Dr. Chris Lavers, was able to use imagery and aide Amnesty International's investigation of the destruction of communities in Zimbabwe.

In late January, GeoEye provided newly collected imagery to actor/activist George Clooney's Satellite Sentinel Project over Sudan. The GeoEye-1 satellite collected some 400 square kilometers of imagery over four towns in southeastern Sudan on the day voting was taking place on a referendum for succession. Clooney feels that as more people were watching on the ground and from outer space, the likelihood of violence diminishes. He recognizes that sometimes sunlight is the best disinfectant. It provides light — that generates heat — which generates action.

Some other examples researchers at the University of Maryland and the Missouri Botanical Gardens used our imagery to reveal illegal logging and rosewood trafficking practices in Madagascar. The illegal logging of precious hardwoods in Madagascar's national parks has increased dramatically in the past years, but there was little that could be done to stop the practice. With help from the GeoEye Foundation and images from the GeoEye-1 satellite, however, researchers were able to track the illegal timber shipments to help international authorities put a stop to the exportation of these natural resources. Due to the limited infrastructure and unrest in Madagascar, it was only with the images provided by the Foundation that the research team was able to shed light on and reduce these illegal practices.

Another research team at the **Max Plank Institute for Ornithology** used imagery for their Galapagos tortoise conservation efforts. Giant tortoises are known as the native mascots of the Galapagos Islands. Each year their migration is tracked by scientists. Mysteries still remain around this animal's choice of habitat, migration patterns and how it may impact the local ecosystem. GeoEye Foundation imagery was used as part of a comprehensive ecological study of Galapagos tortoises. The imagery was used to establish a baseline habitat and land use maps of the island, allowing researchers to assess land changes and tortoise impact. The study will ultimately help the Ecuadorian government plan socioeconomic development options for Galapagos that are compatible with tortoise conservation.

SM

With GeoEye operating its own EO satellites, how would you go about requesting a re-tasking of a satellite to offer coverage of a disaster? Would such prove problematic for GeoEye's commercial and government customers?

Mark Brender

Since 2007, the Foundation has donated more than 120,000 square kilometers of imagery to researchers and non-governmental organizations. The imagery we provide is most always archive imagery from GeoEye's vast digital library. If there are disasters and GeoEye collects imagery for any customers, then the Foundation has access to it. The Foundation itself does not task the satellites but rides on the collections done by governments or commercial customers. When it comes to disasters though, digital information is like an oyster. It has the greatest value when fresh. So the Foundation moves quickly to get newly collected imagery to those agencies and non-governmental organizations that need it.

SM

As a 501(c)(3) are you noticing other companies and organizations assisting with your organization's primary goals?

Mark Brender

The GeoEye Foundation is always happy to work with other organizations that are committed to helping students, researchers and non-profits develop projects that improve our environment, society and access to information. For example, GeoEye provided supporting funds and partnered with **Penn State University** for a video project known as the ***Geospatial Revolution Project***.

The Geospatial Revolution Project is a public service media and

outreach initiative about the world of digital mapping and how it is changing the way we think, behave and interact. The Project is designed to expand public knowledge about the history, applications, related privacy and legal issues, and the potential future of location-based technologies.

The Foundation is also supportive of the Centre for Spatial Law and Policy since there are many implications and policy issues that have an impact on high-resolution commercial remote sensing.

SM

Earth observation and imagery demands continue to rise around the globe — where do you see GeoEye, and more specifically, the GeoEye Foundation — heading over the next year or so?

Mark Brender

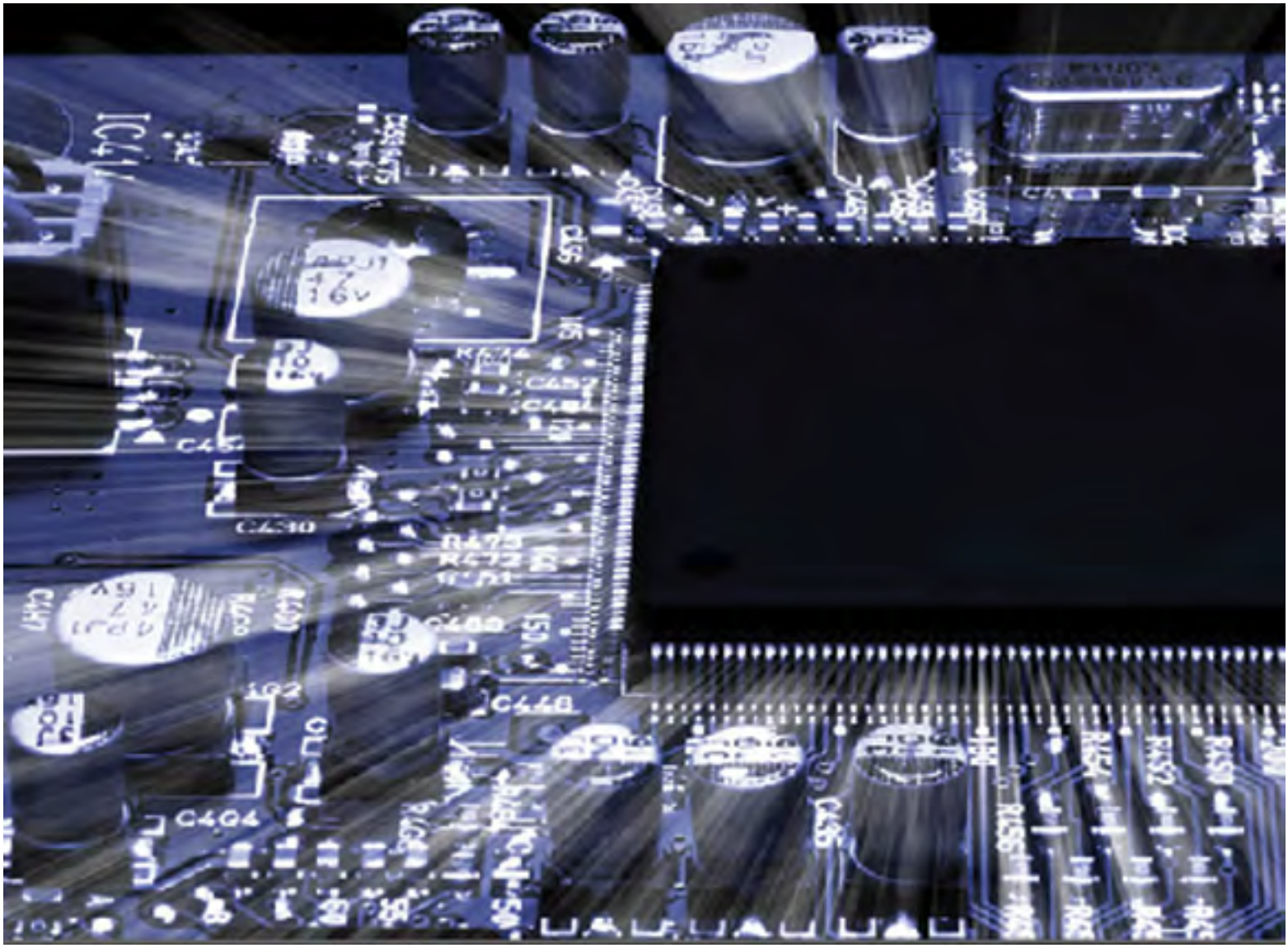
In the future, I see the Foundation as part of a larger effort to use innovative technologies for philanthropic purposes. The Foundation's work thus far has already proven that satellite imagery can be used to inform the public about human rights abuses, identify pressing environmental issues and help save endangered wildlife species. The Foundation needs to be fast, bold, and super-ambitious because as more people become aware of this technology, mankind will find more uses for it. Satellite imagery is like visual truth serum of what's happening on the ground. It just so happens that the camera is 423 miles in non-sovereign space where it's free to look down anywhere on Earth and collect imagery. There are not any 'no fly zones' or restricted areas when you are in space.

Over time, and as resources permit, we hope to increase the number of recipients and therefore increase our positive impact in helping students with their research and NGO with their missions of humanitarian support throughout the globe.

Taking Optimal Advantage Of New Video Compression Codecs and Transmission Schemes

By Jack Vickers, SENCORE

The variety of digital video formats being deployed today is in direct response to consumer demand for more program choices across multiple platforms such as Over-the-Top and Mobile TV applications. Content providers are turning to these advanced formats in an effort to reduce bandwidth, increase HD content, and add additional services while maintaining operational expenses. Digital television transmission, whether it is terrestrial, IP, or via satellite, depends highly on efficient use of compression codecs and transmission schemes. Bandwidth is another important factor that must be considered since an increase in bandwidth comes at an additional — and fairly significant — cost. Making the best and most efficient use of available bandwidth is critical to providing the additional HD programming and services consumers demand.



Compression Scheme Varieties

Looking at the current video delivery markets, Western Europe and North America have a functional legacy infrastructure that consists largely of **MPEG-2** encoders, multiplexers, modulators, and set-top boxes (STBs). While predominant, MPEG-2 also has its limitations. This is because this compression standard was designed about 15 years ago to match the processing power that was economical for video encoders at the time.

In contrast, today's processors are nearly a thousand times more powerful. However, because there is a limit beyond which codec losses from lower bites can be recovered with acceptable quality, dramatically faster processing does not translate into commensurately lower bit-rates for MPEG-2.

To gain desirable video and audio quality at lower bit-rates, many content providers have moved to the **MPEG-4 Part 10** (**AVC**) — or **H.264** — standard. This standard yields better quality as the technology supports the use of multiple reference pictures, up to 16 frames or 32 fields, and multiple motion vectors that improve the predictability of GOP sequences. H.264 also takes advantage of improvements in entropy coding that enable better probability analysis for data and picture detail.

Due to the high cost of retrofitting entire networks and replacing STBs, MPEG-2 will remain the most common format for quite some time, in spite of inherent shortcomings. However, to gain some of H.264's bandwidth and cost-saving benefits, cable operators and broadcasters who currently rely on MPEG-2 can adopt a system that mixes the two compression schemes. As an example of the potential savings involved, a satellite operator offering 100 channels of MPEG-2 SD and 12 channels of MPEG4/H.264 HD using an early generation of multiplexers and encoders would require 11 satellite transponders for the standard definition (SD) content and three for the HD. If that same operator took advantage of new processors and H.264 compression in the head-end, the number of transponders needed for HD content drops to two, and for SD, this number falls to nine; ultimately freeing up three transponders for additional services or programs.

From DVB-S To DVB-S2

In addition to employing H.264 compression, satellite providers are also transitioning from the more commonly used DVB-S format to DVB-S2, which offers nearly a 30 percent increase in bandwidth efficiency. Implementing DVB-S2 also allows an increase in the bits per hertz that are transmitted, which translates into lower operational expenditures without sacrificing video quality or consistency. In addition to DVB-S2, advanced formats such as **16-APSK** and **32-APSK** have the potential to further increase capabilities.

Satellite APSK modulation schemes exist in many variations, each having a different signal constellation, including **4+12 APSK** or **5 + 11 APSK** for **16-APSK** and **4+12+16** for **32-APSK**. A content provider using 16-APSK can improve bandwidth efficiency because 16-APSK offers more bits per symbol. Specifically, an **8-PSK (2^3)** system offers eight positions in the constellation, while the extra bits in **16-APSK (2^4)** adds another eight additional positions for data packets to be included in the transmission of the signal. Given the nonlinear characteristics of the amplifier in the transponder, the constellation or modulation schemes that achieve the best performance are 4+12 APSK and 4+12+16, which have been adopted in DVB-S2.

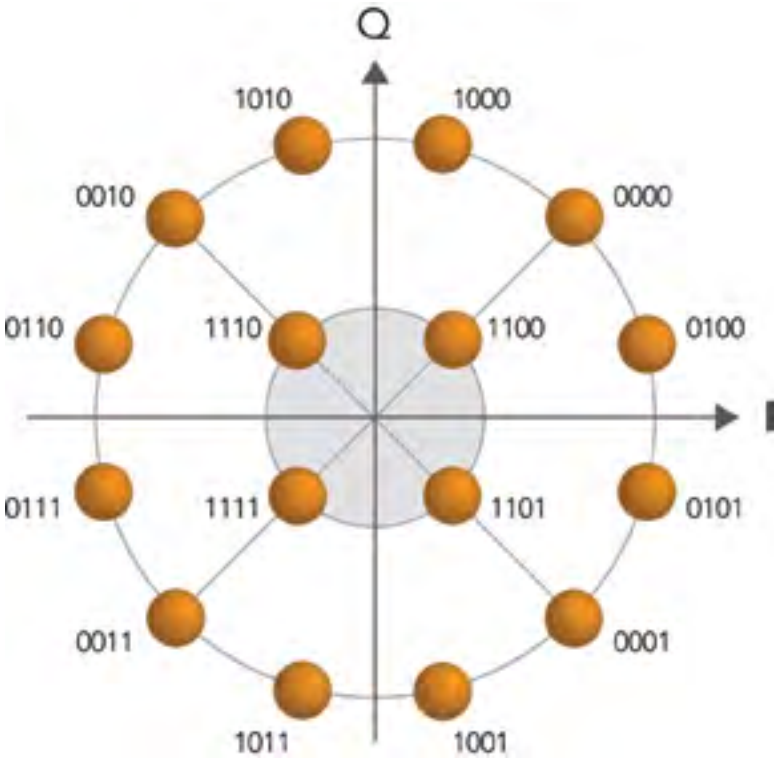


Figure 1: 16-APSK Constellation

To better understand what the satellite constellation diagram is revealing, a quick review is in order. A satellite constellation is a plot of symbols on a rectangular space. We can create a constellation for PSK modulation by drawing a circle of radius =√Es. For this example, give the I and Q channels an amplitude of 1, so that the radius of the circle becomes 1.414.

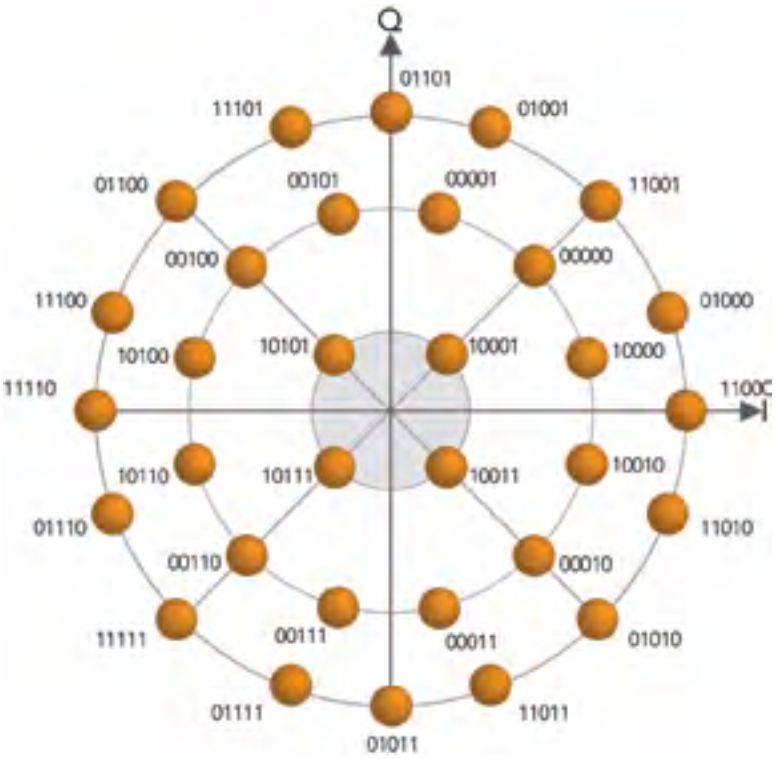


Figure 2: 32-APSK Constellation

Now, compute the modulation angle, which is 360 degrees divided by M, which for PSK modulation, is 90 degrees. That gives us four points, each one 90 degrees apart on the circle. A 16-APSK modulation is represented with two concentric rings of uniformly spaced 4 and 12 PSK points, with the radius of the inner ring R1 and the outer ring R2. The ratio of the outer to the inner ring, Y=R2/R1, can be adapted to FEC channel coding method allowing performance optimization according to the channel characteristics. The standardized Y ratios for 16 APSK in DVB-S2 are as follows:

Code Rate	2/3	3/4	4/5	5/6	8/9	9/10
Y	3.15	2.85	2.75	2.70	2.60	2.57

Figure 3

Code Rate	3/4	4/5	5/6	8/9	9/10
Y1	2.84	2.72	2.64	2.54	2.53
Y2	5.27	4.87	4.64	4.33	4.30

Figure 4

The 16-APSK points, or symbols, on the constellation are 22.5 degrees apart. The 32-APSK modulation constellation is developed from three concentric rings of uniformly spaced 4, 12, and 16 points. The inner ring has radius R1, the intermediate ring has the radius of R2, and the outer ring has radius R3, which is represented as Y1= R2/R1 and Y2 = R3/R1. These ratios are also adapted to the FEC channel coding method. The Y-ratios for DVB-S2 32 APSK are specified as follows:

The data presented above shows how newer, advanced advance modulations schemes — such as 16-APSK and 32-APSK — allow content providers to further compress the video data and thereby reduce the necessary transponder space that was once needed with older modulation schemes.

Until recently, DVB-S2 (16-APSK or 32-PSK) was thought to be useful in point-to-point applications, but not in multipoint instances. The format was considered effective for **ENG** or **DSNG**, but not for *Direct-To-Home* (**DTH**) or contribution. However, **SENCORE** and its partners have undertaken multipoint DVB-S2 testing with impressive, industry-changing results, and we will begin to see more trials and implementation of these advanced formats in a wider variety of applications.

Downsides Of Advanced Formats

We have considered some of the efficiency benefits that can be derived from advanced modulation formats. One unfortunate tradeoff is that these formats require higher transmit power and higher gain-receive antennas to accommodate the link budget that resolves the carrier-to-noise separation at the receiver. Additionally, 16-APSK and 32-ASPK are much less forgiving of non-linearities associated with high-power amplification in satellite transponders.

When transmission deviations cause interference in a digitally compressed signal, the loss of data or bits can result in a variety of reception issues that disrupt the viewer experience — including complete loss of signal. Other potential data issues include dropped packets, metadata errors, and inconsistencies like PCR jitter and overloaded buffering — any of which can cause tiling or lack of A/V synchronization.

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As every device in the delivery network that touches the MPEG stream has the potential to cause a problem, one invaluable support for video consistency is strategic monitoring and analysis at multiple points throughout the delivery network. Advanced signal monitoring devices assess compressed audio, video, and data services for missing packets, clock pulse, overall jitter, and compliance with ETR-101-290 standards. These types of devices also offer a variety of inputs including fiber/copper GigE, ASI and RF, which enable the operator to monitor any portion of the network for quality of service issues on a 24/7 basis.

Relying On Flexible Operational Gear

Beyond monitoring, manufacturers have developed operational devices to help customers take advantage of the gains being offered through DVB-S2 with 8-PSK, 16-ASPK, or 32-APSK modulation, as well as H.264 compression.

These include compact, high-density transcoders with flexible I/O, supporting H.264 to MPEG-2, H.264 to H.264 transcoding and H.264 transrating, as well as audio pass-through. The latter enables providers to take MPEG-2

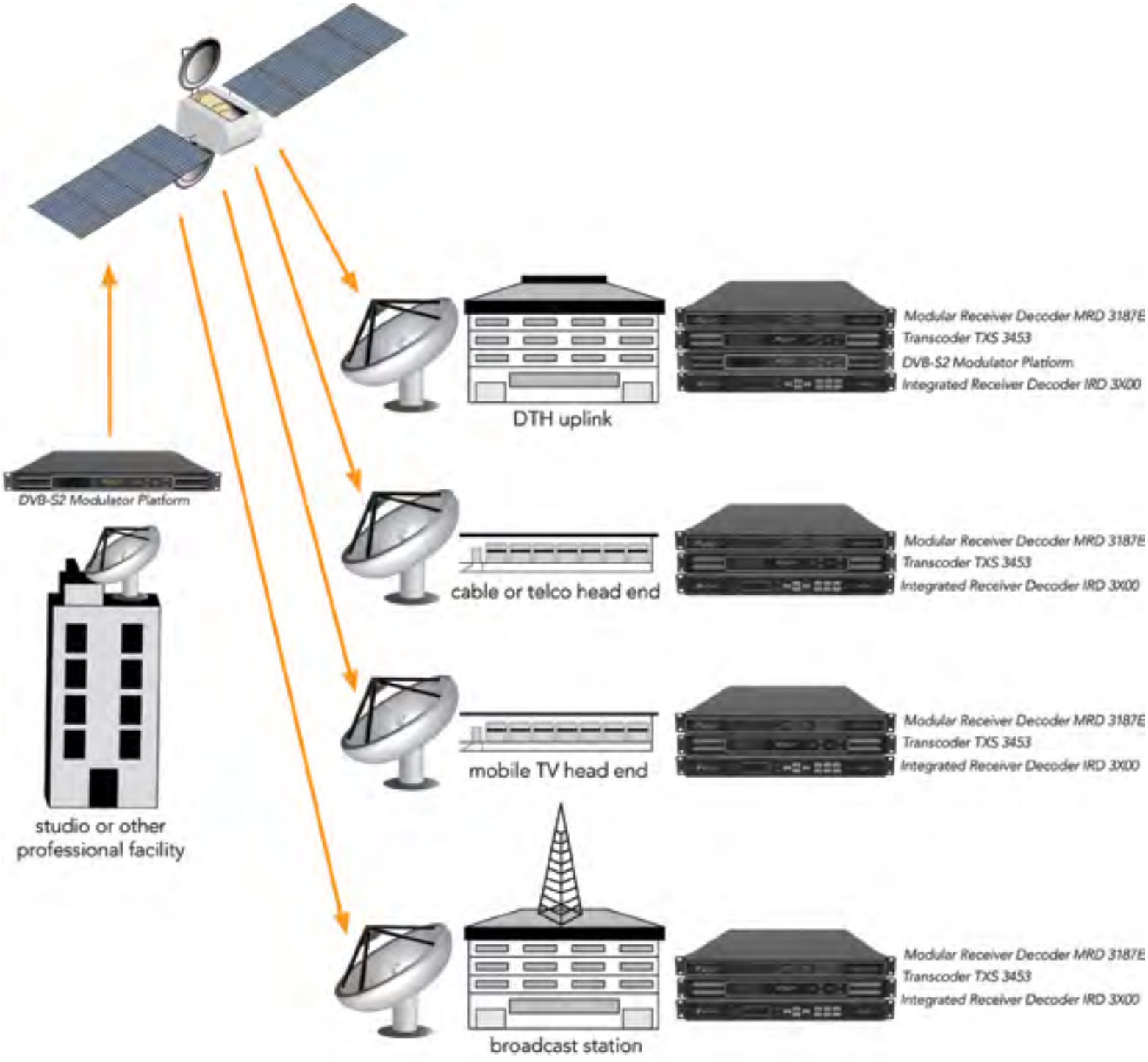

Figure 5: Multi-Point Distribution is used for a variety of applications.

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content and output H.264 for satellite transmission, or, to take H.264 content on the receive side and output MPEG-2 content for cable distribution.

Modular platforms for satellite modulation are capable of either single or multi-stream modulation of MPEG. Some can support either one or two independent streams while variable coding and modulation (VCM) capabilities allow each stream in a single RF carrier to have its own modulation parameters.

Advanced *integrated receiver decoders* (**IRD**) can also be a cost-effective means of supporting SD applications that offer satellite or MPEoIP input and either a composite or SDI output. IRD units should also offer an upgrade path from SD to HD, so operators can leverage existing SD infrastructures while putting a solution in place to enable SD to HD migration when appropriate. SENCORE offers a variety of modular receiver decoders that combine dual-channel processing for MPEG-2, H.264 (4:22 and 4:2:0) SD, and HD video decoding with a wide range of interfaces that make the device adaptable to contribution, distribution, or backhaul environments.

The International View

The international market is fragmented and reliant on satellite-carried video content, which creates a unique opportunity for manufacturers of video distribution equipment as they look to help content providers and distributors to leverage existing infrastructure. DVB-S2's multi-stream capability will be very useful in implementing single frequency networks for DVB-T terrestrial distribution.

As mentioned, Western Europe and North America have a functional legacy infrastructure based primarily on MPEG-2. Meanwhile, the countries in Eastern Europe and elsewhere in the world are in the initial stages of building digital television infrastructure from scratch and have the advantage of learning from the digital launches in the U.S. and Western Europe. These countries can seamlessly bypass the limitations of yesterday's technology and take full advantage of today's advances.

The worldwide equipment demand for DVB-S2/H.264 is expected to grow nearly 40 percent over each of the next two years. India is one of the world's largest and most powerful emerging markets, and the *Telecom Regulator Authority of India* has recommended the use of DVB-S2 and H.264, even for broadcasting SD video, due to the technical advantages it offers. The Indian DTH market is one the fastest growing satellite markets in the world and is expected to quadruple from 5 million today to 20 million in 2012.

Recognizing the global need, companies such as SENCORE are providing versatile and advanced operational equipment that in many cases is also interoperable with legacy systems. Together with multipoint monitoring, these products will allow content providers to create hybrid systems that leverage MPEG-2 infrastructure even as they take advantage of the benefits of more advanced encoding and formatting.

What's Ahead

To meet viewer demand for higher image resolution, 3D, and video that is available on any screen at any time, video distribution models will need to be even more flexible. Likewise, continued growth in the number of channels means a shortage of available bandwidth and may prove to be a limiting factor — technology that takes advantage of existing, available bandwidth will be crucial in order to meet consumer expectations and remain competitive.

SENCORE is among the manufacturers supporting new and innovative video delivery networks with products designed to meet the global demand for more video content. The Company recently partnered with a leading U.S. content provider to test our equipment's ability to transmit and receive more than 100 Mbps of video, audio, and data formatted as 16-APSK — using a live C-band satellite link and a 4.5m receive dish. Following this successful trial, we went a step further and transmitted 32-APSK modulation using a 9m receive dish. While these modulation techniques are still in their infancy, the results of our testing is good news for content providers hoping to leverage technology to expand service offerings while maintaining reasonable operational expenses and improve bandwidth efficiency.

About the author

Jack Vickers is the Senior Product Manager at SENCORE, where he focuses on designing and implementing technology to help content providers maximize bandwidth and existing infrastructure. SENCORE is a leader in the development of high-quality signal transmission solutions for the broadcast, cable, satellite, IPTV, telecommunications, and professional audio/video markets. Learn more at www.sencore.com.

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Broadcasters: Changing The Ways Satellite Capacity Is Used

By Simen Frostad, Chairman, Bridge Technologies

Both in scale and scope, satellite services are expanding. The footprint is growing as operators extend coverage via new satellite launches and more effective use of existing fleets. More and more consumers and businesses are coming to rely on satellite as a way of linking to the world from locations where cable infrastructure is not available — at sea, on the move, or in remote locations. And the use of satellite communications embraces an ever-growing variety of applications, right down to the consumer level.

Broadcasters and media operators are changing the ways they use satellite capacity, too. For broadcast distribution, satellite has always been an excellent solution, and contribution – particularly for DSNG applications – has also come to rely heavily on satellites.

More recently, the move to IP-based workflows is opening up the potential for more flexible and versatile use of satellite communication. Most operators still need the ability to support traditional **DVB-S** or **S2 TS** encapsulated video and will do for some time yet, but IP-based satellite operation offers considerable advantages. It enables broadcast satellite transmissions to integrate more readily with the widespread IP-based workflow elsewhere in the production chain, and also allows broadcasters to gain greater value from their infrastructure by adding to the various uses for satellite capacity. An example is the increasing trend for uprating **DSNG** vehicles to act as mobile production offices, with the capability for two-way connectivity and all the advantages that brings. DSNG crews equipped this way can now do much more than gather news and pipe it back to the studio on a pre-booked satellite slot: Instead, with two-way IP-based connectivity, they can research via the Internet, send and receive email, download file-based content, conduct VoIP conversations with studio staff and even interviews for broadcast. A mobile production center like this is a far more productive and versatile resource for the broadcaster than the old style of DSNG van.

However, broadcast and media operations are just one area using IP-based satellite technology. IP-based satellite services lend themselves to a much greater variety of services.

One of the current expansion trends is in the extension of connectivity to parts of the globe that have, until now, been unable to plug into the global village through lack of terrestrial infrastructure. Most obviously this affects the emerging regions where laying cable is not practical or financially feasible, or parts of the world where geographical conditions or low population densities mean communities are widespread and remote. Surprisingly, significant percentages of the populations in developed regions are still unconnected to broadband as they are too remote from cable infrastructure: Satellite connectivity is a potential solution for them, as well.

Of the less-developed regions, parts of Asia, the Pacific Rim, the Middle-East and Africa are the focus of much development in satellite provision. In the MENA region, there is a great deal of coverage expansion through the ***Astra2Connect*** service, and the **O3b Networks** initiative has been established to target mobile backhaul and broadband customers in remote areas both in MENA and around the globe, with a constellation of new, medium Earth orbit satellites.

The expansion of Ka-band satellite fleets is another indicator of the rapid growth in the demand and use of satellite for a variety of applications. This is a development that has major implications for the industry: Ka-band multi-spotbeam satellites and the vast increase in capacity they bring will transform the industry — this will have a big impact on the satellite business. The huge explosion of capacity will lower the cost of transmission substantially, but the technical limitations of the new satellites will mean access will only be available through a limited number of gateways.

With Ka-band multi-spotbeam satellites, uplink from any point in the footprint for transmission to all terminals will no longer be possible, and this will have a major impact on many existing players as the Ka-band satellite fleet starts to come into the equation over the next three to five years. Consumer broadband is a primary focus for most of these launches. However, as the impact of the extra capacity ripples through the satellite sector, many regions could see it used for other applications such as DTH, IP trunking, or TV contribution and distribution to cable headends, as lower costs open up new approaches to these strands of business.

Another interesting feature in the development of satellite communications is the diversity of applications satellite customers are building. Apart from media and broadband provision, there are many specific applications in mining and exploration, science, shipping, environmental monitoring and alternative energy. **SCADA** (*Supervisory Control and Data Acquisition*) networks are another application that may become increasingly widespread as new forms of energy generation become more important. The expansion of coverage to sparsely-populated and developing regions opens up the potential for distance learning and virtual schools and universities.

All these developments are supported by technology advances that make the use of satellites more cost-effective and secure in adverse conditions. In some cases, such as the O3b service, some additional complexity will be introduced through the need for two antennas to track the satellites: Eight satellites at eight-kilometre altitude over the equator will substantially reduce latency, but new antennas will be needed to track the satellite as it rotates and catch the next as it comes over the horizon.

This proliferation of satellite capacity and diversification of use means not only that more data — and more varied data — will be carried over satellite in the coming years, but also that satellite operators and satellite customers will use capacity in a more fluid and dynamic way. Fluidity and constant change are increasingly a feature of the media and communications world anyway, but the tendency of satellite operators and users to stick with a configuration without making regular changes is a thing of the past.

Technological advances in the satellite sphere and in the application technology used by satellite customers means that continual re-configuration is a fact of life. Satellite users are much more likely now to be swapping transponders, changing the mix of services, and making other changes to the way they use their capacity. All of this makes it far more important that comprehensive monitoring systems are in place to trap and identify errors and failures.

It only takes a small change to have a big impact on services further down the line, and when change is constantly on the cards, small errors can creep in at any time. Another audio channel added on the same **PID** can mean viewers are suddenly hearing the incorrect language. Merely changing a file name can trip up an entire operation. Operators running their own chain from the satellite to the user usually maintain good control of any changes and they understand the implications right down to the set top box (STB). Problems are much more likely to arise when capacity is resold to other operators: A change that is insignificant for the satellite operator could cause a major failure for its customers. The value of a comprehensive monitoring system at all points of the signal chain increases in this situation.

Technological advances in the satellite sphere and in the application technology used by satellite customers means that continual re-configuration is a fact of life.

With the varied types of data being carried over satellite in this two-way environment, where the signal may include everything from traditional **ASI** broadcast transmissions to a **VoIP** call, a comprehensive monitoring environment needs to be just that; capable of tracking everything that passes through it, and aware of all the activity that impinges on the quality of the service received by the customer.

That means that satellite users and operators should be able to monitor the signal at any location from the DSNG van, or the remote energy generating plant, right through the data aggregation points, through the headend and down to the end user or delivery point. A monitoring system can only deliver rapid fault resolution and prevention if it is truly end-to-end, so that operators can see the big picture across the entire signal chain, in order to track and resolve issues quickly, and restore service levels to the customer.

Quality of service and robust connectivity is important to providers and consumers of digital media over satellite. For more significant Internet-based communication such as decision-making based on real-time business data, telemedicine, and other scientific applications, or industrial control and planning, it's perhaps even more vital that the service is reliable and meets the demands of its users.

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Executive Spotlight

Greg Ewert, Executive Vice President, Iridium Communications

Greg Ewert joined Iridium in 2004 and is responsible for business development for Iridium as well as its relationship with its distribution channels. Mr. Ewert brings 19 years of experience at senior-level positions in the global communications industry. Prior to joining Iridium, from 2002-2004, he served as Executive Vice President for Marketing, Sales, Product Development, Business Development and Customer Service for COMSAT International. Prior to COMSAT, from 1998-2002, he held executive positions within Teleglobe Inc., ranging from Senior Vice President of Global Data Services to Vice President and General Manager of Carrier and Emerging Markets. Before Teleglobe, he worked for Sprint from 1987-1997, where he held various positions including President of Sprint International of Canada.

SatMagazine (SM)

First, Greg, can you tell our readers about your background and your current responsibilities as executive vice president for global distribution channels?

Greg Ewert

I joined Iridium in 2004 and am currently responsible for business development as well as building relationships with our distribution channels. Prior to Iridium, I served as Executive Vice President for Marketing, Sales, Product Development, Business Development and Customer Service for COMSAT International. Prior to that, I held the position of Senior Vice President, Data Services at BCE/Teleglobe. I started my telecom career at Sprint, where I served in various capacities, including as President of Sprint International Canada. I was also a member of the executive management team of GlobalOne, an international joint venture of Sprint, France Telecom and Deutsche Telecom based in Brussels, Belgium.

SM

I see you've just completed your annual partner conference in New Orleans. Can you give us a high-level report on that significant Company event?

Greg Ewert

This year's Iridium Partner Conference — themed *The Future is Everywhere* — was more impactful and richer in content than previously experienced. We had more than 400 attendees representing 130 partner companies from all over the world participating in the event. The two-day conference included presentations by Iridium's senior management team and breakout sessions that were dedicated to specific Iridium product lines and vertical markets, as well as case studies from customers.

Iridium CEO *Matt Desch* offered a report on the state of the company and the mobile satellite communications marketplace. Also, *Elon Musk*, president and CEO of Space Exploration Technologies (SpaceX), reported on the successful launches of the new Falcon 9 rocket, which will be the primary launch vehicle for the Iridium NEXT satellite replenishment program.

The conference served as a platform for partners to introduce new Iridium-based products and solutions and provided a forum for networking opportunities among partners and Iridium team members. It's truly exciting to see the synergy at work among the partners attending the conference, sharing ideas and opportunities with each other.

SM

You often refer to your network of service partners as an ecosystem. What exactly do you mean by that?

Greg Ewert

An ecosystem is typically defined as a system formed by the interaction of a community of organisms with their environment. Our partner ecosystem refers to Iridium and all the components that interact and connect with each other to create partnerships. For us, the "ecosystem" is Iridium, the solution providers and the end users, all working together and operating on the Iridium network.

SM

Can you give us a concise description of the types of partners in Iridium's ecosystem?

Executive Spotlight

Greg Ewert

Iridium service providers (SP) and value-added resellers (VARs) sell Iridium products through their dealer networks. VARs also take the raw Iridium data products, combine them with solutions, and resell the integrated products. For example, a VAR that sells both Iridium equipment and airtime. Value-added manufacturers (VAMs) manufacture the equipment and have the sophisticated knowledge required to get products and solutions through the certification processes. Value-added developers (VADs) supply the solutions, such as email or specialty billing services, which support the products.

SM

How has your partner network grown and changed over the past several years?

Greg Ewert

The number of partners in our network has steadily grown each year. Iridium's partner ecosystem now stands at more than 250 companies spanning the globe. Over the years, Iridium has made a substantial move from primarily voice services towards more data-centric partners. Our driving force is to provide global satellite M2M service to parts of the world where no other network can go. Iridium has consistently sought to develop relationships with a strong partner base that includes some of the most successful companies in the industry across key vertical markets.

Introducing the revolutionary *Iridium 9602 Short Burst Data* **(SBD)** *Transceiver* has allowed our partners to build and implement new innovative 9602-embedded products and has made global satellite M2M communications service obtainable to a much larger group of partners and applications. In addition, the introduction of ***Iridium OpenPort***®, which provides the world's only global voice and data service, has considerably grown our partner network throughout the maritime industry.

SM

How do you see the partner network changing over the next few years?

Greg Ewert

We anticipate continued growth across the vertical markets as our partners continue to develop products, applications and solutions for an even broader range of customers and end-users.

Iridium NEXT, our next-generation satellite constellation, is expected to begin launching in 2015. Our partners can expect to experience a seamless transition to the greater capabilities of Iridium NEXT and can expect 100 percent backward compatibility. As with the current satellite network, the Iridium ecosystem of partners will have full access to the robustness and resiliency of Iridium NEXT to support their products.

SM

I understand you have instituted a new certification program for partner products operating on the Iridium satellite network. How does that work, and how will it improve your service to end users?

Greg Ewert

The Iridium product certification process has been streamlined to more efficiently move partner products and solutions through. We have team members in our product certification department working around the clock, reducing the amount of time it takes for products to achieve certification and ensuring that more Iridium-certified innovations are brought to market sooner.

SM

How will Iridium NEXT affect your distribution strategies?

Greg Ewert

We do not expect to make any drastic changes in the way we distribute to the market. The current partner system works very well for us. Indeed, it's the innovative products and solutions developed by our partners that drive Iridium's surge into a position of market leadership. Importantly, Iridium NEXT will be totally backward compatible with the current satellite, so all user equipment will still function on the new network. But I'm sure that Iridium NEXT will be a major driver of growth for our company and our partners, enabling new and exciting capabilities.

Iridium NEXT satellite

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Insight

The Choice... SSPA vs. TWTA...

By Dr. Phillip J. Koh, Director of RF Engineering, Integral Systems SATCOM Solutions Division

The benefits of Solid State Power Amplifiers (SSPAs) versus Traveling Wave Tube Amplifiers (TWTAs) have been discussed continually over the years. In the past, this was always in the context that TWTAs had better efficiency and size/weight, while SSPAs brought other significant advantages, such as linearity, reliability and lower lifecycle cost.

The choice between SSPAs and TWTAs was made more difficult because, although SSPAs offered many reliability and application advantages, they had one fundamental drawback: poor efficiency and size/weight. Therefore, the engineer had to make a tough call: In order to obtain the higher efficiency and compact size/weight of TWTAs, they had to live with all the burdensome idiosyncrasies and costs of this vacuum tube-based technology.

However, progress marches on — over the years, the efficiency "gap" between TWTAs and SSPAs has continued to shrink. Recent advances in SSPA efficiency have brought them into parity with TWTAs in Ku-band, making SSPAs ideal for replacing TWTAs in Ku-band communications systems.

The new, more advanced SSPAs offer enhanced reliability, eliminating tube replacement and other maintenance costs. Also eliminated are high-voltage power supplies, eliminating an unusual, unreliable, (and potentially lethal) component, which, while in widespread use in the 1950s, have now become very rare and hard to source, subject to unexpected obsolescence.

In addition, recent advancements in efficiency gains make SSPAs safe to operate at full power into highly reflective loads, eliminating a source of potential failure

common to TWTAs and older SSPAs. Engineering designs have also moved forward to increase high immunity to shock and vibration, significantly expanding to SSPA the potential use of SSPAs.

Linear Power: Comparing Apples and Oranges

The performance characteristics of SSPAs and TWTAs look quite different. Frequently, the question arises: How do we select and/or specify an SSPA in order to retrofit/replace a TWTA? In most cases, a TWTA can be replaced by a SSPA that is more efficient.

In the majority of applications, especially in communications, TWTAs are not used anywhere near their maximum power. For example, a 400W TWTA in a communications application may be operated at 3dB or even 6dB back-off in order to meet linearity requirements. At 6dB back-off, the 400W TWTA is only producing 100W.

In general, for a communications application, the TWTA cannot run at "full power," because doing so will cause a significant amount of distortion due to the non-linearity of the TWTA. This distortion may cause errors in demodulation and/or cause the transmitted signal to violate restrictions on spectral regrowth, generating interference in neighboring channels. Therefore, in order to meet these various restrictions on distortion, the TWTA transmit power is reduced by decreasing the modem signal level until it reaches a lower power level (often called a "linear

power") at which it meets the maximum distortion limits. This "linear power" is generally far below the much higher nominal power of the TWTA.

In contrast, a SSPA typically will have significantly better linearity than a TWTA, and so may be operated at little to no back-off while meeting the same restrictions on distortion. Therefore, a much smaller SSPA may achieve the same "linear power" (*i.e.*, usable transmit power in practice) as a TWTA of much higher power. A typical rule of thumb is that a SSPA can achieve the same linear power as a TWTA of two to three times higher saturated power.

The very pleasant side-effect of operating at lower back-off is that you can use a much smaller SSPA to replace a larger TWTA, and therefore your weight, size and power consumption are much better. Consider the below table, for example, which compares the size/weight and power of an **Integral Systems**' ***200W SSPA*** against a typically much larger 400W TWTA (rated at 350W at the output flange), both in Ku-Band (13.75-14.5 GHz).

	200W TWTA	400W TWTA	200W Integral Systems AMP-
Weight	34	55	33
Power consumption at 140 Watts output	850 Watts	1400 Watts	870 Watts
Linearity at 140 Watts output	poor	good	good
Size (in.)	16 x 9 x 9	20 x 11 x 10	12 x 11 x 6

Looking at the above table, the Integral Systems' 200W SSPA is comparable at 33 lbs. to the 200W TWTA (34 lbs.) and much smaller than the 400W TWTA (55 lbs.) Power draw is comparable to the 200W TWTA, and much lower than the 400W TWTA. However, the fair comparison is the 200W SSPA against the 400W TWTA, because the 200W TWTA has such poor linearity at 140W that it is not usable at that level for the majority of communications applications.

Note in particular the power consumption in the aforementioned table. Due to the poor linearity of TWTAs, in practice they cannot be operated in their high-efficiency, saturated mode, but must be backed way down to a much less efficient linear mode. While backing down the RF power level, the RF output decreases, but the power consumption stays roughly constant or decreases at a much slower rate than output power, so the practical achievable efficiency for a TWTA in a communications application is much lower than the theoretical efficiency it achieves when operated at full power. As a result, the 200W SSPA delivers the same linear power as a 400W TWTA at a much lower power consumption (and consequently lower heat generation); in the above example the SSPA's draw is 870W instead of the TWTA's 1400W.

Ultra-Fast Mute (Power Standby) Capability

A unique feature available on certain SSPAs is ultra-fast mute/unmute (power standby) capability. Whereas TWTAs, based on vacuum tubes, have long warm up times (on the order of minutes) and so are typically operated in an always-on mode. This means they are constantly drawing power at their full rate.

For example, using the ultra-fast mute/unmute capability in a typical Integral Systems' SSPA, the SSPA can be shut down in 20 nanoseconds and can come on and reach stabilized gain in 80 nanoseconds. In the muted state, the power amplifiers and drivers are shut off — power consumption goes to near-zero.

This ultra-fast standby capability offers new possibilities for power savings and heat reduction. Especially for TDMA systems, it is possible to mute the amplifier between bursts. While it would be unimaginable to shut down a typical TWTA in-between bursts of a TDMA signal, with turn-off/turn-on times in the nanoseconds, an

Integral Systems' SSPA may be called up from a ultra-low-power-consumption sleep state and stabilized to its normal operating gain in a small fraction of the duration first bit of a packet preamble, then switched off immediately after the last bit is transmitted. As a result, dramatic power savings are possible. If a transmitter is only operating at 20 percent duty cycle, then power consumption can be reduced by 80 percent, as the SSPA may be turned off for 80 percent of the time. In many cases the pulse repetition frequency is high enough that this switching is not even seen as a variation in power draw; internal capacitors hold the power rail during pulses, so all that is observed externally is a continuous, smooth power draw which is far lower than the normal un-muted power draw.

Even in non-TDMA systems, the ability to instantly awaken the SSPA allows many power-saving operation modes where the SSPA is automatically put in standby on any occasion where it's not actively transmitting data, then instantly re-activated whenever it's called back into service, resulting in great power savings. For 1:1 redundancy systems, the unused unit may be left in muted mode, saving half of the power for the system, since the unit can be un-muted and ready to transmit in much less than the time it takes for a waveguide mechanical switch to flip.

These power savings due to both the high efficiency and ability to put in low-power standby, also make the SSPA a greener solution, reducing lifetime operating costs and electrical consumption, especially in larger teleport installations.

Integral Systems' ***SATCOM Solutions*** division has released a new series of Ku-band SSPAs extending from 25 to 200W output power. Higher power levels are also available as custom products. These products offer an unprecedented combination of small size and efficiency, equaling and/or surpassing the efficiency of typical TWTAs.

The Company's next generation of SSPA products have made dramatic efficiency and size/weight improvements so they now equal or exceed TWTAs, which were formerly TWTAs traditional areas of strength (when compared

Table 1: Ku-Band Power Amplifier Performance

	Psat(typ)	Power consumption at Psat			
	Efficiency	Heat Dissipated	Size	Weight	
	(Watts)	(Watts)	(Watts)		
	(in)	(lbs)			
AMP-Ku25	34	115	30%	81	5.3x3.2x3.3 3
AMP-Ku40	62	241	26%	179	5.3x3.2x3.8 3.7
AMP-Ku100	125	500	25%	375	10x5x3.5 11.5
AMP-Ku200	220	916	24%	696	12x11x3.5 23

against older models of conventional SSPAs that typically have under 10 percent efficiency in Ku-band).

For example, the Integral Systems' Ku- product line achieves typical saturated efficiency ranging from 30 percent for the lower power amplifiers to 24 percent for the 200W product. Also, size/weight is much smaller than older SSPAs, ranging from three pounds up to 23 pounds for the 200W in the component configuration, and five to 33 pounds in the outdoor configuration with power supply and cooling.

For example, in Table 1, note that the 200W Ku- SSPA draws under 900W, typical when operating at linear power, in an ultra-compact 23 pound package that is sized at only 12x11x3.5 inches. This is comparable to a 200W TWTA of the same saturated power, allowing a direct drop-in replacement with little or no increase in power draw, weight or size.

All of the arguments traditionally made in favor of SSPAs over TWTAs also apply to these new ultra-efficient SSPAs. One common rule of thumb often cited is that, for linearity-sensitive applications, a SSPA can replace a TWTA with two to three times more saturated power while achieving the same linear power output. In the past, these arguments were made by SSPA manufacturers to offset TWTA's advantages in efficiency. In the case of Integral Systems' ultra-efficient SSPAs, these arguments still apply, but since we are starting with an amplifier whose efficiency and size/weight is equal to TWTA's, the superior linearity allows us to replace a TWTA with a SSPA that is far superior in power consumption and size/weight.

Reign Reigned In

The reign of TWTAs as the highest efficiency power amplifiers has come to an end. New 25 to 200W Ku- Band SSPAs match TWTAs spec-for-spec in saturated efficiency and size/weight, but with much better linearity and consequently far superior size/weight and power consumption for equivalent linear power, while bringing SSPAs traditional advantages in reliability, power savings, noise and total cost-of-ownership.

About the author

Dr. Phillip J. Koh is Director of RF Engineering at Integral Systems' SATCOM Solutions division. Prior to joining Integral Systems in 2010, Dr. Koh founded Virginia Millimeter Wave, Inc. in 1997 and Sophia Wireless in 1999. At Sophia Wireless, Dr. Koh served as principal investigator on many research contracts for the United States Air Force, Army and Navy, NASA and MDA for the development of innovative mixers, amplifiers and oscillators, antennas and antenna arrays, phase shifters, MEMS devices and in particular, ultra-high efficiency power amplifiers. Dr. Koh's doctoral research focused on semiconductor device design for millimeter wave applications, which set records for output power from a solid state source at 160 and 320 GHz.

Integral Systems has just made available their 100 Watt Ku-band Solid State Power Amplifier (SSPA). The new 100 Watt SSPA, offered through Integral Systems' *SATCOM Solutions* division, offers high-power efficiency and produces large power output – 480 Watt consumption at 120 Watt radio frequency output – from a very small package, while producing very little heat. At just 10 pounds in component form, or 15 pounds with the optional cooling system, the new 100 Watt SSPA is compact in size, offers low weight, high efficiency as well as low cost.

Integral Systems' 100 Watt SSPA reduces initial capital costs — up to 40 percent, depending on system requirements — as well as ongoing operating costs by eliminating expensive tube replacements.

"Our customers have been demanding a smaller, lighter and more powerful amplifier that can solve their most challenging power issues and be used in a disparate set of environments," said *Steve Gizinski,* General Manager of Integral Systems' SATCOM Solutions division. "We are making available the most advanced, ultra-compact, lightweight and powerful SSPA that is ideal for any customer looking to cut capital and ongoing operating costs and increase efficiencies. In addition, our new line of SSPAs are ideally suited to replace old, 20th Century TWTA technology, with the market's most advanced, state of the art SSPAs."

The unit provides up to 140 Watts of saturated output power with a peak efficiency of 28 percent and 500 Watts of total power consumption with very little heat. The integrated power supply accepts a wide range of input voltages from 18 to 55 VDC and is co-located with the power amplifier section to eliminate losses in high-current power paths and reduce drain bias line inductance. Thermal dissipation is typically under 400 Watts, which makes the cooling system smaller and simpler than other power dissipation systems. Plus, an integrated heat pipe baseplate evenly distributes heat load to eliminate hotspots. The core unit is fully O-ring sealed, and has been field tested for all-weather operations. A simple Graphical User Interface (GUI) interfaces with a host computer over a serial communications link to monitor and control voltage and output power.

Product Perspective

Communications — When + Where You Need Them

Emergencies rarely occur on schedule. Comms and power equipment must be ready to handle critical needs at such times. One answer just may be the just released by Squire Tech Solutions is their pCom™ 300, a mission critical power communications trailer system for government and private industry mobile infrastructure needs.

The pCom™ 300 provides an immediately deployable, self contained power generator, lighting and communications infrastructure where you need it. Emergency management and field operations require an infrastructure designed to solve the problems that come with the unknown. The flexible design of the pCom™ 300 offers an environment to operate vital equipment and services to IT and Incident Operations Management personnel.

All electronics bays have NEMA4 extreme environment enclosure with controls for humidity, water intrusion, heat, cooling, and air-born particulate filtration. The pCom's™ on-board 10,000 watt ultra quiet power generation system provides for site power, core communications equipment and powerful scene lighting system. The clean power generation, a 105 gallon internal diesel tank, and an auto-acquire satellite antenna, when combined with a standard 30' internally cabled tower, creates the ultimate response trailer.

With 40 rack units of environmentally controlled rack space, pCom™ operators have numerous options for their critical communications equipment. Whether you run proprietary internal networks or you simply require reliable access to high-speed internet, phones, radio, video, or broadcast, the pCom™ 300 fulfills portable communication needs.

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- *Tower mounted high power scene lighting*
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- *Satellite modem, router, and rack kit*
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- *Engenius™ long range 600mW wireless access point and client bridge*
- *Engenius™ high powered cordless phone system and outdoor antenna*
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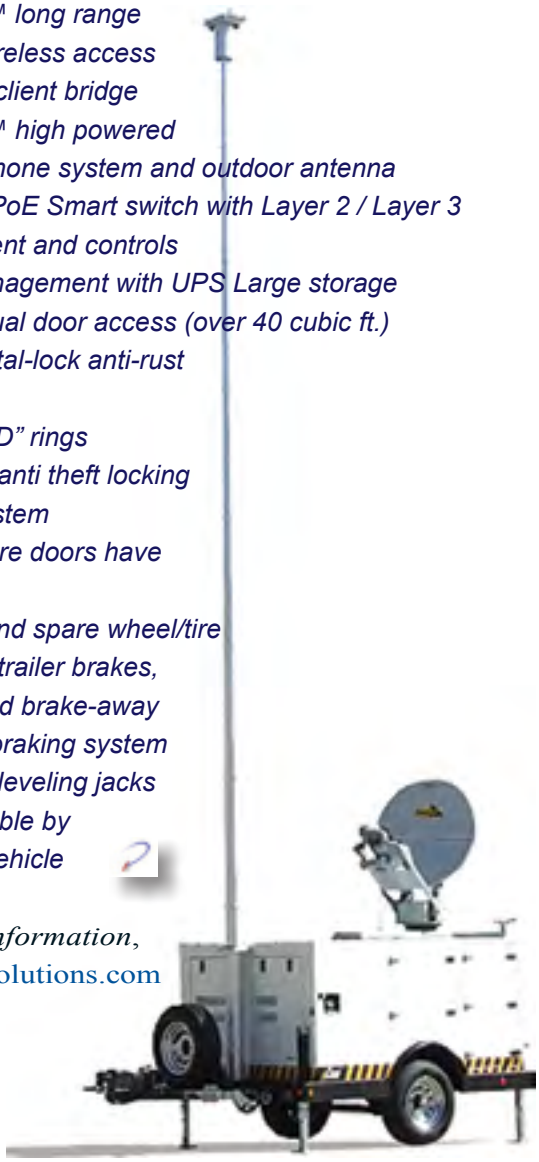

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A Case In Point

DinoComms

Every June since 1997, Southwestern Adventist University's Dinodig Project has sent research teams to eastern Wyoming to excavate dinosaur bones. The isolated quarry site has one of the world's densest dinosaur bone beds; the remains of as many as 10,000 animals are buried there. The University is conducting world class taphonomic research, which studies the precise location of dinosaur bones, to understand how the dinosaurs died. This research requires sending data and photos from the remote site back to Southwestern Adventist University daily.

However, lack of connectivity is a serious problem on a remote ranch one hour from the nearest town in the least populated county in America. Without a reliable broadband connection, it is virtually impossible for the Dinodig team to upload their findings or send important photos to the University. The diggers would otherwise have to save their research on rare species like the newly discovered Nanotyrannus lancensis, and wait months to categorize, analyze, and authenticate their findings back at the University.

Waiting was not an option. Justin Woods, technical director for the Dinodig Project, explored a number of possible Internet services, including one-way satellite communications, but that would only get information from the University to them. To send information, he looked into installing a phone line, but that solution was cost-prohibitive. Cellular service was also eliminated as an option since the only way to get good reception was to hike up into the surrounding hills.

In 2003, Woods looked to the sky for a solution and found HughesNet® high-speed satellite Internet service. Unlike terrestrial solutions, satellite broadband does not rely on cable or phone wires, making affordable broadband services available to consumers and small businesses everywhere, regardless of geography, at speeds comparable to DSL. The compact dish needs only to have a clear view of the southern sky.

Digging For Broadband

Global positioning satellite (GPS) technology is a tool to record the positions of bones once they're found. The diggers photograph the bones, record the GPS coordinates, and then export the data to the University's campus computers in Keene, Texas. A computer program then recreates how all the bones looked in the ground. This imaging allows scientists to better depict the shape, size, and overall look of the dinosaur, which greatly aids in properly categorizing the species.

"I cannot overstate how well HughesNet is working for us, especially this season," said Woods. He is more satisfied than ever with his HughesNet service since his equipment was upgraded and his service is now delivered over the SPACEWAY® 3 satellite system, the world's first commercial satellite with onboard switching and routing. "The data collected by the scientists is irreplaceable, and the HughesNet service enables us to send daily backups to is our most vital link. It's irreplaceable." the University to ensure that all our findings are properly archived. HughesNet also gives us a way to spread the excitement of our dig to the general public and recruit new volunteers."

Using their HughesNet connection, the Dinodiggers post daily video blogs on YouTube to give followers a sense of what it's really like to be on a dinosaur dig. The team also strings together hundreds of images into a single panorama that is posted to the web in an online dinosaur museum.

"The great thing about HughesNet is that it not only keeps us in contact with our University, but it also gives us a way to keep in touch with the outside world, and most importantly, our loved ones."

Digging Up The Past... Staying Connected To The Present

Broadband satellite Internet service proved to be a good recruitment and morale tool for the project as well. Prior to HughesNet, when the diggers went out on a dig, they kissed their families goodbye and spoke to them maybe once a week, since the nearest town with Internet connectivity is one hour away, and obtaining cell phone reception is a roll of the dice. "It would be much harder to recruit volunteers if they just went into a black hole for a month," said Woods. "But with HughesNet, they can check email, go on Facebook, and talk over the phone via Skype."

Occasionally, intense weather conditions prevent work in the quarries. When this happens, many of the participants use the time to catch up on email and browse the Internet. "Even with 30 people using the system at the same time, the stability and speed of HughesNet has been great," added Woods. "The satellite link is our most vital link. It's irreplaceable."

For more information regarding HughesNet, access...
http://www.hughesnet.com

Head reconstruction of Majungasaurus, a Late Cretaceous dinosaur from Madagascar. Credit: Department of Anatomical Sciences, Stony Brook University

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...David Gelerman, CEO Advantech Wireless

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100W C-Band

100W X-Band

100W Ku-Band (GaN)

Available Models

C-Band	**Model 110-C**				**Model 2100-C**					
	8W	16W	25W	30W	40W	50W	60W	80W	100W	125W
X-Band	**Model 110-X**				**Model 2100-X**					
	8W	16W	25W	30W	40W	50W	60W	80W	100W	125W
Ku-Band	**Model 110-K**				**Model 2100-K**					
	8W	10w	16W	20W	25W	30W	40W	50W	60W	-
Size	8.0 x 6.22" x 3.5"				10" x 8"x 4.8"			13" x 8" x 4.8" DC - 13"x8"x5.2" AC		
	203 x 158 x 89 mm				254 x 203 x 114 mm			330 x 203 x 114mm - 330x203x132mm		
Weight	5.3 lbs (2.5 kg)				14.4 lbs (6.5 kg)			18 lbs (8.2 kg)		
Ku-Band (GaN)	-	-	-	-	-	-	40W	50W	80W	100W
Size							8.1"x5.25"x5"		12.5"x7.9"x5.4"	
							206x133x127 mm		317x200x137 mm	
Weight							8.6 lbs (3.9 kg)		21.1 lbs (9.6 kg)	

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