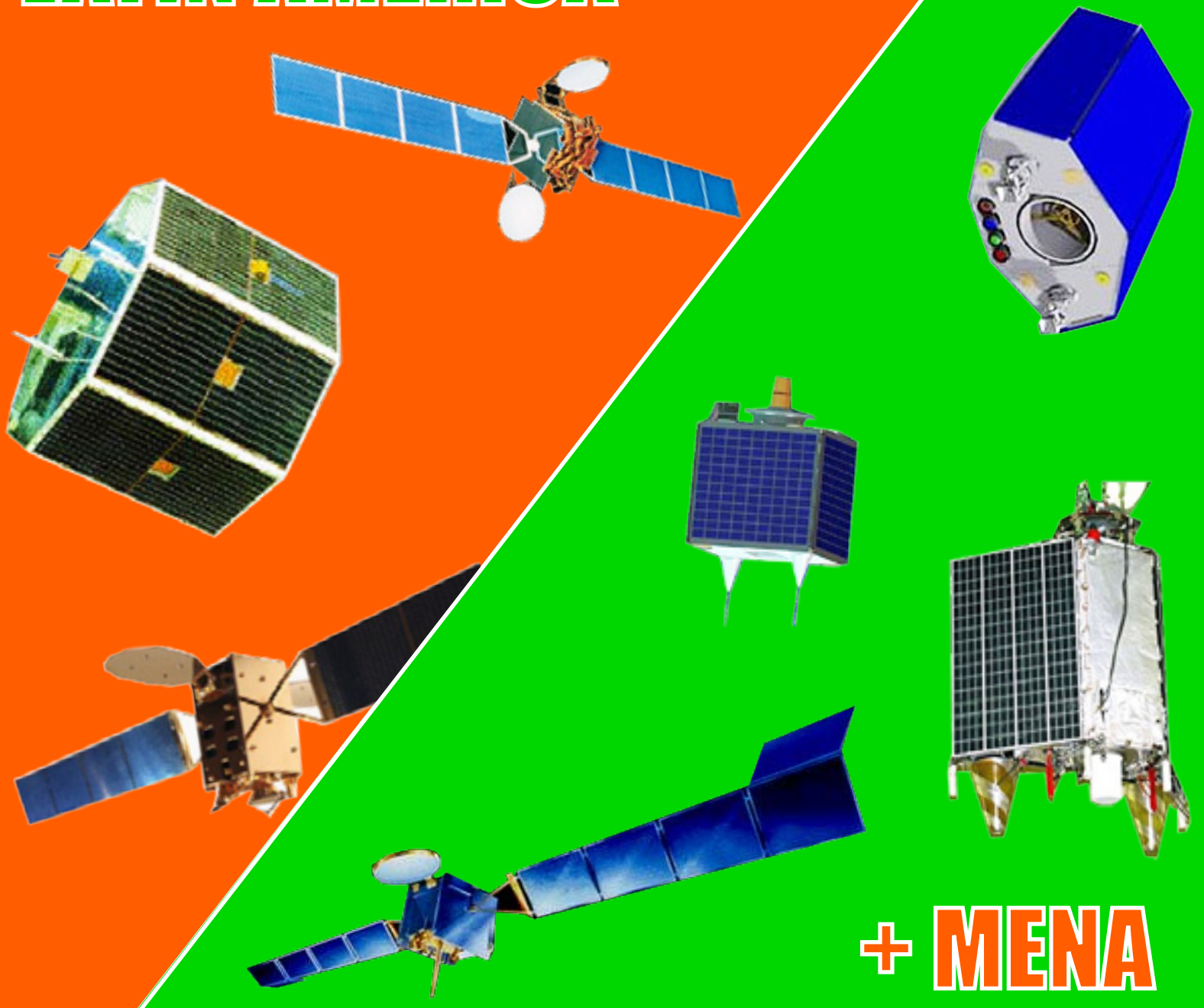
Worldwide Satellite Magazine November 2009

SatMagazine

LATIN AMERICA



+ MENA

IBC2009

Awards

Winner

Judges' Award Innovation Award - Content Delivery

Congratulations ASBU and Arabsat

The ASBU MENOS network, developed by Newtec and hosted by Arabsat, is a revolutionary concept for the broadcast industry. A next generation all-IP network for contribution and exchange of multimedia content over satellite.

The MENOS system also provides ASBU a complete range of tools to facilitate coordination tasks and provide additional IP services across the network.

Advanced DVB-S2 modulation technology, combined with the statistical multiplexing of the data, voice, television and radio signals, ensures the optimum efficiency of the satellite bandwidth usage.

"We are very proud of MENOS as one of our most innovative and challenging projects, and we are really appreciative to IBC and to the international community to recognise it. I would like to thank all those who have worked very hard from ASBU to make this regional and Arab project achieve this recognition in the international arena."

Dr. Riyadh Najm, ASBU President

"The introduction of MENOS has been a historical moment for the broadcast industry, and we are delighted that the Arabsat satellites are playing a key role in this. We have worked closely with the ASBU to ensure that they have a real technological leadership with this advanced service and are proud of the recognition from the industry, validating our vision for the future."

Khalid Balkheyour, CEO of Arabsat

This success – coming at such a showpiece event for our industry – caps another remarkable year for Newtec and is really an acknowledgement, not just of our own people and their commitment but for the teamwork between ourselves, Arabsat and the ASBU."

Serge Van Herck, CEO of Newtec.

MENOS

Multimedia Exchange Network Over Satellite

Newtec

SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS

www.newtec.eu/menos

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Take the flexibility of IP-based file exchange. Add cutting-edge satellite transmission technology. Package the whole in a service offering unlike anything the broadcasting community has ever seen. What you get, is the most agile and fastest ever satellite contribution network for broadcasters.
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The name is Newtec. The broadband system is MENOS.

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Get full MENOS system specs on www.newtec.eu/menos

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MASTHEAD CONTENTS

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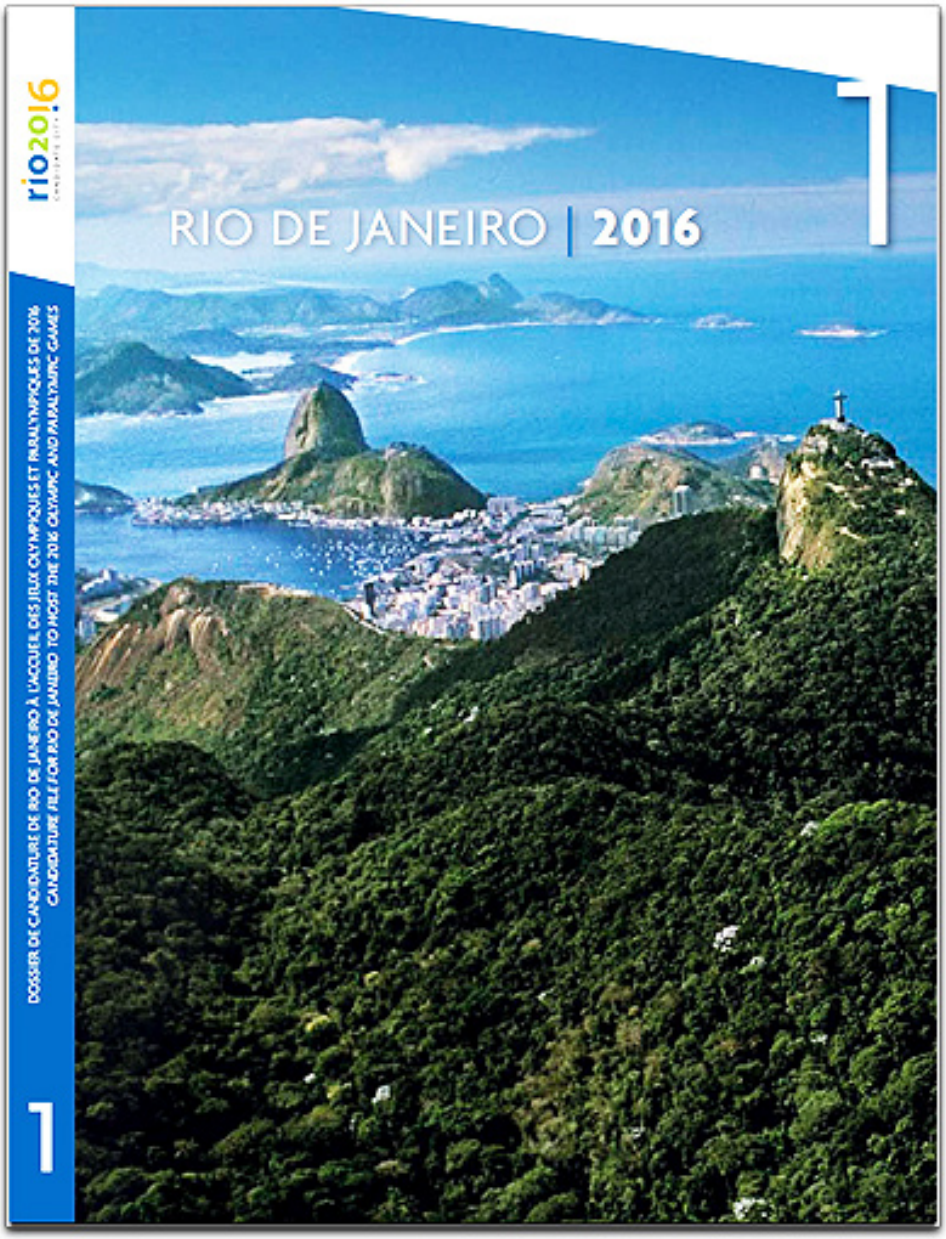
INTELSAT
General Corporation

... Game Plays ...

With this issue's focus on the Latin American and MENA markets, one of the most interesting news items deals with Rio de Janeiro's win of the 2016 Winter Olympics. Companies who bid for, and win, the broadcasting rights to the 2016 Summer Olympics in Rio de Janeiro are certain to enjoy substantial profits, and Latin American countries and communities are already celebrating this award by the Olympic Committee.

The Games, which will run from August 5th through the 21st, 2016, will draw the attention of millions of global viewers, no matter their primary language. With instantaneous language translations for the Olympic events, such barriers that were once deemed formidable several years ago — requiring broadcast delays are now merely one of the thousands of agenda matters that can be handled swiftly and with expediency. With the use of the secondary audio channel (SAP), no matter the language of the originating broadcast feed, most viewers will easily understand the delivered content.

Worldwide broadcasting rights will drive negotiations sky high between satellite and terrestrial broadcasters and Olympic officials. Financing for the Games, managed by the Rio de Janeiro Organizing Committee for the Olympic Games (ROCOG), has a budget that will be developed by various private and public sector entities. Such logistics as customers, immigration, medical, security and transportation will be provided by the country's Federal, State and Municipal levels of government who will also alleviate tax burdens by offering various business concessions, exemptions, and zero ratings.



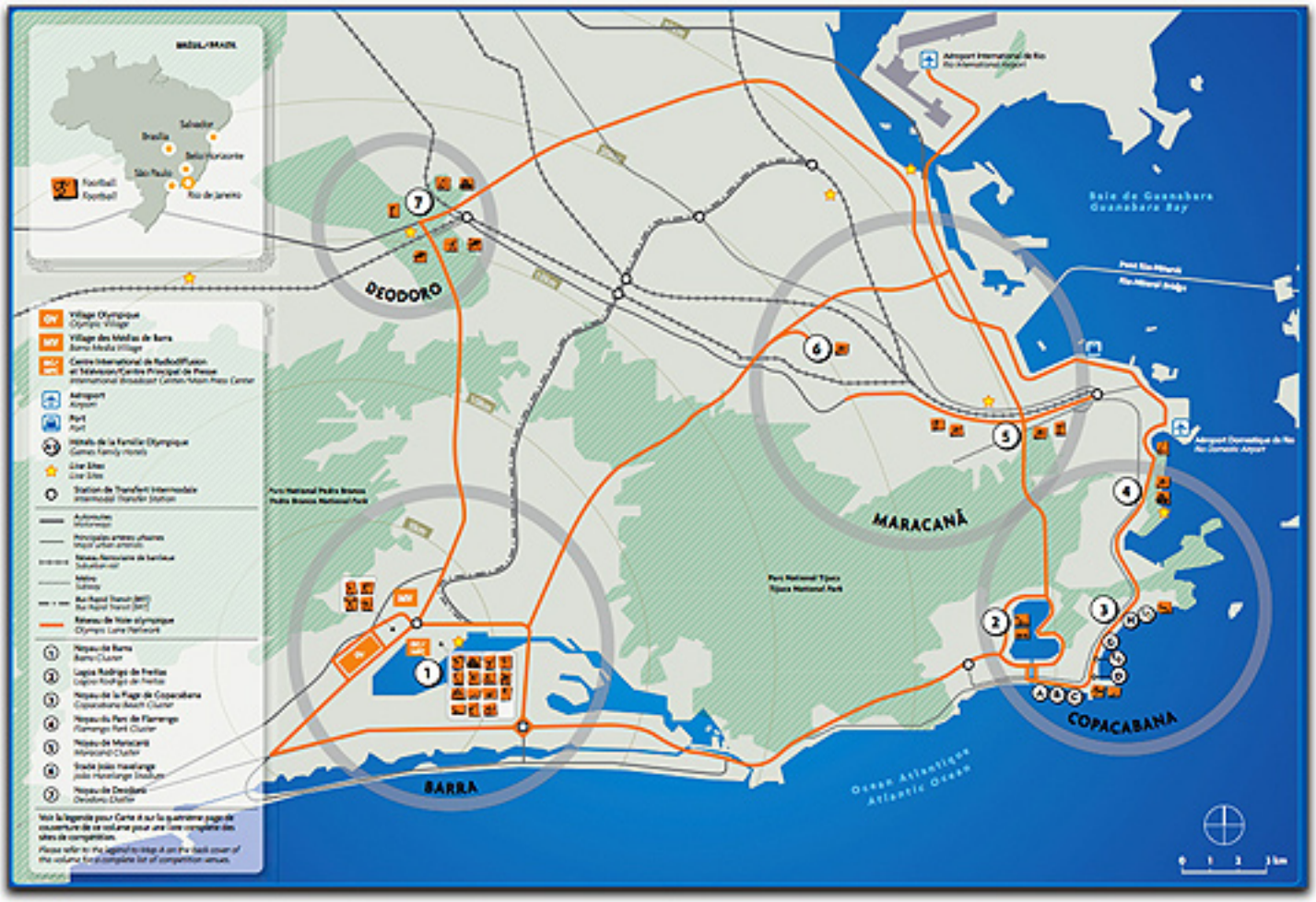
Rio's Barra Zone

Expect a major scramble for product licensing rights as well as various merchandising contracts, Games and event sponsorships, and a thorough venues' ticketing program. Added to this will also be the International Olympic Committee's (IOC) infusion of other commercial and broadcast revenues — current commitments and promised expenditures by the IOC total 3.9 billion dollars.

There will be four zones in which events will be held. For outdoor sports conducted in temporary venues, an area within Rio known as Barra will be the host. This will be the center of Olympics' activities, with the Olympic Village, media housing and broadcast centers, and a few of the sports venues. The internationally famous Copacabana beach will host outdoor venues, while Maracana (heavily populated area in Rio which will receive major redevelopment projects) will be the venue for the opening and closing ceremonies in two stadiums. The current Maracana stadium is going to be closed for a couple of years as the facility gets a huge facelift. It truly can't take longer than that, as Rio is also the host of the 2014 FIFA World Cup and the stadium is to be used for that event, as well.

A majority of the facilities for the 2016 Summer Games have already been built. Joao Havelange Stadium, Rio Olympic Arena, the National Equestrian Center, and the National Shooting Center, Maria Lenk Aquatic Center, all are in place, having been built for the 2007 Pan and Parapan American Games.

Just added to the 2016 Games' venues are Golf and Rugby. The last time golf participated in the Games was back in 1904, and rugby hadn't been included in the Olympics until 1924. (A gold for Tiger???) For golf, it'll be an eight-day competition divided into four days each for the men and the women, all playing 72 holes, with medals awarded to the three competitors owning the lowest score — intense TV coverage is expected. For rugby, there will be two to four days of competition of rugby sevens, with the teams divided into two pools of six, with 12 teams each for the men's and women's teams — that's 288 athletes. The two top teams in each of the pools will qualify for the semi-finals and, again, heavy worldwide television coverage is assured.



As of this writing, the initial onslaught of broadcasters vying for Games' rights remains a secret on company meeting whiteboards. In addition, let us not forget, the rights for the upcoming Olympics includes TV, radio, as well as online coverage. We can get an idea of what's upcoming for satellite and terrestrial broadcasters by looking at the 2008 Games, where the total worldwide broadcast revenues were US$1.737 billion, or about US$100 million each event day.

That's certainly enough to ensure broadcasting executives do all in their available power to grab a piece of the 2016 action. NBC has pretty much controlled U.S. Olympics coverage for the most recent games in China, and has already committed to nearly US$2 billion for the 2010 and 2012 games. However, they are not the only player — for the Beijing Olympics there were 20 additional rights' holders. They ranged from the African Union of Broadcasting to the Korean Broadcasting Association and, within those individual syndicates, there were 250 additional broadcasters! Revenues paid by TV broadcasters to the IOC for the 2008 Olympics' rights surmounted US$2.5 billion with an additional US$900 million in revenues generated by product licensing, ticketing and sponsorships.

For the upcoming 2010 Winter Games in Vancouver and the 2010 London venue, revenues have climbed 40 percent above the Beijing and Turin Game totals — the projection is income generation in excess of US$3 billion. What is interesting is a projection for these upcoming Olympics is that 15 percent of the revenues will be generated from online and mobile environments. Guess it's safe to assume that the era of the US$50,000 licensing fee that was paid by CBS in 1960 for the Winter Olympics in Squaw Valley, California, is definitely long over!

Satellite and terrestrial broadcasters can certainly expect increased IOC licensing and production for the 2016 Rio de Janeiro Games — enthusiasts of the Games should account for revenues easily offsetting such expenditures, and the broadcasting commitments should prove to be highly viable revenue generators even with the instability of the world's economic situation during this global event. As the 2016 Summer Olympics theme states, it's time to "Live Your Passion."

Gilat Satellite Networks

Doron Elinav, the Vice President of Marketing at Gilat Network Systems, offered his insight into exactly what their company offers and how they perceive their market segment.

Doron Elinav

Gilat Satellite Networks Ltd. (NASDAQ: GILT) is a provider of products and services for satellite-based communications networks. *Working around the world from Africa to Latin, North and South America to the Mediterranean and to all of Asia, we provide network systems and associated professional services to service providers, operators, enterprises and governments as well as rural telephony and Internet access solutions to remote areas.*

MENA and the Mediterranean Basin are fast becoming exciting markets due to increased telecom and communications infrastructure projects and investments. With a great deal of latent demand for broadband opening new markets around the region, we are also noting a change in the composition of the region's service operators. Compared to the more prevalent model of European service operators supplying areas like North Africa and Sub-Saharan Africa, there is now a movement to create more local service providers.

Though MENA also has more cable and fiber communications capacity than other parts of Africa due to its geographic proximity to Europe, the demand for satellite based broadband services and applications is growing especially for business and institutions serving populations that have, until recently, been on the wrong side of the digital divide.

The addition of capacity is lifting up the entire communications sector and there is an increase in government projects reaching outlying geographic areas for which the most effective communications' networks are satellite based. There is an increasing need for more broadband services as traditional telephony shifts to the Internet and to cellular networks. The latter, specifically are seeking to augment their back haul capacities, which is our expertise around the globe. Indeed, new government networks and projects are easier to implement and less expensive, if conducted by VSAT applications.

Outside of government, or international financing, (re: World Bank, IMF) projects, large, medium and small enterprises are recognizing the need for broadband access. As local groups expand nationally, or as multi-national construction and manufacturing groups move into the region, the need for reliable and high quality broadband access grows. MENA's economic advantages, beckoning to Europe, are generating further broadband services and applications.

Take, for example, enterprises in the financial or data sectors requiring five 9 quality. Service providers using high quality backbones such as Gilat's SkyEdge and SkyEdge II high performance VSAT platforms can provide these businesses with broadband connectivity and other advanced applications. Requirements include high-speed connectivity to allow high throughput for file transfer; voice quality for telephony; reliability and high availability including satellite redundancy; advanced Quality of Service (QoS) to prioritize application data traffic; and unified networks for multiple branches.

With these VSAT and related technologies, financial institutions are able to connect with high security and reliability between their own branches, provincial offices as well as with international financial sector players.

Finally, I want to mention a very specific regional need: support for NGOs and peace-keeping forces. These organizations demand high quality, reliable and heavy usage broadband networks. Though currently not proliferating around the region, peace-keeping forces exist and meeting their requirements is truly a valorous responsibility.

MENA and the Mediterranean Basin from Turkey and Lebanon in the East to Morocco and Algeria in the West are filled with new projects, many with international financing, and this is heartening for the industry

GMV

We queried Pedro J. Schoch, GMV's Director of Marketing & Business Development, for his thoughts regarding the market in Latin America today and where it may be in the next year or so.

We asked Pedro what components of this market seem the strongest, and will his company address those markets?

Pedro J. Schoch

GMV is looking at the Latin American market with optimism. *After some years of slow growth, we are finally seeing signs that the market is up for a push. This will come both from the established regional operators as well as new entrants as government-funded programs finally begin to take shape in different countries in the region.*

We are already present in this area, most significantly with the largest satellite operator in the region, ***StarOne,*** *for which GMV is supplying an updated satellite ground control facility for the* ***B1-B4*** *family of satellites.*

GMV plans to continue offering our portfolio of satellite ground control systems and ground segment integration services as new satellites come into place and as new operators are established. We believe that the region is set for continued growth and, certainly, Brazil winning the Olympics should provide another well-founded reason to guarantee steady growth in telecommunication services for the near future.

GTX Corporation

According to GTX Corp., a firm whose base is in the Personal Location Services businesses, Latin America has increased its adoption of Location Based Services by a factor of 10 from 2008 to 2009.

GTX with you™

Carlos Briceno, the firm's Vice President of Business Development, states that the category with the highest total spending in South and Central America is in "People Tracking," which has been the exact focal point of GTX Corp for the past seven years.

It is expected that People Tracking users in the region will increase in number from 4.4 million in 2009 to 54.4 million by 2013. Brazil, the largest market in the region, will see 68.4 percent CAGR in LBS spending over the next five years, with a market valued at US$102 million in 2013. The second largest market in the region will be Mexico with an expected growth rate of 70 percent over the next five years and an estimated value of US$61.7 million in 2013.

GTX Corp recognizes Latin America as growing and strategically important market and is engaging this market through partnerships, bilingual sales, and technical support staff, along with localized software translated into Spanish for the region. GTX Corp is currently selling personal location solutions to Mexico, Brazil, Colombia, Peru, Chile, Venezuela, and Guatemala, through hardware devices, platform licensing, and smart phone Apps. Several Apps are already available at Apple's App Store, with an on going roadmap to deliver two to three apps per year. The Company expects to see significant growth in 2010 as they increase marketing efforts and add customers as they become more aware of the technology and its benefits — peace of mind.

The rising need for personal location services in the region is influenced by several factors, among them:

- ***Personal and asset security concerns affecting a greater portion of the population.***
- ***Families caring for loved ones and elderly or memory impaired members (Alzheimer's, etc.)***
- ***Corporations needing to manage worker productivity and logistics***
- ***Government agencies, law enforcement and military personnel monitoring***

Founded in 2002 and based in Los Angeles, California, the company has evolved from its early beginnings of putting a micro GPS device in a shoe — the smart shoe at www.gpsshoe.com — and continues to pave the way with innovative geo specific and proximity alerting applications that help users know where someone or something is, at the touch of a button. The company believes in a strong intellectual property strategy and to date has an extensive portfolio of patents, patents pending, registered trade marks, copy rights and URL's. GTX Corp is well positioned to capture Central and Latin America market share through its diverse product platform, brand recognition and strategic partners.

Global Satellite

Global Satellite offers a variety of global communication and satellite needs. *One of Global Satellite's offices is in Morocco and the CEO of the company, Martin Firestone, offered the following following insight regarding his firm's projects in this sector of the MENA market.*

Martin Firestone

We opened our Moroccan store just under a year ago as sole distributor of GARMIN. *Our expectations have been overwhelming with sales exceeding first and second year projections. Apart from GARMIN's comprehensive range of products, Global Satellite Morocco is also promoting some revolutionary GARMIN fleet management systems for private and government clients.*

Orbit Technology Group

Another company that is continuously active within the MENA and Latin American markets is Orbit Technology Group. The firm offers Marine Mobile SATCOM systems in Ku- and C-bands. Orbit solutions are being used mainly by the Oil and Gas industry and by several Navies.

And why is this company particularly successful?

The company boasts a range of marine systems including its flagship — the ***OrSat-G*** *— which enables continuous connectivity in all weather and sea conditions and provides uninterrupted broadband satellite communication for a variety of applications including: Internet, TV, video, and VoIP.*

Orsat's systems are installed onboard a wide variety of seagoing vessels worldwide: West Africa, Brazil, U.S. the Gulf, and so on. The OrSat-G, a 1.15m Ku-band antenna, has been approved by ***Eutelsat***, ***Intelsat,*** *and* ***Anatel*** *in Brazil. The company's C-band products — the* ***2.4m AL-7108*** *and the* ***2.8m AL-7109*** *— are also popular within the O&G Industry. Orbit is particularly pleased with the acceptance of its product lines within Naval Departments in Latin America, Europe, Asia, and North America.*

As support is a key to Orbit's success, it maintains a network of trained dealers and integrators in every region of the globe. This network is overseen by a number of Regional Orbit offices. In the Americas, this effort is lead by Orbit's Florida Marine Operations' Center. Installations throughout Latin America, the Caribbean, and North America all fall within their responsibility.

Mr. Bill Thompson, Director of Marine SATCOM Sales in the Americas said, "We have developed a close relationship with highly technically trained dealers and integrators in Latin American countries such as Mexico, Brazil and Peru. This extends our reach into the continent and allows us to provide the best and fastest possible service and support to our customers." He continues: "We have set up our Florida offices as an Advanced Service Center (ASC), one of four Orbit's worldwide ASCs in order to maintain an extensive stock of spare parts and support personnel."

ASBU, Arabsat + Newtec

There was also an impressive win at IBC2009 by the trio of the Arab States Broadcasting Union (ASBU), Arabsat, and Newtec — they were awarded the prestigious IBC2009 Innovation Award for Content Delivery and the Judge's Prize for the most influential project of the year, all for MENOS.

MENOS (Multimedia Exchange Network Over Satellite) is a revolutionary IP-based networking concept for the exchange of multimedia content over satellite, allowing broadcasters to share video and audio material among scattered SITs in a fully automated and cost efficient manner. The MENOS system provides to ASBU a complete range of tools that facilitate the coordination of TV and radio content exchange, as well as providing additional IP services across the network towards all Member States.

Why is MENOS fundamentally different from traditional satellite contribution systems, you may ask? With IP as the core protocol, all exchanged materials transmit through a central hub station, which also provides permanent, 2-way satellite IP connectivity with all of the remote stations. Advanced DVB-S2 modulation technology, in combo with the statistical multiplexing of the data, voice, TV and radio signals, makes certain the use of satellite bandwidth retains optimum efficiency.

The first use of MENOS by ASBU was during the 2008 Olympics, where Member States received live Olympic coverage, and after a full year of operation (first launched into full production in January of 2009), the system continues to prove to be highly reliable, with outstanding performance and quality of satellite VoIP.

Serge Van Herc, the CEO of Newtec, said, "This success — coming at such a showpiece event for our company — caps another remarkable year for Newtec and is really an acknowledgement, not just of our own people and their commitment, but for the teamwork between ourselves, Arabsat, and the ASBU."

Slaheddine Maaoui, Director General of the ASBU said: "The introduction of MENOS has been an extremely important milestone for us, the Arab region, and the broadcasting industry as a whole. The MENOS service is not only a powerful international exchange platform for radio and television, but a powerful IP based service that is going to revolutionize broadcast transmissions."

The CEO of Arabsat, Khalid Balkheyour, added, "The introduction of MENOS has been a historic moment for the broadcast industry, and we are delighted that Arabsat satellites are playing a key role in this. We have worked closely with ASBU to ensure they offer true, technological leadership with this advanced service."

MENOS is fundamentally different compared to traditional satellite contribution systems. With IP as the core-protocol, all exchanged material transits through a central hub station, which also provides permanent two-way satellite IP connectivity to all remote stations of the members. The multimedia content, whether it is audio, video, or data, can be transmitted in real-time or be transferred as data files. It can also be archived in the central hub station for later access by other stations. The reservation of the bandwidth and the line-up procedure are fully automatic and the uplink stations are smaller and much less expensive than traditional systems. The two-way IP connectivity is ideal for VoIP coordination channels, e-mail exchange, Intranet and Internet access, other collaboration tools & IP services.

Among key advantages is the deployment of easy-to-use terminals. Once installed, MENOS terminals are connected to the network in an always-on mode. All network services and terminal features are available on a single graphical user interface. Starting a video or audio transmission requires no line-up procedure as the bandwidth reservation is done automatically.

Different types of MENOS remote terminals are available, depending on the type of applications performed at the remote site. Data terminals only provide data and VoIP connectivity and can be used for Internet, Intranet, Private Networks and interactive collaboration tools. Radio terminals provide all the service of a Data terminal in addition to radio exchange services. Television terminals provide all the service of a Data terminal in addition to television exchange services. MENOS terminals can also be integrated into mobile units, in the form of DSNG trucks or Fly-Away kits. Through a MENOS certification program 3 suppliers have already been accredited to build MENOS DSNG trucks: Sematron (UK), OmniGlobe (UK/Canada) and NDSatcom (Germany).

Another key advantage is the lower terminal cost. As all communications are established via a central hub, MENOS terminals require much less power and smaller dishes (1.2-1.8m) than point-to-point media exchange systems. The transmission equipment in the terminal is IP-based, resulting in an overall terminal cost that is only a fraction of the cost of other types of satellite TV or radio uplinks. This in itself is a revolution in the world of high quality video content transmission.

Newtec

As far as Newtec's thoughts regarding the MENA and Latin American markets, the Company has been active in these regions for several years and has become a leader in broadcast and IP solutions used for contribution, distribution, and IP trunking applications.

Through the Company's strong presence in the market, they have built a reputation for reliability and excellent customer support by addressing the needs of customers both in terms of technology innovation and cost efficiency. Newtec's expertise sits right across the spectrum — unlike some vendors that have a narrow focus — covering everything from Contribution and Distribution DVB-S2 solutions, DVB-T, DVB-H, IP trunking, broadband access over satellite and content exchange infrastructure.

Their business in the MENA region is primarily in the areas of IP trunking, mobile, and terrestrial television and content exchange for broadcasters. The majority of broadcasters in the region use Newtec modulators and converters within their DTH infrastructure.

In the Latin American market, Newtec has traditionally been present in the broadcast space as well as the telco market. Broadcast networks and their affiliates, as well as independent DSNG operators, have been using their products for many years. In the telco world, Newtec is mainly active in the medium- and high-rate IP backhaul solutions. Newtec delivers a number of key benefits to these customers, which have allowed the Company to become market leaders in this region. In the broadcast market, they also offer some innovative solutions that also deliver reliability and significant cost savings.

Reliability has been the long-term asset for Newtec products in the broadcast market. **Casablanca Online,** a Brazilian DSNG (Digital Satellite News Gathering) operator and long term customer, purchased Newtec modulators to cover the *Confederations Cup* from South Africa. Newtec supplied Casablanca Online with DVB-S2 modulators with BISS scrambling capabilities. The reliability of Newtec's equipment for live transmissions from South Africa to Brazil was an essential requirement for the project's final success.

2009 has been a bumper year for new satellite-IP-based services in the MENA region. **Horizon Satellite Services** in the UAE successfully upgraded its link facilities with Newtec's redundant ***FlexACM*** solution connecting several sites in the Middle East with an uplink in Europe. The upgrade project allowed Horizon to eliminate issues of interference from adjacent carrier intermodulation and antenna tracking errors at receive sites on the outer edge of its footprint.

In the broadcasting world, independent Iraqi satellite TV station, **Alsumaria TV**, invested in Newtec's IP over satellite solution as part of its migration towards tapeless news production. Increased productivity, speeded up delivery of news content, and reduced costs are the return on investment.

Newtec's ***Elevation*** equipment with FlexACM for broadcasters has been installed in Alsumaria's hub and in five interactive DSNG (iDSNG) vans. Equiped with IP Quality of Service (QoS), Elevation modems give Alsumaria TV the ability to deliver MPEG-4 live streaming at one megabit per second, as well as video files. The Newtec solutions provide overall control on the quality of service and higher dedicated throughput over traditional VSAT (shared MF-TDMA) systems. It also provides lower delay compared to MF-TDMA systems and higher availability and throughput. The FlexACM technology means Alsumaria TV's DSNG fleet has an extended reach in the satellite's footprint.

In Africa, a leading satellite communications' company providing carrier and business network solutions is using IP Elevation equipment with ***FlexACM*** in multiple IP trunking networks to increase the bandwidth efficiency of its intercontinental data links between Europe and Africa. The move to Elevation products has enabled them to increase the bandwidth by 50 to 100 percent. The higher quality, lower operational costs and the significant bandwidth gains offered by Newtec's DVB-S2 based solution has made it the obvious choice to assist this company in their accelerated growth plans.

Newtec's long running project in the MENA region is MENOS (Multimedia Exchange Network over Satellite). The MENOS service offers the Arab States Broadcasting Union (ASBU) a formidable international exchange platform for radio and television. Its

powerful IP based service forms the basis of value-adds such as a central archive, VoIP, corporate VPNs and an integrated billing system. (*See the Newtec story starting on Page 11.*)

The fast adoption of DVB-S2 by Newtec and its leading role in the technology has been a key business enabler in these markets. Demand for bandwidth is on the rise and satellite users are looking to reduce their operational costs. DVB-S2 offers this OPEX reduction. The acceptance of DVB-S2 as efficient transmission standard extends beyond the broadcast space; telco's have also accepted DVB-S2 as a means of leveraging greater bandwidth efficiency.

Newtec recently delivered high speed IP modems with DVB-S2 technology for **Alcatel-Lucent** to realize a 1 Gigabit/s IP backhaul (*Rio-Manaus*) over satellite for one of Brazil's major satellite operators. Newtec's Elevation Series ***EL478*** high speed IP satellite modems, optimized for high speed trunking and backbone applications over satellite in compliance with the DVB-S2 standard, perform advanced IP processing functions such as packet filtering and encapsulation. The modems are integrated with Alcatel-Lucent's Layer-2 switches in a flexible N+1 redundancy configuration, interfacing seamlessly with the SDH network of the end customer.

Newtec's IP and DVB-S2 solutions offer significant bandwidth savings and the project with Alcatel-Lucent was one where the efficiency, reliability and high data throughput rates that Newtec was able to support were key factors.

The fact that Newtec has a physical presence in the MENA and Latin American markets, combined with Newtec's strong performance in these regions, shows customers the Company is there for the long-term, supporting them, and addressing the requirements specific to these markets. In the case of MENA, for example, Newtec is delivering solutions that address the key issues impacting broadcasters and satellite service providers such as interference and extreme weather conditions.

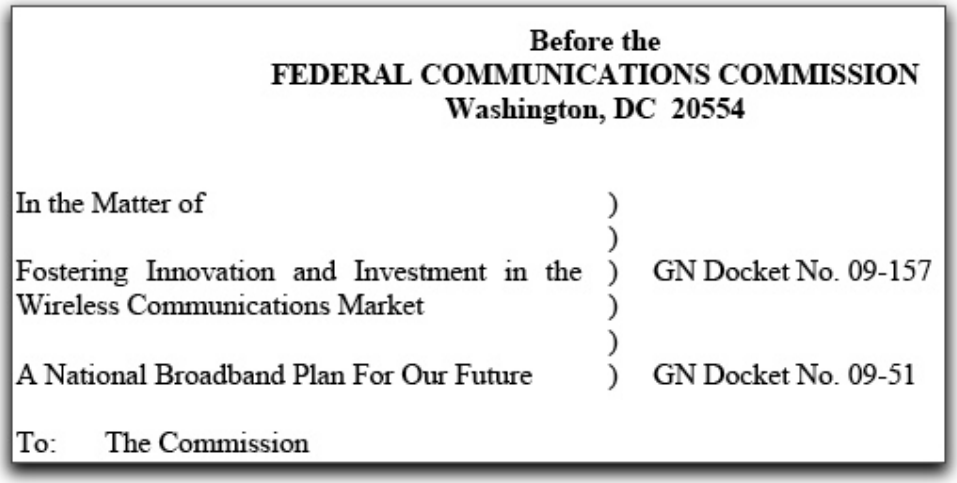
So far, the impact of the current economic climate on the MENA and Latin American markets has been minimal. Newtec's business in these regions has not experienced any negative effects; quite the opposite is true. In Latin America, the only factors that are slowing growth in the telco and satellite sectors is a lack of bandwidth, so Newtec is well placed to address this with their FlexACM technology. In MENA the move towards HD has been driving growth in their business as they enable customers to get the most out of the available bandwidth — in both the satellite and content exchange sectors.

Looking ahead they see a real demand for capacity; the increasing demand for transmitting Mbit/s over satellite is not being matched by the available capacity in MHz. As broadcasters move towards the adoption of HDTV, this will in turn increase the demand for more bandwidth, again putting a squeeze on capacity. In the MENA region there is fierce competition for a limited number of orbital slots, so again enabling customers to get more bit/s down the same bandwidth is crucial.

Similarly, in the telco space, operators plans to bring data/Internet services to rural areas means manufacturers will have to come up with bandwidth efficient solutions. 2010 is set to be another exciting year of growth for Newtec in these regions.

Newtec's EL478 high speed IP satellite modem

The Satellite Industry Association ("SIA") submitted the following comments in response to the Notice of Inquiry in the above-captioned proceeding.[1] The Commission seeks input on "the factors that encourage innovation and investment in wireless" and "concrete steps the Commission can take to support and encourage further innovation and investment in this area."[2] While the Notice of Inquiry appears largely focused on terrestrial-based services, any meaningful evaluation of the "wireless ecosystem" must also account for the dynamic innovation and investment occurring in satellite operations, services, and technologies.



Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Fostering Innovation and Investment in the Wireless Communications Market	)	GN Docket No. 09-157
	)	
A National Broadband Plan For Our Future	)	GN Docket No. 09-51

To: The Commission

SIA is a U.S.-based trade association providing worldwide representation of the leading satellite operators, service providers, manufacturers, launch service providers, remote sensing operators, and ground equipment suppliers.[3] SIA is the unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite business.

Discussion

As an initial matter, SIA encourages the Commission to consider, in the context of its inquiry here, the record developed as part of its proceeding in preparation for the next annual report to Congress on satellite competition. The record in that proceeding recounts the significant innovation and investment occurring in the U.S. satellite market.[4] SIA submits these comments to highlight a handful of examples of such innovation and respond to some of the spectrum-related issues raised in the Innovation NOI.

Innovations in Satellite Operations

Just last year, the Commission observed that "consumers of communications satellite services continue to realize significant benefits in terms of service choice, innovations fostered by technological change and improvements in both space and ground segment, and improvements in service quality."[5] In particular, the Commission cited the "[r]ecent technological advances [that] have enabled more efficient reuse of spectrum," including advancements in satellite antenna technology, satellite beam forming technology, and on-board processing payload systems.[6] These are but a few of the innovations taking place in the satellite industry. As shown below, many others abound.

For instance, the Ka-band spacecraft that **Hughes Network Systems** ("Hughes") has deployed (***SPACEWAY-3***), which was placed into commercial service in 2008, achieves capacity of approximately 10 Gbit/s on a single satellite — a significant increase over older satellite designs — through use of phased-array antennas, on-board signal processing, mesh connectivity among terminals, and spot beams that enable spectrum to be reused many times over.

The newest generation of Ka-band spacecraft being designed and built, including the ***ViaSat-1*** spacecraft (scheduled for launch in early 2011) and Hughes' new Ka-band satellites, will be able to achieve 100 Gbit/s throughput. These results are enabled by leveraging a number of different innovative technologies, including innovative propulsion systems, which permit less satellite mass to be assigned for fuel; bigger satellite buses that have more prime power for hardware; heavy duty launchers that allow a larger mass to be delivered into orbit; more powerful and efficient RF components; and more efficient coding methods. Innovation in satellite spot beam technology is also enabling more efficient spectrum usage than in previous generation satellites.

The Consensus Voice of the Commercial Satellite Industry

For example, next-generation *mobile satellite service* ("**MSS**") satellites built for **DBSD**, **SkyTerra**, and **TerreStar** have phased-array antennas which, in conjunction with innovative ground based beam forming systems, give these systems flexibility to generate a virtually infinite number of beam configurations over their service areas. ***TerreStar-1*** and ***DBSD G1*** are capable of producing hundreds of simultaneous spot beams over the United States and Canada. Similarly, in the case of **Inmarsat**, its ***I-4*** fleet has been designed to provide spot beam coverage globally via three satellites that support IP-based communications, including BGAN service. Innovation is occurring on the ground segment side as well. Ever more complex chip designs, new modulation and coding schemes, and antenna performance improvements, have all facilitated the design and commercial availability of smaller, more powerful and less expensive Ku-band Earth stations. Where it cost tens of thousands of dollars in the 1980s for a terminal with a 2.4 meter antenna providing speeds of only 9.6 kbit/s, today, 5 Mbit/s terminals are commercially available for $400, requiring an antenna only two-thirds of a meter wide.

As the Commission's recent proceedings in the **ESV**, **AMSS** and **VMES** contexts recognize, innovation in the development of Earth terminals now allows *Fixed Satellite Service* ("**FSS**") satellite operators to provide the same types of mobile satellite-based services that once were the domain of MSS operators, and without increasing the chance of harmful interference.

Inmarsat's BGAN service offering uses highly portable and easily deployed "notebook sized" antennas that are one-third the size, weight, and price of traditional Inmarsat terminals, and provide voice and broadband service at speeds of almost half a megabit per second worldwide.[7] These technological advances, coupled with the regulatory flexibility that the Commission has provided, lead to more choices for consumers and enhance competition.

Satellite operators also are driving innovation in new chipsets that will radically redefine the capabilities of end-user handsets. TerreStar has developed a multimode smartphone operable on both satellite and terrestrial networks that will support 3G-level data speeds.[8] **SkyTerra**, **TerreStar,** and **Infineon** announced an agreement earlier this year to develop multi-standard mobile platform chips that would allow a handset to access both terrestrial and satellite networks. In addition, ICO (now DBSD North America), SkyTerra, TerreStar and Qualcomm announced an additional agreement to develop chipsets allowing satellite interoperability with GSM and CDMA networks. These agreements are important steps towards deploying devices that will drive significant economies of scale in satellite communications, and provide an anywhere, anytime functionality for wireless users across the country.

Additionally, *Ancillary Terrestrial Component* ("**ATC**") is a significant innovation that allows MSS operators to re-use their assigned L-band, Big LEO, and 2 GHz spectrum bands in order to integrate terrestrial and satellite operations on the same spectrum. Since the Commission adopted the ATC policy in 2003, hundreds of millions of dollars have been invested to further develop the necessary technology, and to develop the next-generation satellites capable of best providing a robust suite of services to consumers.

With the launch of next generation satellites this year and next, the industry is on the threshold of deploying ATC networks that will make even more efficient use of MSS spectrum and expand the consumer market for satellite services, increasing economies of scale and lowering prices.

In addition to communications services, satellites use the radio spectrum to deliver a broad variety of other innovative services and applications. Almost every day, it seems, the global marketplace develops new applications for precision navigation, timing and geospatial references provided by satellite systems in the radio navigation-satellite service (*e.g.*, GPS and its augmentations) and the Earth exploration-satellite service. In fact, many of the newest and most innovative location-based features of consumer wireless products come from satellite derived information, delivered via satellite radio spectrum.[9]

Advances in the emerging field of environmental monitoring are driven by satellite sensors that use unique properties of portions of the radio spectrum to detect changes in atmosphere, pollutants and other features in order to supply real-time weather information and monitor long-term climate changes.

Service to Key Constituencies

Satellite providers offer voice, broadband data, and video services in areas where terrestrial wireless providers have no, or limited coverage, providing significant benefit to consumers, government, and industry alike.[10]

In particular, by virtue of their ubiquitous coverage and limited dependence on terrestrial facilities, both fixed satellite and mobile satellite services offer invaluable connectivity to "solve problems" with respect to public safety/homeland security, health care and disaster relief, and the energy and education sectors.[11]

In 2007, for example, working with the **Department of Justice** and the **FBI**, **SkyTerra** developed *Satellite Mutual Aid Radio Talkgroups* ("**SMART**"). SMART rides over SkyTerra's existing *push-to-talk* (**PTT**) voice network and allows a public safety agency to communicate with a defined user group that not only includes its own first responders but any first responder also using SkyTerra PTT. The SMART offering was recently recognized by Maryland emergency management for allowing seamlessly interoperable communications among Allegany County Emergency Management, 911, the County Emergency Operations Center, and the State Highway Administration when a tornado destroyed terrestrial communications capability in western Maryland in July 2009. Notably, SkyTerra can establish additional talkgroups within hours to address specific crises. This kind of flexible and always-available interoperability is exactly the kind of solution public safety needs, and which has been made possible only because of innovation in mobile satellite communications.

In the security arena, **Inmarsat** service was used to repel pirates who tried to attack a bulk carrier in the Indian Ocean by allowing the ship to alert naval units in the vicinity, as well as to provide piracy warnings to alert ships to incidents in the area.[12]

In the disaster relief context, small fixed terminals have provided broadband accessibility at rescue command posts; enabled banks and stores to authorize credit cards and bank cards so customers have access to cash and goods; and allowed disconnected terrestrial mobile service base stations to reconnect to the PSTN. For the health care sector, small satellite terminals allow two-way video conferencing, permitting medical consultations with patients in rural villages by specialists located far away.

Of course, as the Commission itself recognizes, satellite service is a viable and cost-effective means of providing high quality wireless broadband and other communications services in rural, remote and sparsely populated areas,[13] making affordable connectivity available to those who would not otherwise be connected. Developments in services and equipment also are expanding the availability of satellite-based broadband services on mobile platforms such as planes, trains, ships and buses, thus allowing consumers to remain connected while in transit.

Harmonization in Spectrum Allocations

One area identified in the *Innovation NOI* and of significant interest to the satellite industry is the spectrum allocation process and various licensing and use policies.[14] Satellite operators face unique technology and deployment challenges in light of the global or regional scale of their networks, making international spectrum harmonization critical to investment and innovation in satellite operations.

First, satellite systems have extremely high up-front infrastructure costs which must be financed many years before any revenues flow, unlike terrestrial

systems that can be built incrementally and generate revenues as soon as deployed. Capital investments, therefore, must be planned far in advance of satellite launch and service initiation, and the assets must last for many years in order for the business to remain viable. For example, the foresight that the Commission had to open the Ka-band for satellite licensing, and subsequently to authorize blanket licensing in the band, has provided the certainty that is needed to enable the billions of dollars that ViaSat, Hughes and others in the satellite industry have invested and will invest in Ka-band broadband infrastructure.

Second, in order to build a viable international satellite system (and thereby use spectrum efficiently), operators must secure spectrum allocations, assignments and landing rights in many countries rather than obtaining just one license in one country. This too can result in a long, drawn-out process. International harmonization of spectrum bands, and maintenance of regulatory stability in spectrum bands already allocated, are therefore critical to the long-term success of the satellite industry. Access to harmonized spectrum that can predictably be available to support a long-term capital investment is essential to satellite operators, and provides them with powerful economic incentives to maximize spectrum efficiency and fully exploit their assigned spectrum so as to recover their upfront investment.

Spectrum Management

The Commission also seeks comment on a number of spectrum management issues, such as efficient and flexible spectrum use, band sharing, and interference protection.[15]

In this regard, the Commission's technical rules already provide for the efficient use of satellite spectrum. For example, the Commission's two-degree spacing policy and full frequency reuse requirements enable limited spectrum to be re-used many times at multiple orbital locations across the geostationary arc through a combination of orbital separation, spatial separation of satellite beams and/or dual polarization. These rules provide an excellent starting point for intra-service coordination and operation among satellite operators for the use of limited spectrum resources. The Commission's rules also allow satellite spectrum to be flexibly deployed for virtually any kind of service offering or application.

In the MSS context (L-and S-band), the Commission's **MSS/ATC** policy is an important example of how flexible spectrum use, where proven after extensive study to be technically feasible, can foster innovation. MSS satellite operators have also found that operator-operator sharing arrangements, such as the cooperation agreement entered into by Inmarsat and SkyTerra, offer the prospect of improved spectrum efficiency and flexible spectrum use, and should be encouraged by the Commission (and accommodated via rule waiver, as appropriate).

The combination of detailed technical regulations that are designed to maximize spectrum utilization and efficiency within the satellite services and reliance on operator-to-operator sharing arrangements between satellite licensees has proven effective for C-, Ka-, and L-band licensees. The Commission should recognize the success of these techniques as useful means of improving spectrum efficiency, flexible spectrum use, and spectrum re-use throughout the vast geographic areas served by geostationary satellites.

In recent years, satellite operators have developed innovative technologies, such as improved frequency reuse (e.g., multi-color spot beam reuse and paired carrier multiple access, whereby two Earth stations can operate co-frequency and co-time), multiple access protocols (which allow dynamic re-assignment of capacity), digital modulation, high performance FEC codes, and video compression standards. These new technologies provide a number of significant public interest benefits, such as higher throughputs, more intensive use of spectrum, better quality service, and lower cost to end-users.

These advanced techniques allow satellite service providers to achieve significantly increased efficiency over earlier generation technologies, but, as a consequence, they provide little, if any, margin for new sources of interference. As a result, inter-service sharing, *i.e.*, spectrum sharing between separately operated satellite and terrestrial services, can be problematic for satellite operators, particularly in the satellite downlink bands where an Earth terminal is designed to receive signals from a satellite located as far away as geostationary orbit, 22,300 miles above the Equator. For this reason, while the process of coordinating satellite earth stations has proven

manageable in certain circumstances to date, this problem would be much more vexing in the case of sharing with new classes of ubiquitously-deployed or unlicensed terrestrial wireless services.

SIA, therefore, urges the Commission to exercise extreme caution before considering the allocation of new fixed and mobile terrestrial services — licensed or unlicensed — in frequency bands allocated on a primary basis to fixed satellite and mobile satellite services.

Conclusion

Satellite operators and technologies are a critical component of the wireless ecosystem the Commission is examining in the *Innovation NOI*. In order to continue to fostering innovation in the satellite industry, the Commission must ensure that its policies continue to account for the satellite industry's unique geographic scope, far-reaching contributions to the public interest and national security, and technology characteristics.

Respectfully submitted,

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[2] *Id. at ¦ 1.*
[3] *SIA Executive Members include: Artel Inc.; The Boeing Company; CapRock Government Solutions; The DIRECTV Group; Hughes Network Systems, LLC; DBSD North America, Inc.; Integral Systems, Inc.; Intelsat, Ltd.; Iridium Satellite, LLC; Lockheed Martin Corp.; Loral Space & Communications Inc.; Northrop Grumman Corporation; Rockwell Collins; SES World Skies, Inc.; SkyTerra Communications Inc.; and TerreStar Networks, Inc. Associate Members include: ATK Inc.; Comtech EF Data Corp.; DRS Technologies, Inc.; EchoStar Satellite, LLC; EMC, Inc.; Eutelsat Inc.; iDirect Government Technologies; Inmarsat Inc.; Marshall Communications Corp.; Panasonic Avionics Corporation; Spacecom Ltd.; Stratos Global Corp; SWE-DISH Space Corp; Telesat; ViaSat Inc.; and WildBlue Communications, Inc. Additional information about SIA can be found at http://www.sia.org*
[4] *Public Notice, IB Invites Comment for Third Annual Report to Congress on Status of Competition in the Satellite Services Market, DA 09-1045 (May 14, 2009).*
[5] *See Second Annual Report and Analysis of Competitive Market Conditions with Respect to Domestic and International Satellite Communications Services, Second Report, IB Docket No. 07-252, ¦ 3 (rel. Oct. 16, 2008).*
[6] *Id. ¦¦ 69-70.*
[7] *Companion BGAN services are now offered for aeronautical and maritime customers as well, and Inmarsat recently enhanced its land BGAN service to provide access to fast mobile video streaming by satellite.*
[8] *See http://www.terrestar.com/inc/pdf/TerreStar_Handset.pdf.*
[9] *The use of Global Positioning System ("GPS") satellite technologies not only for military operations, but for terrestrial providers' enhanced 911 services, location based mobile services and applications, and other commercial applications such as fleet tracking, is perhaps the most familiar example.*
[10] *See Comments of the Satellite Industry Association, WT Docket No. 09-66, filed June 15, 2009; Comments of the Satellite Industry Association, WT Docket No. 09-29, at 2-3, filed March 25, 2009, at 3-4.*
[11] *Innovation NOI at ¦¦ 15-19.*
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[13] *See http://broadband.gov/broadband_types.html#satellite.*
[14] *See Innovation NOI at ¦¦ 21-22.*
[15] *Id. at ¦¦ 34-48.*

Al Yah Satellite Communications Company (Yahsat) has signed a Memorandum of Understanding (MoU) with Microsoft Gulf to potentially offer YahClick online services based on Microsoft Live to Middle East, Africa, and South-West Asia. Microsoft Live is a set of Internet-based services designed for consumers and small businesses interested in creating a website or storing and sharing documents online.

The Memorandum of Understanding is signed by (L to R) Charbel Fakhoury, Regional General Manager, Microsoft Gulf and Shawkat Ahmed, Chief Commercial Officer, Yahsat

The cooperation will help address the challenges faced by regions with limited or no Internet connectivity and improve the overall information and communication technology (ICT) landscape. The collaboration will allow YahClick — the advance broadband satellite internet service from Yahsat — to offer Microsoft Live based online services such as email, customer relationship management, SharePoint, Health Vault, and so on, to consumers, businesses, and government, wherever appropriate or applicable.

The Yahsat and Microsoft partnership will focus on connected industry frameworks like government, health care, education, tourism, government, citizen portals and e-services. The two organizations will also collaborate in developing awareness and training programs that aim at building IT capacity within markets served, to lead social and economical transformation in the public and private sector.

Arianespace achieved success with their Ariane 5 launch — this was the vehicle's 33rd consecutive success and its fifth flight in 2009 — bringing total payloads orbited by the company this year to seven telecommunications satellites, two deep space telescopes and two piggyback spacecraft.

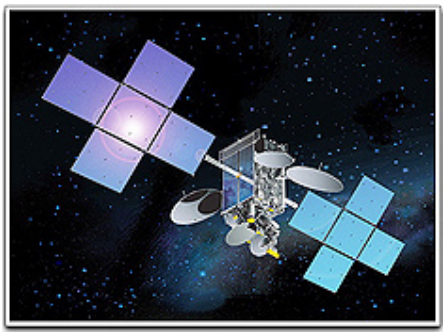
This mission carried the ***Amazonas 2*** civilian relay platform for Spain's **HISPASAT** and the German

COMSATBw-1 secure military communications satellite as a dual-passenger launch.

The flight orbited a combined payload mass of more than 7,900 kg. for the Amazonas 2 and COMSATBw-1 passengers, bringing ***Ariane 5***'s total lift performance in 2009 to approximately 34,000 kg. ***Amazonas 2*** rode as the upper passenger in the launch vehicle's payload "stack," and was deployed 27 minutes into the mission by Ariane 5. This satellite will be operated by Spanish telecommunications operator **HISPASAT**, for which Arianespace has provided repeat launch services since its orbiting of the ***Hispasat 1A*** telecom relay platform in 1992. The Amazonas 2 spacecraft was produced by **EADS Astrium**, and is the 66th satellite from this manufacturer orbited by Arianespace. With a mass at liftoff of approximately 5,500 kg., Amazonas 2 will provide a wide range of telecommunications services over its coverage area extending from Alaska to Tierra del Fuego. It is to be operated from an orbital slot of **61 degrees West** for relay services with 54 Ku- and 10 C-band transponders. Based on EADS Astrium's ***Eurostar E3000*** spacecraft bus, the satellite has a design lifetime of 15 years, with an end-of-life power of 15.3 kW.

Also, the next ***Ariane 5*** mission has moved into its final preparation phase as the vehicle for this sixth flight of 2009 is delivered to

Arianespace. Following its rollout from the **Spaceport**'s *Launcher Integration Building* in French Guiana — where the vehicle's basic build-up was performed by prime contractor **EADS Astrium Space Transportation**. The mission is scheduled for liftoff later this month, carrying **SES WORLD SKIES**' ***NSS-12*** spacecraft and ***THOR 6*** for **Telenor Satellite Broadcasting**.



NSS-12 was manufactured by **Space Systems/Loral** based on the company's ***1300*** spacecraft platform and is designed to reach an estimated two-thirds of the world's population. As a replacement for ***NSS-703*** at **57 degrees East**, NSS-12 is to serve virtually the entire Eastern Hemisphere with its 40 C-band transponders and 48 Ku-band transponders, providing direct-to-home (DTH) TV delivery power levels, as well as elaborate beam interconnectivity and C-/Ku-band cross-strapping. Its DTH coverage will be handled through four regional Ku-band spot beams covering the Middle East and Europe, Central and South Asia and — for the first time — East Africa. NSS-12's high-capacity, high-power C-band hemispheric beams are configured for Europe, Africa (including Mauritius), and the Middle East, as well as an area stretching across Asia to Australia. They will be augmented by a powerful C-band global beam that reaches from the United Kingdom to the Far East.

Atrexx Ltd. & Co. KG is offering more widespread 2way2sat services in C-band to tropical regions, especially to Africa, where rain attenuation often presents a problem.

"Rain fade is still a considerable issue for users of Ku-band satellite services in areas where wet weather is extremely common, causing disruption of services that cannot be delivered through any other means", commented Jean-*Claude Bisenius*, Managing Director of **atrexx**. "This can cause problems for important public services that rely on satellite-based services as an alternative to terrestrial that cannot reach certain areas or is too expensive to roll-out."

Due to the much lower frequency range of C-band, the margin for weather degradation is often only 1 decibel (dB), but in Ku-band, it can be 6 to 10 dB in subtropical and tropical regions. Power losses of 10 decibel in Ku-band equate to the need of a tenfold power increase or an antenna diameter of 3.80 meters in tropical regions instead of 1.20 meters needed in drier regions — for the same service availability!

The ***2way2sat*** services offered by atrexx are based on the ***iDirect iNFINITI*** platform over the ***Intelsat 10-02*** satellite which boasts very strong C-band coverage over all of Europe, the entire African Continent, and the Middle East, and offers 45 C-band transponders.weather sensitivity, such adaption is not necessary.

Gateway has upgraded its pan-African network from the original Digital Video Broadcasting standard for satellite to a second generation system; DVB-S2. Migrating to the new standards allows more efficient use of scarce African satellite capacity and as a consequence significantly improves the commercial position of Gateway in the marketplace.

Gateway has spent the last six months transitioning more than 1,000 customers onto a new network that has dramatically improved speed, security and network reliability. Initially, Gateway's entire hub infrastructure had to be prepared in order to migrate its customers from the older iDirect Infinity system to the new Evolution DVB-S2/ACM system. The transition started in West Africa, where Gateway's corporate customers switched across seamlessly, with no service interruption. Extensive, independent tests show that DVB-S2 systems can deliver substantial improvements in network uptime through Adaptive Coding and Modulation (ACM), the ability to change encoding parameters in real time.

For customers this means that their service doesn't drop off during adverse conditions. This is because rather than there being a service outage, there is instead a small drop in bandwidth speed as the coding adapts to the most suitable speed for the conditions. Upgrading the network has maximized Gateway's efficiency in using its backbone and bandwidth. This means Gateway can continue to provide the highest quality service level and network availability to its customers in the most effective efficient manner.

Gilat Satellite Networks Ltd. [NASDAQ: GILT] has been selected by Cable & Wireless Panama, the country's largest telecommunications operator,

to provide a SkyEdge II high-performance network that will be used to deliver broadband Internet to hundreds of schools in remote areas nationwide. Gilat will provide equipment, technical support, assisted network operations, and training.

The new network will enable students in Panama's remote areas to enjoy an enhanced educational experience through interactive learning programs and other Internet applications. **Cable & Wireless Panama** is already using a Gilat SkyEdge network, deployed in recent years, to provide telephony and Internet services to more than 450 remote Panamanian communities.

Gilat's ***SkyEdge II*** is a multi-service platform enabling the delivery of high-quality voice, broadband data and video services for diverse environments including enterprises, rural networks, cellular backhaul and government network apps.

SkyEdge II is a standards-based system using DVB-S2 and DVB-RCS. With better efficiencies and full adaptability for both the inbound and outbound channels, it provides higher performance that serves the growing requirements of end-users. Gilat's diverse portfolio of SkyEdge II VSATs are all supported by a unified platform, offering service providers the most suitable product for their application needs as well as the flexibility to evolve their networks. The newest addition to Gilat's SkyEdge II portfolio is ***NetEdge***™, a dedicated solution for multi star networks, specifically designed to meet the needs of corporations and cellular backhaul applications.

SIGNIS, the non-government World Catholic Association for Communication with members from 140 countries, has invited iDirect to participate in its 2009 World Congress event in Chiang Mai, Thailand, during October 17-21. SIGNIS and iDirect will demonstrate the capabilities of satellite communications for efficiently distributing and sharing media content to developing nations to encourage social development and growth.

SIGNIS evaluates, promotes and provides communication technologies for use in the spreading of faith and human values, especially in developing countries.

Today, the organization has more than 1,000 VSAT stations in operation for missions, hospitals, dioceses, nunciatures and non-government organizations, mainly in Sub-Saharan Africa. ***SIGNIS Services Rome*** (**SSR**) recently upgraded

its network infrastructure to the **iDirect** platform to maximize bandwidth efficiency and reduce the cost of sharing capacity among its large deployment of stations. iDirect's IP-based satellite platform can support significantly higher traffic over conventional video broadcasting networks, providing a more cost-effective system for SIGNIS.

During the 2009 World Congress, SIGNIS will use the iDirect network and capacity provided by **Asia Broadcast Satellite** (ABS) on the ABS-1 satellite to exhibit live broadcasts of SIGNIS radio programs streamed over the Internet. SIGNIS and iDirect will showcase several advanced media applications including video broadcasting, Voice over IP and IP radio, and multicast content distribution.

iDirect, Inc. has announced that NYNEX Network Solutions (Nynex), a satellite network operator headquartered in Germany, has expanded its DVB-S2 broadband satellite service to accommodate growing business demand. Nynex has upgraded its network infrastructure with iDirect's new Evolution XLC Line Cards, X5 Satellite Routers, and iDX 2.0 operating software. The enhanced network will deliver increased data performance, while allowing Nynex the flexibility to serve an expanding customer base efficiently. The investment follows **Nynex**'s introduction of an ***iDirect DVB-S2 Evolution***

iDirect X5 satellite router

network in the Middle East and Africa. For Nynex, nexgen bandwidth efficiency gains have led to significant customer contracts with government organizations and with enterprise customers in the oil and gas, financial services, and other industries.

The upgraded network stretches these gains further through iDirect's newly released *2D 16-State* inbound coding capability, which delivers an additional 10 to 20 percent increase in inbound IP throughput over DVB-S2/ACM gains. With expanded network capabilities, Nynex will continue to leverage the iDirect platform to meet a broad range of customer requirements from TDMA and mesh networks to maritime connectivity, secure government communications and GSM network integration.

Iridium Communications Inc.'s subsidiary, **Iridium Comunicaciones de Mexico SAPI de CV** ("Iridium Mexico"), has now received all of the necessary authorizations to operate, provide, and sell mobile satellite services (MSS) in Mexico. Iridium Mexico received its licenses

from Mexico's *Ministry of Communications and Transportation* (Secretaria de Transportes y Comunicaciones or "SCT") and the country's Federal Telecommunications Commission.

As a result of these new licenses, customers in the business, government and consumer sectors in Mexico now have access to the world's only truly global MSS service. Plus, Iridium has partnered with **Spacenet Communications Services de Mexico SA de CV** ("Spacenet"), a Mexican telecommunications company. Spacenet provides integrated communication solutions to the Mexican market, including a range of voice and data services and applications, developed to meet customized communications needs.

As more telcos in the Middle East and Africa prepare to launch IPTV services, and others move past phase 1 of their deployment, the region's pay-TV industry appears to be undergoing a considerable change. While IPTV and cable TV remain youthful platforms in the MENA region at present, many telcos are investing substantial amounts in their broadband networks, in line with government drives to keep ahead of the ICT curve, and regulatory barriers are

starting to fall and content production values to increase. According to a recent report from the **Arab Advisors Group**, there were six countries in the MENA region offering IPTV services as of May 2009 (Algeria, Jordan, Lebanon, Morocco, Qatar and the UAE), compared to four service providers in three countries in August 2007.

There are also thought to be ongoing or planned projects by service providers and/or governments in seven other countries in the region which would enable the future launch of IPTV — Bahrain, Egypt, Kuwait, Oman, Tunisia, Yemen, and Saudi Arabia.

The IPTV Forum Middle East & Africa event will once again tackle the big issues facing the region's IPTV industry, as well as giving regional players the chance to learn from each other and from other IPTV operators from further afield.

This year's IPTV Forum MENA will be held in Dubai's **Jumeirah Hotel** once again, on November 15th to 16th. The exhibition will be free to attend for all visitors, while delegates from Asia and Africa will also gain free entry to the conference sessions. There will additionally be a focus on the Indian IPTV market on Day 2 (November 16th) of the event, featuring speakers from Indian IPTV operators such as **MTNL** and **Bharti Airtel**, and from the *IPTV India Forum*.

Orbit Technologies has announced record orders for its satellite communication products — the company reports 2nd quarter additional orders in excess of US$5 million of its marine VSAT systems. According to Orbit, total worldwide VSAT systems orders are expected to exceed US$100 million this year.

Orbit's record VSAT bookings reflect intentional and purposeful changes at the company since Avi Cohen took over as CEO. Mr. Cohen has undertaken the planning and implementation of a new direction. This has resulted in new products, increased sales, and overall renewed vigor at Orbit. With a can-do attitude and a new vision, the new CEO is proving that his current plan is the right one, resulting with company growth and success even in the face of a global economic downturn.

According to ***Frost and Sullivan***, an international market research company, Orbit currently holds 17 percent of the world market for installations of VSAT antennae for satellite reception onboard marine platforms. Orbit, according to market research, is considered the world's second largest supplier of these types of systems. Frost and Sullivan asserts that the market size of the marine segment of satellite communication is expected to reach US$1.3 billion (systems and services combined).

Orbit Technologies has also been awarded a $3 million order to provide a wide range of advanced tracking tactical systems for various applications, including UAVs, large aerial platforms, and radar system integration to two leading Israeli defense companies with a range of tracking solutions over the coming year. The deal includes tactical systems for tracking UAVs, systems designed for radar installation integration, and large systems for tracking airborne manned platforms.

Orbit's AL-4012

As part of the orders that Orbit has received from these leading Israeli defense companies, Orbit will supply small tactical systems based on its AL-4012, capable of

being carried by infantry troops, for tracking UAVs. It will supply large systems based on its AL-4018 intended for tracking test flights, and Orbit will be supplying, as part of this deal, electro-mechanical rotational systems for radar.

With high dynamic and high accuracy modular design, the rugged, customizable AL-4018 withstands harsh environmental conditions, boasting a proven track record of worldwide performance. The AL-4012 is a compact, robust, and cost effective lightweight digital tracking system with high dynamic accuracy and a single command and control communication link. The system is designed for both fixed and portable ground installations.

Overwatch's Communications Systems business has been selected by Astrium Limited of the United Kingdom to provide SATCOM solutions in support of Yahsat.

Yahsat has partnered with **EADS Astrium** and **Thales Alenia Space** to build a multi-purpose satellite communications system. The Yahsat system includes two multipurpose satellites designed to provide government and commercial SATCOM capabilities. **Overwatch** will provide three one-meter, Ka-band shipboard antennas and accompanying radomes that are expected to be used aboard **United Arab Emirates** naval ships. The award includes options for as many as 30 additional units.

"This award builds on the successful relationship established between Astrium and Overwatch on the ASTIS program in support of the Royal Australian Navy," says Communications Systems Business Area Manager *Terry Benson*. "With this new endeavor, Overwatch is bringing its proven experience and mature military SATCOM technologies to new users." Overwatch delivers single-band and simultaneous multiband SATCOM system solutions for flyaway, transportable, fixed-site and shipboard applications.

RapidEye, who owns and operates a constellation of Earth Observation satellites, will supply the Brazilian state of Bahia with RapidEye satellite imagery through their Brazilian distributor Santiago & Cintra Consultoria.

"RapidEye has been selected to provide the state of Bahia imagery because of their capacity to return to an area multiple times until a low cloud cover image can be acquired, and because of their high quality satellite data. Bahia is quite difficult to image with low cloud cover, as it is a tropical area, and the five RapidEye satellites are the best system out there to capture these challenging images. RapidEye satellite imagery will provide the state of Bahia with updated land use information for decisions on environmental issues, agriculture and infrastructure. The imagery will be used by multiple organizations and decision makers that are related to territorial planning with a socio-economic sustainable approach," said *Rita Pimentel* from the **SEI–Bahia Government Organization**.

"This contractual agreement will provide proof of our system capabilities. We have already delivered 250,000 square kilometers of imagery in September," commented Michael Prechtel, Head of Marketing and Sales for RapidEye. "It is hard to predict when this area will be cloud free. With the RapidEye system, we can continue to return to the area until we achieve our goal of a low cloud covered image. The successful completion of this project will highlight our advantageous imaging capabilities for frequent monitoring in tropical areas like the state of Bahia and the Amazon area."

Sierra Wireless [NASDAQ: SWIR - TSX: SW] and **MobiPower** of Brazil have agreed to the development of stolen-vehicle recovery and asset protection solutions based on **Sierra Wireless** embedded cellular modules.

The brain of the device is to be a Sierra Wireless ***WMP100 Wireless Microprocessor***®, which hosts an *Open AT*® application and communicates information via cellular connection to the Internet, enabling remote monitoring of vehicles and other personal property. The **MobiPower** device will offer Brazil's industry the ability to protect valuable assets including vehicles and possibly real property in order to improve service delivery. To do so, MobiPower has focused on providing a compact, low-power-consumption device that can be easily applied to a variety of different assets, all designed and produced locally in Brazil.

"We chose Sierra Wireless because they offered the most cost-effective, feature-rich solution available on the market," said *Carlos Cecanecchia Neto*, Director of MobiPower. "By embedding our application on the module we are able to reduce component redundancy and realize both cost savings and a more compact design."

"Sierra Wireless is pleased to be actively involved in the growing marketplace in Brazil and particularly with our relationship with MobiPower," said *Dan Schieler*, Senior Vice President of Worldwide Sales for Sierra Wireless. "MobiPower is uniquely positioned to provide best-in-class asset monitoring, and we're proud to help keep insurance costs in check for business and consumers, especially in today's difficult economic environment."

Talia Limited, one of the largest suppliers of satellite Internet for Africa, the Middle East, and Europe, have debuted Talia Home, a VSAT-based residential broadband service. With coverage from Ireland to Iraq, and Senegal to South Africa, Talia Home is the first offering which brings affordable Internet access to areas which otherwise lack connectivity.

Talia Home is a Ku-band service on several satellites. With excellent coverage throughout all service regions, prices start at as little as US$50 per month for an uncapped service. Talia Home includes access to the *Talia Voice* service, a voice over IP service which offers inexpensive worldwide calling as well as incoming calls. Talia Voice accounts are included as part of Talia Home. The Talia team will be attending ***Gulfcomms 2009*** in Dubai from October 18th through 22nd at stand Z-C35, Zabeel Hall, in the **Dubai International Conference Centre**.

The SPACECONNECTION, Inc., a provider of satellite transmission services, recently inaugurated their new office in Mexico City, Mexico, to service customers. The new office builds on **SPACECONNECTION's** presence in the Americas. SPACECONNECTION's Mexico City office was opened in response to Latin America's growing demand for content transmission services and draws on the company's successful track record of sourcing satellite capacity globally.

The SPACECONNECTION's Latin America team will complement SPACECONNECTION Canada and U.S. teams, working collaboratively under the direction of SPACECONNECTION's U.S. headquarters.

The office is located at:

Blvd. Manuel Avila Camacho
no. 36 Flor 10
Col Lomas de Chapultepec, Del. Miguel Hidalgo
Mexico D.F., C.P. 011000
— Tel: +52 (55) 9171 1725
— Fax: +52 (55) 91711699

Orlando Skelton, VP of Sales, spearheaded the founding of the Mexico City office and is overseeing Latin America sales initiatives.

ViaSat Inc. received a US$46 million contract award from Star Satellite Communications Company, a wholly owned subsidiary of Al Yah Satellite Communications Company PrJSC (Yahsat), for ***SurfBeam 2*** network infrastructure and initial customer premises terminals.

The equipment will power an advanced new high-speed Internet access service called ***YahClick***. Under the contract, ViaSat will deliver and install four complete satellite broadband gateways, provide the equipment and installation for a network control center, supply a pilot production quantity of user terminals, and support Yahsat with network operations and maintenance services.

YahClick, targeted to enterprise customers and consumers in the Middle East, Africa, and Southwest Asia, is expected to go live upon the launch of YahSat's second satellite, ***Y1B*** in the second half of 2011. Y1B includes a spot-beam Ka-band payload designed to support broadband access networks for a range of applications. Ka-band spot beam satellites re-use frequencies to maximize spectrum efficiency for more network capacity.

On the ground, the design enables use of smaller, lower cost terminals, antennas, and transceivers. The nexgen SurfBeam 2 network is designed for the latest Ka-band spot beam satellites. The system has been selected to bring to market more than 200 Gbps of aggregate satellite capacity serving four continents in the next few years. That capacity represents more than a 10x increase over the combined global Ka-band capacity in service today.

XipLink has announced DigitalSkys has commissioned an additional high value premium managed service offering, using XipLink's core optimization technology, to typically double throughput for its customers across the Middle East, African and Asian markets that they serve.

DigitalSkys, a 'last-mile' wireless communications provider using current state of the art satellite-based VSAT technology, GSM, VoIP, IP-PBX and Wireless PBX, Visual Intelligence, and Wi-Fi technologies,

XipLink™
Maximum Capacity
your wireless gateway to the world

has already initiated the roll out of the high value premium managed service offering to initial customers in the Middle East, African, and Asian sub-continents. Using the dual-redundant ***XipLink XA-30K*** optimization appliance platform, DigitalSkys is able to provide a full STM-1 capacity of optimized traffic across multiple satellites and networks into many different theatres and markets.

XipLink's XA-Series of wireless optimizers include a range of industrial computing appliances scaling from 2 Mbps and 50 connections to very high performance systems running at 155 Mbps and 30,000 simultaneous connections for the largest of installations.

Revenues Up For MSS Operators

Euroconsult, an international research and analyst firm that specializes in the satellite communications sectors, announced that revenues of mobile satellite service operators grew to more than US$1.2 billion last year, despite the adverse impact of the economic crisis on some of the industry's key vertical markets. Industry wholesale revenues are expected to continue growing over the next decade, by a rate of 8 percent (10-year CAGR). According to Euroconsult's just-released report ***Mobile Satellite Communications Markets Survey, Prospects to 2018,*** the MSS industry is currently at a crucial point, with growth opportunities ahead. However, a number of operators with high capital requirements face a difficult financing environment.

"Despite the adverse economic environment, MSS operators' core market — critical mobile communications where terrestrial networks are not available — has been robust," said *Pacôme Revillon*, CEO at **Euroconsult**. "Needs for better broadband communications and remote control of assets are key growth drivers for the MSS industry going forward," he continued. Increasing demand in emerging MSS regions such as Asia will also contribute to growth.

MSS operators, however, have not benefited uniformly from this market growth. While **Inmarsat** has largely reinforced its position as market leader in the industry, with a 51 percent market share in 2008, **Iridium** was the only MSS operator to significantly increase its market share in the last two years, to around 26 percent.

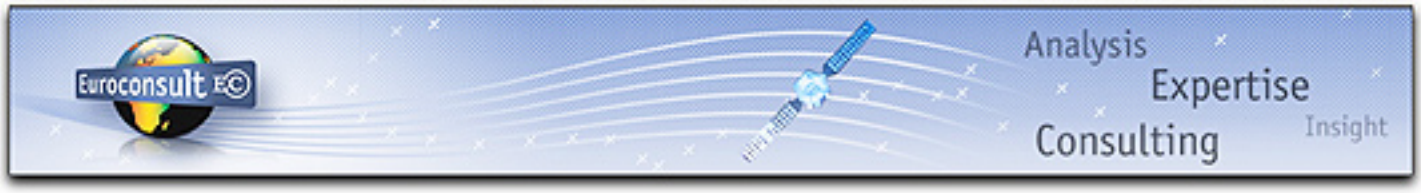
Financials Continue to Shape MSS Value Chain

A number of operators are on the verge of replacing their aging satellite fleets, and several others are still seeking funds for their future systems. After **Globalstar**'s success in achieving full funding in 2009 with support from the French export credit agency **Coface**, **Iridium** is the next candidate looking to raise money for the estimated US$2.7 billion ***NEXT*** constellation.

Consolidation has been prevalent among MSS service providers in recent years. Inmarsat recently completed the acquisition of **Stratos Global,** the world's largest service provider, and **Apax Partners** merged two large service providers to form **Vizada**, currently the second largest MSS service provider worldwide. Renegotiation of the *Commercial Framework Agreement* (**CFA**) in 2009, which defines the commercial relationships between Inmarsat and its service providers, is expected to further reshape the market in the coming years. More consolidation — either vertically or between certain service providers and resellers — would come as no surprise.

Growth Opportunities In Data Applications

According to the Euroconsult report, MSS wholesale revenues are expected to reach nearly US$2.5 billion in 2018, a 10-year CAGR of roughly 8 percent. Terminals will perform even better with a 10-year CAGR of 13 percent to nearly 7 million active terminals by 2018, driven by low data rate M2M applications. In the short term, however, growth might slow down in certain vertical markets as a result of the economic environment. Driving this overall growth are data applications, including MSS broadband, rising demand in emerging regions, and growth in key vertical markets such as government/military, oil and gas, and



media, as well as the maritime and aeronautical markets.

"We are seeing a major shift in the MSS industry today from a time when legacy voice dominated traffic towards increased data traffic," said *Richard Roithner*, Senior Analyst at Euroconsult. "This has led to strong growth in low data rate M2M products and high data rate MSS broadband systems, supporting a number of new end-user applications and services," he concluded.

MSS broadband (*i.e.*, >128 kbps data rates) has seen strong growth in the last few years and will be one of the major revenue drivers for the MSS industry in the coming decade, with wholesale revenues increasing to over US$800 million in 2018 — a 25 percent 10-year CAGR. First launched for the land-mobile market, with main users being government/military, media, and the oil and gas sectors, MSS broadband is now gaining momentum in the maritime and aeronautical markets with dedicated products for those markets creating ample opportunities for operators, service providers and equipment manufacturers alike.

However, competition from mobile VSAT technology, which provides higher data rates often at fixed monthly prices, is growing, particularly in the maritime markets and to a lesser extent in the aeronautical markets. This is due to rapid technological progress in recent years which allows equipment (and in particular the antenna systems) to be made considerably smaller, lighter and more bandwidth-efficient.

MSS **M2M** (*Machine to Machine*) generated close to US$100 million in wholesale revenues for MSS operators in 2008, after a period of significant growth. Underlying much of this growth has been a decrease in hardware and service pricing and increasing use in vertical markets, such as land transport, energy, and utilities, as satellites have become instrumental for data collection and fleet management.

M2M is also gaining importance in the maritime market due to tightening regulatory requirements such as **AIS** and **LRIT.** North America has the largest subscriber base for MSS M2M terminals, with around 70 percent of the world market. This positive trend will continue going forward, with the number of active terminals expected to grow at a CAGR of 16 percent between 2008 and 2018 to over 5.4 million.

Aeronautical + Maritime Markets

The aeronautical segment will be the main growth story among user segments for MSS communications in the coming decade. While the aeronautical segment is still in an early phase of development, and only accounts for 7 percent of MSS wholesale revenues in 2008, that figure is expected to nearly double in the next 10 years reaching wholesale revenues of more than US$270 million in 2018. This reflects the emergence of a number of specialized service providers (*e.g.*, **OnAir**, **AeroMobile**) and the launch of new MSS products for the segment.

The uptake of in-flight passenger cabin communications services will be a particularly important driver in the decade to come. Despite the positive 10-year outlook for growth, the current economic crisis could lead to a somewhat decelerating growth in the short term, as two of the key markets, business aviation and commercial airlines, have been seriously impacted by the economic crisis.

Maritime is still a major market for MSS with approximately US$400 million in wholesale revenues in 2008. This market is expected to grow at a 10-year CAGR of 7 percent, despite the short-term impact of the economic crisis. While data applications will provide the engine for growth — particularly higher data-rate MSS broadband systems — voice will remain an important application for crew welfare and safety

communications. Asia Pacific will be a particularly important region for MSS growth in the maritime markets as distribution channels improve and competition among operators and service providers heats up.

Report Profile

Euroconsult's ***Mobile Satellite Communications Markets Survey, Prospects to 2018***, is a comprehensive assessment of business opportunities in the MSS sector that is both growing and facing specific challenges.

The report provides exclusive 10-year forecasts for terminals and wholesale revenues; a comprehensive analysis of operators and the value chain, review and forecasts for all applications (MSS broadband, M2M, handheld, hybrid networks, mobile VSAT) and trends and forecasts broken down by user segments (maritime, aeronautical, land). The report also provides regional profiles which review the current situation and trends and growth drivers by segment and application in five different regions of the world.

About Euroconsult

Euroconsult develops comprehensive research reports and forecasts; provides strategic consulting and analysis; produces world summits; and offers customized training. With 25 years of experience and more than 350 satellite-related consulting assignments, Euroconsult is a worldwide reference.

Euroconsult has more than 560 clients in 50 countries, including leaders throughout the satellite value chain: satellite operators and service providers; satellite manufacturers and launch service providers; equipment providers and integrators; space institutions; media and broadcasting companies; and banks and investors.

For more information visit www.euroconsult-ec.com

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A Match Made In [The] Heavens

by John Stone, Partner, ***Near Earth LLC***

Earlier this month, ViaSat announced that it was acquiring WildBlue Communications for $500 million, net of cash acquired. Given that ViaSat itself isn't really all that much bigger, with an enterprise value in the US$875 million ballpark, this is clearly a big deal for them. But is it the right deal? And are there other winners and/or losers? Let's see!

First, let's look at the numbers. With adjusted EBITDA of US$76 million, the deal comes in at a 6.6x multiple (not including tax effects) — significantly lower than the trading multiples for the big fixed-satellite services firms. Of course, with EBITDA margins in the high 30s and growth rates of 20 percent+ annually, WildBlue is a pretty different animal, so some multiple compression is probably appropriate. But, (as we discuss below) we don't think that's the whole valuation story. For **ViaSat**, pricing the deal at this level allows it to be accretive to earnings from day one.

Next, let's consider the fit. For ViaSat, vertically integrating with their principal customer for their ***DOCSIS*** satellite modem product helps secure a long term stream of business. In addition, ViaSat gains **WildBlue**'s brand and marketing relationships that have enabled it to garner a subscriber base of over 400,000 — saving ViaSat tens of millions in startup marketing expense. And then, of course there're the subscribers themselves. From WildBlue's perspective, this deal addresses their long standing concern about how to secure financing for a follow-on satellite — ***ViaSat-1*** becomes that satellite. It also addresses the threat posed by ViaSat's pending entry into the market with a technically superior satellite — an entry that promised to make it hard for WildBlue when it had to compete with its principal vendor, and arch rival, Hughes, simultaneously.

Finally, it addresses a capital structure where the lion's share of WildBlue's cash flow was going for debt service, leaving little excess cash to return to shareholders. For all of these reasons, we think ViaSat had a strong negotiating position in its talks with WildBlue, which in turn drove the valuation for the deal.

Finally, consider how this affects other players. The first company that springs to mind is ViaSat and WildBlue's arch-competitor, **Hughes Communications**. Hughes is a vertically integrated provider of satellite broadband (like WildBlue) and a provider of hardware and turnkey satellite networks (like Viasat). Hughes operates its own satellite, like WildBlue, and has a new Ka-band satellite on order, like ViaSat.

Clearly, the folks at Hughes would have liked to have gotten their hands on WildBlue, as much to deny it to ViaSat as to get it for themselves. While at first blush, the fit between Hughes and WildBlue would not appear to be as strong for it as for ViaSat, over time, WildBlue's bent-pipe satellites could have had their customer bases gradually migrated to Hughes' equipment. With all this said, Hughes' shareholders clearly didn't mind — the stock had no discernible reaction to the deal announcement. We think this indicates that the market views the downside from a strengthened ViaSat to be balanced by the neat competitive

Hughes' shareholders clearly didn't mind — the market views the downside from a strengthened ViaSat to be balanced by the neat competitive landscape of duopoly.

landscape of duopoly, as compared to a wild and woolly three-way horse race.

How did WildBlue's investors do? With a total of US$453 million in equity plus US$350 million in debt, clearly not everyone is being made whole with ViaSat's US$568 million of cash and stock. However, if we note that earlier investors were crammed down during the December 2002 raise (US$247 million in prior investment became ~$50 million in pre-money valuation), then the equity investors since then ($206 million in all) probably received most of their money back, if a few years later then when they originally made their investments.

What about the future? Does this transaction portend future tie-ups? Considering that the ViaSat-1 satellite is a collaborative effort with Telesat (which also collaborated with WildBlue on their first satellite, by the way) and Loral, we think these companies are starting to get pretty chummy, and may just wake up at one point with a desire to get closer still. A move in that direction could then force Hughes to seek a suitor as well. We could also envision the trend of the modem manufacturers vertically integrating with the service providers and launching their own satellite capacity continuing globally — so the folks doing satellite broadband outside North America could become targets as well.

About the author

Mr. Stone brings a wealth of finance and industry experience to the Near Earth team. In addition to his background in corporate finance and as a senior research analyst for both equity and debt securities, John also has an extensive background in science and engineering. Immediately prior to joining Near Earth, Mr. Stone worked in the corporate finance unit of National Securities, where he was involved in sourcing, banking and distribution of private placements for early stage technology companies. From 2000 to 2002, he worked as a senior equity and debt analyst at Ladenburg Thalmann and Company. At Ladenburg, he covered satellite and cable broadcasting equities, and satellite/launch vehicle manufacturer and the debt of a networking company. While primarily dedicated to research during his tenure at Ladenburg, Mr. Stone also worked in a support role for the company's corporate finance activities.

Market Intelligence

The Global DTH Market

The Whole is Not Equal To The Sum of Parts

In numbers, 99 active Direct-to-Home (DTH) platforms were broadcasting over 13,800 television channels to more than 114 million subscribers at the end of 2008, generating more than US$65 billion in Subscription Revenues. At blended average revenues of US$47.75 per month, viewers were being treated to High Definition (HD), Digital Video Recording (DVR), Video on Demand (VOD) and Triple Play services like never before.

Every television market, however, has its own unique dynamic that goes beyond box-selling economics, payTV penetration and broadcasting regulation to reflect the role of television in popular culture. North America, Europe and East Asia are strong markets for DTH, whereas those of South and South East Asia, Sub-Saharan Africa, and Latin America are still very much on the growth track. In the mature markets, competition drives innovation, which affects everything from localizing content to bundling services. Content exclusivity, on-demand services, and Internet delivery are all examples of services that have been driven by competition in the mature markets. Younger markets such as South Asia, Middle East, and parts of Central Europe are still to consolidate before they experience growth beyond just subscriber numbers.

Global DTH Market Analysis

North America still dominates the DTH market with nearly 30 percent of subscribers and 49 percent of subscription revenues being generated from the region's four DTH platforms. The market is predominantly based on services, and growth is coming in the form of Premium products and packages such as DVRs and HD. Television channels are also moving to HD, with new local HD markets being added every quarter.

Central America and the Caribbean are witnessing a much needed change with the entry of **Dish Network Mexico**. There has been remarkable growth in subscribers for the platform and the market is expanding at the lower end with competitively priced packages. Subscriber, Revenue, and Channel numbers may be in the low single-digit percentages when compared with the rest of the world, and Premium services are yet to emerge, which indicates plenty of growth opportunities.

South America's DTH market is experiencing a fresh wave of growth driven by convergence of voice, video, and data. The market, earlier dominated by heavyweights such as **Sky Brazil** and **DirecTV Panamericana**, is now bubbling with Triple Play services from telcos that have made forays into the payTV market. Healthy subscriber growth will be complemented by Premium services over the long term, even as competition is set to increase.

Western Europe has long been dominated by single, large, near-monopolistic DTH platforms — one for each country. A region that houses 25 percent of the worlds' DTH subscribers and an equal percentage of subscription revenues is witnessing a new spurt of activity. Markets that could easily be pegged as saturated are growing HD subscribers in double digits.

Central and Eastern Europe, as well as Russia, have seen the emergence of more than two dozen distinct platforms that now dot the DTH landscape in the region. Subscriber growth is steady as viewers switch from analog terrestrial to digital satellite. However, the number of players vying for a share of the market has made competition fierce.

As a region that was, until recently, on the growth track, **NSR** expects a steady increase in DTH subscriber numbers for the Middle East and North Africa. However, consolidation has set in despite the small number of players in the region, with **Showtime** and **Orbit** merging operations. Piracy continues to plague the regions' payTV markets and subscriber growth is muted as a result.

Sub-Saharan Africa, as a region, has been dominated by a single DTH operator in the form of **MultiChoice**. The emergence of new platforms in countries such as Nigeria and Kenya has met with mixed response. The market is headed towards expansion driven by low cost platforms that are increasing the penetration of satellite television into smaller cities and towns of the African continent.

Direct-to-Home is the "Sunshine" sector in the continually growing Indian economy. Apart from **Dialog TV** in Sri Lanka, all South Asian DTH platforms are adding subscribers at staggering rates. Even at 10 percent of the world's DTH subscribers, the market seems premature for Premium services. Competition, however, has overruled that premise, with DVRs and HD making an early appearance.

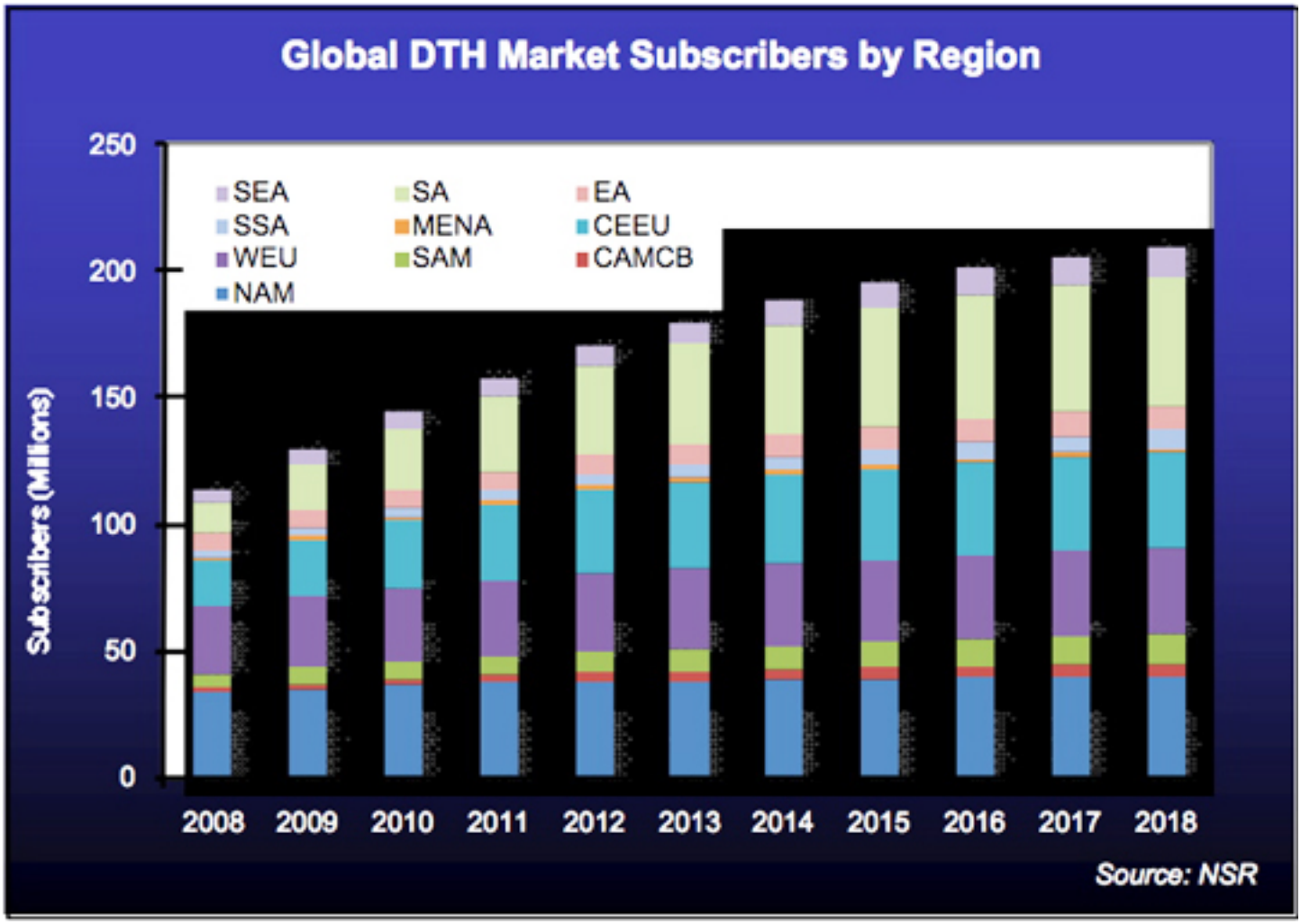
East Asia is a market dominated by terrestrial and cable television with extremely high penetration rates and a growing broadband footprint. DTH has made a reasonable impact, but growth will remain gradual — driven by Premium services, but held back by competing platforms.

Generating nearly 7 percent of the world's television channels, South East Asia has been touted as a region poised for growth for DTH platforms and their satellite operators. The market has what it takes to deliver on that promise as penetration increases, but piracy continues to plague all PayTV platforms.

Global DTH Industry Analysis

Cushioned Impact

As the rest of the world, and most other industries, recover from the effects of the slowdown in the global economy, PayTV operators in general have



reported a relatively cushioned impact on subscriber growth. Research indicates that most people prefer to "stay at home and watch television," something that is viewed as an inexpensive source of entertainment, rather than go out for movies, dinner or travel in the times of recession. DTH operators have tried to cash in on this phenomenon by slashing package prices and introducing multiple payment options.

"Mature" Competition

North America, Western Europe, and East Asia are, by and large, the more "mature" of DTH markets. However, the latest marketing messages point towards how cable television has been unable to meet the demand for DVRs. Companies battling for a share of the same television household pie are often found locked in battle. Competition is fierce, to put it mildly, and operators are scrutinized by their churn numbers.

Advertising campaigns are aimed at competitor weaknesses more than one's own strengths, and in countries where there is little to differentiate in terms of content or service, price becomes the lowest common denominator.

Cooperation and Consolidation

Regions such as Central and Eastern Europe, Russia, and South America are nearing the end of their rampant growth period. The operator climate is characterized by a large number of players, either in the form of DTH operators or divisions of telcos offering DTH as a part of Triple Play. In the case of Central Europe, consolidation seems almost inevitable, as countries such as Poland seem incapable of supporting the ever-increasing number of DTH platforms. South America, on the other hand, is witnessing the cooperation of telcos and payTV providers to combat DTH heavyweights that have hitherto dominated the market. In another part of the world, the merger of Showtime and Orbit underscores the need for scale in the Direct-to-Home marketplace.

"Sunshine" and Subsidies

South Asia is the region with the fastest growing subscriber base complemented quite drastically with the lowest *Average Revenues per User* (ARPU) in the world. Subscriber acquisition costs are tremendously high, and the industry on the whole is suffering from

the burden of heavy subsidies on equipment. As operators bet upon the teeming billions to mimic the success of the cellular business, the industry will eventually have to deal with extended gestation periods before break even is achieved.

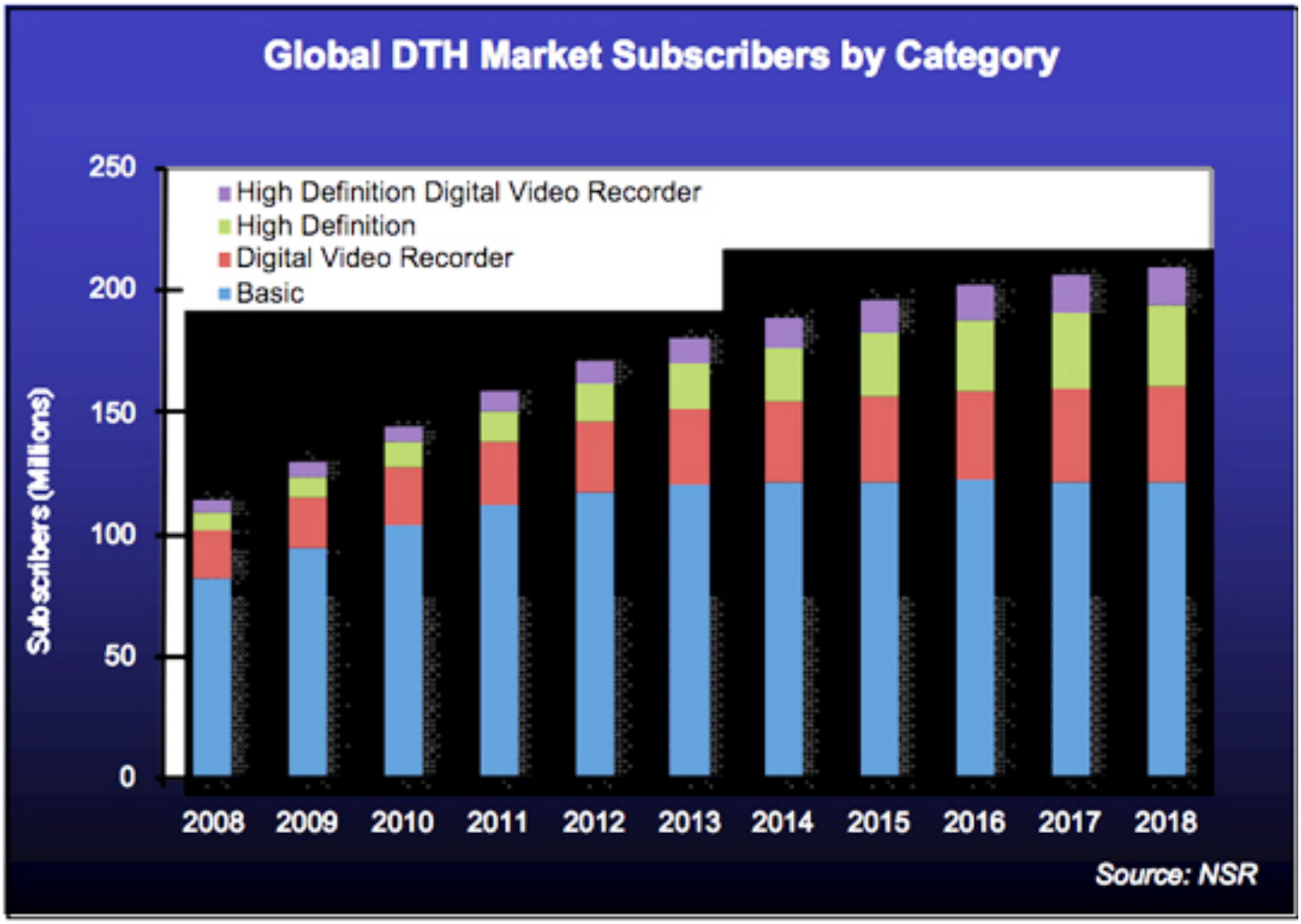
Global DTH Forecasts

Basic DTH service subscribers are on their way to being matched by Premium subscribers — a phenomenon that is being seen in almost all countries of the developed world. In addition, market trends indicate that Basic subscriber figures are declining steadily in regions such as North America, Western Europe, and East Asia, even as more subscribers choose DVRs, HD, and HD-DVRs as their entry packages. The higher ARPU figures certainly do not hurt the DTH platforms, but the long term challenge lies in providing the HD content to keep the subscribers coming back for more.

NSR projects the total figure of 114.3 million DTH subscribers will grow to about 209.6 million DTH subscribers, even though Basic DTH subscribers are expected to decline towards the end of the forecast in the period from 2015 to 2018. However, the situation varies drastically according to region as there is still a significant percentage of the global population that does not have the ability to pay the difference and switch to a Premium service.

DVR subscribers, on the other hand, have made their presence felt across all of North America and Western Europe and are extending their reach in countries as far as Australia, Japan, and parts of Central Europe. DVRs have noticeably changed the way television is watched, and the influence of devices such as TiVo cannot be overstated. Many believe that DVRs will also have a significant impact on traditional television advertising, however, little evidence exists to prove that viewers across the board are skipping ads altogether.

NSR expects that, as with most other services, there would be saturation in the global DTH market at about the 210 million subscriber mark, which represents a penetration of a little above 15 percent of TV households during the 2018-2020 time frame. Competitive offerings by cable providers will be partly responsible for this saturation — churn will continue to be an important parameter that all payTV platforms will need to keep in check.



As of the end of 2008, there were 13,875 channels on DTH platforms around the world. Market trends suggest that throughout the forecast period, growth will be a combination of internal and external additions; *i.e.*, in the form of new channels being added to existing platforms, and NSR also expects over a dozen new DTH platforms to enter the market during this time that will add to channel counts drastically.

NSR's assessment of subscription revenues takes into account the net loss and net gain of subscribers for DTH platforms year-on-year. Subscription revenues alone bring in about US$65 billion annually, and NSR expects this figure to grow at a CAGR of 4.4 percent to a little above US$100 billion by 2018. Revenues from Basic DTH services are expected to contribute smaller percentages going forward as subscribers switch to the higher ARPU Premium services.

Forrester's Focus

TwoFour54 Debuts Abu Dhabi Plans

by Chris Forrester, Editorial Director, ***Rapid News***

twofour54's sparkling new Abu Dhabi 'intaj' facility was opened Sunday, September 27, at a VIP-rich event, and promising to bring a fresh approach to Middle East production and post-production demands. Tony Orsten, CEO at ***twofour54*** *(named after Abu Dhabi's 24 degrees North, 54 degrees East geographic coordinates) said the studios were not just to create extra hours of new MENA content, important as that is. "Today's launch introduces the final component of twofour54's content creation community, which is designed to facilitate the development of a sustainable media industry in the MENA region."*

"We have in our region around 330m people, 60 percent of whom are under 25 percent," Orsten explained, adding that some 450 people had already 'graduated' through the company's 'tadreeb' training academy helped by its partner organisations such as the BBC and Thomson Reuters. Orsten said that training was the bedrock of what they were doing, of people coming into media and for those already working but who wanted to improve their craft skills as well as improving their understanding of broadcasting. "This will lead to new businesses here."

But he stressed that buildings, and facilities like those at **twofour54** were also important so that programming could be made. "We are a content creation community. Our media partners help make that possible," he explained. "Our media partners, whether in the shape of CNN, or the BBC or Harper Collins, they take part in our work and people like CNN, as well as building their own facility here, will also take our young people. They'll be part of the training process, taking interns into the system, from the region, and in order to learn more. Every media partner present with us has a similar commitment to participation."

Orsten declined to supply the full list of an anticipated roster of 66 such partners, but said many were major names and announcements would be forthcoming soon.

At twofour54's heart is a six-studio complex, available on a 'wet' or 'dry' basis, and complete with edit suites, post-production facilities, sound, graphics, and all the other elements expected by today's demanding producers. The six studios are headed by a 650 sq m beast, a pair of 280 sq m spaces (both already fully hired) and two 60 sq m 'babies', each fully equipped with Sony HDC-1500 HDTV cameras, and the sort of technical provision that would make any studio manager green with envy. "And not a tape machine in the building," said *Orsten*.

OB facilities are also to hand, based on **Sony**'s ***HDW-F900*** kit. The building is fibre linked to an **Airspeed/Omneon** system for ingest and playback in or out of Studio 1 and the

other studios. There are similar links to a cluster of giant satellite dishes for reception and transmission, either for DTH or occasional use demands. As far as post production is concerned, there are 22 HD server-based suites, 13 of which look after video editing, 4 for audio, 4 for graphics and one dedicated to high-end finishing and compositing. There is no favouritism between **Avid** and **Apple** (***FCP***) editing because they employ both!

Twofour54 is also looking to tap into the explosive growth of local channels out of the region. Its near-neighbour, Dubai, is uplinking hundreds of channels onto **Nilesat** and **Arabsat.** Twofour54 has anticipated demand and pre-installed encoding, multiplexing and encryption kit ready to handle DTH clients.

Indeed, it is difficult not to be dazzled by the fit-out, both in terms of the physical buildings but also in regard to the standard of 'back stage' decoration where seemingly just about every fixture is chromed and polished to a sparkle, and including purpose-designed signage and a degree of planning that's rare in the business.

But there's more. Just 3 miles away at Khalifa Park, adjacent to the city's National Theatre site, twofour54 has another complex of buildings, including an impressive Penthouse studio being readied for CNN's new Middle East operational hub. From this set of buildings some 20 channels can be ingested and played out to fibre or satellite — again all in HD if needed, and Orsten said they are very much aware of 3D in the production matrix.

twofour54 is based in an Abu Dhabi free trade zone, offering a tax-free environment and 100 percent foreign ownership - as well as an opportunity for freelancers who are affiliated to the business to gain residency in the Emirate. They stress that all-comers are potentially welcome ranging "from established TV broadcasters like CNN to much smaller media production companies".

But perhaps even more important than the bricks, mortar, glass and thousands of miles of fibre, is a fresh approach to permitting freelance staff into the Emirate. Nearby Dubai, itself no slouch as far as media development is concerned, charges freelancers a 24,000 Dirhams (about US$6500) annual fee in order to work in the Emirate.

Orsten, while not putting a price on the anticipated charge for Abu Dhabi hinted that it would be "very competitive" and will be formally announced at the end of October. Freelancers can then get a UAE residence visa and be eligible to work at twofour54 or any of company's partners — including Abu Dhabi TV, CNN, Atlas TV, C-Sky Pictures, or the other partners already in train but not yet announced.

And there's more again. For all this investment is just a down-payment on an, as yet, un-built new purpose-built facility at Mena Zayed which will open in about five years time. Work is already underway at what will be a spectacular water-side city, linked by a 12-lane motorway to Abu Dhabi. The MGM Grand Abu Dhabi is but one new addition to the site now under construction as part of a 25,000 sq metre retail complex which sits within a brand new city for the region. Orsten said the initial 10-year plan, at least for twofour54, seeks to create a unique ecosystem of skills and talent, of buildings and of content making and programming rights. "This is just the beginning."

About the author

London-based Chris Forrester is a well-known entertainment and broadcasting journalist. For 25 years, he has reported on all aspects of the TV industry with special emphasis on content, the business of film, television and emerging technologies, including interactive multimedia and the growing importance of web-streamed and digitized content over all delivery platforms.

Insight

6 Steps To A Profitable Marketing Plan

by Andy Marken, President, ***Marken Communications, Inc.***

New ideas are almost a dime a dozen. There's an innovation on almost every street corner.

What makes a new idea successful is a well thought out, well developed marketing plan that everyone in the organization can understand, believe in, and then follow.

Without a solid marketing plan it is too easy for an organization to be distracted by sales ideas that are not central to the firm's long term goals and objectives. In addition, without a solid plan that everyone buys into, it is impossible to measure your success or determine when the time is right to move in new directions based on the changing marketplace.

Today's marketplace is still exciting, vibrant and tolerant. Every day, across the country, designers, sales people, and application specialists who have great market niche ideas step forward to start the next killer company. Unfortunately, these new companies are often like roving mobs, rather than armies planning to win on the battlefield.

Two years after their formation, fewer than five out of every 100-marketplace contenders will still be around. The dazed, battle-worn founders will walk the scarred landscape wondering what went wrong. As the industry continues to grow at a respectable annual rate, the defeated wonder how and why they not only lost the skirmish but the war.

Wrong Focus

These people blow it because they don't have "the right stuff."

The company founders assign responsibilities and authority without considering true capabilities. Just because someone handles the checkbook at home is no reason to believe he or she can be the finance officer for the company. The best technical guru may not be the best to be VP of engineering or design. The person who had the idea may not be the best person to be president. The most outgoing individual, or the salesperson with a record of outstanding sales, is probably not the one to guide marketing and sales.

Being able to talk technically, or having a good sales sense, has nothing to do with being an outstanding marketing person. Outstanding salespeople generally think that good marketing is belly-to-belly selling or, increasingly, a solid web presence. Their marketing plan is to double sales next year. They fail to understand the total marketing concept. They believe that advertising, PR, selling and the other marketing activities are separate and independent functions.

Interrelation of Activities

There's a strong interdependence among all the parts of the marketing activity: pricing, packaging, positioning and service/support as well as advertising, public relations, selling, literature, and promotion. The successful company doesn't separate advertising plans from the other parts of their marketing activities. For example, public relations isn't just another promotional tool, it's an integral part of the company's overall positioning and strategy.

The primary purpose of the marketing plan is to make certain that all relevant facts are known so you are aware of the obstacles that have to be overcome. . . and the opportunities that can be exploited. Once these are identified, you can establish a realistic set of objectives and plan your actions to achieve those objectives.

The plan of action uses all of the marketing tools — advertising, selling, sales and support literature, website, social network activities, email communications, direct mail, public relations, pricing, packaging, training, customer support and so forth.

Social network and Web 2.0 firms spend tens of millions to attract eyes and gather clicks to "build market share/market awareness" and prove value. But when you look at their model there appears to be little or no concern about making a profit. . . now or in the far distant future. In two to three years, 70 percent of these firms will be the skeletons along the Internet superhighway.

They lack a real marketing strategy, substance or value. They also are completely devoid of an explanation of the value they are delivering to our global community.

Marketing Plans = Battle Plans

Isolated battles don't ensure total victory.

The firm's marketing plan is not an academic (or funding) exercise. The very act of putting the plan on paper requires a complete knowledge of the facts so that you will have a tighter, more foolproof plan. It will assist you in sizing up and structuring your market. It will also aid you in sizing up the market's total business volume.

Then, you can take your market's breakdown of sales and compare them with the patterns of spending with other market area and industry averages.

Properly done, the marketing plan will allow you to evaluate alternative methods of meeting marketing problems and objectives. It also provides evidence upon which sound business models, programs and ideas should be considered.

More importantly, the marketing plan produces a unified, cohesive program, which everyone in the organization can understand, use and follow. It helps you change the product/service mix when necessary. It shows the need for pricing changes, customer and repeat customer models as well as what portion of

the market or application area you are penetrating. The marketing plan can clearly show you who the prospective buyers are, where they are located, and what appeals are most likely to affect their purchasing decisions.

Plan's Components

Your marketing plan should be composed of six crucial elements:

1. Statement of Facts.

This is first and most important, because everything else depends upon a correct understanding of the facts surrounding the market segment, business, products and services. In general, the plan should include every fact that is of relevance to your marketing efforts. This includes an objective appraisal of your product/service line, sales history of the products, services, competitive situation, pricing and expenditures in past marketing activities. It should also include details on who the purchasers are, what their wants and needs are, and an analysis of your trade/business relations.

2. Problems and Opportunities.

Many problems can be turned into opportunities. What are the problems? They may be a product line or its pricing. They may be unsatisfactory sales support materials. They may be mistargeted advertising. There may be too little or no PR support to interpret the firm's products and services to the marketplace. Regardless of the problem, recognition is the first step in creating an opportunity.

3. Identification of Objectives.

Objectives such as "increase sales," "improve share of market," "increase vendor support," don't define the target enough. Objectives must be stated in terms of end results. For example, increasing ad readership is a desirable intermediate objective. The important thing is to increase the number of specifiers or buyers who receive the message and are informed or persuaded. There should be a clear distinction between objectives and budget forecasts. While objectives have to be realistically attainable, they should be sufficiently conservative so they can be realized. It is from these objectives that sales are projected, marketing expenditures determined and gross profits are established.

4. The Complete Marketing Plan.

If the statement of facts reveals that there are product, application support, or service shortcomings that are interfering with the success of your operation, the plan should recommend the corrective steps to be taken. The plan should suggest, consider and evaluate alternative marketing and promotional strategies. On the basis of that evaluation, it should include a recommendation of the particular strategy that appears most likely to succeed. Similarly, with respect to the execution of the promotional strategy. These alternatives should be presented fairly and objectively, with the pros and cons clearly spelled out. Only in this way is it possible to make sound business decisions.

5. The Recommended Marketing Appropriation.

The plan should include a recommendation for the total amount to be spent on marketing as well as the activities that will be funded. Dumping all marketing efforts online because that's what is in vogue right now doesn't fly. It should also include complete supporting rationale as to why these amounts are correct — based on the needs of the market you are targeting, the activities necessary to meet those needs, and the gross profit to be generated by the estimated sales volume.

6. Forecast of Volume and Profit.

Finally, the marketing plan should include a profit-and-loss projection based on a conservative estimate of the sales volumes to be attained, the gross profit to be realized at the proposed prices, and estimated costs. It should also include the deductions that must be made from that gross profit to arrive at a profit-before-tax figure.

The Business of the Business

A good marketing plan gives you a clear, comprehensive picture of the state of the business, its problems and its opportunities. It spells out the objectives that you consider essential, as well as the specific means by which they will be pursued.

It gives you the opportunity to judge the soundness of the strategic and tactical approach that will be taken. It puts everyone in the organization on record with marketing and sales objectives as well as expense and profit budgets. This should be your team's commitment to deliver the performance spelled out in the plan.

If the plan works — if it is right in its determination of marketing objectives, and if events prove that satisfactory progress has been made toward those objectives — then we assume it was a good plan.

Unfortunately, many people fall into a trap. They assume that just because a plan worked in 2008 that same plan is going to work in 2010 and 2012. They forget, or lose sight of the fact that the market, its wants and its needs isn't stagnant from one quarter to the next, let alone from one year to the next.

Frequent Evaluation

Another problem is that too many neophyte marketeers feel that, once they have successfully completed the annual marketing plan, they are free from the drudgery for another 12 months.

Wrong!

There are a lot of reasons for, and benefits to, a mid-year review. The obvious reason is that it helps in developing the next year's plan. More importantly, it helps realign and modify the present year's program, when necessary. Granted, reevaluation requires a little time and effort, but only a total fool follows a battle plan that isn't working.

And business is war — *each of us had better be fighting to win.*

About the author

MARKEN COMMUNICATIONS

In his more than 30 years in communications, Andy Marken has been involved with a broad range of corporate and marketing activities. His experience includes strategic and market planning and execution for more than 10 years with communications and Internet firms including AT&T and CERFnet as well as more than 15 years in storage, storage management and video solutions with firms including Philips, InterVideo, Ulead, Matsushita, Pinnacle, Dazzle, ADS Tech, Verbatim, Mitsubishi and Panasonic.

In My View

Chronicles of SATCOM: System Integrator

by Tony Radford, ***Paradise Datacom***

When the commercialization of SATCOM began in the mid 60s, telecom service providers and users alike were quick to realize the benefits satellite-based communications had to offer. Long before the introduction and proliferation of optical fiber, intercontinental communications was relegated to the use of low-capacity sub-oceanic copper cables or hand-delivery of the written word.

Following the launch (pun intended) of commercial SATCOM, telecoms operators learned they could establish reliable links quickly and begin capitalizing on the provision of services previously unimaginable by anyone other than Mr. *Arthur C.* himself. Spirited sports enthusiasts around the globe enjoyed the opportunity to view multi-national events as they happened.

Though it was the answer to many a telecoms operator's dreams, no one short of a wand-wielding techno-wizard had any idea of how it worked or how to build a system capable of exploiting this new black-magic technology. The knowledge-base required to architect Earth stations was held by a scant few. Some, seeing the potential bonanza looming on the horizon as the demand for satellite communications exploded, banded together and formed a new market segment of this promising new industry.

Today we pay tribute to one of the most under-appreciated pillars of our industry, that often faceless team of quintessential techno-geeks to whom we owe the formation and perpetuation of the industry we know and love. Yes – the SATCOM system integrator. Uncomfortably situated in the middle of the food chain, with "end-users" to the north and product vendors to the south, integrators are typically placed in the unenviable position of having to create much from little at a bargain price and over night. Do you want fries with that? They are fueled with proposal requests consisting of reams of documentation often wrought with impossible logistical hurdles, references to errored or non-existent technical specifications and commercial terms that appear to be based directly upon the provisions of Chapter 11.

Armed with extensive technical knowledge and years of experience as evidenced by the physical and psychological scars imposed upon them by an uncompromising customer base, they assemble a team of specialists — Project and System Engineers, Program Managers, Pursuit Strategists, logisticians, wiremen, installers and exporters — all anxious to tackle the latest challenge with little reward beyond obtaining a valid job-charge number for this week's time sheet.

With a finite selection of components and technologies from which to choose, like a Mexican restaurant that must create an entire menu from three basic ingredients — ground

beef, refried beans and cheese — they must interpret an often cryptic request and architect a solution that hopefully contains an element of uniqueness that will separate their offer from those of an army of competitors — that provides a value proposition no savvy customer could refuse.

Their commercial strategists go to work constructing a complex pricing workbook designed to capture and mask the intangible costs of their value-added services, which seems a bit ironic since customers, anxious to avoid design and deployment risks, seek the council of system integrators whose unique experience and knowledge is key to safely navigating the potential pitfalls of a poorly architected solution and resulting techno-disaster.

Countless hours are spent generating volumes of commercial and technical documents. With submission cut-off dates timed to the minute, proposal teams must run a protocol-laden obstacle course standing between a potentially winning offer and a straight shot to the "round file" due to some mundane detail such as a missing signature, an improperly dated bid-bond certificate or any one of a hundred catastrophe-causing details that will give Murphy the opportunity to end the race before the starting pistol is even fired.

Weeks, months — even years go by as the customer's evaluation committee scours the reams of information contained in the plethora of offers received, while others invest less effort in their purchasing decision than *Caligula* placed on his decision to execute one of his soldiers for flatulent behavior during a glut-fest of fatty goat meat and stale wine served from a gourd.

How Do YOU Spell "Dutch Auction"?

If the requirement, project budget, or for that matter — customer — survive this seemingly infinite gestation period, a contract award eventually ensues, ripe with the chance to declare victory over all other comers, but accompanied with the fear of having failed to account for a critical cost element, the looming risk of schedule delay penalties, or sobering realization of inescapable deployment challenges — everything except guaranteed profit.

I say to all customers, foreign and domestic; the next time your conference room is graced with the presence of a system integrator vying to provide you with a clever orchestration of buzzing fans, flashing L.E.D.s, and bent metal intended to enhance your bottom line, raise your glass, tip your hat, and toss him or her the thanks he or she deserves.

Hail the system integrator!

More Radford ruminations ***at this link.***

An Intro To Conditional Access System Monitoring

by Frank A. Ekern, Chief Development Engineer, ***Bridge Technologies***

For most digital TV operators, the ***Conditional Access*** *system is a vital component in a successful and profitable operation. Without the ability to encrypt the signals and thereby limit access to paying customers that a conditional access system provides, a broadcaster can't generate the revenue potential locked up in the content. But while most operators have personnel with traditional broadcasting skillsets, and knowledge of MPEG, DVB and networking, conditional access systems tend to be proprietary, and surrounded by a lot of secrecy.*

They are also complex and inevitably cause problems for DTV operators — problems that in-house staff find difficult to diagnose and remedy, partly due to the pervasive use of encryption in the system. The situation isn't helped by the typical symptoms reported by the subscribers: the black screen, or the 'no access' message. There's a dearth of specific information that can help trace the fault from the user end.

While most analyzers and monitoring systems follow the **ETSI TR 101 290** standard promoted by the DVB organization, conditional access systems aren't covered by this specification at all. It's a recipe for buck-passing: is the problem with the Conditional Access system, or the STBs? The smart cards or the multiplexer? Maybe the descrambling at the input of the headend has failed, or perhaps there is a network problem? Without the right tool, it is difficult for the engineers to know. And unfortunately, until recently, the tools to debug Conditional Access systems have been lacking.

A monitoring product which identifies faults with the Conditional Access system long before the customers notice them can save the operator money and prevent problems with dissatisfied customers. And by relatively simple means it is now possible to monitor and detect common problems that are likely to occur in a digital TV system.

But why do Conditional Access systems cause operators problems? In Europe, systems for satellite, terrestrial, and cable broadcast use the *Common Scrambling Algorithm* (**CSA**) to perform the actual encryption and decryption (scrambling and descrambling) of the TV signals. The unencrypted signal is fed into a scrambler that encrypts the signal using a random key called the *Control Word* (**CW**) according to the CSA algorithm. The descrambler decrypts the scrambled signals by using the same Control Word to reproduce the clear signal. For security reasons, the Control Word used for scrambling is changed regularly, usually every 10 seconds. The transport stream header contains two scrambling control bits that indicate which Control Word is to be used for descrambling, normally denoted **Odd** and **Even**. This allows the Control Words to be changed without causing any descrambling problems.

The Control Word is placed in an message called an *Entitlement Control Message* (**ECM**), which is encrypted in a proprietary way and then inserted into the Transport Stream. Most Conditional Access systems use smart cards that are inserted into the STB to handle the security, and the smart card receives the ECM associated with the TV channel, decrypts the ECM, and sends the Control Word to the STB so that it can be used to descramble the signal.

Figure 1 — The clear signal is fed into the scrambler which encrypts using the Control Word. The descrambler uses the same Control Word to recreate the original clear signal.

Entitlement Management Messages (**EMM**) are used to send entitlements to the smart card, so that it knows to "allow the user to view this group of channels the next month" or "allow the user to watch this Video on Demand movie". The set-top box receives the EMMs and forwards them to the smart card for processing. The smart card uses the information in the EMMs to update its internal access control database containing a list of channels and VoD movies the user is allowed to watch.

The EMM can authorize the smart card to allow viewing of a VoD movie for a couple of hours, or one or more TV channels for one or several months to come. When the smart card receives ECMs it will use the information in the smart card's internal access control database to decide if the user has access to the channel or not. If the user has access to the channel the decrypted Control Word will be sent to the STB which can then descramble the signal. EMMs are encrypted with a proprietary encryption method known only by the CA vendor.

If what you've read so far is making you think this is a pretty cloak-and-dagger world we operate in, sit tight, as the levels of encryption are still piling up! Most IPTV and cable TV operators receive a significant portion of their input signals in encrypted form, often over satellite. The various channels will come from different providers which all have different CA Systems. The first part in the turn-around of digital TV (DTV) signals is to descramble the incoming signals, but if the input signal for some reason cannot be descrambled the signal will still be encrypted with the original CA system. Then, later in the turn-around process, the signal will be encrypted with the operator's own Conditional Access system, causing the signal to be encrypted twice, usually leading to a black screen for end-users.

And there's more. Most content is normally scrambled in the headend, but scrambling in the edges of the network is becoming more popular. Scrambling in the edges are most commonly used to insert different local content in different regions and to scramble VoD sessions. No matter where the signals

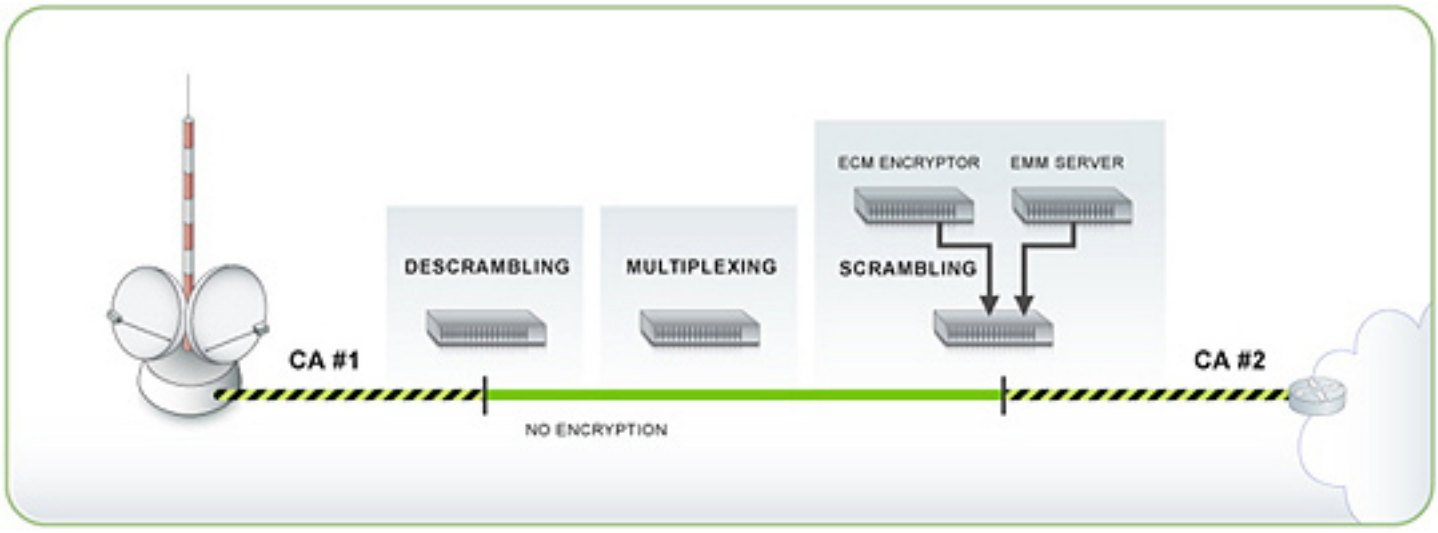


Figure 2 — The input signal is descrambled correctly and is then scrambled with the operator's Conditional Access system.

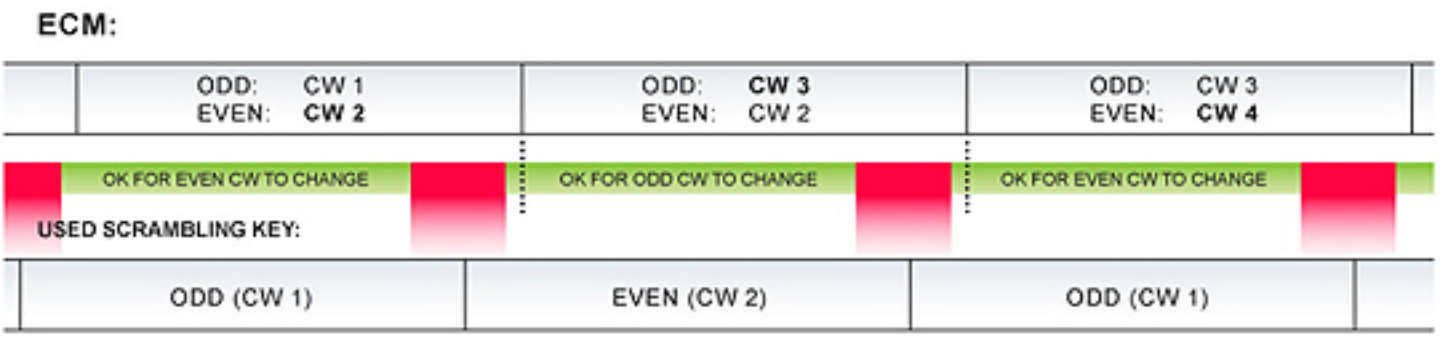


Figure 3 — The change of the ECM has to happen a certain time after the Control Word used to scramble the signal has changed. Similarly the change of the ECM has to happen some time before this new Control Word will start to be used to scramble the signal.

are scrambled, there are many potential problems along the way. The solution to problems caused by encryption/decryption failures is to monitor the signals after descrambling and before they are re-encrypted. To get effective monitoring, it is necessary to analyze the incoming signal in detail, especially the video PIDs.

For the best possible results, the system should check that the audio and video can be decoded. Ideally, the monitoring product should be able to extract thumbnail information from all streams and check audio levels. The ability to detect picture freeze and "black screens" is also highly useful, as these are problems which often occur when the digital signal is decoded and there are CA errors. This is normally done in a decode-recode process to change the bitrate/resolution of the input signal.

EMMs can also go missing for a variety of reasons. The first indicators of this scenario are if the operator does not have CA system monitoring and the would be customer calls to report no access to new channels they have ordered. First line support is likely to identify the fault as being with the smart card, and mail out new cards, until enough calls have been received for the support staff to identify a pattern and pass the problem to another level.

By the first day of the new month, if EMMs are still not being sent out, all subscribers will be denied access, and as the calls flood in, the CA expert is finally summoned. Contrast what happens with an operator equipped with CA system monitoring: here, as soon as the EMMs go missing the monitoring equipment raises alarms for all affected transport streams. The shift operator calls up the CA expert who fixes the problem in a matter of minutes — before any customers are affected by this short period without EMMs.

There are many other entry points through which faults can creep in to disrupt the smooth operation of the service, but the example above illustrates the difference a CA monitoring system can make in nearly all cases: it's the difference between a slowly unfolding disaster, the full extent of which is only known by the time it has inflicted most damage on the confidence of the subscriber base — and a quick correction that fixes the fault before it becomes a problem. Until now

Rackmounted version of the analyser with IP, ASI and QAM interfaces. ETSI TR 101 290 monitoring and monitoring of Conditional Access systems are supported on all interfaces. The analyser can also be fitted with COFDM and QPSK/DVB-S2 interfaces.

there have not been solutions available for monitoring the Conditional Access system and raising alarms — operators have either relied on manual inspection routines to detect problems or have let their subscribers act as the monitoring system. There's a high cost to pay for this approach though, in terms of maintenance staffing costs, and in customer dissatisfaction.

To be truly effective, Conditional Access system monitoring should be integrated with the overall monitoring solution, coupled with full ETSI TR 101 290 monitoring and monitoring of IP and RF transmissions to provide a powerful and complete monitoring system for Digital TV. The monitoring solution should also include an NMS system which aggregates errors from all the different analyzers placed in the network and displays not only a list of alarms, but also pinpoints where in the network the problem occurred and generates reports showing quality, jittering and other parameters so that the operator can see trends over time.

CA system monitoring is so important that **Bridge Technologies** has implemented it in all our ETSI TR 101 290 monitoring products and include it free of charge. We recommend all operators monitor their CA systems and add the missing link to their monitoring system.

About the author

Frank A Ekern has a master's degree in digital electronics and computer science from the Norwegian University of Science and Technology. Frank leads the development of the ETSI TR 101 290 monitoring functionality at Bridge Technologies, which provide a full end-to-end solution of products covering all the monitoring and analysis needs of Digital TV operators. Previous jobs include working with Conditional Access systems at Conax and development of monitoring and analyzing products at Tandberg Television.

The Scheduling + Allocation Of Broadcast Resources

by Barry Lyne, Managing Director, ***ScheduALL EMEA***

Arqiva operates at the heart of the global broadcast and mobile communications industry. With a heritage dating back to the start of ITV in 1955, the company has played a leading role in the introduction of digital terrestrial television and radio in the U.K. Arqiva today provides much of the infrastructure behind television, radio, and wireless communications in the U.K. and has a growing presence in Ireland, mainland Europe, and the United States. Within Arqiva's worldwide footprint are an award-winning infrastructure of 10 international teleports in cities including London, Washington D.C., Los Angeles, and Paris; more than 100 Earth stations; and a global terrestrial fibre network.

Arqiva provides transmission for all U.K. terrestrial TV broadcasters, with scores of full-time TV channels uplinked from the company's satellite teleports. In addition to contracting for permanent links, Arqiva provides occasional use services to broadcasters requiring temporary connections, typically for news, sports, and special events, or needing ad hoc telecom or conferencing links. Arqiva's fixed broadcast service resources, including studios and post-production facilities, are complemented by the company's own fleet of *outside broadcast* (**OB**) and *satellite newsgathering* (**SNG**) vehicles. All of these operations also contribute to the company's non-permanent satellite transmission services.

To streamline the booking and allocation of resources for ad hoc and non-permanent satellite and transmission services around the globe, Arqiva relies on **ScheduALL**'s ***ScheduLINK*** transmission management and optimization software. The extensive deployment of ScheduLINK across Arqiva's occasional use and SNG business, as well as its permanent studio facilities and state-of-the-art OB units, simplifies the coordination and provision of transmission packages of any size and complexity. ScheduLINK brings speed and agility to Arqiva's substantial and varied business, enabling the company to take bookings for customers and, in turn, quickly schedule and allocate resources from different business areas to address even the most complicated implementations.

Situation Analysis

Arqiva has experienced spectacular growth in its satellite services business over the past five years, going from US$50 million to US$350 million in yearly revenues through a combination of acquisitions and new business. With this growth in resources came the ability to provide broadcasters, channel providers, and content owners with a complete portfolio of satellite and terrestrial broadcast media solutions. To pull its existing and newly acquired resources

together in offering such services, the company sought to replace legacy and manual scheduling systems with a robust resource management solution that would enable it to identify and then allocate service components in a way that fits the customer's product and delivery model.

"ScheduALL was an obvious candidate for our operations because the company already completed successful software implementations in the broadcast and satellite space," says *Julian Portman*, finance director at Arqiva Satellite and Media. "Our operations present a significant challenge because they require the application of features across many different business areas. As a result, ScheduALL's experience in addressing resource allocation across companies like Arqiva's was key to our decision to work with ScheduLINK. We plan to grow our business along with the software, competing with other businesses in providing everything from the simplest service to the most complex package."

As Arqiva offers a variety of end-to-end services that span multiple business units, the scheduling of all required resources for a project is a complicated undertaking. Whereas competing companies in the OB market need only schedule trucks, staff, and possibly some equipment, and competitors in the satellite business need only book satellite bandwidth, Arqiva schedules every required resource on the signal transmission path, often from the studio or production truck to the target destination.

"We do much more than sell our customers a simple uplink; we offer end-to-end satellite transmission services that can be quite complex, and we use ScheduLINK software extensively across our business to schedule the people, facilities, equipment, bandwidth, switching arrangements, and other resources that make these services possible," says *Portman*.

An Integrated Solution

Arqiva placed its ScheduLINK order in February 2008, took the system live in its U.K. master control rooms four months later, and subsequently rolled the system out to master control rooms in the United States and France, as well as for scheduling of its studios in London, Gerrards Cross, and Feltham; SNG trucks located throughout Europe; and outside broadcast service based in Nottingham.

The company's ScheduLINK system today serves as a common solution for efficient management of the multiple resources required for occasional use services, whether for studio production and transmission, mobile production for sports and live events, newsgathering in the field, or delivery of content to or from a post-production facility. Working within the ScheduLINK interface, Arqiva's team of experts can manage resources supporting the entire broadcast chain, from cameras and operators to SNG mobile uplinks and global satellite distribution. Leveraging these resources jointly in the service of a single project or customer, Arqiva can offer a broader, more comprehensive range of services using its existing pool of staff, equipment, and satellite capacity

Operations

By facilitating bookings across countries and different parts of Arqiva's business, ScheduLINK enables the company to expand its service offering, improve competitiveness against local providers, and increase overall opportunities for revenue generation.

Arqiva's Los Angeles dishes

"There are different methods of delivering a signal from a sports ground, for example, depending on the telecom provider, production company, and holder of distribution rights, among many other factors," says *Portman*. "All of these elements affect the resources we can line up to handle a particular signal. With standard route and resource sets linked together on the ScheduLINK software system, our staff can quickly work out the best solution for all but the most specialized projects and complex logistics. Even in those cases, ScheduLINK automates the bulk of the booking and provides the result to logistics staff in a convenient electronic form."

ScheduALL In Operation @ Arqiva's Newman Street Ops

Equipped with a rich resource database that includes technical data and information specific to elements such as client, event, and transmission route, ScheduLINK simplifies the booking process and prevents costly conflicts in the allocation of resources. With the shift of bookings staff onto ScheduLINK has come not only greater automation of recurring tasks, but also better instructions for the operators involved in facilitating transmissions. The software's BandPlan module provides the bandwidth scheduling flexibility that is so important in occasional use services.

As ScheduLINK maintains real-time scheduling data around the clock,

bookings staff in the U.K., France, or the United States can allocate resources from multiple sites with confidence and without delay. This capability enables the company to offer a broader range of services more competitively. As the company continues to expand its use of ScheduLINK, *Portman* anticipates that the ability to build comprehensive packages for complex jobs will help Arqiva to challenge conventional suppliers for some of Europe's most prestigious live sports' events.

Finance

Quotes built within ScheduLINK apply real-time cost data as resources and services are pulled into the booking. By automating the recording and issue of purchase orders for resources, ScheduLINK benefits both Arqiva and its suppliers. Internally, the system uses this data to set out specific job requirements for staff. For suppliers, ScheduLINK automates inclusion of this data into the quote and provides fast, easily tracked electronic notification of procurements, in turn enabling both Arqiva and its suppliers to be more responsive to requests made on short notice. Once the service has been completed, Arqiva uses ScheduLINK data to assess the profitability of the quoted job.

Arqiva's first step in leveraging ScheduLINK's reporting data has been to identify bottlenecks in the provision of occasional use services. The software's production reports are used to show key historical and projected targets, utilization graphs, and detailed and summary usage reports. With better information and reporting on how well internal and external resources are being used in service provision, Arqiva can better determine when to own or buy a resource. This information also allows staff to see how bottlenecks in resource use and allocation directly affect the company's productivity and profitability.

While Arqiva's plans for ScheduLINK include eventual links into a separate financial system, the company has

implemented its ScheduALL software as a stand-alone system. Because the accounting system can't keep up with the scheduling and resource allocation demands of Arqiva's fast-paced occasional use business, the ScheduLINK software is configured to pass final financials on to the company's **Oracle** system.

Administration

By consolidating the scheduling of a broad array of resources within a single software system, ScheduLINK allows Arqiva to adapt to the rapidly changing needs of its customers and the unique demands of breaking news and live event broadcasts. In addition to the actual assignment or procurement of satellite space and the arrangement of switching between circuits, such a booking might include allocation of studio space or a newsgathering truck; management of equipment and resources such as the encoder, antenna, satellite circuit, and decoder; and assignment of existing and freelance staff across the project.

With time and bandwidth at a premium, ScheduLINK provides time-saving bookings tools, ensures the validity of those bookings, helps to maximize use of available satellite capacity across Arqiva's European and U.S. operations, and improves overall productivity by enabling convenient communication of job details to scheduled personnel. The ability to book complex jobs accurately and quickly makes Arqiva a highly competitive provider that operates more cost-effectively and realizes an improved ROI through better use of its many resources.

"The ad hoc satellite business demands that providers be ready to spring into action at a moment's notice," adds *Portman*. "To provide the quality and type of services that make us successful, we need the right resources in hand and the right technology at our disposal. ScheduLINK gives us the flexibility and agility that are essential to effective resource management for ad hoc and non-permanent services. Serving as a key business tool that puts our business on a competitive footing now and going forward, ScheduLINK has been well worth the investment."

Efficiencies = Effective Ops

Arqiva's extensive implementation of ScheduLINK demonstrates how a flexible transmission scheduling and resource management solution can be adapted to provide dramatic operational efficiencies and valuable versatility in meeting the unique needs of each client and booking. As Arqiva continues to apply the benefits of a broad enterprise resource management and scheduling solution across its occasional and ad hoc satellite services, the modular design of ScheduLINK will provide the industry-leading company with added efficiencies in delivering timely, competitive, and profitable transmission services.

About the author

Barry Lyne has extensive leadership experience in driving organizational and sales growth for software companies on an international basis. Prior to joining ScheduALL, Lyne spent 18 years as Managing Director for a consortium of global software companies, and also held senior sales management positions at Hewlett Packard. Lyne's broad expertise has spanned high growth businesses within the Broadcast, Media, Publishing and Manufacturing sectors.

Securing Space: The Space Security Index

"Space is in the news more than ever. With both Iran and North Korea developing space programs, and with both the United States and China demonstrating new capabilities to shoot down satellites, international concerns for space security have never been greater. In the Space Security Index, policy makers, journalists, and technical professionals, as well as those just interested in space, have a single reliable resource for information on space security. There is no more comprehensive and up-to-date source of information on developments in space, and the threats to space security." — Hon. Philip E. Coyle, Senior Advisor, Center for Defense Information, Former Assistant Secretary of Defense and Director, Operational Test and Evaluation, U.S. Department of Defense

This article excerpts material from the sixth annual report on trends and developments related to security and outer space, covering the period January to December 2008. The report itself is part of the wider ***Space Security Index*** (**SSI**) project that aims to improve transparency with respect to space activities and provide a common, comprehensive knowledge base to support the development of national and international policies that contribute to space security. The definition of space security guiding this report is in keeping with the express intent of the *1967 Outer Space Treaty* that space should be preserved as a global commons to be used by all for peaceful purposes:

The secure and sustainable access to, and use of, space and freedom from space-based threats.

This broad definition encompasses the security of space as a particularly unique environment, the security of Earth-originating assets in space, and security from threats originating from space-based assets. The primary consideration in the SSI definition of space security is not the interests of specific national or commercial entities using space, but the security of space as an environment that can be used safely and sustainably by all.

Space Security 2009 does not provide absolute positive or negative assessments of 2008 outer space activities. Instead, the report indicates the range of implications that developments could have on the security of space across the various indicators and highlights the difficult challenges faced by policymakers.

Insight

The Space Environment

Trend 1.1: Growing risk to spacecraft as orbital debris continues to increase — Traveling at speeds of up to 7.8 kilometers per second, space debris poses a significant threat to spacecraft. The number of objects in Earth orbit has increased steadily; today, the U.S. Department of Defense (DOD) is using the Space Surveillance Network to track more than 19,000 objects approximately 10 centimeters in diameter or larger. It is estimated that there are more than 300,000 objects with a diameter larger than one centimeter, and millions smaller. The annual growth rate of new debris tracked began to decrease in the 1990s, largely due to national debris mitigation efforts, but has accelerated in recent years.

2008 Developments

- ***Short-lived debris created by destruction of USA-193 satellite to mitigate risk posed by reentry***
- ***Growth rate of new space debris declines for first time in four years***
- ***Increased risk of spacecraft posed by debris***

With no major on-orbit fragmentations in 2008, there was minimal additional risk by new debris, but existing debris continues to pose hazards to operational spacecraft, particularly in Low Earth Orbit (LEO). Concerns are also raised by intentional satellite breakups, as well as the ongoing presence in orbit of satellites with a history of severe fragmentation.

Although relatively little lasting debris was created, the U.S. destruction of the failed ***USA-193*** satellite prior to its reentry in Earth's atmosphere raises a challenge for space security in which the sustainability of the space environment can potentially conflict with security from threats posed by objects in space.

TREND 1.2: Continued efforts to develop and implement debris mitigation practices — Significant on-orbit collisions, such as the collision of the French military satellite ***Cerise*** with a portion of an ***Ariane*** rocket in 1996, and improved tracking abilities have encouraged the recognition of space debris as a growing threat. Since the mid-1990s, many spacefaring states, including China, Japan, Russia, the U.S., and the European Space Agency, have developed debris mitigation standards, and the United Nations has adopted voluntary guidelines.

Reporting by some states on efforts to implement the *Debris Mitigation Guidelines* of the *U.N. Committee on the Peaceful Uses of Outer Space* (**COPUOS**) and evidence that some states are factoring the guidelines into decision-making are positive signs that the Mitigation Guidelines are becoming part of state practice. However, responsible actions by a few spacefaring states will not guarantee progress in reducing the creation of space debris. In particular, efforts are needed to make emerging and developing space states aware of the consequences of space debris and their international responsibilities, and to help them develop the technical means to meet those responsibilities. Finally, while the U.S. asserts that it adhered to the guidelines when destroying the de-orbiting USA-193 satellite, it is not clear how other states may engage in similar actions over the long term.

TREND 1.3: Space surveillance capabilities to support collision avoidance slowly improving — Efforts in the 1980s to create an international space surveillance system to support collision avoidance and debris reentry were unsuccessful, but several states have pursued national systems. The *U.S. Space Surveillance Network* uses 30 sensors worldwide to monitor over 19,000 space objects in all orbits, but since 2004 has provided limited access to its data, out of concern for national security. Russia maintains a Space Surveillance System using its early warning radars and monitors some 5,000 objects (mostly in LEO), but does not widely disseminate data. China, the EU, France, Germany, and Japan are all developing independent space surveillance capabilities. Discussions have once again been initiated about the practicalities of sharing such data.

2008 Developments

- ***The U.S., European Space Agency, and Russia take steps to improve access to independent space surveillance data***
- ***Efforts to better coordinate international space surveillance data increase***

The various national efforts to improve independent space surveillance capabilities in 2008 are positive for space security because they provide better and redundant tracking of space objects and greater transparency of space activities. However, ongoing

challenges to greater cooperation and collaboration include hesitancy to share information on satellites that are deemed sensitive, particularly as space surveillance information can be used to support space negation efforts; and technical difficulties associated with combining information in various formats and from different types of sensors. Consequently, the use of orbital data to adequately support collision avoidance remains limited, but events in 2008 indicate that such use may increase in the near future.

TREND 1.4: Growing demand for radio frequency spectrum and orbital slots — Expanding satellite applications are driving demand for limited resources in space, including radio frequencies and orbital slots. Satellite operators spend significant time addressing frequency interference issues, including conflicts such as the disagreement over frequency allocation between the ***U.S. Global Positioning System***, the EU ***Galileo*** system, and the Chinese ***Beidou*** system.

The growth in military bandwidth consumption has also been dramatic: the U.S. military used some 700 megabytes per second of bandwidth during operations in Afghanistan in 2001, as compared to 99 megabytes per second during *Operation Desert Storm* in 1991. There are more than 800 operational satellites in orbit today. Increased competition for orbital slot assignments, particularly in GEO where most communications satellites operate, has caused occasional disputes between satellite operators. The **International Telecommunication Union** has been pursuing reforms to address slot allocation backlogs and related financial challenges.

2008 Developments

- ***Continued uncertainty regarding future satellite navigation signals***
- ***Efforts to overcome the costs of unintentional signal interference***

Developments in 2008 further highlight both the scarcity of available slots in the radio frequency spectrum and the challenges with the existing governance mechanisms. In particular, the Chinese plan for *Beidou* appears to be consistent with current ITU regulations, and efforts to resolve the issue of frequency coordination were complicated by untimely release of technical details about Galileo. Moreover, as military and economic interests drive the growth of competing systems for similar services, additional demands are also made on their related orbits — in this case, highly elliptical orbit.

Determining the nature of solutions to satellite signal interference, both accidental and hostile, will continue to be a challenge for the foreseeable future and is a significant deterrent to space security.

Commercial Space

Trend 2.1: Continued overall growth in the global commercial space industry — Commercial space revenues have steadily increased since the industry first started to grow significantly in the mid-1990s. Global commercial space revenues, dominated by satellite services, have been estimated as totaling between US$144-billion and US$175-billion in 2008. Individual consumers are a growing source of demand for these services, particularly satellite television and personal GPS devices. In recent years, Russia has dominated the space launch industry, having the most commercial launches, while U.S. companies have led in the satellite manufacturing sector. However, international competition in both of these sectors is increasing.

2008 Developments

- ***Continued industry growth driven by consumer services and a strong satellite replacement market***
- ***Growing international competition from China, India, and Japan***
- ***Growth opportunities for small, low-cost satellites may expand access to space***

Although the strong commercial launch industry in 2008 was in part due to the ongoing replacement of satellites, continued growth is also seen in satellite services and ground equipment revenues, driven by consumer-oriented products. Ongoing growth of the industry suggests that there is overall confidence in the security of space and the ability of both companies and consumers to continue to rely on space resources.

Further, individual consumers continue to become more significant stakeholders in space. Growing competition in the commercial launch market may contribute to space security by providing greater access to outer space, although tensions may arise if future demand for space resources such as orbital slots and radio frequencies exceeds supply. Currently, however, the positive gains in the sector's value and ubiquity outweigh the greater friction with respect to supply and demand.

Trend 2.2: Commercial sector supporting increased access to space — Commercial space launches have contributed to cheaper space access. The cost to launch a commercial satellite into GEO has declined from an average of about US$40,000/kilogram in 1990 to US$26,000/kilogram in 2000, with prices now stabilizing. The commercial space industry is also opening up access to Earth imaging data, which until a few years ago was only available to a select number of governments.

Today any individual or organization with access to the Internet can use these services through *Google Maps*, *Google Earth*, and *Yahoo Maps* programs. An embryonic private spaceflight industry continues to emerge, seeking to capitalize on new concepts for advanced, reliable, reusable, and relatively affordable technologies for launch to suborbital trajectories and low Earth orbit.

2008 Developments

- **New launchers entering the market increase capacity, but no indication of further launch cost reductions**
- **Private human access to space slowly progressing**
- **Commercial actors continue to expand availability of Earth imagery**

Sustained competition in commercial space launch may slightly reduce the cost of access to space in the near future, but in the absence of revolutionized technologies, there is not likely to be a significant impact on space access. Moreover, while efforts are being made to support private human access to space, such access may cause challenges to space security, both in terms of the sustainability of the space environment as well as the applicability of international laws, such as the *Astronaut Rescue Agreement*.

Finally, while the space industry is facilitating greater use of space applications, in particular remote sensing data, there are legitimate fears about the security implications on Earth of widely available imaging data.

Trend 2.3: Government's dependency on the commercial space sector means that subsidies and national security concerns continue to play an important role — The commercial space sector is significantly shaped by national governments with particular security concerns. The *1998 U.S. Space Launch Cost Reduction Act* and the *2003 European Guaranteed Access to Space* program provide for considerable government subsidization of the space launch and manufacturing markets. The U.S. and European space industry also receive important space contracts from government programs. In 1999 the U.S. placed satellite export licensing on the State Department's *U.S. Munitions List,* bringing satellite product export licensing under the *International Traffic in Arms Regulations* (**ITAR**) regime and significantly complicating participation by U.S. companies in international collaborative satellite launch and manufacturing ventures.

2008 Developments

- **Military dependence on commercial space services continues to expand, deepen relationships between governments and commercial sector continue to evolve toward more substantial partnerships**
- **Ongoing debate over how to apply trade restrictions for security purposes**
- **Commercial operators engage in space governance**

The strong relationship between military and commercial uses of space and the security dimensions of many commercial services have complex impacts on space security. On the one hand, multiple-use spacecraft could become military targets in the future, resulting in an overall decrease in security.

Alternatively, the proliferation of dual-use assets in space could make a military attack less useful and, therefore, less likely. This could increase overall space security. The focus of the year has been a constant discussion on changes that ought to be brought about in ITAR to increase the commercial competitiveness of the U.S. satellite and launch industries, specifically in the light of the ITAR-free satellites manufactured by Europe for the Chinese market.

About the report

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Product Perspective

The Vision For Airborne Broadband

ViaSat ArcLight technology builds a network — and business case — for in-flight broadband to business jets. With a 75-year history in communication networks for aviation, ARINC knows the performance aviators demand and the strict guidelines the industry maintains. That was the environment ARINC faced in seeking to bring broadband data connections to business aircraft.

The prevailing industry-standard data rate of just 64 kbits-per-second was slipping far behind the broadband connections enterprise customers enjoy on the ground. Additionally, business jet customers are typically technology advocates and early adopters: they need good connections to the home office when they travel and demand the cutting edge of technology in their business and leisure pursuits.

Now More Than 70 Installed, Operating Systems

To fill such needs, the ***SKYLink Broadband***[SM] Service was launched, a revolutionary in-flight broadband service from **ARINC *Direct***[SM]. This high-speed satellite connection can change a corporate aircraft into an "office in the sky." SKYLink Broadband allows business aviation passengers to remain connected — at speeds more than 6x faster than a cable modem — even at 30,000 feet. Passengers can download data to the aircraft at up to 3.5 Mbit/s, while sending data from the plane at 128 kbit/s. The service comes at an "all you can eat" fixed price and every link is secure, as well — each aircraft is on its own *Virtual Private Network* (VPN) within the system. **SES Americom** is partnering with ARINC to provide ***SKYLink***, supplying satellite transponders and funding for the project.

To make the service a technical and business success, ARINC turned to **ViaSat** satellite networking technology. ViaSat is supplying a complete airborne broadband terminal and ground system, available both as a retrofit for larger business aircraft and as original equipment in new corporate jets, the first being GulfStream Aerospace.

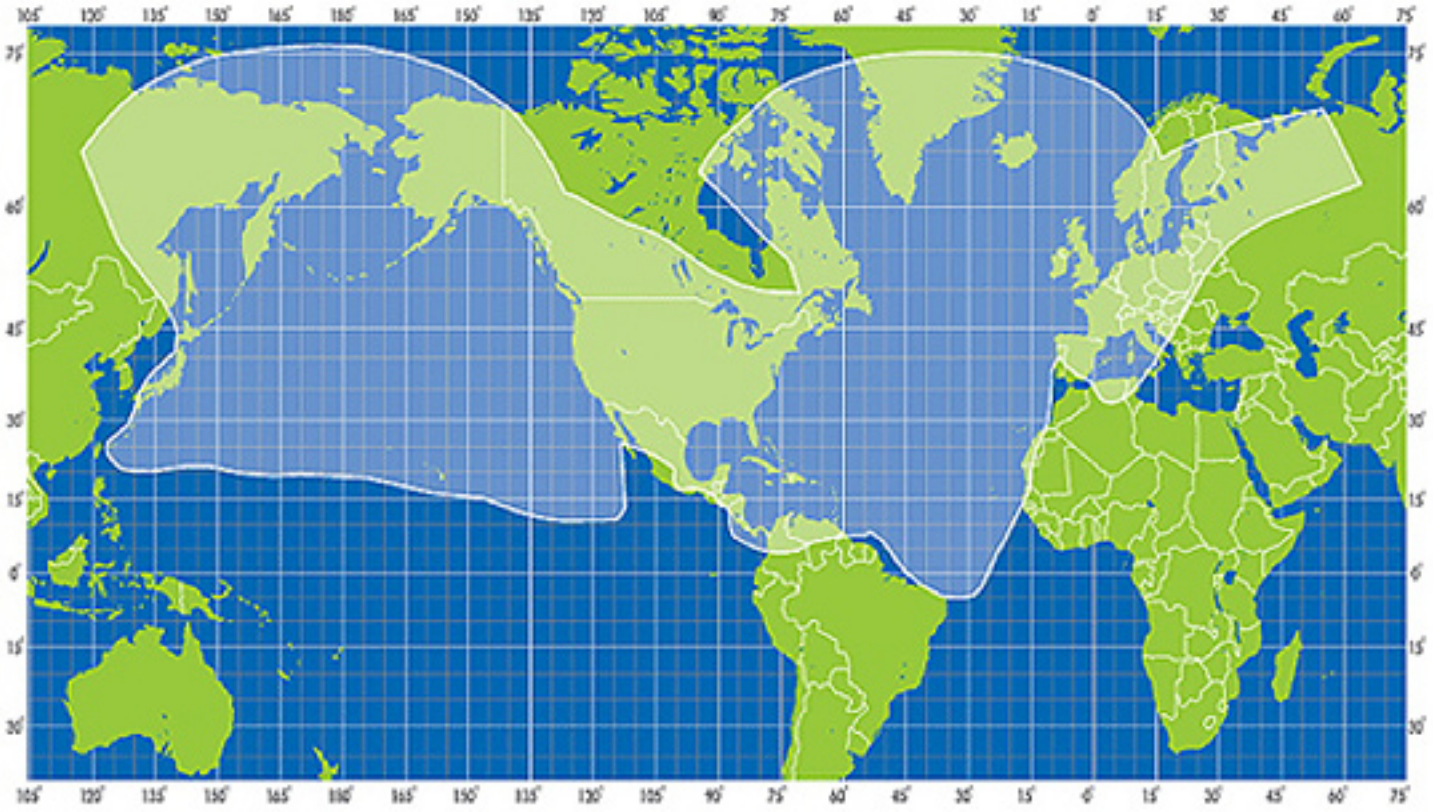
The Lower Cost, Higher Speed Combo

The airborne system builds on **ViaSat *ArcLight*** CDMA broadband VSAT technology. ArcLight satellite communications technology introduces new breakthroughs in satellite network waveforms, frequency reuse, and return channel technology. The result is efficiency, lower costs, and added data security.

"Our competitive advantage is definitely the ArcLight technology. We can put 250 business jets on a single transponder," said *Bob Thompson*, senior director of satellite services at ARINC. "That is very efficient and a very compelling business model."

ViaSat ArcLight VSAT Technology

To reach that level of operating efficiency, ArcLight incorporates two ViaSat-exclusive technologies: *Code Reuse Multiple Access* (**CRMA**) and *Asymmetric Paired Carrier Multiple Access* (**A-PCMA**). PCMA enables data transmissions coming back to the hub from remote sites to be combined within the same bandwidth as the outbound channel. Rather than requiring additional bandwidth for return channels, ArcLight needs only the space segment required by the outbound broadcast to



SkyLink coverage map

support two-way satellite services. Several benefits are the result:

- ***More efficient use of bandwidth especially for completely random traffic patterns***
- ***Full use of bandwidth without loss of data throughput due to reservation schemes or contention-based protocols***
- ***Less power required through spread spectrum transmissions***
- ***Encoded signals with a combination of CRMA and PCMA technologies***

A key hurdle in developing SKYLink was placing an antenna onboard that could receive broadband data. Anything added to an aircraft must always be as small and as lightweight as possible. The CRMA spread spectrum waveform is the answer, as the lower power requirements open up applications that need smaller satellite antenna sizes, as opposed to standard VSATs. The antenna used for the SKYLink mobile broadband system is less than 24 inches in diameter.

The SKYLink installation includes a tail-mounted antenna and a satellite transceiver on the aircraft. The Ku-band satellite network is expanding to offer end-to-end, seamless roaming extending over most popular air routes. Global coverage is expected to be in place by the end of 2010. ARINC estimates that there are 1,200 "larger" business jets in the U.S. that can accommodate the service, and 2,000 such jets worldwide. Other mobile applications could follow, as well.

About ARINC Inc.

ARINC Incorporated is the world leader in transportation communications and systems engineering. The company develops and operates communications and information processing systems and provides systems engineering and integration solutions to five key industries: airports, aviation, defense, government, and surface transportation. Founded to provide reliable and efficient radio communications for the airlines, ARINC is headquartered in Annapolis, Maryland, with more than 3,000 employees worldwide.

In My View

Thoughts On Satellite Filings

This article, authored by Chris Stott, the Chairman and CEO of ManSat, is excerpted from Near Earth LLC's newsletter, with permission from the author and the publishing company.

*The possible reform of the **International Telecommunications Union (ITU)**, or the regulatory process with which it manages satellite services, is a topic that is always on the minds of many in the satellite industry. This is because it is only through the ITU in Geneva that our national regulators, and then the satellite industry, gain access to the lifeblood of our business, radio frequencies. Any changes to this process affect all in the industry, from satellite operators to investors, and this is why it is such an important topic.*

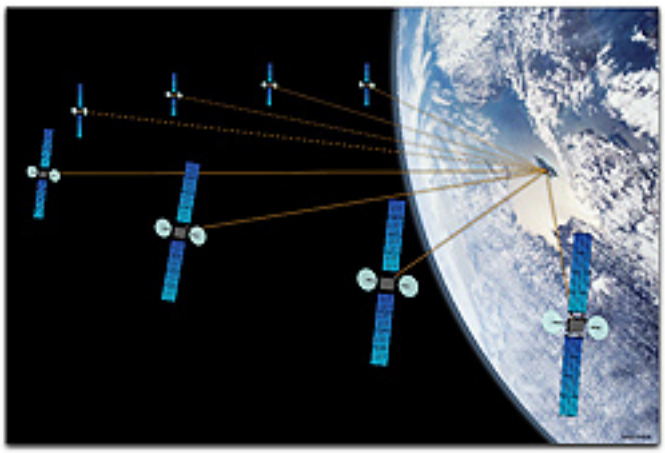
Obtaining access to those most vital frequencies is seen as high art by some and as voodoo by others. Yet, if you take the time to understand what is actually going on, it can be a deeply fascinating and ultimately transparent process. There is a lot of relevant history out there surrounding satellite filings and if you'll allow me to delve into recent events, we will try to expound upon them, see their impact on the potential future, and shed light on what is going on today.

Before commercial satellite operators were instrumental in creating today's industry, the market was served by inter-governmental organizations (IGOs) such as Intelsat, Eutelsat, Intersputnik, and Inmarsat, some of which are today private companies. In the early days of the industry, there was an informal 'gentlemen's' agreement' where those administrations responsible for IGOs made satellite filings purely to meet the needs of those organizations.

Once access to orbital positions/frequencies was fully commercialized, many sought different approaches to seek greater commercial opportunities. This led to the situation that we have today – where we find the geostationary orbit very much congested and difficult to access the finite amount of frequencies associated with satellite services.

The ITU and national administrations have worked proactively to tackle the congestion in the arc and filing process. This is why today we have due diligence processes for satellite filings at national administrations and at the ITU to try to sort the wheat from the chaff. The additional workload created at the ITU resulted in charges being levied on those making satellite filings. It is very much a case of cause and effect.

Filing is also a competitive process, as of course all commercial operators in many different countries compete to gain the best orbital positions and frequencies to meet their business needs. Yet at the same time, these commercial operators, and those in associated businesses often band together to work well as an industry, for example, when facing encroachments upon our limited frequencies.



Radio frequencies are a valuable and finite natural resource and the demands upon their use are increasing almost daily with every new digital technology that rolls out. There is only so much spectrum. We can't make

any more. We often see the terrestrial sector that we serve as an industry competing with the satellite sector for access to spectrum. For example, in recent years the satellite industry, working together as a collective, fought off encroachment of mobile services into the C-band. This showed us that we have to defend what spectrum we have while working to gain access to new bands to allow the growth of our own businesses. We cannot take spectrum for granted.

When looking at spectrum concerns there are a whole host of issues and contributing factors, both space-based and terrestrial-based, and it's not just the focus of the ITU, but the whole scope of the sector that we have to consider. We can't hope to cover them all here, but we will try to touch base on some relevant examples. Nothing is ever perfect, but the system does work.

Another important factor is market access or opening your skies to allow satellite operators to land signals to create new services and competitive prices for the market in that country. Although there has been so much progress with guidelines agreed at the *World Trade Organization*, satellite operators do spend disproportionate amount of time, in comparison to their terrestrial counterparts, in gaining access to markets. There is the potential to do more to ensure equitable access to markets to satellite operators.

Another area of recent activity is in the realm of 'phantom' satellites, orbital filings where a nation has *Brought Into Use* (**BIU**) an orbital filing, yet where no satellite actually exists. The recent **ITU Circular Letter # '301'** addresses this and is asking for every national administration in the world to re-examine their satellite fleets and orbital filings to ensure that they tally with reality. Another hopeful freeing up of a vital resource from which we can all benefit.

For example, we can see this in another recent development, where the **European Union** has taken steps to assign frequencies/orbital positions for EU wide satellite applications, for them a next logical step onwards from their terrestrial work. However, what might work well for terrestrial cell phones or for broadcasting on the ground, doesn't always work well in space and is inconsistent with the ITU process established under an international treaty. We can never take our eyes off the ball, not even for one moment.

It can be said that 'change is the only constant' in satellite filing. As the ITU and our national administrations work to adapt the filing process to meet and serve the ever evolving spectrum environment, we find ourselves facing the fact that we have to work with them on this.

At the end of the day, ours is also a small industry and this is especially so in the arcane realm of orbital filings. I've been fortunate to have spent time working in politics in both Washington DC and in Westminster and I can honestly tell you that the negotiating and diplomacy I witnessed there are nothing when compared to the skills I've seen displayed by the regulatory teams around the table at a frequency coordination meeting. If you ever have the chance to attend such a meeting, I would highly recommend it. It is at the same time both enlightening and heartening to see the experts, regulator and commercial counterparts alike, at work. Professionals competing for a resource, yet cooperating to make it happen: it gives true meaning to the word integrity.

The satellite industry is somewhat unique in that we work more closely with the ITU than almost any other industry in the world. Our use of radio spectrum crosses continents and connects them and is truly international in nature. It's unique in that the ITU maintains the Master Frequency Register for our orbital filings. It gives our industry a unique perspective that can be most valuable.

Spectrum is also increasingly scarce in orbit. Nations compete for it. We compete for it. It drives our industry. Yet, it is a part of our industry that is known and understood by relatively few. We tend to focus on the satellites and launch vehicles, and on the revenue, which is all good and well. Yet you'll see that those companies who also focus on the frequencies are usually those who are leading the market.

These companies also tend to be the leading voices via the industry's various associations, who are the focal points for the coming together of the industry to discuss and to act upon its frequency concerns: the *European Satellite Operators Association* (**ESOA**); the *Cable & Satellite Broadcasting Association* of Asia's (**CASBAA**) *Satellite Forum*; and the U.S. based *Satellite Industry Association* **(SIA)**.

One of the better ways to understand the issues around orbital filing and radio frequencies is to get involved with, and to support, these and other industry associations. We can't expect the ITU to solve the issues for us; instead we have to work with them to solve them together for us all and we can achieve this by becoming more engaged in the radio frequency process via our industry associations.

Yet, do we really want a perfect regulatory world? An awful question to ask, I suppose? How nations approach the ITU filing process does differ. These nuances do make a difference. Satellite filings are the keystones for any satellite venture. Satellite filings are obtained by working with the ITU via a national government. Jurisdictions around the world compete for this business. **ManSat** works on behalf of the *Isle of Man* in this regard. ManSat believes that although the system is not perfect, it works reasonably well, and it allows for competition which ultimately benefits the market.

In closing, it's always easy to criticize any organization or any process, but at the end of the day we must remember that those working at the ITU and as our national regulators are doing a great job under increasingly difficult circumstances. These are people who work hard with very limited resources to make

our work possible. Given the importance of radio frequencies, it would come as a shock to many at how little resources our national and international regulators have to work with. There are so many competing demands, yet the regulators have to balance all of them. It is increasingly a very difficult, yet ever more important role that they play.

The closer you work with your respective regulators the better you are able to ensure that they understand your needs. They can't represent you if they don't know what your needs are. The Satellite Filing process is a superb example of such a relationship where those who successfully work in transparent partnership with their regulators progress at all levels, and it must always continue to be a partnership as opposed to an adversarial relationship.

Every question our industry faces in the future as it continues to grow hinges around the use and growing scarcity of spectrum, which in turn depends greatly upon the smooth and rational functioning of the regulatory processes with which we continue to work. How will we integrate Space Based Solar Power into the geostationary arc? How will we land their power signals into an already congested terrestrial frequency environment? How will we commercialize the Moon and the space between it and the geostationary arc? Yet these are just two of many new ideas being pursued by venture companies today that could be the new '*Googles*' of tomorrow.

One final thought is that your regulators and frequency experts have been doing too good a job. No, really. They have been working so well that the rest of the world, let alone the rest of the industry, often forgets that they are there and their work goes unnoticed. They make the impossible look easy. It's always about the frequencies…

About the author

Chris Stott is Chairman and CEO of ManSat LLC and is also the Isle of Man's Honorary Representative to the Space Industry. He sits on the Board of the SSPI, ISU where he is also faculty, and the Institute of Space Commerce, as well as serving as a Board Member of Odyssey Moon Limited. He is also the Chairman of the Manna Energy Foundation, a not for profit working in water and energy programs in Central Africa. His wife, Nicole, is currently serving aboard the International Space Station as part of Expedition 20. Building upon the Isle of Man's preeminent position as a supplier of world-class banking and financial services, ManSat provides tailored business services to meet the needs of the international space industry, specifically focused on providing access to geostationary orbits and associated radio frequencies.

Focus

Shakin' Satellites

The space industry probably has the most demanding requirements of vibration testing anywhere in the world. Given the huge stresses involved in the launch of the payload, and the fact that you cannot easily repair a damaged system (satellite) once it has been deployed, it's best that the system has been thoroughly tested before launch!

ESTEC (*European Space Research and Technology Centre*) has recently invested in a quad shaker system using **LDS**' ***V984LS*** shakers, delivering forces up to a staggering 640 kN of sine force (each shaker is capable of delivering a maximum sine force of 160 kN/36000 lbf). The four shakers are mounted on a seismic block and connected to a head expander level with the floor. This will be used to test satellite solar arrays, large satellite communications antennas, and complete satellites from 400 kg up to 10,000 kg. These satellites will be launched using a variety of rockets, including ***Ariane 5*** and ***SOYOUZ***.

Image courtesy of ESTEC

The vibration systems are used for a variety of tests. *Alexandre Popovitch,* head of Test Facilities and Test Methods at ESTEC, comments, "For large, light specimens, sine and random tests are usually performed at levels up to 20 g. This will require almost 100 percent of the QUAD system shaker capabilities. Complete satellites are only submitted to sine vibration at acceleration level close to 1 g. In certain cases, the whole satellite can be submitted to high acceleration level to simulate the static loads." A test can take anything from one day to two weeks to set up, depending on the number of sensors to be mounted, with the actual test lasting a few minutes at a time.

The new quad system is a vital component in ensuring that ESTEC and the European Space Agency (**ESA**) maintain their position at the forefront of the space industry. "This new facility will save time in the critical path of the mechanical test campaign and, therefore, will reduce the testing price for our programme," said Mr. *Popovitch*.

ESTEC is the technical heart of the ESA, and is located in Noordwijk in The Netherlands. The Agency manages nearly all the programs on space projects covering science missions, human spaceflight, telecom, satellite navigation, and Earth observation. The only exception is the actual launchers used to deliver the payloads into orbit, which are managed by **Arianespace** in France. Overall, more than 12,000 personnel in more than 100 European companies are involved in the preparation and launch of each space flight.

ESTEC's test centre is home to about 60 personnel who cover all the fields required for qualification of space hardware for thermal, electrical, and mechanical environments. The mechanical facility is operated by six personnel who operate the vibration test systems, acoustic chamber, and mass properties' measurements systems. This facility is the largest in Europe and one of the biggest in the world.

HERSCHEL being prepared to undergo vibration testing. Herschel will be the largest space telescope of its kind when launched. Herschel's 3.5 m diameter mirror will collect long-wavelength, infrared radiation from some of the coolest and most distant objects in the Universe.

Paul Steel, LDS Project Manager for the vibration system, is justifiably proud of LDS' contribution to the overall installation and the work he and his team have achieved. He describes this new system as "a showpiece for the industry." "This has been a big project in partnership with other suppliers and we have all pulled together to see the project through to a successful conclusion," he says.

This new quad-shaker system is in addition to an existing dual-V984LS system, which can be used in single-shaker mode (vertical or horizontal with a slip table) or in dual-mode with a custom made dual head expander. The slip plate for horizontal excitation measures 3.5 m long by 3.0 m wide. The dual system is fixed to a springmounted 550 tonne seismic mass to protect the building from forces generated.

ESTEC also has a ***V964LS*** (90 kN/20 000 lbf) shaker used for testing smaller payloads in sine, random and shock modes up to 2000 Hz, and with a 1200 × 1200 mm slip table for horizontal testing.

The ***V900*** series of water-cooled shakers has a long-established positive reputation in the aerospace and space industries. Water-cooled shakers are able to deliver higher forces than equivalently powered air-cooled shakers.

The water-cooling is applied to the field coils and results in quieter operation and a cooler body temperature, minimizing the temperature effects on the equipment under test. This makes water-cooled shakers ideal for applications requiring high forces or large payloads tested for short durations. The absence of the air blowing around the shaker and test equipment makes water-cooled shakers particularly appealing in clean room environments, or when testing hazardous materials

Acknowledgements

LDS would like to thank Alexandre Popovitch, Head of Test Facilities and Test Methods, ESA/ESTEC Test Centre Division, and Gaetan Piret, Technical officer in charge of the QUAD shakers procurement, for their contributions and permissions for this article.

About LDS

LDS Test and Measurement provides Product Validation Solutions for use in the aerospace, defence, automotive, machinery, electrical and electronics markets. Using our solutions at the design and test phase, customers can prove product integrity, improving the reliability, safety, durability and efficiency of products. With 230 employees, LDS is an international company with its headquarters in Royston, Hertfordshire, U.K., and research and development sites located around the world.

LDS
Brüel & Kjær

Product Perspective

Hub-nubbing With Advantech — Tried & True

Advantech offers a two-way, open standard (DVB-RCS) broadband satellite access system. SatNet's DVB-RCS Hub, and in particular its Return Link Sub-System (RLSS), is at the heart of the broadband access system.

Advantech Hubs (including the ***RLSS***) are turnkey systems which can be installed in days to enable a wide range of public and/or private network topologies with satellite interactive terminals.

The RLSS from Advantech is a modular hub sub-system which can be integrated with new or installed IP/DVB broadcast platforms and IP switch/routing equipment to provide two-way satellite broadband access services.

The RLSS is designed to receive inbound traffic, handle inbound and outbound signaling, schedule and control networks of satellite interactive terminals (available from multiple suppliers). A single scalable RLSS unit can support networks ranging from just tens to thousands of simultaneously logged-on terminals.

Features

- ***Up to 135 Mbps outbound / Up to 6 Mbps inbound per carrier***
- ***DVB-S2 CCM/VCM/ACM outbound maximizes bandwidth efficiency***
- ***Optimized for IP and multi-media content***
- ***Open standard design (DVB-RCS)***
- ***Qualified with multiple IP/DVB broadcast platform vendors***
- ***Interoperable with 3rd party SatLabs certified terminal vendors***
- ***Unique and powerful multi-carrier demodulation technology***
- ***World-class scheduling efficiency, maximizing bandwidth utilization***
- ***Always-on***
- ***User-friendly Network Management System (NMS)***
- ***Multi-Mode DVB-RCS and DVB-SCPC network architecture support***
- ***Mesh Overlay (peer-to-peer) optional capability***

DVB-RCS VSAT Hub

Advantech satellite networks hubs and terminals are highly flexible; several different network architectures are possible. Some key features of the ***SatNet DVB-RCS Hub*** include:

- ***Frequency independent — hubs, terminals and onboard processors can be operated in any frequency band (e.g., Ku, Ka, C, X or hybrids of these).***
- ***Satellite versatility — the system can operate with the forward and return link on the same satellite, or on different satellites.***
- ***Multi-mode System capability — evolves the DVB-RCS standard one step further by allowing for a centrally managed hybrid DVB-RCS and DVB-SCPC network.***
- ***Terminal diversity — networks can support receive-only terminals at the same time as two-way terminals, as well as both mesh and star topologies of terminals.***

Advantech's entire system, as well as the DVB-RCS standard, have been designed to minimize the cost of scaling a broadband access network from terminal populations as small as a few tens of terminals to tens of thousands.

Performance of access layer protocols is highly dependent on the traffic profile. Advantech's implementation of DVB-RCS, using dynamic assignment techniques mandated in the DVB-RCS specification, has been specifically designed and tuned for multi-media traffic. In comparison, other VSAT systems are less dynamic and less flexible.

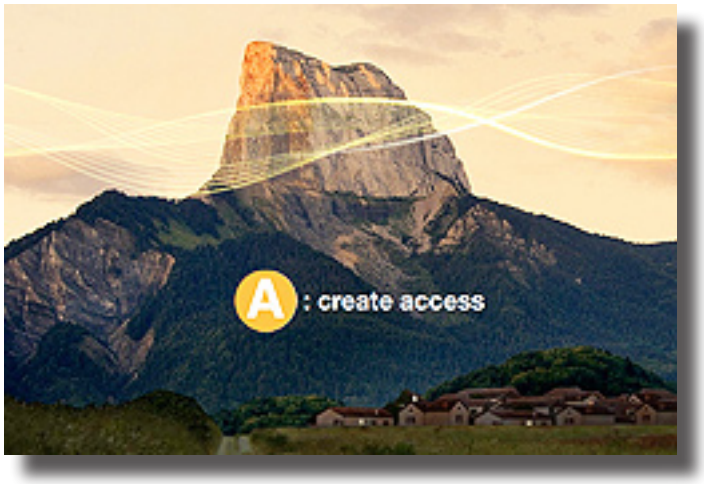
Advantech SatNet Multi-Mode Architecture

The Advantech multi-mode connectivity offering revolves around taking the DVB-RCS standard and evolving it one step further. This approach delivers open standard benefits to fixed and mobile users. The S5420 VSAT terminal has the ability to be reconfigured between DVB-S/S2/TCC (SCPC) and DVB-RCS (MF-TDMA). Multi-mode operation brings an extra dimension to networks where the need for SCPC connectivity is frequent within the population of terminals but occasionally at the individual terminal level.

The hub provides the forward link DVB-S2 modulated service to the multi-mode terminal using the standard DVB-RCS forward link. The return link operates typically in DVB-RCS mode but can switch to a DVB-S/S2/TCC SCPC mode through the hub station NMS which provides centralized management of the system. The switching mechanism, on the return link, between the DVB-RCS TDMA system and the DVB-S/S2/TCC SCPC modes is customer controlled and can be commanded by the hub Operator.

The Satnet Multi-Mode solution, with its scalability and flexible mix of DVB-SCPC and DVB-RCS terminals, offers a very cost-competitive solution for any size network. With the addition of the Mesh Overlay capability, Satnet offers a powerful network architecture that can meet the demanding requirements for virtually any application.

More than a decade of research and development has gone into the DVB-RCS satellite-based broadband ground equipment. The current generation of products took almost three years to bring to market. Products beginning with pilot equipment now installed in Europe since June 2000 and in North America since September, 2000, result in unparalleled implementation, experience, and product maturity.



Executive Spotlight On...

George E. Gonzalez, Founder, CEO + CTO, XStreamHD

George Gonzalez is responsible for XStreamHD's vision and mission, as well as the successful achievement of its business, production and technology goals.

Prior to forming **XStreamHD** in 2002, *Gonzalez* was the founder, president, and CTO of **iDirect**, a subsidiary of **VT Systems, Inc**. (VT Systems) and a world leader in satellite-based IP communications technology. iDirect, Inc. pioneered the world's premier bi-directional satellite broadband router that uses advanced networking protocol acceleration and forward error correction algorithms to achieve throughput unmatched by competing products.

Gonzalez previously served at **GTE Spacenet**. While there, he invented the leading *demand access multiple access* (**DAMA**) technology for the satellite communications industry. He also was a member of the engineering team at **Hughes Network Systems** (HNS) that developed the *Personal Earth Station* (**PES**) very small aperture satellite terminal (VSAT) product line.

SatMagazine (SM)

Nice to be able to take advantage of your time for this quick chat, Mr. Gonzalez... how would a satellite broadcaster take advantage of XStreamHD in delivering content to subscribers?

George Gonzalez

XStreamHD is different than the services offered by the two DBS providers in the U.S. (*DirectTV* and *Dish Network*). In 2010, XStreamHD will launch the most advanced HD entertainment service ever offered to U.S. consumers. XStreamHD leverages unique satellite transport technology and advanced consumer electronics to provide consumers with delivery of the highest-quality protected content distributed to consumers digitally that matches or surpasses the quality of Blu-ray; made possible with XStreamHD temporal coding and *forward error protection* (**FEC**).

George Gonzalez (center) at CES engaged in product discussions

Also being driven is *Pre-Fetched Entertainment* (**PFE**) Access. This is a leap forward in-home entertainment that allows consumers to immediately access HD entertainment anywhere in their home without the hassles associated with lengthy Internet downloads, in-store shopping, or limited

inventory mail order services. PFE provides every XStreamHD user with a customized virtual video store, pre-populated with content they're likely to enjoy, which is constantly updating with new titles that are ready to be enjoyed. Just push play!

Another element will be the whole-home entertainment network access — A single ***XStreamHD Media Server*** can be accessed from any **DLNA Certified A/V** device or HDTV equipped with an XStreamHD Media Receiver anywhere in the home. The system is capable of simultaneously streaming multiple different Full HD movies, streaming up to 400 MBPS of content throughout the home.

We'll also mix in unparalled protection of studio content by employing state-of the art encryption systems based upon public key cryptography and *Advanced Encryption Standard* (**AES**).

SM

George, given the state of the consumer electronics industry, what are the most significant consumer needs that simply are not being addressed through the various media channels?

George Gonzalez

The home entertainment industry has increasingly focused on enhancing the speed and convenience by which consumers can access media content, sacrificing picture and sound quality. This has resulted in a growing disparity between the full technical capabilities of most home entertainment equipment and the quality of most downloadable content. Consumers lack a service that can deliver in both of these areas — providing quick, convenient access to the best movies, music and games while fully using their existing elite home AV system. Our new XStreamHD service fills this void.

SM
What, exactly, is XStreamHD's focus?

George Gonzalez
XStreamHD will offer U.S. consumers unmatched access to the highest quality HD movies, music and games delivered digitally, direct-to-home (DTH), in uncompromised **Full HD (1080p)** video format with up to 7.1 channels of lossless ***DTS-HD Master Audio***™.

With XStreamHD, consumers will have in-home access to the highest quality and most recent content available. XStreamHD represents the next-generation of home entertainment — it's not just different, it is better.

SM
With a myriad of new streaming options available to consumers, what makes XStreamHD different?

George Gonzalez
XStreamHD allows any home consumer to seamlessly stream uncompressed, Full HD content across their entire home network without the worry of Internet lag-time, errors in the video stream, or compromised video quality. The XStreamHD Media Server can also operate with consumers' other DLNA-compatible A/V equipment, eliminating equipment redundancies. Add-on features such as the *Network Video Recorder* and on-board business-class *PBX* also serve to further differentiate XStreamHD from its competitors.

SM
Who is your company targeting as far as a customer base is concerned?

George Gonzalez
It is expected that XStreamHD early phase adopters may have very different characteristics than future target segments. They will span a market of technophiles and HD home-entertainment enthusiasts who have longed for a whole-home solution that can not only integrate with all of their home audio video equipment, but also deliver the maximum potential output in terms of quality.

XStreamHD will implement a segmentation strategy to enable the Company to attract early adopters and then migrate to a farther reaching communications program that delivers a message with broad audience appeal.

SM
As XStreamHD plans to deliver HD video programming direct to home (DTH) via satellite, how will you circumvent FCC licensing that, to date, has allowed for only two DBS licenses in the U.S. Are you considering alternatives?

George Gonzalez
XStreamHD's unique transport network will allow the company to use conventional geo-synchronous satellites to deliver the best HD content, based upon our proprietary data algorithm. As such, the company will be able to operate under its data license to transport content.

SM
We have seen so many advances taking place in the consumer electronics industry and the home video market over the past couple of years. What do you think will be the next big revolution, and what should consumers be looking forward to?

XStreamHD product suite

George Gonzalez

I believe that the next big push in the consumer electronics' industry will come in the form of enhanced networking capabilities for media content. Consumers are increasingly becoming acclimated to being able to view their media content in whatever form, on whatever device that they choose, whether it be on their TV, computer, iPhone, and so on. You've seen movie studios start to respond to this trend by bundling a digital copy of a film along with the DVD. I would expect this trend to continue for the next 5 to 10 years. This is why those in the home entertainment industry need to ensure that consumers have as many tools as possible to enjoy any given entertainment purchase on any number of media devices — but not at the expense of quality.

SM

Will XStreamHD be contemplating a move into the mobile TV market?

George Gonzalez

As we prepare for our upcoming market launch, we are firmly focused on providing consumers with a home entertainment solution that allows them to enjoy the highest-possible-quality entertainment content throughout their home with the greatest amount of ease. While Mobile TV is not currently in our immediate future, it is certainly an area that holds a great deal of promise given the rapid software and hardware innovations that we have seen in the past couple of years.

SM

Where do you believe XStreamHD will be in a year or so?

George Gonzalez

XStreamHD will be in the thousands of U.S. households. It will forever change the way consumers access and enjoy home entertainment and it will set the quality standard for virtual home entertainment delivery.

Executive Spotlight On...

Patrick Shay, Vice President, Iridium, Data Division

This Executive Spotlight focus is on Patrick Shay, a Telematics and LBS industry pioneer with more than 20 years background in the GPS and wireless marketplace. He led the sales and marketing efforts on a global basis for Motorola's GPS and Telematics business. His team launched the Telematics business in Europe and the U.S. with General Motor's OnStar, Ford's Lincoln RESCU (the first Telematics program in 1995), Nissan's Communicator, BMW's Mayday, and Mercedes-Benz's Teleaid in Europe and the U.S., as well as Opel, Vauxhall, and Renault. These programs created a new US$1 billion business for Motorola.

Additionally, *Patrick* created a winning strategy for **Mercedes-Benz**, the first automotive manufacturer to add Telematics as standard on all cars. At **Rand McNally** as Vice President, *Patrick* led the team responsible for creating a new electronic road atlas product, winning the *2001 "Best of Comdex Award"* with **Palm Inc**. He and his team launched new GPS and travel navigation programs with **Magellan**, **Sony**, and **Cobra Electronics**. *Patrick's* team created a new wireless turn-by-turn navigation service that launched with **Sprint**. **Sirius Satellite Radio** recruited *Patrick* as Vice President to create and launch the data services business for the automotive and consumer marketplace. With his leadership, his team developed and sold new satellite data services with service launching at **Chrysler**, **Ford**, **Alpine,** and **Panasonic.** As Vice President of **Hughes Telematics**, *Patrick* developed new Telematics and wireless services.

SatMagazine (SM)

Patrick, could you first tell our readers about yourself? What is your background? How did you become involved in the mobile satellite communications' business?

Patrick Shay

I have more than 20 years of experience in the wireless and GPS business. That includes 13 years with Motorola, where I was involved in integrating GPS and wireless devices. This, of course, eventually evolved into what is now the booming Telematics industry. I also worked as vice president of data at Sirius Satellite Radio, where we created and launched new data services using the Sirius Satellite network. I joined Iridium last year to head up the newly established Data Division. I was attracted to this opportunity because I see tremendous opportunities and exciting challenges for the emerging mobile satellite data market.

SM

As vice president and general manager of Iridium's Data Division, what do your executive responsibilities encompass?

Patrick Shay

I am involved in all aspects of Iridium's mobile data business, including R&D, product development, sales and marketing, and managing relationships with our growing infrastructure of value-added partners in this arena. I am fortunate to be able to work with a superb team of professionals with extensive experience in the mobile satellite industry here at Iridium. I serve as a focal point for the global market requirements for Iridium data products and services. I am directing the effort to increase our market share in this rapidly growing sector of the business while expanding into new vertical market segments such as personal satellite location, tracking and messaging. I am also involved in Iridium's expansion into new geographical regions, such as South America, where there is growing demand for mobile data services.

SM

Can you give us a brief description of Iridium's current data communication products and services?

Patrick Shay

Sure, but first let me just restate Iridium's basic value proposition for mobile data. Iridium's constellation of 66 low-earth-orbiting (LEO) cross-linked satellites provides a unique combination of global pole-to-pole

coverage, low latency, two-way (duplex) data links and high network quality. Our network has inherent built-in redundancy and resiliency, both in the space segment with multiple in-orbit spares, and in the ground segment. Iridium's narrowband satellite channels are ideally suited for voice and low-rate data applications, such as position reporting and telemetry from remote sensors.

Our current satellite data service offerings fall broadly into two groups: circuit-switched and short-burst data. We supply the satellite data modems to our service partners, who embed them in their end-user solutions for vertical market applications.

Our ***9522B*** circuit-switched data modem is designed to integrate with user equipment through an RS232 interface and AT command set. The data protocol is based on Iridium's *router-based unrestricted digital internetworking connectivity solution* (**RUDICS**). Iridium's short-burst data (**SBD**) service is based on our ***9601*** data modem, which is embedded by our partners, usually with a GPS receiver into a wide range of products for remote tracking, alarms, monitoring and other machine-to-machine (M2M) applications. The device is about the size of a deck of cards and weighs just 117 grams. It includes an RS 232 interface and SMA Antenna Connector to a small, omni-directional, L-band antenna.

Iridium's 9601 SBD Transceiver

In addition to these embeddable data products, our new 9555 satellite phone handset has a mini-USB port that makes it easy to connect to a laptop for sending and receiving emails and data files. This is very popular, for instance, with cruising sailboats, which use it to retrieve weather forecasts from the Web.

I'll also mention our new ***Iridium OpenPort***® system, which we introduced to meet the rising demand for higher-bandwidth maritime voice and data connections. The IP-based Iridium OpenPort system provides three independent voice circuits and a separate data port with scalable rates from 9.6 to 128 kbps.

SM
Can you give us an example of the circuit-switched RUDICS service?

Patrick Shay
One of the most interesting applications is one that has been developed by our partner Uplogix. It uses the Iridium RUDICS service for an automatic out-of-band connection to the satellite and network infrastructure equipment at remote VSAT sites around the world. It provides console-level access for fault management and recovery, configuration management and maintenance activities. It acts as a secure 'back door' to provide a secondary means of accessing devices and systems if the primary connection has been lost. This ensures rapid restoration of service to the network, as well as a substantial reduction in IT support costs. These systems are now being deployed to support U.S. military operations overseas as well as in the oil and gas industry.

SM
What about the SBD service? Who are your major customers? What sorts of applications?

Patrick Shay
SBD is our fastest growing business area at Iridium. Our SBD modems are being incorporated into an amazing variety of products for applications such as automatic flight following for airplanes and helicopters, fuel consumption for ships at sea, oceanographic data from buoys, uploads from remotely operated subsea gliders and warnings from subsea tsunami-detection sensors. We're tracking virtually anything that moves — vehicles, construction

machines, trains, aircraft, ships, weather balloons, sailboats, snowmobiles and even dogsleds.

There is also an emerging market for personal satellite location, tracking, alarm and messaging devices. (Hold this thought, and I'll return to this subject later.) In Canada, for instance, there is a government requirement that lone workers in remote locations must have an automatic tracking and alarm device for safety. And the maritime life-saving authority in Great Britain is deploying Iridium SBD-based devices, which are worn on lifejackets and automatically trigger an alert if a crewperson falls overboard. In the government markets segment, Iridium data is used for logistics and blue force tracking, unattended sensor monitoring and personal tracking and communications. Iridium data is also used for UAV communications.

Increasingly we are seeing the satellite SBD business transitioning from narrow niche-market applications into broad-based enterprise solutions for large industrial and government customers with assets worldwide. The Iridium satellite SBD solution gives them a standard data communication platform across all their geographical markets. Some of our service partners have also developed "dual-mode" hybrid devices that are programmed to transmit data reports via cellular when in range of terrestrial wireless towers, and defaulting to the Iridium SBD at all other times. Our customers value our global coverage coupled with predictable, low latency messages from a device and antenna that are small and easy to package.

SM

You mentioned dog sled tracking. We remember seeing that Iridium has been supporting the iconic Iditarod race in Alaska the last few years. Can you tell us more about that?

Patrick Shay

Iridium has been working with the *Iditarod Trail Committee* for several years now, providing satellite phone connections for the race organizers and teams as an important safety measure for the mushers and their dogs during the 1,000+ mile race across some of the most remote and lonely terrain in North America. In 2008, the committee installed an SBD remote tracking device developed by our service partner, IonEarth, on several sleds. They were so pleased with the results that in 2009 that they mandated that all mushers in the race must be equipped with the IonEarth tracking devices for safety.

The ***IonEarth*** device developed for the **Iditarod** consists of a miniature GPS receiver, Iridium SBD modem, control electronics and lightweight, high-performance batteries especially designed for extended operation in severe temperatures. IonEarth programmed the devices to transmit position, speed, heading and temperature through the Iridium network to a central server every 15 minutes.

Journalists, film crews and Iditarod race officials were also equipped with IonEarth terminals. These terminals were wirelessly connected to handheld computers, allowing them to monitor the mushers and each other from remote locations without the need for an Internet connection. Race fans all over the world could log onto the Iditarod Website, where they could view the latest information and location for each musher superimposed on a 3D terrain map of the trail. Importantly, the rules provided that mushers could not obtain information on their competitors' position or progress, to maintain the integrity of the race. You might be interested to know that we also have provided similar tracking services for off-road auto rallies, such as the famous Paris-Dakar event, and ocean sailboat races.

SM

The original business plan for Iridium back in the 1990s was based primarily on voice communications, with data as an afterthought. Now we understand that data is Iridium's fastest growing business area. Can you explain how this paradigm shift occurred? What factors are driving Iridium' rapid growth in mobile data?

Patrick Shay
It's true that Iridium was originally designed primarily as a mobile telephone service. I'm sure I don't need to tell your readers that a lot has happened in terms of data communications since the 90s. Just look, for instance, at the proliferation of handheld multi-function devices such as *Blackberries* and *iPhones* and the explosion of SMS text messaging.

The Telematics revolution, which has been enabled by the combination of low-cost embedded GPS and wireless data modems, is continuing to grow and expand into other parts of the globe. Industrial and government customers are beginning to discover how mobile data can increase their visibility across their entire logistics and supply chain, as well as managing fleets of vehicles and shipping containers, even drilling down to pallet-level tracking with hybrid RFID-GPS-satellite data solutions. Applications are virtually endless, and we're just touching the tip of the iceberg in terms of market penetration.

SM
Exciting times, to be sure. Let's change the subject and ask about the industry alliance Iridium announced a few weeks ago. What exactly is the ProTECTS Alliance, and what are its goals?

Patrick Shay
Iridium has joined with more than a score of industry partners to create a new industry alliance with a primary goal of fostering the rapid and orderly market development for portable two-way satellite-based location, tracking and messaging devices.

The industry group, known as the ***ProTECTS*** (*Promotion of Two-way Emergency Communication and Tracking Systems*) ***Alliance***, will provide a forum for addressing issues affecting the suppliers and users of these vital safety devices. It will also facilitate the

development of bi-directional satellite data solutions meeting the requirements of the growing user base of government and business organizations deploying portable tracking devices, as well as the public-safety community.

There is a rapidly emerging market for satellite personal tracking and distress alerting devices, and a major goal of the group is to work in a collaborative atmosphere to develop broad-based industry standards that will ensure interoperability with public safety dispatch networks, systems and response procedures without stifling creative competition in the marketplace. We believe there is strong need for a standard based on two-way data as opposed to one-way (simplex) data links. It has been widely reported that simplex location and distress beacons have a very high incidence of false alerts triggered by accidental activations. This places a tremendous burden on first responders and search-and-rescue (**SAR**) authorities. The large number of distress alert messages makes it impractical, and prohibitively expensive, to launch rescue operations without determining whether it is a real emergency or accidental activation.

The interactive bi-directional data link permits first responders to send a return message to the transmitting beacon to ascertain whether it is a bonafide distress situation and determine the nature of the emergency before deploying resources in response. It also gives the mobile user a reassurance that the distress message has been received and that help is on the way. Membership in the ***ProTECTS Alliance*** is open to mobile satellite companies, service providers, product developers, manufacturers, system integrators, network operators, resellers, distributors, retailers, users, consultants, SAR organizations, first responders, trade associations, national and international regulatory bodies and *non-governmental organizations* (**NGOs**).

The first organizational meeting is scheduled to take place in conjunction with Iridium's annual partner conference in Arizona during January 2010. Regular meetings will be scheduled at major industry conferences, events and trade shows.

SM

Thanks for the information, and we'll be watching developments with interest, so please keep us informed. Let's close by asking what's on the horizon for Iridium in the mobile data arena?

Patrick Shay

I can't reveal any specific information regarding new product plans, but I can tell you that the next generation of satellite data modems will be even smaller and less expensive. We see continued rapid penetration of the burgeoning market for remote asset tracking and monitoring. Although GSM/GPRS networks continue to expand, more than 90 percent of the Earth's surface is outside the coverage of terrestrial wireless networks. This is our natural market.

Iridium NEXT, our engineering program for development and deployment of the next-generation Iridium satellite constellation, is well underway, with launches scheduled to begin in 2014. The full constellation is planned to be operational in 2016. We are designing it to be similar to the existing constellation architecture, with 66 LEO cross-linked satellites in 11 orbital planes intersecting over the poles.

Our plans incorporate a number of exciting new capabilities, including higher-bandwidth data links up to 1 Mbps. Two major aerospace companies — **Lockheed Martin** and **Thales Alenia Space** — are competing to become the prime contractor for Iridium NEXT, and we plan to announce our final selection in the next few months. At that time we will rapidly move into the full system development phase.

We passed a major milestone last month, with the closing of our merger with **Greenhill Acquisition Corporation.** As a result, our company's name has been changed to **Iridium Communications, Inc.**, and our shares are listed on the NASDAQ stock exchange (ticker symbol **IRDM**). This is an important step in our Iridium NEXT development business plan.