# SatMagazine

///Focus On
///Africa ///Latin America ///MENA

SATELLITE DISHES, ALGERIA

# InfoBeam: Africa, Latin America, MENA



## ABS + SS/L... A Ten Beamer To Be Built

Asia Broadcast Satellite (ABS) and Space Systems/Loral (SS/L) have contracted for Space Systems/Loral to manufacture the ABS-2 spacecraft, which is scheduled for launch in 2013. ABS-2 will have over 12 kW of payload power and as many as 87 active C-, Ku- and Ka-band transponders across 10 different beams, bringing increased capacity and transmission power to the Middle East, Africa, Asia Pacific and CIS/Russia. The ABS-2 spacecraft is based on Space Systems/Loral's 1300 satellite bus, with a separated mass in excess of 6,000 Kg at launch and is designed for 15 years of operational life. ABS-2 will be located at the 75 degrees East, ABS' prime orbital location where ABS-1, ABS-1A, and ABS-1B are currently located.

*More Info...*



## Arqiva Delivers...DIDAR Wants More

Arqiva is receiving kudos from DIDAR Global TV. DIDAR is calling upon Arqiva's expertise to expand their popular Persian content channel to an even wider TV audience. Arqiva is supporting the expansion of DIDAR Global TV with transatlantic fiber, teleport services, uplinking and satellite capacity to launch the channel onto Hot Bird. This will enable DIDAR Global TV to reach new audiences in Iran and throughout Western Europe. Arqiva has also closed a multi-year agreement with Traffic Sports International to support global distribution of its seven international soccer leagues. Via Arqiva, the television rights holder to Latin America's key soccer tournaments will reach TV households throughout the Americas, Europe, Asia, and the Middle East, which started with the August 4th transmission of the first Copa Sudamericana soccer match.

*More Info...*



## Blue Sky Network... Operator Opportunities

Blue Sky Network is now a service partner of mobile satellite service provider, Iridium Serviços de Satelites S.A., a subsidiary of Iridium Communications Inc. As an Iridium service partner in Brazil, Blue Sky Network can now provide its satellite-based GPS tracking

and remote communication solutions directly to operators of air, land and marine vehicles based in that country. The new partnership expands Blue Sky Network's global footprint and builds upon its long-standing relationship with Iridium. The new partnership lays the foundation for Blue Sky Network's long-term growth in the Brazilian market. The Company recently opened Blue Sky Network Brazil based in Alphaville, just outside Sao Paulo.

*More Info...*



**A Diamond Of A Contract For CapRock**
CapRock Communications received notification of an extension today. The multi-year contract extension to provide CapRock's always-on VSAT communications to Diamond Offshore's fleet located in the Gulf of Mexico. CapRock will continue to provide Diamond Offshore with a fully-managed communications solution, complete with equipment, installation and 24/7 support, so that Diamond Offshore personnel can focus on their core business and not be burdened with managing the many components of a dependable communications service. Under the agreement, the Gulf of Mexico fleet, consisting of three semisubmersibles and four jackup drilling rigs, will continue to receive CapRock's always-on Voice over IP (VoIP), Internet access, connectivity to its corporate network, as well as new increased bandwidth to further support growing crew amenities and demands.

*More Info...*



**Comtech... Coming Soon For The Seas...**
Affordable, high-quality marine broadband is one step closer, with Comtech Mobile Datacom using Dubai's GITEX Technology Week to confirm that its new advanced broadband satellite transceiver will be available to commercial fleets in early 2011. The new broadband terminals, developed in partnership with Thuraya Telecommunications Company, will deliver the first real choice for the maritime sector, complying with all maritime standards to seamlessly connect vessels to the Internet and beyond. Comtech's new state-of-the-art Marine broadband terminal is designed to deliver reliable high performance voice and data broadband services using Thuraya's advanced satellite network.

*More Info...*

# InfoBeam: Africa, Latin America, MENA



## GE - Satcom... In MEA's Best Interests

GE - Satcom (NYSE: GE) and du, (DFM: du), UAE's integrated telecom service provider, have signed a partnership agreement that will see the two companies co-operate on the delivery of satellite network solutions throughout the Middle East, Africa, and beyond. The agreement was signed between Ronny Svang, President and CEO, GE - Satcom and Farid Faraidooni, Chief Commercial Officer, du, in Dubai, United Arab Emirates. The deal, which brings together GE - Satcom's advanced satellite communications solutions and du's extensive MEA expertise, gives both partners the opportunity to achieve significant growth, particularly within the region's oil and gas, energy and financial sectors.

*More Info...*



## Gilat + Wavestream

Gilat + Wavestream... [SatNews] Gilat Satellite Networks Ltd. (Nasdaq: GILT) has acquired all of the outstanding stock of Wavestream Corporation. Wavestream is a provider of high power solid state amplifiers.

Wavestream's family of K-a, Ku-, X- and C-band Solid State Power Amplifiers (SSPA) and Block Upconverters (BUC) provide systems integrators with field-proven, high performance solutions designed for mobile and fixed SATCOM systems worldwide. Gilat expects to leverage Wavestream's technology and sales reach to further enhance Spacenet Integrated Government Solutions' (SIGS) market position in the government sector. Wavestream's advanced technology has achieved broad-based success within the MILSATCOM and COMSATCOM sectors. The company's products have been selected as key components in a number of DoD programs.

*More Info...*



## Harris... Tactical Move In The Middle East

Harris Corporation (NYSE: HRS) has received $12 million in orders for Falcon III(r) and Falcon II®(r) tactical radio systems from a nation in the Middle East. Harris is supplying this country's Ministry of Defence with Falcon III® RF-7800W High-Capacity Line-of-Sight radios, which deliver greater bandwidth for transmission of data, such as streaming video. The RF-7800W provides a quick-to-deploy, point-to-point or point-to-multipoint wireless Internet Protocol (IP) infrastructure.

*More Info...*

# InfoBeam: Africa, Latin America, MENA



### iDirect... An Evolutionary Move

Telenor Satellite Broadcasting (TSBc), a regional satellite operator delivering services throughout Europe and the Middle East, has launched a nexgen satellite network based on the iDirect's Evolution platform. The operator's new network makes valuable satellite capacity available to the region's service providers. To power the network, TSBc has purchased an iDirect Universal 5IF Hub and installed it at its Nittedal teleport near Oslo, Norway. TSBc's Evolution network will support a variety of Virtual Network Operator (VNO) customers who are looking to expand operations and capture new opportunities in EMEA. On land, the network offers always-on, dedicated IP broadband over satellite for service providers to extend terrestrial networks and deliver business-critical Internet, voice and data connectivity to remote areas for enterprise, government and military customers in the Middle East.

*More Info...*



### KVH... Brazil Bound

Filling in a major new region in its worldwide satellite communications network, KVH Industries, Inc., (Nasdaq: KVHI) has signed an agreement with Star One to support mini-VSAT Broadband(sm) coverage for Brazil and its offshore waters. Supported via the Star One C-1 satellite, the new service region is expected to go live in the fall of 2010, providing mini-VSAT Broadband service for commercial and leisure mariners, the expanding Brazilian offshore oil and gas fields, and network coverage to the ViaSat Yonder® in-flight broadband network for business and commercial aircraft. The mini-VSAT Broadband network was designed from the ground up to be the first nexgen maritime satellite communications solution.

*More Info...*

# InfoBeam: Africa, Latin America, MENA

will serve customers in the Middle East and Africa, extending new capacity to Nynex's fast growing market base. To support the service expansion, Nynex has installed an iDirect 5IF Hub in CETel's state-of-the-art teleport facilities in Bonn, Germany.

*More Info...*

## Lunasat... Merging Matters (Services)

The VSAT division of Lunasat Offshore has merged with IDMH's subsidiaries, IDMI Sal Offshore and Communications Network Services Inc, to establish a new company, Lunasat-IDMI. Lunasat is a satellite services player and a system integrator that provides services to governments, institutions, corporations, GSM operators and end-users in the MENA region. IDMI is Lebanon's leading ISP with about 60 percent of the high speed Internet connection segment covering the individual and the corporate sectors.

*More Info...*

## NYNEX... MEA Makeover

NYNEX Network Solutions (Nynex) has partnered with CETel (Central European Telecom Services) to expand its satellite IP network and introduce new broadband services on the NSS-12 satellite. The satellite network

## Paradigm Services + Telesat... Satisfaction

Paradigm Services, part of Astrium Services' Telecoms division, has entered into a 15-year contract with Telesat for the full X-band payload on Telesat's Anik G1 satellite. Astrium, through Paradigm Services, currently provides state-of-the-art seamless milsatcom services to the UK Ministry of Defence, the US Department of Defense, the Canadian Department of National Defence and many other international armed forces and Government Agencies, combining its own satellites with capacity leases to meet all milsatcom requirements. Anik G1, scheduled for launch in the second half of 2012, will operate from 107.3 degrees West and will use a 3-channel, global beam, X-band payload covering Canada, the Americas, and the Pacific Ocean. In addition, Anik G1 will include 16 transponders in extended Ku-band over Canada, 24 C- and 12 Ku-band transponders over South America.

*More Info...*

# InfoBeam: Africa, Latin America, MENA



## PCI Geomatics... A Geo Reach Into Africa

PCI Geomatics plans to undertake a business development mission to Africa and the Middle East to meet, train, and interact with local partners and customers and to participate in a key industry event. PCI Geomatics will begin its mission at the 8th International Conference African Association of Remote Sensing of the Environment (AARSE) in Addis Ababa on October 25-29. PCI will take part in the conference alongside their new reseller, GEOMARK, to raise awareness of PCI products and technology and how they can assist in solving some of the region's geospatial challenges. This is one of the largest African geo-intelligence events and brings together over 600 participants from over 40 countries.

*More Info...*



## RapidEye... A View Of State

RapidEye's Brazilian distributor, Santiago & Cintra Consultoria, has provided RapidEye images to the State of Minas Gerais. As part of the agreement, RapidEye became the sole provider of satellite imagery for three different coverage periods of the State, which began in September 2009 and lasted until the end of

July 2010. Additionally, RapidEye is currently acquiring images of major forested areas across Europe and North America. These images will be also used in RapidEye's forest cover analysis and forest inventory services such as tree species determination and stem volume estimation in boreal forests. RapidEye has also just expanded their sales territory in South America, including Argentina, Chile, Uruguay, Paraguay, Bolivia, Peru, Ecuador and Venezuela. These new sales territories will be the responsibility of Santiago & Cintra Consultoria, the company's distributor in Brazil.

*More Info...*



## RRsat... Sporting Endeavors

RRsat Global Communications Network Ltd. (NASDAQ: RRST) is working with Sm2 Sports Media Solutions, LLC, and their teleport partner, TV2GO in Canada, to deliver live HD sporting events worldwide in MPEG-4. The programming will include the US Open, the PGA Championship, and — for the first time, globally — the 2010 NFL season. The reduction in megahertz and reduced latency period make HD MPEG-4 broadcast particularly attractive for live sporting events with a global demand for viewership. This is precisely why RRsat and Sm2 have teamed together to broadcast major events.

*More Info...*

# InfoBeam: Africa, Latin America, MENA





### SES... African Reach

SES S.A. has signed a service agreement with the South African information and communications technology provider SkyeVine (Pty) Ltd. for the delivery of its satellite broadband service in Africa. The agreement is the second for SES' ASTRA2Connect broadband platform on the African continent. SkyeVine, a joint venture company between Q-KON and Ellies Holding Ltd., will provide the ASTRA2Connect broadband service to Internet service providers, corporations and public institutions for resale in sub-Saharan Africa. Q-KON is a South-African based engineering group that provides turnkey solutions and managed network services to the African telecommunications market.

*More Info...*

### Stratos Global... BGAN Support

Stratos Global is providing the world's largest media organizations with Inmarsat BGAN mobile broadband satellite service to broadcast ongoing coverage of the Chilean Mine Rescue. BGAN streaming services are being used by broadcasters, including the BBC and Fox News, for live video streaming from the remote mine site. The broadcasters also are using BGAN for store-and-forward video clips as well as audio streaming for radio broadcast. All BGAN traffic is routed via the Stratos global IP network, known as StratosNexus, into the broadcasters' headquarters offices worldwide. These organizations began broadcasting news reports from the remote San Jose mine in northern Chile's Atacama Desert soon after the 33 miners became trapped on August 5th. Their coverage continued Oct. 13th when the last of the miners was rescued.

*More Info ...*

# InfoBeam: Africa, Latin America, MENA



## Talia Broadband... Roll Out Refresher

Talia Broadband continues to expand with new value-added services that include Talia BackupNet, Talia MultiNet, and Talia Phone, each addressed at different customer requirements: connection resiliency, service expandability, and voice communications. Talia BackupNet is a data-based VSAT service. Designed to back up terrestrial, wireless, or VSAT primary connections, Talia BackupNet adds resilience to all network connections at an inexpensive rate. The service is available for customers throughout Africa, Europe, the Middle East, and South/Central Asia (Afghanistan, Pakistan, and India, inclusive) and is based on an inexpensive Ku- or C-band VSAT kit. Services are charged as pay as you go, so users never spend more than they use.

*More Info...*

## Thuraya... Smallest Sat + A Seagull

Thuraya had much to share at GITEX 2010 in Dubai. Thuraya demo'd a series of customized data, maritime and voice solutions at the Thuraya stand, which was themed according to vertical market segments. Visitors tested cutting-edge SATCOM solutions, such as Thuraya IP and the world's toughest satellite phone, Thuraya XT from the Company's portfolio of products. For the maritime sector, Thuraya is displaying the Seagull 5000 and a broadband marine terminal supplied by Comtech. Other solutions exhibited by Thuraya included specialized antennas, such as the SCAN Antenna, European Antenna, and the Comms on the Move compact antenna designed for satellite broadband communications for moving vehicles at high speeds.

*More Info...*



## TSF...Trains For The Worst, Hopes For The Best

The European Commission, through the international NGO Telecoms Sans Frontières, trained Information and Communication Technologies (ICT) emergency organizations

working throughout Latin America. The seminar was held in Managua. The European Commission, through its Humanitarian Aid Department, supports relief activities for vulnerable people in crisis zones around the world. TSF is using its experience as the first NGO specializing in telecommunications to deploy telecommunications equipment in the field.

*More info...*



### Uplogix + Tec-Nor... Cementing Connectivity

Tec-Nor, a data and communications systems integrator headquartered in Monterrey, Mexico, has deployed Uplogix appliances in VSAT applications for the oil & gas industry. Tec-Nor is using Uplogix at land-based sites using VSAT communications, as well as offshore energy platforms, for persistent connectivity and automated management and recovery of hybrid infrastructure. By deploying locally and connecting directly to satellite, SCADA, and traditional networking gear, Uplogix' intelligent appliances are able to manage devices without relying on the network and can take proactive and corrective actions.

*More Info...*



### XCOR Aerospace... Space Tourism + Curaçao

Space Experience Curaçao (SXC) and XCOR Aerospace, Inc. have jointly announced the signing of a Memorandum of Understanding (MOU) for the wet lease of a production version of the Lynx suborbital spacecraft, pending United States government approvals to station the vehicle on the island of Curaçao in the Netherlands Antilles. With a planned start date in January 2014, SXC will market, and XCOR will operate, suborbital space tourism flights and scientific research missions out of Space Port Curaçao. Recently, the Curaçao government and airport authority announced their intentions of investigating and creating the conditions suitable for the formation of a vibrant and active commercial space flight services industry. An investigation of the legal and regulatory framework necessary to enable a robust flight services industry in Curaçao has commenced. Investment in the spaceport infrastructure and operator has been committed and made by Curaçao Airport Holding, N.V., the company responsible for overseeing Curaçao airport operator. SXC is the entity selected by the Curaçao government and airport holding company to create a robust suborbital space flight business focused on research missions, space tourism, and science & technology education. SXC has, in turn selected, the XCOR Lynx as its vehicle of choice for Curaçao operations.

*More Info...*

# Inmarsat's Challenging Transition

*author: Alan Gottlieb, Managing Director, Gottlieb International Group, Inc.*

*For Inmarsat, the move into the maritime VSAT world is a leap far beyond the scope of a difficult technological transition. The Company's bold move will require a re-make of its traditional business and financial structure. To be successful, Inmarsat must morph from a traditional communications provider that sells by the byte and by the minute to a solutions provider skilled in systems integration and consultative selling. This challenge, if properly met, will insure Inmarsat's dominance in the maritime communications world, or if unmet, could relegate the Company to the ranks of other corporate giants who missed a critical turn in the market...and are no more.*



Inmarsat 5 satellite

## The Rush To Fixed Priced Broadband

From nearly no market penetration three years ago to more than 5,000 installations today, VSAT adoption continues to grow dramatically. In **Inmarsat**'s core heavy user market, the shift to VSAT continues to accelerate.

To its credit, Inmarsat has achieved some success by defending its position through aggressive discounting of it **FleetBroadband** service and a novel-pricing plan called **SCAP** (*Shared Corporate Access Plan*), directed specifically at the large fleet market. Under SCAP, owners with 50 or more vessels and ready to commit to three year contracts can reportedly buy packages of 2 to 5 Gigabytes per/month for as little as $1 per/Megabyte. The implementation of if the SCAP combined with the recession has helped Inmarsat — especially in the Containership segment.

The Plan has been especially effective because the high price of a 1.2 Meter VSAT Antenna ($60,000 or more) has been difficult to justify during the severe downturn in container shipping — purchasing FleetBroadband makes sense as a first step when acquiring a hybrid L/Ku-band service (as it is required anyway as a VSAT back up). However, despite the aggressive marketing of FleetBroadband and the SCAP, major operators have conducted numerous VSAT trials, and a significant move to the technology in the Containership sector is expected as economic conditions normalize.

In the Tanker segment, **Teekay Shipping**, **Frontline** and **Tsakos Tankers** are recent purchasers of major VSAT systems. With demand for more than 50 Gigabytes per/month per ship of data, *Rob Morrison*, Teekay's IT Manager for Europe, notes at the recent *Digital Ship Conference* in Stamford that FleetBroadband is, simply put, economically impractical. Tsakos, one of the largest Greek Tanker operators and a leader in new technology adoption has 2.4 Meter C-band Systems installed on 17 of its vessels — **Eletson**, one of the largest product tanker companies, plans to install VSAT within the next 18 months. With the adoption of VSAT spreading, the pressure for Inmarsat to react has intensified.

## Inmarsat Responds

In August, Inmarsat stunned the Maritime VSAT community by announcing its answer to the Ku- VSAT threat, the *Global Xpress* service, a high capacity Ka-band service billed to deliver speeds up to 50 Megabits per/second to antennas as small as 20 cm. According to *Andrew Sukawaty*, CEO of Inmarsat, the move to Ka- was justified by limited Ku- availability.

**Andrew Sukawaty, CEO, Inmarsat**

While Sukawaty's logic seems inescapable — lack of capacity in Ku-, the use of the proposed Ka- infrastructure raises significant technological questions regarding the ability of the narrow beam structure to support services with *Committed Information Rate Service* (**CIR**). CIR is a feature often demanded by large fleets of sophisticated users. Ka-'s ability to deliver "*always on*" service, especially under Rain Fade conditions, is also in question.

The advanced infrastructure of the **Boeing *702 HP*** satellites and state-of-the-art coding and modulation techniques are likely to mitigate the technical issues associated with the new *I5* Service, no one knows for sure how the service will actually perform under tropical rain. Unlike FleetBroadband with its verified L-band performance, trials will almost certainly be required to prove Ka's viability in a monsoon or heavy rain environment. While reaction to the proposed service, so far, has focused largely on these sorts of technical issues, the business and financial issues associated with the new Global Xpress services offer daunting challenges as well.

## Needed — A New Business Model

The need to re-make the Inmarsat business model to accommodate Global Xpress has profound implications to the Company itself and its reseller network. The entire marketing and sales structure will need to be altered, sales personnel will need to be retrained or replaced, and there will be severe affects on the cash flow of both Inmarsat and its resellers.

In the conventional Inmarsat business model, services are offered either by the byte or by the

minute. Customers know what they are buying; the sale cycle is short; selling expense is low, and cash flow is realized in the short term. The VSAT business environment is substantially different.

In the VSAT or Fixed Priced Broadband model, the sales cycle is long, 1 to 2 years. Selling costs are high and the cash flow cycle is greatly extended. Unless accounted for in the financial projections and compensated for by Inmarsat and its re-sellers, the extended cash flow and higher selling costs associated with a VSAT model could adversely affect the ability to service Inmarsat debt as well as the ability to fund the higher selling costs associated with a long term consultative sale. Furthermore, due to the need to initially prove out the Ka- service under actual sea conditions, initial cash flows from sales of the new service could be even more protracted. Whether Inmarsat's vast network of re-sellers will be able to support this added financial burden is an open question.

Apart from the financial challenges associated with the sale of the new service, the variant nature of the market segments will require marketing to develop service packages and sales strategies tailored to the needs of each segment — Containerships, Tankers, Oilfield Service Vessels, Fishing, and so on. Each segment will require different pricing plans, different rationale for justifying cost, specialized software to regulate access and manage bandwidth, and specialized content and value-added services. The pricing structure of Global Xpress will also be a very critical issue.

Of course, The *Holy Grail* of a Maritime VSAT service is an *always on* high capacity service delivered at one fixed price. Current L/Ku- Services still require users to pay-by-the-byte for L-band during periods when Ku- Service is not available, a fundamental weakness of the hybrid service. When Ku- is not available, users must either curtail their use of the Internet or be exposed to potentially unlimited expense. To be truly compelling, Inmarsat must be able to differentiate by offering a totally fixed priced service that includes the L-band backup. Without this feature, the Global Xpress offering will be more of a *me too* service and less of a game changer.

## Needed — New Selling Skills and Training

For sales and marketing professionals accustomed to selling bytes and minutes, adjusting to a consultative selling environment will be especially challenging. In particular, the need to educate not just the IT shipping people, but finance and top management, in the virtues and value of a VSAT service will also be an issue and add significant complexity to the sales process. Sales personnel who have never made a C level presentation before will now be faced with the need to address sophisticated business and financial issues as well as the traditional technical issues usually associated with the sale of such services.

While some of Inmarsat's resellers have the requisite consultative selling skills through their experience selling hybrid L\Ku-band VSAT packages, many sell only Inmarsat and Iridium. Even Inmarsat's **Stratos**, a company that has sold VSAT services, has most of its VSAT experience in the oilfield, not in global shipping. In fact, the Company has lately placed much of its sales emphasis on FleetBroadband and does not currently offer global Ku- to the global shipping industry.

**Image courtesy of Seaband Satellite Communications**

## Success — Complex + Challenging — But Achievable

The bottom line is that while Inmarsat has cleverly hedged risk through Boeing's *take or pay* commitment on a minimum of 10 percent of network capacity, success in the maritime market entails numerous business and technical challenges. Success achieved under one business model does not guarantee success in another, and market dominance can easily be lost on the slipper slope of change. Whatever the outcome of its Global Xpress venture, Inmarsat has indeed recognized the challenge of a changing market, accepted the risks of navigating a new direction and has boldly staked its claim on a new broadband future.

**About the author**

Mr. Gottlieb is Managing Director of Gottlieb International Group Inc. His firm specializes in the application of VSAT Technology in Maritime and Oil and Gas Markets — the mission is to provide vendors with the "hands on" information and contacts to structure product and service offerings and to assist maritime VSAT buyers in selecting the appropriate service and vendor. Clients have included Iridium, Intelsat, KVH Industries, Globecomm Systems, Inmarsat, RigNet, Verestar, Parallel Software, THISS Technologies, (Singapore), Sonic Telecom, and Private Equity Firms Permira Advisors, Apax and Midwood Capital. Alan has published numerous articles in *SatNews*, *Digital Ship*, and *Satellite Market Research* and has recently authored *Buying Maritime VSAT, The First Independent Guide*, a work that debunks the myths associated with buying Maritime VSAT.

# Focus

# Harvesting Efficiency For Brazilian Agriculture

*author: John R. "Ted" O'Brien, Vice President, Americas, Iridium Communications, Inc.*

*Brazil has the fourth largest agricultural system in number of square kilometers in the world. It's also the world's largest producer of sugar cane and the second largest producer of soybeans. Both sugar cane and soy bean harvesting work is concentrated on certain specific periods of the year, requiring machinery to be fully operational, sometimes 24 hours a day for more than three months at a time. Constant monitoring of the machines is critical to maintain harvesting operations and to identify and respond to any problems that may arise.*



**A sugar cane farm in Brazil**

**Enalta**, a major Brazilian technology solutions provider for the agricultural sector, has met this challenge by developing a system that uses **Iridium**'s *short-burst data* (**SBD**) service to track and monitor the huge harvesting machines in real time. Working with Iridium value-added reseller **NRG Telecom**, Enalta has produced an onboard device that uses an embedded Iridium satellite modem to transmit data from onboard sensors to an equipment monitoring and control center.

"Enalta chose the Iridium-based solution because many of their customers have operations located in rural areas where there is no terrestrial wireless coverage," said *Bernardo Rosenmann*, CEO, NRG Telecom. "Iridium's global coverage and reliable two-way low-latency data links offer customers an ideal solution for tracking assets in areas where there is no other reliable communications coverage available."

Several agricultural customers, including **Abengoa Bioenergia**, **Delarco Agricola** and **Cosan**, are currently using this solution in their harvesting machines. Rosenmann stated that Enalta customers on average are improving efficiencies by approximately 10 percent and reducing fuel and maintenance costs by about five percent.

Incorporating the Iridium-based technology into the harvesting machines gives agriculture industry workers 24/7 tracking and monitoring capabilities. Work-event detector sensors and on-board wireless GPS technology monitors all facets of the machines' operations including speed, RPM, engine temperature and oil pressure, all

in real-time. The SBD messages from the harvesting machines enable operators at remote monitoring stations to be alerted immediately of any irregularities in operations.

"With the Iridium-based tracking devices, we receive the machine data in real time, allowing us to collect, manage and analyze complex information quickly and easily," said *Renato Delarco*, CEO of Delarco Agricola, one of the sugar cane harvesting companies currently using the Iridium-based equipment.

**BRAZIL RISING**
An Emerging Global Model

"Being alerted immediately of any irregularities in equipment assists in avoiding work stoppages and allows preventive measures to be taken, ensuring production efficiency."

"This is a perfect example of how Iridium's global coverage and reliable, low-latency satellite data links can be leveraged for mission-critical tracking and monitoring applications in remote areas of the world," said *Greg Ewert*, executive vice president, global distribution channels, Iridium. "Iridium's SBD service provides a reliable, robust and cost-effective solution that enables these companies to remain fully operational throughout their peak harvesting seasons."

Ewert noted that satellite *machine-to-machine* (**M2M**) data transmission is Iridium's fastest growing business. The company recently introduced its next-generation ***Iridium 9602***™ SBD transceiver, which, according to ***Ewert***, will be a game changer in the mobile data sector. The product's small form factor and low power consumption will provide a low-cost,

embedded satellite tracking capability for a wide range of applications, including personal satellite location and alerting devices.

"We see enormous opportunity for growth in Brazil and the other countries of South America, where there are large areas not reached by GSM or GPRS wireless networks," said *Ewert*. "We are working closely with our value-added partners such as NRG to develop cost-effective asset management solutions that will meet this huge pent-up demand."

***About the author***

**Ted O'Brien is credited with defining Iridium's targeted markets, and developing and implementing Iridium's strategy for the global sale and distribution of Iridium's products and services. This included the recruitment and management of the global network of service providers through which Iridium's products and services are sold. As Vice President, Americas, Ted O'Brien is currently focused primarily on the strategic development of additional partnerships and key customer accounts in the Americas. He has more than 20 years of management experience working in the commercial satellite communications industry. O'Brien has represented Iridium as a speaker in a wide variety of maritime, disaster management, space, satellite, telecommunications, government and aviation industry events. He holds a bachelor's degree in Business Management from American University.**

# African Extremes

authors: *Max Tangen, Marketing Director, Vizada Networks, and...*
*Mike Hennessey, Managing Director, Spidersat Communications*

*The challenges of communication on the African continent mean that wildly different industries depend upon the same technology base and service for safe, secure and efficient operations, according to Max Tangen, Marketing Director,* Vizada Networks *and Mike Hennessey, Managing Director,* Spidersat Communications.



**VSAT terminals used for mining must withstand a harsh environment including, as pictured here, severe dust storms. Photo courtesy of Spidersat Communications.**

The African continent has greatly improved terrestrial communications following decades of development by local and international companies. The **Seacom** cable runs the length of the African East coast and many capital cities and large towns are benefiting from the fast broadband and high quality voice that it brings with it. However, the sheer size, and often harsh, inhospitable environment means that it's unlikely that Africa will ever be as connected using terrestrial communications as Europe, North America and indeed much of Asia.

VSAT is the communications lifeline for enterprise, NGO and humanitarian organisations, and government departments working in Africa. It supplies high speed, always-on broadband and premium voice communications regardless of the environment. A 2.4 meter antenna can serve the communication needs of any size site, anywhere on the entire African continent. As VSAT is in many cases the primary requirement of customers in Africa, **Vizada Networks** dedicates a whole business unit to the continent and ensures that it has some kind of presence in every African country.

The company has developed advanced technology for high-speed Internet access. This proprietary technology has been designed to maximize efficiency of links on both the IP and satellite levels, which results in predictable service, enhanced productivity, and an excellent end-user experience. The solution available on the market is called **Taide WorldConnect**, a bundled managed IP solution that combines two services; **Taide Link for Tx** connection, and **Taide Broadband for Rx** connection.

Taide Link is an advanced SCPC service combining state-of-the-art VSAT technology with global Internet access through the Vizada Networks backbone. The service allows establishment of point-to-point satellite links and optionally features variable bit-rate transmission capability. Taide Broadband is a high-quality, high-speed receive-only service using frame relay encapsulation, which has been, until today, the most efficient way of encapsulation in light of satellite capacity usage. The Taide Broadband service is built on JanUX technology and the solution provides bandwidth that is dedicated to the client with guaranteed CIR.

Site survey in Port Loko Sierra Leone; measuring interference on a spectral analyzer.
Photo courtesy of Oxfam

Vizada Networks is currently working on new technologies that will make use of the latest developments and will offer upgraded feature sets. A primary aim of this development is to achieve even better space capacity utilisation, which will result in an improved, and even more cost effective, service.

Regardless of the application, WorldConnect is the prevalent VSAT technology foundation being used by Vizada Networks and its partners and customers in Africa. The company counts among others; brewers, embassies, mining outfits and aid organisations as users. The technology supplies the stable, reliable connection that is needed for efficient communications, whilst the customers harness it to meet completely different demands.

## Communications For Aid

One high profile user of WorldConnect is aid agency **Oxfam**, who uses the service in **Uganda**. Raising awareness of the needs of people affected by the long conflict in northern Uganda, lobbying for peace and rights of nomadic herders, tackling domestic violence and campaigning for change, **Oxfam GB** (the UK arm of the famous organisation) in Uganda is dependent on reliable connectivity to effectively communicate its issues with the world. Oxfam was using leased line connectivity via a local ISP to connect the country office in Kampala to the Internet, and for its data (and voice) transmission needs. However, this solution turned out to be insufficient and expensive.

**Oxfam Community Meeting in northeast Uganda, photo courtesy of Oxfam**

Firstly, the leased line service was unreliable and the link availability was intermittent. Secondly, leased line connectivity was expensive when compared to alternative connectivity products such as dial-up, ADSL, WLL, or WIMAX, due to the fact that the lines are dedicated exclusively to the leaseholder. In addition, the link was shared and would become unuseable during the core business hours due to congestion. Technical support was also a major challenge, and issues usually took a long while to get resolved. Finally Oxfam had to manage its own network termination equipment.

The protracted dissatisfaction with the quality of service provided by using leased line led Oxfam to re-evaluate the situation and seek a more efficient solution for their needs. Oxfam is operating in some of the most underdeveloped parts of the world, where VSAT is the typical technology of choice for providing coverage in areas that lack good and reliable infrastructure. In such situations satellite links are

able to deliver very high availability and quality, truly independent of local infrastructure.

At Oxfam's office in Kampala, a **JanUX** modem with a 5-Watt BUC, and 2.4 meter antenna are deployed. The solution is provided on a dedicated C-band satellite platform that is less interference-prone (less sensitive to atmospheric disruptions, such as rain etc.) compared to Ku-band based services. Furthermore, as part of the solution Oxfam receives remote support and network management from the Vizada Networks **NOC** (*Network Operations Centre*), which is backed by a strict service level agreement (SLA), with performance penalties and MTTR guarantees. Oxfam GB in Uganda has contracted Vizada Networks to deploy the same solution at two of its remote field offices in Kitgum and Kotido.

The new connectivity solution for the country office in Kampala met Oxfam's expectations. Not only was the service up and running in less than four weeks,

# Insight

Oxfam is now benefiting from the 99.5 percent availability of the link, enjoying the dedicated C-band VSAT connectivity without even thinking about the amount of data transmitted per month. The service costs less to manage than the leased line and the new infrastructure offers flexibility and scalability. It also benefits from a range of QoS features implemented on the link and ensures different types of data traffic can be prioritised for efficient communication.

Vizada Networks can check remotely that Oxfam's VSAT is working properly as well, as it features JanUX advanced performance monitoring. There is also an extensive network of established partners — the Global Field Support Program — responsible for delivery of maintenance services in tightly controlled periods and within the highest quality guidelines specified

in the service level agreement. Oxfam has access to an online portal, where personnel can get all the information they need about the link performance, subscribed services and track any in-progress issues.

## Communications For Mining

African mining produces a significant amount of the world's most important metals and minerals, and production may grow dramatically as much of the continent is still to be explored by the mining companies. It's estimated however that Africa hosts nearly a third of the world's mineral reserves so it's safe to say that the mining industry in Africa is vital to the economy and indeed welfare of the people. The mining industry may be at the opposite end of the spectrum of organisations working in Africa when considering Oxfam, but its communication requirements are the same.



**Clean water being carried from a new Oxfam bore hole in northeast Uganda, photo courtesy of Oxfam**

Vizada Networks doesn't always directly attend to the mining industry in Africa. Instead, its partner since 2003, **Spidersat Communications**, is its link to this important market. According to Spidersat, the mining industry needs high quality data and voice circuits that are always on. This is the same requirement as the aid organisations, so Spidersat's core offering to the mining industry is also based on WorldConnect, on which it offers a variety of different branded services that provide applications for wide area networks requiring voice, data, and Internet and multimedia services. Spidersat's broadband service offers Tier 1 Internet backbone capacity to users anywhere in the world through the Vizada Networks C-band SCPC/DVB-S2 hub based in Norway.

The reality of planning and implementing a VSAT network for a mining site in sub-Saharan Africa is harsh. The mines and projects tend to be very remote so naturally, are nearly always in tough environments. Careful consideration must be given to the environmental issues in terms of temperatures, rainfall and electrical storm activity before a system is implemented. Another major problem faced when developing VSAT solutions for mining operations is the lack of good quality power, because most of the time in remote areas the only form of power is diesel generators. Providing power, be it through sourcing the generators, supplying battery powered solutions where the battery is charged by solar energy or fully autonomous systems that are completely solar powered is part of several of the turnkey solutions provided by Spidersat and based on the Vizada Networks foundation.

As the requirement of trustworthy, reliable communications are similar across all mining operations; there isn't much deviation from the core solution. Spidersat has installed over 100 VSAT systems based on WorldConnect across the continent and despite different requirements for value-added services such as security, VoIP or network management, they are majority based on a 2.4m antenna using SCPC/DVB-S2 broadband service. Users of these systems across 25 African countries include BHP Billiton and Barrick Gold Corporation for main operations, as well as small exploration projects where there's just one-half dozen people in the bush at the very start of a project that may not even take off.



**Oxfam rice harvest in northeast Uganda, photo courtesy of Oxfam**

the systems are secure. More often than not, carrier grade VoIP equipment is also supplied so that high quality telephone calls can be made from the site.

## Communications For All

With the lack of terrestrial communications across the majority of Africa, satellite has had the lion's share of the communications market for a long time. It offers the availability and quality of service that users require because it is not restricted by distance or environmental conditions. Although Africa, especially the East coast, has growing terrestrial connectivity, VSAT is and will be for a very long time the primary source of communications across the continent. Whether the job at hand is helping poor or oppressed people, or mining for valuable, vital minerals that help the world turn, VSAT is not only a necessity, but offers more in the way of reliability and functionality than fibre or terrestrial communications ever could in a continent as unique as Africa.

For further information regarding Oxfam...
http://www.oxfam.org/

The VSAT system will typically include the indoor and outdoor electronics and some kind of layer 7 bandwidth manager QoS device in addition to optional content management, AV and antispam solutions and also intrusion detection systems to make sure that

# MENA = MegaMarket For Thuraya

*The beauty of mobile satellite communications is that customers are able to move and still maintain the ability to communicate effectively even in the most remote of areas. Despite the fact that terrestrial networks are on the rise, there are still many areas which have limited infrastructure thus leading to a dependence on satellite communications to stay in touch with the rest of the world. With ubiquitous coverage in 140 countries in Europe, Africa, Middle East, Asia and Australia, Thuraya is able to provide reliable and mobile satellite based communications to a range of market segments and customer types regardless of their location. The Company achieves this through a versatile and growing portfolio of voice, data, fleet tracking and maritime solutions. Mega markets for the operator are in the Middle East and Africa which have seen extensive use of Thuraya products since the Company's inception in 1997.*



**Thuraya's coverage map**

## The Resource Rich Middle East

"In several areas in the Middle East, **Thuraya** has been the number one source of communication. To be more specific, when we use the term *Middle East*, we are talking about the **GCC** (Gulf States), an area rich in natural resources. The most obvious resources are oil and gas, and there are large investments in these sectors. As the operations of this sector are normally located in areas where there could be limited terrestrial networks, satellite communications is the ideal partner of choice," said Thuraya's Executive Manager Marketing and Sales, Mr. *Muiz Saad*. He also added that Thuraya has worked closely with several oil and gas companies in Saudi Arabia, Qatar, the United Arab Emirates and Libya to ensure they are provided with the most advanced and modern methods of communications.

"Thuraya's handhelds have always been the main products demanded by the oil and gas sector because they are compact, lightweight and incredibly smart devices. We are now seeing increased demand for our data and maritime services from the oil and gas sector and most importantly our tracking services," elaborated Mr. *Saad*. In fact, Thuraya is currently engaged in a project with a large oil company in Saudi Arabia that uses the Thuraya network through a specialized device called *Thuraya Module* which is installed in the oil company's tracking devices to ensure access to the network.

"Thuraya Module is a multi-purpose satellite modem that has been designed to be the core unit of new products being developed by Thuraya or third parties. The module supports voice, data, fax, SMS and GmPRS. It has been strategically designed to create opportunities for partners to use the versatile capabilities of the Thuraya satellite system," said Mr. *Saad*. The oil company is Saudi and is using Thuraya's tracking services for the monitoring of their fleets, especially in remote areas.

The oil and gas sector in the Middle East also benefit from Thuraya products as the coverage area allows data, maritime, voice, and fleet management solutions for onshore and offshore operations. Multinational companies that are dispersed throughout the coverage area can communicate very reliably and efficiently with Thuraya solutions via the network.

"Thuraya's solutions are used by oil companies in the Middle East for communication between remote sites and headquarters since the majority of operations of the energy sector such as rigs, wells and platforms are in areas which may not have access to terrestrial networks. Moreover, Thuraya is a very suitable back up for fixed satellite services which sometimes experience interference during rough weather conditions. The advantage of Thuraya is weather conditions do not affect the ability to communicate reliably," added Mr. *Saad.*

He elaborated that Thuraya can boost operational systems, such as SCADA, by enabling the monitoring of oil wells and pipelines. If an oil company wishes to monitor the pressure, corrosion, and temperature of a pipeline and accordingly communicate this information at regular intervals to make timely decisions, this is possible with **Thuraya IP**.

"Most importantly, Thuraya's communications solutions are highly demanded for oil company crew welfare since they spend large periods of time in tough conditions. With Thuraya, the crew can browse the net, watch movies, chat, use VOIP, make voice calls, and constantly feel connected with the rest of the world," said Mr. *Saad*.

# Focus

Within the Middle East, Thuraya solutions have gained impetus with sectors in addition to oil and gas. Government agencies in the Middle East require Thuraya's services for the monitoring of borders and security. On an individual level, there are several customers who venture out into the desert for hunting and camping who use Thuraya's solutions, especially in areas where there is little or no GSM reach. "In Saudi Arabia, there are several individual users who roam into the Thuraya network," mentioned Mr. *Saad*. "The region is a main trade route for several shipping lines and, as Thuraya covers the Arabian Gulf, Red Sea, Mediterranean and the Arabian Sea, the Company's maritime services are also in demand. Additionally, Iraq and Afghanistan are very unique markets for Thuraya. We were the only source of communications and we enabled troops in both countries to make phone calls very easily," said Mr. *Saad*.

## Rural Communities + Conflict Zones In Africa

Africa is also a core market for Thuraya due to its size and the fact that several regions are under-developed and lacking in terrestrial networks. In many areas in Africa, satellite services are the only source of communication. As a MSS operator, Thuraya supports economies and sectors, such as agriculture, which use our products for the exchange of business and information," mentioned Mr. *Saad*. "In addition, the presence of large Non-Government Organizations (NGOs) in Africa, such as the United Nations and others who require satellite communications for their operations in remote areas, creates vast demand for Thuraya," added Mr. Saad.

Thuraya's voice solutions have proven to be the most reliable and effective means of communication in many parts of Africa. "In rural areas where there are no terrestrial networks or any form of development, Thuraya's Rural Telephone Solutions such as the Public Calling Office and Pay Phones have generated immense interest. In 2005, we installed 2,500 *Thuraya Public Calling Offices* (**PCOs**) and 500 pay phones across much of Libya's desert areas and on oil and gas rigs, to cater to the huge workforce in the industry. As the project was subsidized by the Libyan government, it meant that — for the first time — rural inhabitants in Libya were able to use telecommunications services and stay in touch through the successful implementation of Thuraya's satellite PCO and pay phone services," elaborated Mr. *Saad*.

Africa is a region that is filled with conflict zones such as ***Darfur*** in **Sudan** or **Chad**. In several areas of these countries, satellite communication is crucial.

"Since we started our business in Africa, Thuraya handhelds and pay phones have been used for receiving phone calls at no charge in Darfur. In Chad to help in the monitoring of borders and to facilitate refugee migration through NGOs, our handhelds have also proven to be effective," said Mr. *Saad*. "Both the Middle East and Africa are significant markets for Thuraya and have depended on the Company's voice solutions for a long time. With the increase in demand for data, both regions have witnessed an increased roll-out of Thuraya IP which is a generation enhancement of Thuraya DSL which was widely used in Africa. Thuraya's voice, data and maritime solutions are recognized for their user-friendliness, compact designs and cost-effective payment packages which adds to their competitiveness in the Middle East and Africa which Thuraya will continue to serve customers through specialized products and services that meet the needs of several key vertical market segments."

# SatBroadcasting™
# *The Alsumaria Advantage*

*author: Laurent Roussel, Managing Director, IMEA Branch Office, Newtec*

*Alsumaria TV is an independent privately owned Iraqi TV broadcaster established in September of 2004. It has a highly skilled team of more than 500 working throughout Iraq, and includes Kurdistan, Lebanon, United Arab Emirates and Jordan. Since its inception, Alsumaria has established itself as the most dynamic and popular broadcaster in Iraq, broadcasting 24 hours a day with a line-up of entertainment, culture, politics, and news, in addition to social programs and live shows.*

Part of their mission is the promotion of a unified Iraq and the Company aims to provide neutral coverage of all Iraqi affairs, regardless of political or religious viewpoints. Alsumaria reflects the call for reconstruction, progress, national unity, a better life and a brighter tomorrow. Catering to Iraqi viewers around the world, Alsumaria has finalized an agreement with Jump TV (www. jumptv.com) to distribute Alsumaria signal via home computers, laptops, and Internet enabled televisions.

In transition to IP operations for its DSNG and broadcasting operations, **Alsumaria** sought the most efficient and cost-effective way to maximize productivity and return on investment.

## Their Solution + Advantages Gained

Alsumaria installed **Newtec *DualFlow*™** and ***FlexACM***-enabled technology at its hub and into their fleet of DSNG vans, allowing support for IP and ASI operation. This resulted in outstanding bandwidth use efficiency and a return in investment in only six months.

> » *DualFlow enables DSNGs to operate more effectively, with facilities to flexibly switch from traditional ASI to IP configurations for live broadcast or for file and content exchange with the production centre through email, Internet and VoIP*

> » *Optimization of the bandwidth usage substantially lowers costs plus increases revenue*

> » *FlexACM delivers optimization of modulation according to the location's conditions of the remote DSNG vans, giving a guaranteed level of service, regardless of adverse climate or other fading factors*

Alsumaria broadcasts on **DTT** (*Digital Terrestrial TV*) and can be viewed on **NileSat** in the Middle East and North Africa, Southern Europe, Iran and Cyprus. Much of the same footprint is also covered via **HotBird 8**, while programming is also available to the Arab countries and North Africa via **Noorsat/Eurobird 2.**

## Setting The Scene

Alsumaria started broadcasting in 2004 and employs a fleet of DSNG vans to provide coverage from locations across the country. In the early years, the traditional tape-based workflow in combination with live broadcast over ASI were the starting points to deliver coverage to the newsroom and then to the customer through the digital terrestrial TV network. As a new and dynamic broadcaster, Alsumaria sought to upgrade its infrastructure. The broadcaster has now entered the final stages of a transition to file-based IP operation for its broadcast environment.

## The Challenge

The quest for convenience and flexibility moved Alsumaria towards a fully file-based IP operation. To tackle the efficiency over satellite the DVB-S2 standard was selected. The next step aimed to blend the IP operation together with the legacy ASI network and take full advantage of the DVB-S2 standard. The total solution should bring: The requirements for a new solution were:

i. *Cost efficiency on the operational (OPEX) and on the capital investment (CAPEX) level*

ii. *Increased productivity from DSNG units and faster delivery of news content*

iii. *Greater quality of service, extended reach in the footprint, and transparent interoperability with ASI where required*

# SatBroadcasting™

## The Proposed Solution

DualFlow enables broadcasters and DSNG operators to easily migrate from a traditional ASI video satellite transmission network to an IP infrastructure and is based on the DVB-S2 standard, providing cost-effective and scalable implementation of IP operation while maintaining full compatibility with ASI legacy equipment. Different stages in the migration effort towards IP over satellite are identified — ASI and IP hardware connectivity in the same modulation equipment, to simultaneous transport of live broadcast and IP data and finally two-way IP full interactivity over satellite, is implemented. These stages can be instituted progressively, or all at once, depending on the legacy and the objectives of the migration.

In the case of Alsumaria, the objective was clear: To enable full interactive IP communication between the DSNG van and the newsroom while still providing the capability to switch back to the legacy ASI configuration for occasional use of ASI based broadcasting transmissions. To allow this mode of operation, Alsumaria selected Newtec's *Azimuth DualFlow* equipment.

Alsumaria's DSNGs can now be considered as independent remote offices and deploy the satellite connection in three modes: Initially for live transmission of MPEG-4 over IP; secondly for file transfers and downloads to and from the production center plus other web-based services (email, Internet access, VoIP); and finally for occasional access to legacy ASI transmissions.

## FlexACM

The second break-through technology embedded in the Alsumaria solution is Newtec's DVB-S2 FlexACM, which is the answer to efficiency improvement, *quality of service* (**QoS**), and general availability requirements in IP (broadcasting) networks over satellite. The IP share in Alsumaria's DSNG fleet is mainly reserved for live broadcasts over IP next to interactive IP services (web browsing, email, file transfers, VoIP) to boost the productivity of the remote team.

FlexACM targets the bandwidth efficiency to maximize the return-on-investment. In only 4Mhz Alsumaria can achieve five occasional use slots with a common forward of 400kHz 16APSK — and five concurrent slots of 970kbps for two-way IP operation to five
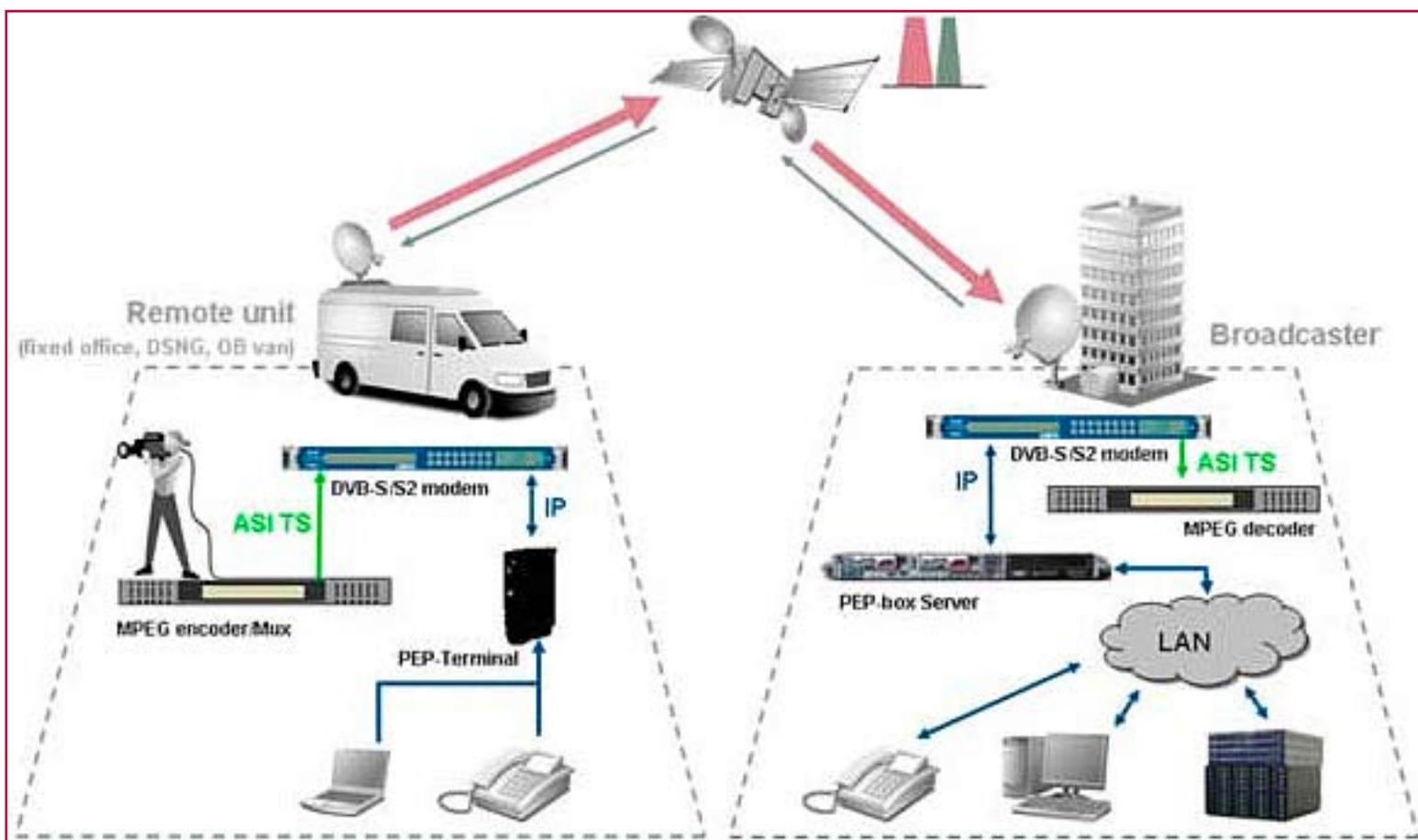
DSNGs, or a throughput of 1.9 Mbps 16APSK 5/6 per channel using MPEG-4oIP video rate.

FlexACM also improves the Quality of Service. The modems with FlexACM functionality facilitate high speed file transfer between the DSNG and the studio/playout/editing site. Newtec **PEP-Box Terminals** (*Performance Enhancing Proxy*) were added to give DSNG staff accelerated file transfers at 1.9Mbps through superior data compression and TCP acceleration, to provide a high-quality broadband experience.

Finally, FlexACM protects the satellite throughput against adverse conditions (rain fade and other sources of interference) and guarantees 100 percent availability. In case of rain fade or other interference disturbance, the receiving site instantaneously reports the degradation of the conditions to the uplink. At the hub, the FlexACM system immediately modifies the parameters of all following frames, ensuring that no data is lost. In other words, even in the worst weather conditions, the IP broadcast or IP data transfers can be assured.

Newly equipped with DualFlow and FlexACM Newtec modulation units, together with IP appliances for Performance Enhancement, Alsumaria TV DSNG vans deliver MPEG-4 live streaming and are fully adapted to store and forward video files over satellite. The Newtec solution provides comprehensive control of the quality of service and higher dedicated throughput than traditional VSAT (shared MF-TDMA) systems, together with lower delay, higher availability and better throughput.

### Advantages For Alsumaria

The implementation of Alsumaria's Newtec infrastructure delivers three key advantages, helping the broadcaster to achieve higher service quality, greater efficiency and responsiveness in its DSNG units, and very significant improvements in cost-effective use of satellite bandwidth.

# SatBroadcasting™

» *DualFlow fully enables two-way IP interactivity over satellite, making it possible to introduce new services into the broadcast workflows, such as real-time interviews, VoIP coordination channels, file upload and download, and remote access to tapeless production infrastructures. By turning DSNG vans into remote offices, DualFlow increases the productivity of Alsumaria's remote newsgathering teams.*

» *DualFlow enables DSNGs to operate more effectively, with facilities to flexibly switch from traditional ASI to IP configurations for live broadcasts or for file and content exchange with the production centre through email, Internet and VoIP.*

» *With FlexACM, Alsumaria can optimize the potential of DVB-S2 to make a quantum leap in efficiency through instantaneous frame-by-frame selection of the best modulation parameters to suit the conditions at the reception site. FlexACM increases the bandwidth efficiency, improves the Quality of Service and guarantees 100 percent availability thus maximizing the total return-on investment.*

"We now have a state-of-the-art operation that gives us an unparalleled ability to respond to events, cover breaking news more effectively, and deliver higher quality content to a wider range of viewers than ever before. The combination of Newtec's DualFlow and FlexACM means we can now get exceptional functionality and value from our DSNG fleet and our satellite bandwidth."

— *Jad Atallah*, CTO, **Alsumaria**.
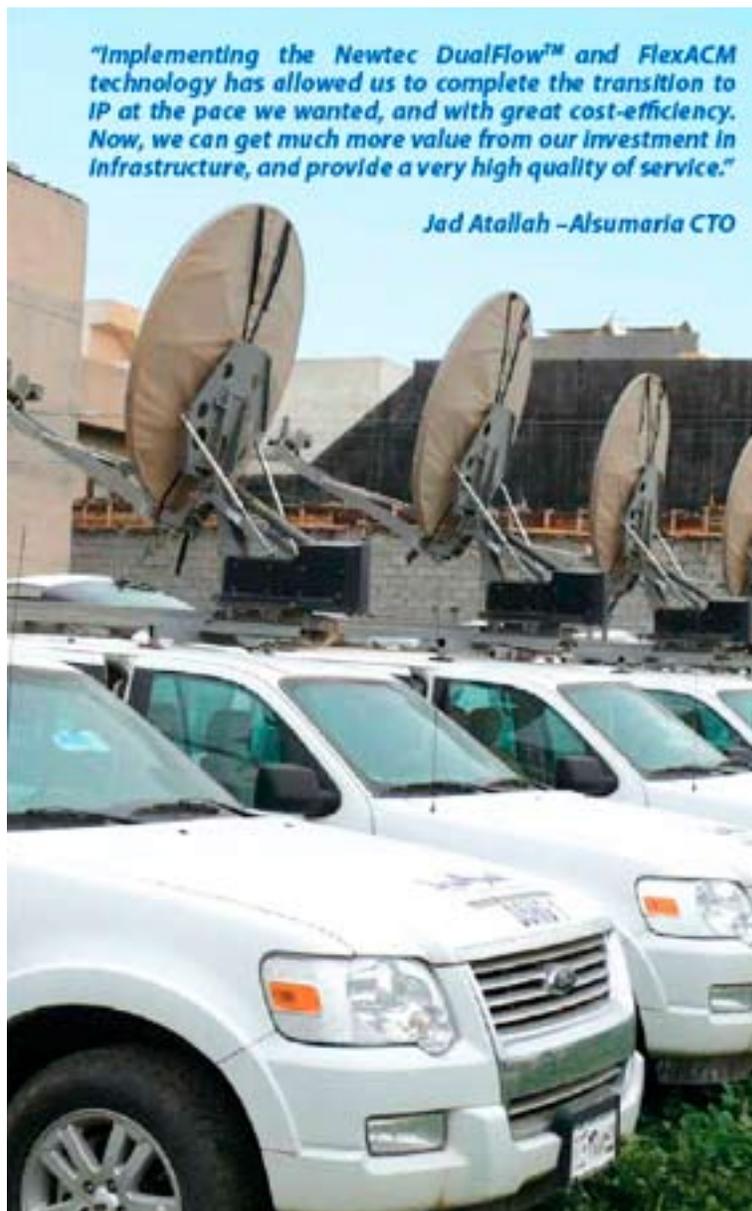
*"Implementing the Newtec DualFlow™ and FlexACM technology has allowed us to complete the transition to IP at the pace we wanted, and with great cost-efficiency. Now, we can get much more value from our investment in infrastructure, and provide a very high quality of service."*

*Jad Atallah – Alsumaria CTO*

### About the author

**Newtec's Managing Director, Laurent Roussel five yars ago, formed the Company's branch office that covers the Middle East, Africa, and India from Dubai. Laurent has worked in the field of satellite communications for the past 17 years, working on European Space Agency projects for five years as a proposal manager. Prior to that, Laurent was a key contributor to the satellite department at Belgacom, delivering solutions to service providers for Internet connectivity, Corporate Networks, Telephony, Defence and Broadcast.**

# Going SatPostal

*author: Jonathan Lee, C-COM Satellite Systems*

*At the turn of the 21st century, postal services worldwide are facing more challenges than ever before. Electronic communications is one of most profound challenges that postal services have encountered. Postal service revenues shrunk sharply when fax machines became standard office equipment in almost every company and then they took another hit when the Internet became an indispensable tool for just about everyone. In addition, postal operations are hampered by problems such as limited access to remote locations and continual losses of revenues due to inefficient operations of some of its outlets.*



**A mobile post office location in bombed-out London, 1941**

In 2008, **China Post** deficits from inefficient rural and urban remote outlets were close to $3 billion a year. Despite these enormous losses most of these outlets could not be closed, as this would leave essential postal services unavailable to those who need it the most.

Postal service providers have to look for other sources of revenues in order to maintain their large operations intact. They are transforming themselves to provide additional services, so it is not surprising to see Post offices running logistics, retailing various goods, acting as a bank and also selling insurance. In a stunning example, 25 percent of all Japanese savings ends up in the bank operated by **Japan Post**. At the same time, Postal services are trying to reach more customers in remote areas as well as offering much clamored for services during the rush hour in urban locations.

## A Remedy?

The Mobile post office looks like a possible remedy for many of these problems. Mobile post offices have been around for more than 100 years. However, most of these could only handle the collection and distribution of mail and parcels. The collected mails and parcels had to be sorted at the post depot. This reprocessing increased the cost.

It is not economically feasible for a post service provider to only operate services for mail and parcels. This is one of the reasons why the old mobile post office did not last long and why new mobile post offices need to be able to handle many new post services, which include logistics (EMS), retail of commodities, as well as banking services. The key to making this all happen is to have a reliable, sufficient data link between Headquarters and the mobile post office, anywhere and anytime.



**Figure 1**

There are several ways to provide a data link for mobile post offices. The most common one is to use a terrestrial cellular network. However, this solution has a number of shortcomings:

### — Security

No matter if it is GSM or CDMA, transmissions can be easily intercepted, which would make it impossible to offer banking services. While satellite does not have this problem, physically the link from a specific location on Earth to a designated satellite is only possible through a single route; plus, satellite frequency has to be coordinated, so there is less frequency interference as compared with all terrestrial means. Such offers a clean and secured data link for the mobile post office to use.

### — Speed Of Transmission

Even 3G, when compared to satellite transmission capacity, can only provide medium level transmission speeds of 9.6kbps-170kbps; this is inadequate and would cause service delays. Slow speed will also make it difficult to offer reliable service. It may be sufficient for mailing services, but definitely not for banking services.

### — Reliability

Having speed that constantly meets a remote operation requirement for various applications is always a big challenge for terrestrial networks. Due to network congestion in certain areas and at certain times, using cellular-like network for mobile post offices would not be feasible. Especially in locations such as a sports stadium or outdoor concert, where a mobile post office would be deployed to serve a large group of people. The cellular traffic in this area would become congested, causing calls to drop, which would ultimately result in the temporary stoppage of the data link traffic, as voice traffic is generally given higher priority than data.

### — Availability Of Service

This is the most important advantage of a satellite link, which gives true anytime, anywhere connectivity and mobility. *Figure 1* in the column to the left shows a terrestrial network's coverage in an urban area. The gaps

# Focus

without coverage are easily visible. In rural areas, where many of the mobile post offices would be deployed, the anywhere, anytime connectivity that satellite provides is, in most cases, the only alternative available. In the case of emergency, such as an earthquake, the only choice of communications is satellite, as it does not depend on the terrestrial infrastructure, which most likely has been destroyed.

## The iNetVu® Solution

**Post Malaysia Berhad** is the exclusive provider of mail services in Malaysia. To reach out to more customers and for their convenience, it is launching two new services, namely, the country's first-of-its-kind *Post-Automated-Machine* (**PAM**) and **Post-on-Wheels** — the mobile post office.



PAM is similar to a bank's ATM (automated teller machine), but it is the first of its kind that is integrated with a postal service. PAM services include the purchase of stamps, posting of non-standard letters (up to 2kg), posting of domestic **PosLaju** items (up to 2kg), posting of domestic *PosParcel* and *PosDaftar* items (up to 2kg), and top-up for *Standing Order Deposit Accounts* (**Soda**). Customers can also pay utility and telecom bills via these mobile post offices. All transactions are done on-line, in real time, with no other processing required.

A 64kbps/64kbps satellite link connects with Post Malaysia's PAM and its headquarters' servers via **Telekom Malaysia**'s satellite Hub. The mobile unit with **C-COM**'s *iNetVu®* (http://www.c-comsat.com/) antenna system installed can be moved to any location in Malaysia. Once the vehicle reaches the
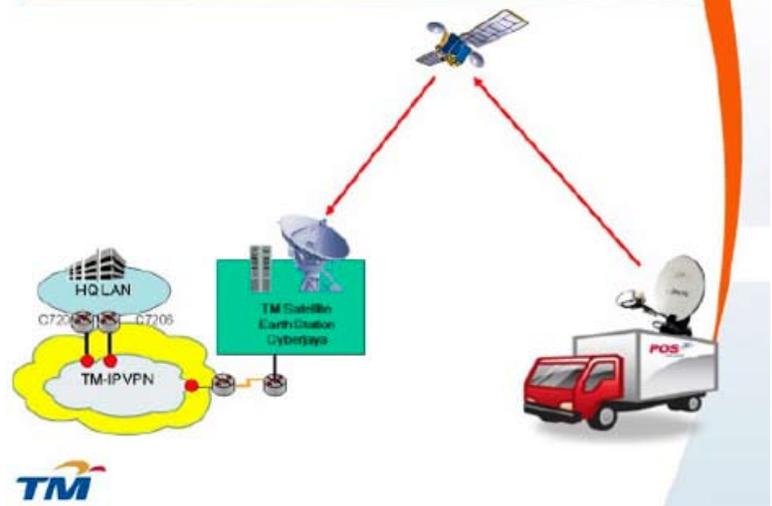


site, a simple press of a button results in the antenna automatically pointing to the desired satellite. Traffic from the mobile unit goes up to the satellite and, from there, down to the satellite hub, where the traffic is routed via backhaul to the HQ.

The response from the public has been very encouraging. POS Malaysia plans to deploy another



30 PAM units this year. The goal is to install a PAM in every post office, nationwide, that will run round-the-clock, all in due course.

It does not cure every problem the postal service providers have to contend with today. However, this technology does improve the efficiency of their existing outlets. Additionally, it provides far more access to their customers for more revenues – plus, the evidence of change is an indication customer can expect better postal services in the future.

# Intelsat /GVF Type Approval

# Executive Spotlight
# Patrick Henry
# President + CEO, Entropic

*Patrick Henry brings more than 25 years of high technology experience to Entropic. He has served in executive management roles in companies ranging from small, innovative startups to large multinationals. Just prior to Entropic, he served as president and CEO of Pictos Technologies, developers of digital imaging products — he exited after completing a multimillion-dollar sale of the company.*

*Prior to Pictos Technologies, Henry was CEO of LinCom Wireless, a chip company focused on Wi-Fi products. He also served as a vice president and general manager at LSI Logic and was a senior vice president at C-Cube Microsystems, a pioneer in the development of digital video ICs. Henry also held sales and marketing management positions at Hyundai Electronics America (now Hynix) and AMD.*

*Henry serves on the board of directors of CommNexus, a San Diego technology industry trade association, and has been recognized by Ernst & Young as Entrepreneur of the Year, named one of San Diego's "Top Influentials" and named Most Admired CEO by the* San Diego Business Journal*. He earned his MBA from the University of Southern California, and holds a Bachelor in Engineering Science and Mechanics, with high honors, from the Georgia Institute of Technology.*

## SatMagazine (SM)

*SatNews has covered Entropic Communications news throughout the past few years, but this is the first opportunity we've had to discuss the Company with you and learn what it does within the satellite industry. Please explain your role in the satellite industry sector.*

## Patrick Henry

Entropic was founded with the mission of developing solutions to improve the connected home entertainment experience. To achieve this, we've spent the past five years developing innovative product lines for *direct broadcast satellite* (**DBS**) service, home networking, silicon TV tuners, and broadband access.

Specifically for our satellite outdoor unit product line, we offer two solutions — our *Channel Stacking Switch* (**CSS**) and our *Band Translation Switch* (**BTS**) technologies — both are designed to enable DBS service providers to cost-effectively deliver new satellite services, including *Digital Video Recorder* (DVR) capabilities. This can be accomplished over a single cable architecture, while lowering installation and future upgrade costs, and improving the customer experience for single-family home and multi-dwelling unit environments.

Our single cable architecture fundamentally changes the way DBS providers deliver content into the home, as Entropic's technology allows for a single cable run that homologates multiple satellite inputs into a single cable output supporting up to 12 tuners or six DVRs. Entropic technology enables either multiple set-top-boxes in and around the home, or a media center inside the home. This in turn enables picture-in-picture viewing or even the ability to watch and/or record multiple programs simultaneously.

We've had much success with our DBS product line and are currently working with **DIRECTV** and **DISH Networks** in North America, as well as international service providers from Canada and Brazil to Europe.
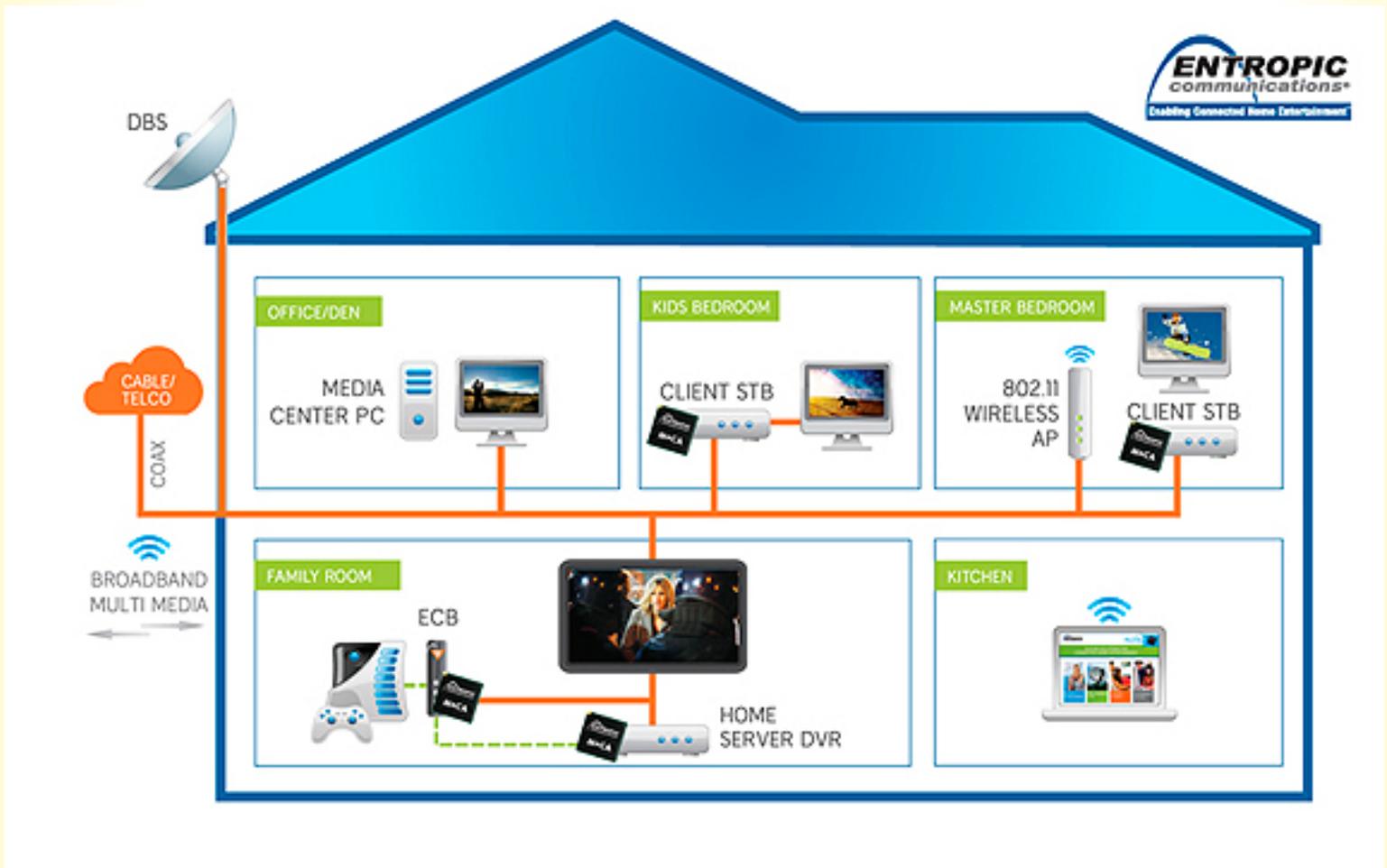


**The Entropic Home Network**

# Executive Spotlight

*Lets talk more about your Channel Stacking Switch solution. What does this solution provide to DBS service providers? How is it helping DBS operators be more successful?*

## Patrick Henry

Our CSS technology is designed to significantly reduce both the cost and complexity of satellite installations, enabling satellite service providers to deliver multiple video streams over a single cable.

Let's look at a multi-dwelling unit case, where often the environment only allows DBS access via a single coax line, where the cost difference for adding or upgrading DBS service into an apartment — off the traditional trunk system versus a CSS truck system — is substantial. In a traditional system build-out, multiple new cables would be brought into the apartment when more than a single tuner set-top box was installed. By simplifying the cabling architecture approach with Entropic's CSS technology, only a single cable is required, and DBS service providers can provide access to available programming for up to twelve tuners within this single cable run — keeping installation costs at a minimum and in many cases, enabling DBS service where it would otherwise be impossible to deliver.

Single family homes greatly benefit from our low power and industry leading performance IC solutions designed for Low Noise Block applications supporting either single or dual satellite systems with single cable outputs supporting between 2 and 6 tuners. This allows DBS operators to aggressively launch churn reducing HD DVR services while lowering the cost to do so.

With an Entropic 4CH CSS solution DSB operators are able to use a single cable run, often this cabling already exists within the home significantly reducing costs, to support an HD DVR in the main viewing location and single tuner STB in the bedroom. Upgrading an existing single tuner subscriber to HD DVR can be as easy as shipping them the STB in mail if the subscriber was future proofed originally with CSS. Feedback from our customer base is that without CSS technology DVR upgrades would not be possible.

We find that many DBS operators are leveraging our CSS technology to generate new lines of revenue while providing significant infrastructure savings. They're improving the customer experience, reducing customer churn and offering a conduit to deliver new services to drive *average revenue per user* (**ARPU**) while offsetting the rising cost of content — all of which can create a positive position in the highly competitive Pay-TV market.

**SM**

*Is there a consumer benefit?*

## Patrick Henry

Absolutely. Consumers are seeing several benefits when our CSS technology is included in their deployments. Most U.S. homes have a cabling network already in place, usually consisting of a single point of entry at the curb or garage with splitters used as required to support multi-room outlets. This pre-existing network goes largely unused during a traditional DBS installation, resulting in a lost opportunity to leverage the existing cabling and reduce labor and material costs during installation.



CSS technology enables a single cable drop to drive multiple STBs and tuners.
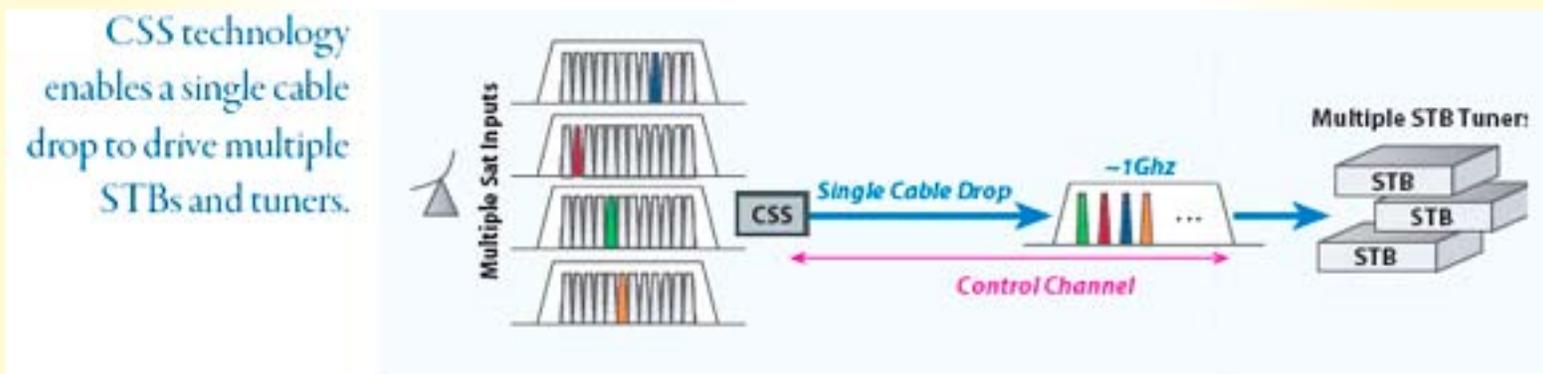
Not only do consumers immediately benefit from cost savings and aesthetics (no more holes punched in every room for wiring) of a single-wire solution, but they gain access to home entertainment services and home networking capabilities as well. A single cable network gives consumers access to *video-on-demand* (VOD) and *pay-per-view* (PPV) services with a central, conveniently located telephone line or broadband connection versus a connection at each set-top box location. CSS also enables DBS operators to create large chunks of bandwidth within the 950MHz -2150MHz band, giving the operator a means to incorporate a whole-home entertainment network system using the home networking standard, **MoCA** (*Multimedia over Coax Alliance*), which gives the consumer greater capacity and access to stream multiple high-definition video, audio, and data traffic throughout the home.

## SM

*How does this impact installation?*

## Patrick Henry

Improved cost and ease of installation are among the core benefits of all our DBS ODU solutions. For a traditional DBS installation, a DVR requires two unique cable runs to the set-top box (STB). A home with 3 DVR's requires 6 cable runs. One can see how this complex cabling architecture is a significant cost driver for the DBS operator and an area of concern for the homeowner.

These cost and complexity issues are addressed through the use of Entropic's CSS technology, creating a channel-stacking architecture where multiple channels can be transmitted on a single

cable based on the demands from multiple STBs and tuners connected to that cable. A single cable drop from the ODU provides each set-top box tuner with dedicated channels, eliminating the need for multiple cables, and greatly reducing installation material and labor costs.

## SM

*Once the satellite signal is brought into the house through a single wire, how does Entropic distribute the signal through the home?*

## Patrick Henry

While our CSS technology allows DBS operators to support multiple viewing locations within the home via a single cable network, Entropic also has an industry-leading product specifically designed for distributing HD video, audio, and data traffic throughout the home. Our silicon, based on the MoCA standard, leverages existing in-home coaxial cable to create a robust, high-speed IP-based network for easy sharing of HD entertainment and multimedia content throughout the home.

Combining the two technologies allows a DBS operator to provide industry leading HD content via DBS and home networking services such as multi-room DVR, media centers, and server-based VOD/PPV. Additionally, with MoCA as the basis for the home network, the customer can access their personal content over this high-speed network and stream music, view a slideshow of family photos or watch stored or downloaded video from the NAS or PC to any viewing location in the home network.

## DBS CHANNEL STACKING SWITCH FREQUENCY PLAN

Ensures co-existance with other services on the same cable

Control | Off-Air / CATV | MoCA* | DBS-CSS

DC 54 862 1075 1125 1260 2150

DBS-CSS + MoCA + Off-Air/CATV
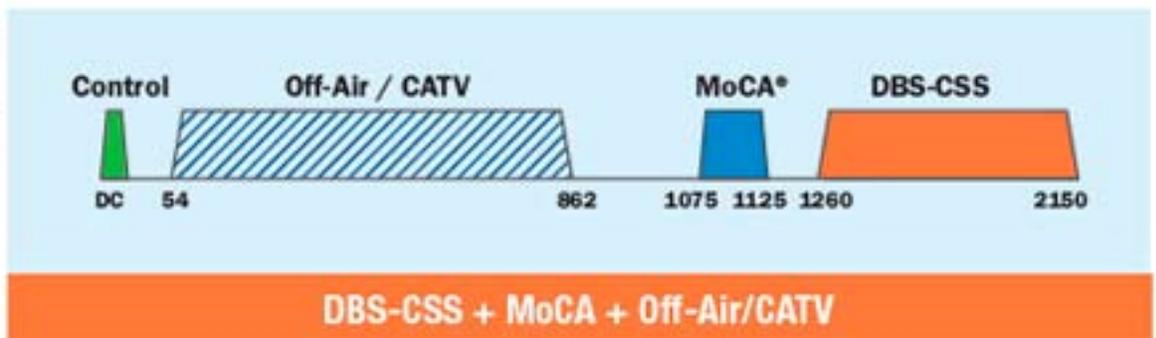
# Executive Spotlight

**SM**

*How does MoCA work? Do you need to have both, or can they work independently of one another?*

## Patrick Henry

The primary goal of the MoCA standard is to deliver a high-performance, high-capacity home network suitable for transporting multiple streams of high-definition multimedia content that leverages existing residential coaxial cabling in the home, while simultaneously supporting the existing services delivered over the coax. The MoCA 1.1 standard, with throughput of 175 Mbps, has been widely deployed throughout North America, principally to support VOD services and as the backbone for the mutli-room DVR deployments we're seeing by major payTV operators today.

While CSS and MoCA can operate independently of one another, combining the technologies brings benefits to both the satellite operator and the consumer. DBS service providers who combine MoCA home networking solution with CSS technology gain the opportunity to offer new services while reducing the capital costs associated with new subscriber installations and current customer upgrades. Entropic's technology is behind the recently deployed DIRECTV Whole-Home DVR deployment. Furthermore, CSS provides a flexible way to allocate spectrum on the subscriber's coax wiring so that it is future-proofed against any potential bandwidth expansion required for the home network.

**SM**

*How many consumers are experiencing satellite television in this way and how large do you expect the market to grow by 2012?*

## Patrick Henry

According to industry analysts at **IMS Research** the satellite market has a base of 0.5 billion and is projected to grow at 10.5 percent compound annual growth rate through 2012. This growth is largely driven by the attractive packages and the availability of HD content, live sporting events, ethnic programming, local content, and premium movies which provide entertainment value to the service subscriber.

Consumer demand for advanced entertainment options such as HD DVR services and their ability to easily access this content lowers service provider churn rates. The phenomenon is helping service providers offset the investment required to deploy advanced services and remain competitive, while giving us new opportunities to enable enhanced consumer experiences.

**SM**

*Is this technology exclusive to North America or can Entropic's CSS technology be used in other countries/continents?*

## Patrick Henry

We see this as a global opportunity. We have long-standing relationships with the top two DBS operators here in the U.S., but we have a growing number of design wins for CSS deployments with major satellite service providers outside of the U.S., particularly in Canada, Brazil, and Italy.

This growing international deployment of our CSS technology is a direct result of the growing use of HD DVRs in the world and is a clear proof-point to the global momentum established to make the single-wire infrastructure the industry standard for DBS installations. As the only single cable solution compliant to the ***ASTRA Single Cable Specification***, our CSS solution is evolving the way broadcast satellite communications is brought into the home; enabling DBS service providers to differentiate themselves by providing innovative services to attract new customers while retaining current subscribers.

**SM**

*What can we expect to see from Entropic Communications in the next two years?*

## Patrick Henry

We envision greater integration across our CSS and MoCA technologies, as satellite service providers looking for solutions to reduce installation cost and complexity, reduce customer turnover and increase ARPU. We feel strongly about our growth prospects for our DBS technologies, as our roadmap continues to enable operators to offer home networking services such as multi-room DVR. Further, investments in our satellite and home networking technologies will bring next-generation home entertainment to consumers around the world.

# Insight

# *A 90-Day Wonder*

*author: Chris Forrester, Editorial Director, RapidTV*

*Imagine the challenges of setting up a sophisticated DTH payTV operation in just 90 days! That was the task faced by* **Astra Platform Services (APS)** *earlier this year. Their client was* **TopTV***, a new multichannel operator based in Johannesburg, and set up to rival the local incumbent — and monopoly DTH player —* **Multichoice's DStv***. In truth TopTV is looking not so much to challenge DStv head to head, but to create a new market in South Africa, targeting new viewers to DTH and a lower-priced bundle of channels.*

The **TopTV** offering has, in reality, been a very long time in the planning. *Vino Govender*, CEO, explains that getting the South African operating licence from the regulator took 18 months longer than anticipated.

"Oddly enough, that wasn't the biggest challenge. It was important, but securing funding through this long period was. We had a group of empowering shareholders prepared to take on the monopoly down here and this was the biggest challenge. We were starting off with a green field project and investors were not exactly queuing up to invest because few believed the monopoly could be broken or even taken on. That was the biggest challenge."

> *"We were starting off with a green field project and investors were not exactly queuing up to invest because few believed the monopoly could be broken or even taken on"*

Helping the scheme along was satellite operator **SES**, which had taken a minority investment stake.

"They stood by us throughout this period, through every hurdle and together with the other partners, we have now managed to get it off the ground. Let me be absolutely clear, it was an amazing feat. When you bring a project of this size together, you have the additional task of keeping shareholders interested, in our case for a period of four years.

"From their point of view, it must have been like pulling teeth with them constantly asking, quite reasonably, when was this thing going to actually happen? They'd allocated the funds, they were keen to see the investment start working and we could do nothing. It's also very time-consuming having to deal with these institutions. Quite rightly, they need to be informed every step of the way.

"Our partners are semi-governmental institutions and they have a raft of legal responsibilities so even though

> *"We gave APS the go-ahead in February 2010 and they were fantastic. We managed to start test transmissions during April"*

we had our approvals, invariably if there was a delay then we would have to wait for the next credit committee to meet and give us a fresh approval for the scheme and this happened over and over again. Like any public institution, these decisions were having to be made usually every quarter or six months. It was hard work."

*Govender* and his team's hard work was made a little easier by deciding, quite early on in the scheme, to outsource as much as possible of the project's technical needs. *Frans Lindeque* was TopTV's CTO, and is now COO at the company.

"We gave APS the go-ahead in February 2010 and they were fantastic. We managed to start test transmissions during April. I started work with the company in March 2009. At that stage there were just seven people in the company so the transition was a major challenge. We had applied for our licences in 2007 and everyone expected the licences to be granted sooner than they were. It was in June and July 2009 that we sent out RFPs and asked for a prompt feedback, which we received.

**Vino Govender, CEO, TopTV**

# Insight

"We then spent some time assessing those proposals and APS was one of the various options on my plate. Our final decision was to go for the 'best of the best' in terms of those offers. I told our CEO that it made sense for this 'best of the best' selection because at the end of the day, the proportional cost of that decision was very modest in comparison to the overall task involved. We agreed that we would not cut corners on the technology.

"What I can now tell you is that we have definitely got the best of the best. Everything we have here is the latest technology available, it's the latest compression technology, it's the latest in satellite modulation, the latest IT systems. We're transmitting MPEG 4 in its H.264 and using DVB-S2 and the latest audio compression to further maximise spectrum efficiency. There is nothing later than this available."

*Lindeque* says that with all the content supply and play-out contracts in hand, the only remaining major obstacle was to choose the Conditional Access. "We went to the usual suspects, NDS, Conax, Nagra and Irdeto. Irdeto were polite but almost said they would not supply us, so it quickly came down to three finalists, NDS, Conax, and Nagra, and we spent a great deal of time and research work assessing these three options and I don't think there's much doubt that the best CA system today is NDS. It's never been hacked and we were very happy with the deal they offered us. As part of the package we bought into their middleware, their EPG option and of course conditional access itself. It meant it was a one-stop-shop."



**TopTV's headquarters building**

But the best facilities in the world are as nothing without a receiver set-top box (STB). "We again put out RFPs and people responded from all over the world. Ultimately we decided on a local company who are already skilled in supplying boxes into the European market. Some people might have thought this meant us avoiding an import tariff but this was not the case because the volumes picked up so quickly that we ended up importing boxes sourced from them but manufactured in China. The first 120,000 boxes came from China.

"Now the plant is in Durban and boxes are rolling off the line at about 10,000 a week. So in that regard, UEC has performed superbly. They are tiny boxes and it is lovely, inexpensive, small and very quick to respond. Now we are looking at a PVR, we have to. We have access to NDS's xTV technology and their road map and thinking in that area. In fact, part of the overall concept was to select suppliers who were prepared to work with us as technology partners and this was especially true of APS. They have walked the extra mile with us." As far as the broadcasting chain is concerned, **TopTV** is also making global history. Perhaps the whole 90-day set-up operation qualifies as a world record, suggests *Lindequ*.

"We are using an SES satellite and currently taking three transponders from them but thanks to MPEG 4 and DVB-S2, it means the capacity is incredible. The uplinking is done from APS at Munich. Then we will have our secondary uplink, our back up, in Nuremberg. But we are proud that we are the very first broadcaster, the very first pay-TV broadcaster, to be uplinking in KA band. We think this is a major, major achievement. Only the military have done this up until now and for contribution links, but not for broadcasting. The satellite then converts the incoming signal to KU band for transmission to our area."

## ODM, on Ka-band

*"We are proud that we are the very first broadcaster, the very first pay-TV broadcaster, to be uplinking in KA band"*

## "We were overwhelmed by the initial response following our launch"

TopTV ingests around 10 local channels on a 'must carry' basis and gets these signals to APS via **GlobeCast**. "The transponders are fully switchable," explains *Lindeque*. "We link from here direct to Europe using GlobeCast who are also a competitor to APS, but in this case we are using their fibre links and I have to say there has been excellent cooperation between GlobeCast, APS, and ourselves in getting these tasks completed. We are using the Seacom undersea cable and Sat-3, the other undersea cable, as a secondary and back up to the first. Should anything happen, we know about this within seconds and the switch is made automatically.

"We did have problems initially when Seacom went down for about ten days and everything was run through Sat-3 and again at the end of July Seacom suffered another failure where again we switched instantly to Sat-3. So at least we know our redundancy plan is working! We are using the exact same equipment as used by APS," says *Lindeque*. "This means Harmonic encoding kit and this is useful in that the equipment is well proven, well tested and understood by all parties. It also helped us achieve a very good deal in terms of pricing, because it was such a bulk buy. Cisco is looking after our IP side and I think we are one of the first companies in the whole of Africa to use Cisco Blade servers. We have a CIC-supplied call centre here in Johannesburg. We are using EMC for storage and back up along with HP for further back up. The end result is, if I may say so, rather fine."

In many respects, TopTV's launch challenges were only just beginning. While the technical headaches were speedily solved, the problem was a happy one in that consumer demand far exceeded their ability to supply. *Lindeque* said, "We have absolutely exceeded our initial plan, however, that gave us some complications. The very first month we had only provided for 35 call centre staff. We only planned for 250 installers so when the immense volumes came in, we simply were not prepared. It

created a wonderful backlog but that's not good for customer relations. Our switchboard was flooded and that went on for more than a month. We had a backlog on installations.

"We can now handle more than 3,000 installations a day. We can now handle 200,000 interactions a month by way of telephone calls, text messages etc. In other words, we are now well equipped at the beginning of the sales season to handle whatever the market demands. We simply did not expect to be that successful so quickly. We planned for 2,500 calls a day but unfortunately there were coming in at 1,000 an hour. The plan allowed for 10,000 or so boxes [to be supplied] per month. This created a headache for marketing and we quickly had to issue apologies with advertisements in newspapers."

*Vino Govender* takes up the story... "We certainly launched successfully, but when we start breaking even from a cashflow point of view, then I'll be happy to claim a degree of success. But launching successfully in such a short period of time was an amazing feat for all concerned. Given the time constraints that we have had to work under, we have essentially put up a pay-tv operation in three months. And this, I am convinced, is a world's first. I've never seen anything done as quickly anywhere else. We were overwhelmed by the initial response following our launch. We have shipped 115,000 boxes into retail and we have activated just over 50 percent of that."

His comment prompted an instant question as to why the slowness in activating boxes. "First, we had a bottleneck in the installer base, there weren't enough installers and, remember, they are also serving MultiChoice, so that skill is thinly spread.

"What we have done is to start a series of projects throughout the country training new installers, giving them the necessary equipment, such as field-strength meters to get them off the ground. For example, when we launched on May 1st, we had only about 250 installers that were trained and ready to take our product to market. Today we have about 1,200 and each of these installers consist of two teams so we can now manage about 2,400 to 3,000 installations per day. This boosts our capacity to serve the market tremendously.

"The other issue was our retail position on launch. The time available to us to get into the market was most limited. We had to get the message out there and build awareness but the physical distribution of boxes into retail stores was also a challenge and we've grown that from 1,500 locations to almost 2,500. So today there are about 1,000 additional retail points where you can get information and buy our equipment. Our current phase which we are busy working on now will take us to 4,000 stores and this should give us a position on every major retail point in the country."

September 1st saw TopTV initiate its *Spring Special* (see separate panel) on South Africa's first day of Spring. "In this country, Christmas time is when most large retail items are bought, whether it's fridges or TV sets, Christmas is a big sale period," says *Govender*. "We are anticipating a large update in the sales of units in the build up towards the holiday season. This year is obviously a little different for South Africa — the World Cup had a major impact here and might well have eroded a great deal of retail spend. People undoubtedly spent time entertaining themselves and their friends and family during the complete World Cup and for us the months of June and July, when the soccer games were on, were relatively poor for us, but we are definitely coming out of that now. July saw us averaging about 300 installs a day but we are now at the 500-600 level and our target is to quickly reach 1,500 installs a day. We would hope to see that number reached during the summer months.



**Frans Lindeque, COO, TopTV**

"Our marketing awareness campaigns will also be boosted at around that time. By the end of December, I'd like us to be at 200,000 subscribers so currently we are quite a way from that aim, currently we are 140,000 short and we have [until year end] to achieve that goal. Upon launch our entire call centre immediately fell down, we simply had not anticipated the market demand and that the demand would be so high, so quickly. It took us about three weeks to get our act together in the call centre so I have written off two weeks from the month of May. Then to make matters worse, in June, South Africa's ports went on strike. The ports were closed leaving with 40,000 to 50,000 boxes sitting at the port unable to be shifted. They were earmarked for retail customers who were screaming for supplies and there was nothing we could do so I say we lost another two weeks there. So out of the three months from May to July, we certainly only traded successfully for two of those months and 60,000 subscribers in two months is not bad. It is acceptable but we have no illusions, building this market is going to take a lot of hard work."

*Govender* explains that 200,000 is a magic number for the broadcaster. "It rather depends on how people perceive break even. For me, break even is very straightforward: If I start selling a box into the market today, how many box sales do I need to pay for all of my costs? And that number is about 205,000, roughly. I believe we are leading the market. DSTV has definitely woken up but we are not going to stand still. We just do things differently. If one compares the two businesses, it is fair to say they are mammoths, they are huge, they have 4Bn Rand on call, they have a war chest. Our marketing spend is miniscule compared to theirs but one of the reasons we are able to do what we do is because we think out of the box.

"We do not do things in the traditional payTV way, we do things differently, we work harder, we work smarter, we do not use third-party agents and consultants, we know our market and our industry best and we do not need consultants to tell us what we already know. This philosophy has made a huge difference, which we estimate as being a 200-300 Million Rand difference. It is about getting out in the market, rolling up our sleeves and getting on with the job. This is what it's all about."

## TopTV shakes up local market

Top TV is continuing to shake up the South African payTV market, announcing — after being operational for only five months — that it is slashing the price of its decoders and installation from R499 to R299, and is on track to sign up 500,000 customers over the next few months. On Digital Media's TopTv satellite TV service initially launched in May, with a price tag of R499 for decoders and installation and monthly subscriptions starting from R99.

Top TV in August reported strong growth from its initial offering, having sold more than 120,000 decoders in three months, including 50,000 during its opening weekend. At this rate, the company's business plan of signing up 500,000 subscribers over the next few months is on track. The greater goal, however, is to reach the 5.5 million available households in the market, it said.

Top TV's entry to market has brought some much needed competition in the industry – however, competitors have been slow to respond to the newcomer. Dominant market player MultiChoice unveiled a DStv Lite package, in retaliation to Top TV's offering, for R99 per month.

However, MultiChoice's response to the competition was criticised, as it earlier announced that it would increase the price of its premium offerings. In addition, a standard decoder from MultiChoice costs R499, without a satellite dish and installation. Top TV also expected to be competing with newcomer Super5Media by now, but controversy has plagued the company, which has yet to launch and is separately reported to be in liquidation.

After Super5Media failed to meet its first go-live deadline, the Independent Communications Authority of SA (ICASA) granted the company another six months to prepare its offering. However, speculation holds that the company is going under. Former employees of the company, who prefer not to be named, say it has effectively closed down, and about 40 staff members have been retrenched. "We were given retrenchment letters from June already," they told ITWeb previously. Media reports say applicants for the liquidation of the company have confirmed that a liquidation application for Super 5Media was submitted. Super5Media and was initially expected to become operational by the middle of this year.

### About the author

**Chris Forrester is a well-known broadcasting journalist and industry consultant. He reports on all aspects of broadcasting with special emphasis on content, the business of television and emerging applications. He founded *Rapid TV News* and has edited *Interspace* and its successor *Inside Satellite TV* since 1996. He also files for *Advanced-Television.com*.**

# Executive Spotlight

## Mark Pisani, Vice President & General Manager
## Positioning, Navigation & Timing, ITT Geospatial Systems

*Mark Pisani is responsible for the overall performance of the business, which includes order inputs, revenue, and gross profit as well as business development, new program pursuits and performance on existing contracts.* **ITT Geospatial Systems** *is a global supplier of innovative night vision, remote sensing and navigation solutions that provide sight and situational awareness at the space, airborne, ground and soldier levels.*

*Prior to assuming his current position, Pisani was vice president and director, Navigation Systems at ITT Space Systems Division, a position held since 2008. He joined the company in June 2007 as a senior program manager for the Navigation business unit. Pisani has more than 20 years of experience in project engineering, program management and product line management at both Allied Signal Aerospace Defense & Space Systems and L-3 Communications.*

*Immediately before joining ITT, he was L-3 Communication's director of space programs, reporting directly to the company's president. In this position he was responsible for the design, build and test of critical NASA manned space flight hardware in support of the Space Station and Space Shuttle platforms as well as key components for the Hubble Space Telescope and Delta launch vehicles.*
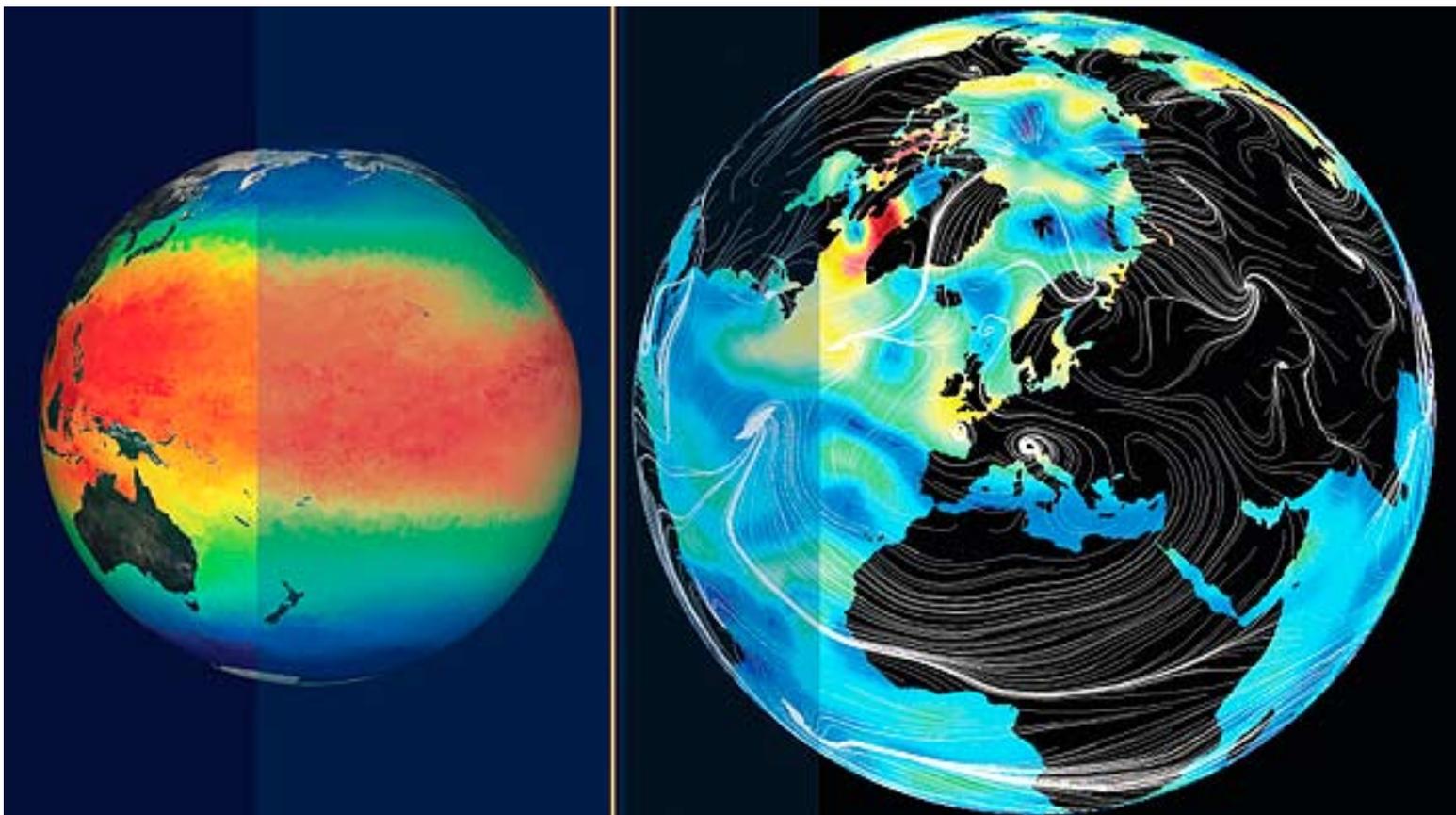
## SatMagazine (SM)

*Mark, what does Positioning, Navigation and Timing (PNT) Systems at ITT do?*

## Mark Pisani

ITT provides solutions in all three segments of GPS PNT-space, control and user. With more than three decades of successful space flight on GPS satellites, ITT designs and builds high-performance, reliable, and cost-effective products for military applications that can be readily adapted for civil and commercial applications. In the control segment, we develop monitor station receiver hardware, as well as critical navigation control software and systems integration of the navigation function. We are focusing on the user segment for growth, as we have new technologies that leverage our existing PNT strengths. Military airborne navigation is a growing market in which we are particularly active, and are developing key partnerships to position ourselves for continued growth.

## SM

*What role do you play in the organization?*

## Mark Pisani

As the vice president and general manager of ITT's PNT Systems business, I am responsible for the overall performance of the PNT business unit, which includes order inputs, revenue and gross profit, as well as business development, new program pursuits and performance on existing contracts.

## SM

*What is your background in the GPS satellite industry?*

## Mark Pisani

In June 2007, I joined ITT as a senior program manager on GPS programs. My role at ITT has always been to support the enterprise, in major part, to the mission and the critical support the GPS system provides to the warfighter and civilian population.

# Executive Spotlight

## SM

*What is ITT's background in the (GPS and other) satellite industry?*

## Mark Pisani

Specific to the PNT industry, ITT navigation payloads and components have been aboard every GPS satellite ever launched, since the program's inception (1970's). ITT was on *Blocks I, II, IIA, IIR,* and *IIR-M.*

For Block IIR, ITT increased content, delivering the total navigation payload. For IIR-M, we improved the signal flexibility, and added a new civil (**L2C**) and military signal (**M-Code**). ITT also supplied the modulators and L1/L2 transmitters on the recently launched IIF with Boeing. For GPS III, we are partnered with **Lockheed Martin** to provide the total navigation payload. ITT has provided some of the most relied upon eyes in space for more than 50 years. We helped to create the commercial remote-sensing market by designing and building the imaging system for *IKONOS*, the world's first commercial high-resolution satellite, launched in 1999 and still operating today. Since then, ITT has built imaging systems and sensors for the latest commercial remote-sensing satellites-*GeoEye-1*, *QuickBird*, *WorldView-1* and *WorldView-2*.



**GPS IIR-M, image courtesy of Lockheed Martin**

In September 2010, ITT was selected to build the imaging systems for the latest earth-imaging satellites — *GeoEye-2* and *WorldView-3*-slated to launch in late 2012 and 2014, respectively.

With regards to advanced climate and environmental monitoring systems, ITT has been a world leader in this industry for more than 40 years. Our proven-reliable sensors, systems, subsystems and software are used to capture, process, visualize and analyze data quickly and accurately, so scientists and policy makers can have the data they need to make the best-informed decisions about managing climate change and making the planet more livable. ITT's imaging and sounding space-qualified systems for *Geostationary Earth Orbiting* (**GEO**) and *Low Earth Orbiting* (**LEO**) programs are renowned for innovation, performance, stability and longevity. They have consistently achieved 100 percent on-orbit mission success.

## SM

*What exciting projects is ITT's PNT Systems group currently involved in?*

## Mark Pisani

Building on our success of the IIR-M series of satellites, ITT is partnered with Lockheed Martin for developing a whole new generation of payloads with increased capabilities and security-GPS III. ITT is also partnered with **Boeing** to build the L1 and L2 transmitters, as well as the *Synthesizer/Interface/Modulator/IPA/Converter* for the **IIF** satellites. In May 2010, the first IIF satellite was successfully launched for the U.S. Air Force.

As part of the **Raytheon** team, and leveraging our GPS payload experience and industry-leading visualization capabilities, our **GPS OCX** system offers superior accuracy and functionality across the entire GPS network. ITT is providing the key navigation processing elements, as well as the precision monitor station receivers. The new OCX system when it comes on line will enable the full potential of the modernized GPS satellites to be realized for the benefit of the warfighter and civilian communities.

Due to our unique solutions and partnerships in the national security airborne market, we are addressing the new market landscape with modular, scalable and

easily upgradable solutions. ITT's road map offers versatility for varied applications and requirements including manned and unmanned aerial vehicles *Selective Availability/Anti-Spoofing Module* (**SAASM**) *M-Code*. We are aligned with multiple partner organizations for various platform applications, and we have exclusive capabilities for the GPS-denied environment that are garnering attention.

ITT is also working on civil space programs for the *National Aeronautics and Space Administration* (**NASA**) and the *National Oceanic and Atmospheric Administration* (**NOAA**) involving radio occultation applications, as well as space receivers for military applications. Note: radio occultation applications measure the changes in radio signals received from GPS satellites, providing useful space and atmospheric weather information.

## SM
*Why is your solution important to your customers?*

## Mark Pisani
No company in the world understands the GPS signal better than ITT. ITT offers our customers a legacy of success in space. Our customer feedback confirms that ITT's PNT engineering team consistently proves its expertise in PNT hardware, software and system integration. ITT's customers get high-performance, reliable, cost-effective PNT technologies and solutions allowing our customers to receive large company resources coupled with small company agility. ITT

has a long history of mutually beneficial partnerships with our primes and our customers. Our solutions offer our customers breadth and depth of PNT knowledge because we are operational in all three GPS segments.

## SM
*What area(s) is ITT focusing on in order to move into adjacent markets?*

## Mark Pisani
We are focused on national security (intelligence and *Department of Defense*) airborne GPS receivers, civil space GPS receivers, national security space GPS receivers, GPS-denied solutions, international clock management systems and *Global Navigation Satellite Systems* applications outside of GPS.

## SM
*Please describe the technological aspects of PNT and the importance such plays for our industry.*

## Mark Pisani
ITT has more than 50 years experience working with PNT systems in today's world. Our technological strengths include reliable, high-performance space payloads and GPS transmitters. In addition to space hardware expertise, PNT technology advancements have led to increased GPS signal flexibility and M-Code capability for military use. ITT has been on every U.S. GPS payload with 100 percent mission success.



**The GPS Advanced Control System (OCX)**

As part of the *Advanced Control Segment,* or **OCX** program, ITT is building navigation components to increase accuracy and security. We will bring to the program new anti-jamming technology, M-Code receivers, advanced algorithm development and complex systems integration. ITT is also focusing on the user segment for growth, and we are developing new products that leverage our advanced knowledge of GPS signals. This technology is contributing to application development including space receivers, and high-performance airborne receivers.

# Executive Spotlight

*How do you see the industry coping with the current global economic "challenges," and ITT in particular.*

## Mark Pisani

GPS is a global utility with civilian as well as military applications. In addition to helping our warfighters determine their precise position, there are many civil and commercial applications that bolster the economy. Bridges can be assembled more quickly and accurately with precise bolt tolerances with the aid of PNT. Land surveying and construction utilizes PNT for greater accuracy and faster project completion. Fleet management for corporations and efficient navigation for individuals contribute to significant economic advantages for our workforce. Financial institutions rely on PNT timing for countless transactions and many corporations use PNT for record time-stamping. Mobile phone networks use PNT timing for cost effective network synchronization. Corporations achieve all of this functionality without the expense of operating their own atomic clocks.

ITT's technology enables reliable PNT performance, and everyday new applications are being developed that help the global economy.

## SM

*What do you see in the near future as a most promising technology for satellite manufacturers and operators?*

## Mark Pisani

GPS III will provide superior system security, greater accuracy and even better reliability for military and civilian users worldwide. Enhanced performance is expected from a boost in transmitter power. When fully deployed, the GPS III satellites will feature a command and control architecture that allows simultaneous updating of the entire constellation of satellites from a single ground station. By providing the total navigation payload for this system, ITT will be a part of cutting-edge technology that will improve PNT services for the warfighter and civil users worldwide.

## SM

*How have your previous positions with such companies as L-3 Communications and Allied Signal prepared you for your role with ITT Geospatial Systems?*

## Mark Pisani

In previous positions, I was exposed to, and worked with, various cross functional groups (*e.g.*, contracts, program management, engineering, operations, business development, and so on) that prepared me for the position I currently hold at ITT. All aspects of a business need to be functioning at a high level to execute and grow. In the past, I was responsible for programs that supported **NASA** manned space applications, including the NASA International Space Station and the Space Shuttle, so I was keenly aware of the challenging reliability, quality and environmental requirements in space and the understanding that failure is not an option.

## SM

*Could you describe some of your past accomplishments?*

## Mark Pisani

I'm proud to have worked on programs that lead to winning the *Large Business of the Year* award from **United Space Alliance** and the *Exceptional Company Performance Award* from **Boeing**. More recently, I'm thrilled to have been a part of the ITT winning team on two major GPS enterprise programs-GPS III and OCX. Being responsible for the ITT Geospatial Systems PNT business area, that has a compounded annual growth rate of 23 percent over the last three years, has been a highlight in my career.

# Focus

# *SatRadio Impetus*

*author: Ernst Eberlein, Communications Department Head, Fraunhofer IIS*

*With the seamless coverage of large areas, satellite-based broadcasting to mobile users has become more and more popular in recent years.* **Digital Radio Mondiale** (**DRM**) *also offers large coverage areas and, therefore, these systems are sometimes considered as competing technologies. However, with each system's benefits, the two approaches can actually complement one another in certain scenarios.*
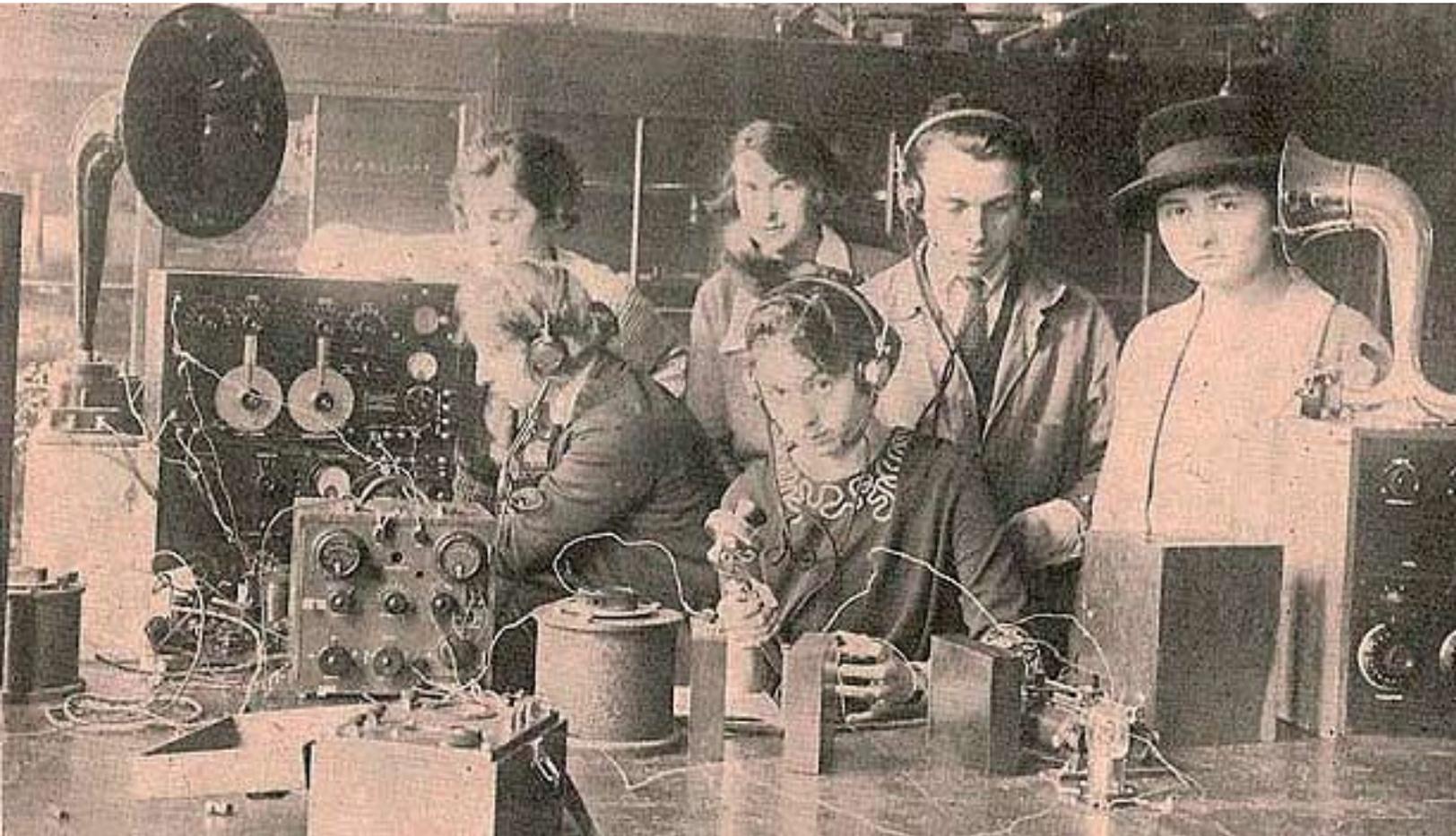


**The Radio Class at Radcliffe College - Radio Journal, Sept. 1922**
**Photo: Western Historic Radio Museum**

DRM is an openly standardized radio broadcasting system [1], which was developed to replace analog radio broadcasting in the AM and FM/VHF bands. For the design of the technology, the following requirements played an important role:

- *Minor impact to overall frequency planning. Especially for short wave, international frequency coordination is required. To allow for a smooth transition from analogue to digital, the DRM channel allocation must be compatible to existing frequency regulations. The DRM system was designed as a narrowband system, with each broadcast frequency assigned to a specific broadcaster. Typically, one audio program together with some data is transmitted per carrier. At the beginning, the design was focused on broadcast frequencies below 30MHz. Later, an extension to carrier frequencies above 30MHz was included, adding a new parameter configuration set. This extension is called "DRM+", whereas the original parameter sets of the DRM standard are referred to as "DRM30". An overview of the frequency range covered by the standard is given in Figure 1, seen on the next page.*

- *High audio quality. DRM is based on the audio coding standard MPEG-4 HE-AAC v2. To achieve FM-like stereo audio quality in the AM bands, requires bitrates in the range of 24kbps. 24kbps bitrates are feasible within one frequency slot. Using DRM+ or several frequencies would also allow higher bitrates.*

- *Data features. Essentially any kind of data can be transmitted over a digital system. Applications using protocols optimized for narrowband systems such as Journaline (official ETSI standard [2]) can be combined with audio broadcasting. To achieve the required bitrate on a short wave channel bandwidth of 10kHz for example, a modulation scheme with high spectrum efficiency is required. For DRM30, OFDM modulation using QAM16 and QAM64 signal constellations fulfills this demand. The DRM standard offers a high flexibility to trade off between transmission robustness and data capacity, and can be adapted to different constraints or propagation challenges. Table 1, seen on the next page, gives an overview of the key parameters of the operation modes.*

## Abbreviations

AM = Amplitude modulation
FM = Frequency modulation
DRM = Digital Radio Mondiale
LF = Low Frequency
MF = Medium Frequency
SW = Short wave
HF = High frequency
VHF = Very high frequency
QoS = Quality of service

## Satellite-Based Systems

In the past years, powerful satellites have become available allowing for full direct reception of the satellite signal with very small antennas. Typically, the antennas are similar in size to those of GPS receivers. This makes the systems attractive for mobile reception, which is possible with portable and even handheld devices. **SDARS** (S*atellite Digital Audio Radio Service*), sold commercially as **XM Satellite Radio** and **Sirius Satellite Radio**, is a good example. SDARS was introduced in 2001 and has since become a popular service in the United States. More than one hundred audio programs are assembled within a broadband multiplex, offering the customer a high variety of content. The user can choose between different music formats, talk, news and sports channels. In addition, the audio broadcasting is combined with data services.

The SDARS system was the first hybrid system to use satellite broadcast combined with complementary ground components (**CGC**, also called **ATC** = *Ancillary Terrestrial Component*). In the meantime, open standards such as **DVB-SH** (*DVB standards for Satellite to Handheld* [4]) or **ESDR** (*ETSI standard for Satellite Digital Radio* [5]) have been released and successfully tested in the field. Deployments of these systems are in planning phase and pilot installations are already on-air.
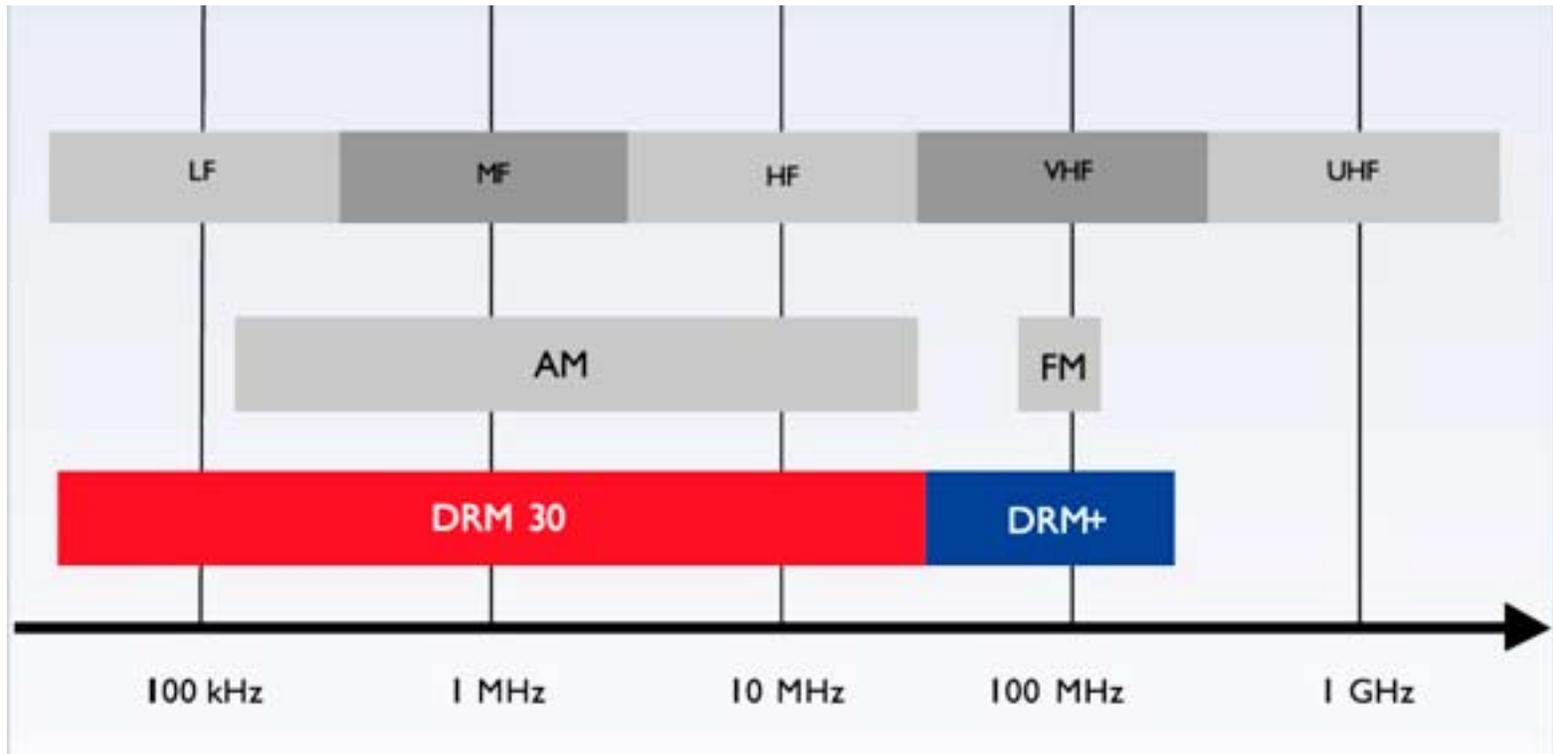
**Figure 1: Overview of the frequency bands supported by the DRM standard (source [3])**

| Mode | MSC QAM options | Bandwidth options (kHz) | Typical uses | |
|------|------------------|--------------------------|--------------|---|
| A | 16, 64 | 4.5,5,9,10,18,20 | LF & MF ground-wave, 26MHz band line-of-sight | |
| B | 16, 64 | 4.5,5,9,10,18,20 | HF & MF transmission on sky-wave | |
| C | 16, 64 | 10, 20 | Difficult sky-wave channels on HF | DRM30 modes |
| D | 16, 64 | 10, 20 | NVIS sky-wave (highest Doppler & delay spread) | |
| E | 4,16 | 100 | VHF transmissions 30MHz-Band III | DRM+ |

**Table 1: DRM Operation modes (Source [3])**

The concept behind the hybrid system is depicted in *Figure 2* on the next page. The satellite provides the core coverage. With technologies such as time diversity and/or spatial diversity, high service availability can be achieved by only using the satellite signal. However, in dense urban areas and for indoor reception, the satellite does not typically provide sufficient field strength. For such areas, operators install terrestrial repeaters to improve the **QoS.**

## Coverage Characteristics

Satellite-based systems offer within the footprint of the beam, a nearly constant field strength over the complete coverage area. For frequency bands such as L- (1.5 GHz) or S-band (2 to 3GHz) the atmosphere and weather have a minor impact on propagation conditions. Therefore, services can operate 24 hours a day, seven days a week without interruption. In particular, for geostationary satellites the reception conditions are very stable, allowing, for example, installation of accessories to ensure access to the signals in areas without repeaters and no direct satellite reception. For example, a user can install detachable antennas or micro repeaters in places well-positioned to receive the satellite signal, such as a south-facing window.

There are three notable types of system deployments:

- *Nomadic application/"Cooperative users only." Satellite systems operate at low field strength. For line-of-sight (LOS) reception, sufficient margin is provided, and to*
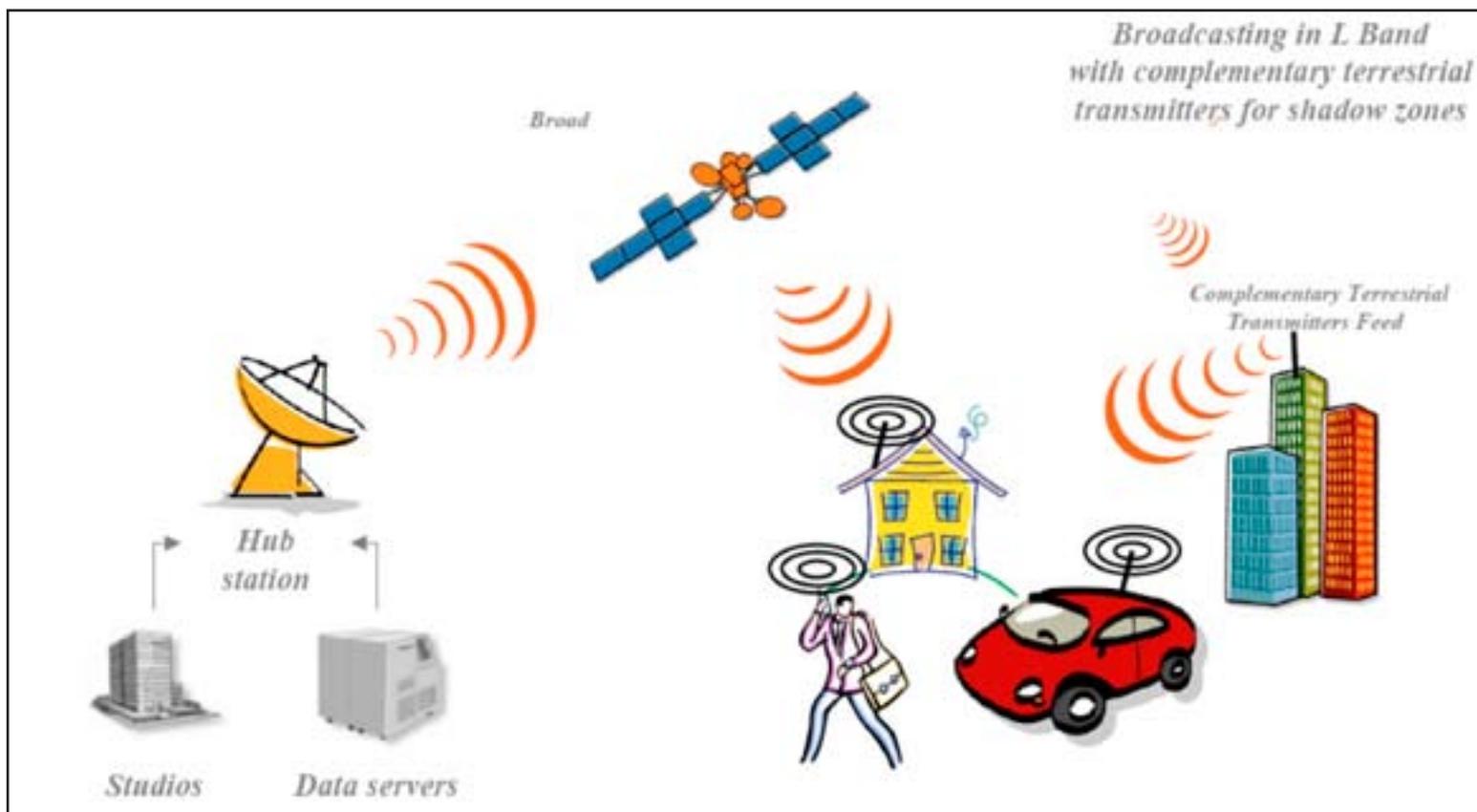
**Figure 2: Principle of hybrid systems  (Source [5])**

*support Non-LOS, more margin is required. This makes the system very expensive or reduces the capacity. A much higher bitrate can be offered if the customer is willing to cooperate and does not expect coverage for bad reception conditions. If the customer is willing to look for a good antenna position such as a south-facing window, the overall network costs can be reduced. In addition, mobile reception in open environments is feasible, and this type of network is typical for two-way communication. An example is the Inmarsat BGAN service. Using small portable antennas placed in a good position allows high bitrates at acceptable cost.*

- *The network targets mainly mobile reception in the car. To achieve high QoS for mobile reception in areas where obstacles block the LOS signal, it is necessary to use countermeasures. Technologies such as time diversity/time interleaving are typical methods. Rural and suburban areas can be served without any terrestrial repeater. In urban areas, the critical issues are traffic jams, and time diversity fails for these scenarios. In areas with Non-LOS (narrow streets, tunnels, etc) and stop-and-go traffic, repeaters ensure an outage free reception.*

- *Full coverage (including indoor and handheld). Without repeaters, very high satellite power is required, or the capacity (number of programs) provided per satellite must be low. Using repeaters is a good trade-off. The satellite segment is designed to serve rural and suburban areas, and repeaters are installed in areas where the satellite is not sufficient or indoor reception is expected.*

The footprint of the satellite beam defines the core coverage area. *Figure 3* on the next page shows the footprint of the SDARS systems. The service targets the United States, but the signal also can be received in neighboring countries and many islands around North and Central America. If required, the coverage area also can be reduced by using spot beam satellites. For Europe it may be worthwhile to consider linguistic zones and use several spot beams instead of a global beam (*Figure 4*). In addition, combinations of global beams and spot beam coverage may be attractive.

DRM for the AM bands ('**DRM30**' parameter configurations) mainly distinguishes between two propagation paths:
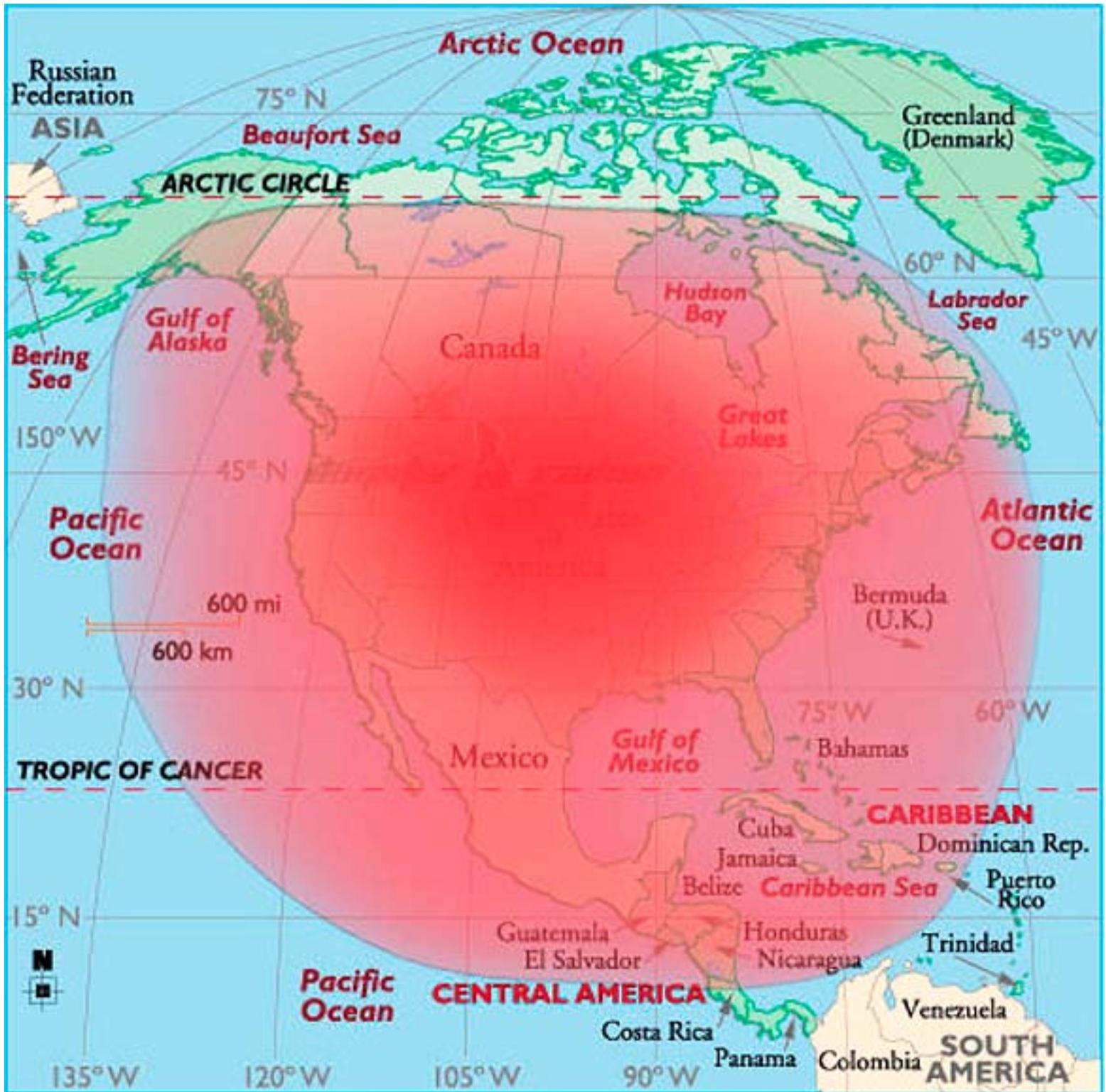
**Figure 3: Typical service area of a satellite-based system**
**(source: http://satellite-radio-source.ca/store//catalog/faq.php)**

- *Ground-wave (typically long wave and medium wave daytime)*

- *Sky-wave (typically short wave and medium wave nighttime)*

Ground-wave propagation essentially describes the field strength as a function of the distance to the transmitter. The coverage area depends highly on the available transmission power. Ground-wave propagation is typical for local/regional broadcasting.

*Figure 5* shows a medium wave propagation example. During the day, coverage is mainly defined by the ground-wave, while during the night, interference caused by stations far away and sky-wave propagation causes interference and reduces the effective coverage area. In this case DRM could be dynamically reconfigured to use a more robust transmission mode. See *Figure 5*.
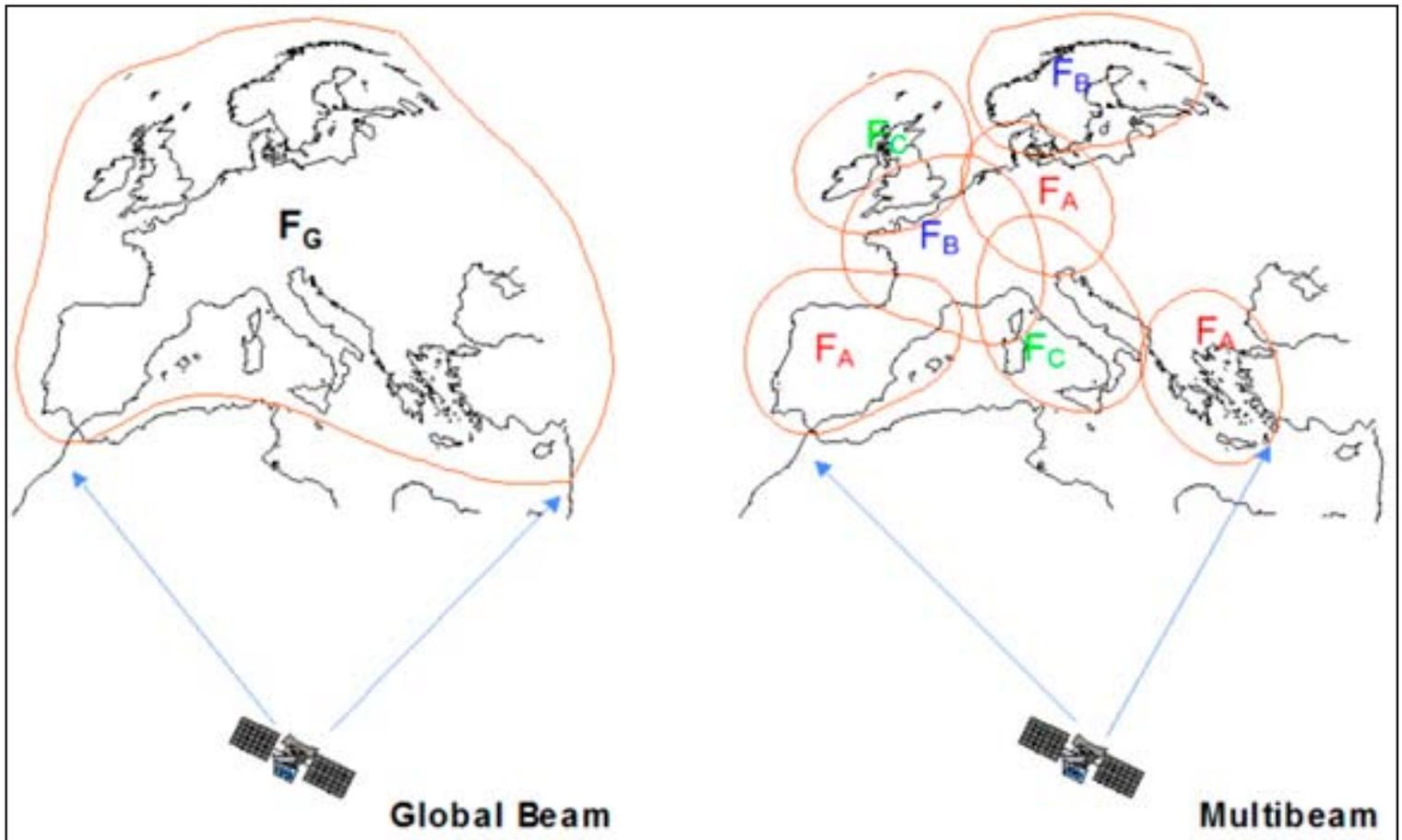
**Figure 4: Comparison of a satellite system with global beam and multi beam providing several spots.**

For wide area coverage, the sky-wave propagation becomes relevant. Signals are reflected in the ionosphere and on the ground, and may approach the receiver after several hops. Sky-wave propagation allows for beaming the signal toward regions far away from the transmitter, thus international SW broadcasts can span multiple continents. On the other hand, such effects as sun spot activity must be taken into account for frequency planning purposes. A 24-hour service may partially require frequency or transmitter site diversity. If one carrier frequency is not suitable, an alternative resource is selected. The DRM standard includes many hooks for automatic receiver hand-over to alternative frequencies and can adapt the modulation robustness parameters if the propagation scenarios change. Generally, it is essential to carefully plan a DRM network and take into account the time variant propagation conditions.

## Terminal + Receive Antenna Considerations

The size of the antenna is a key issue for many terminals and car installations. The antenna size and the wavelength are correlated. For L- and S-band frequencies the wavelength l is in the range of 12 (S-band) to 20cm (L-band). A simple l/4 monopole antenna would already be matched to the transmit frequency. For these frequency ranges, very small antennas or antennas integrated into the handheld are typical. For a MF frequency of 800kHz, the wavelength is 375m, thus alternative antenna concepts are required. A typical antenna is a ferrite antenna, which makes the antenna compact while maintaining a good antenna gain. The drawback for such an antenna is the bandwidth, as the antenna design defines the useful frequency range.

## The Service Concept

The DRM system was designed to use the same overall infrastructure concept as traditional AM and FM – one broadcast frequency operated by one broadcaster. Typically, one transmitter broadcasts the radio program together with complementary audio programs and data services. Besides a one-by-one replacement or extension of analogue stations by a digital system, DRM also offers alternative network concepts such as single frequency networks to extend the coverage area of a transmitter and to allow for
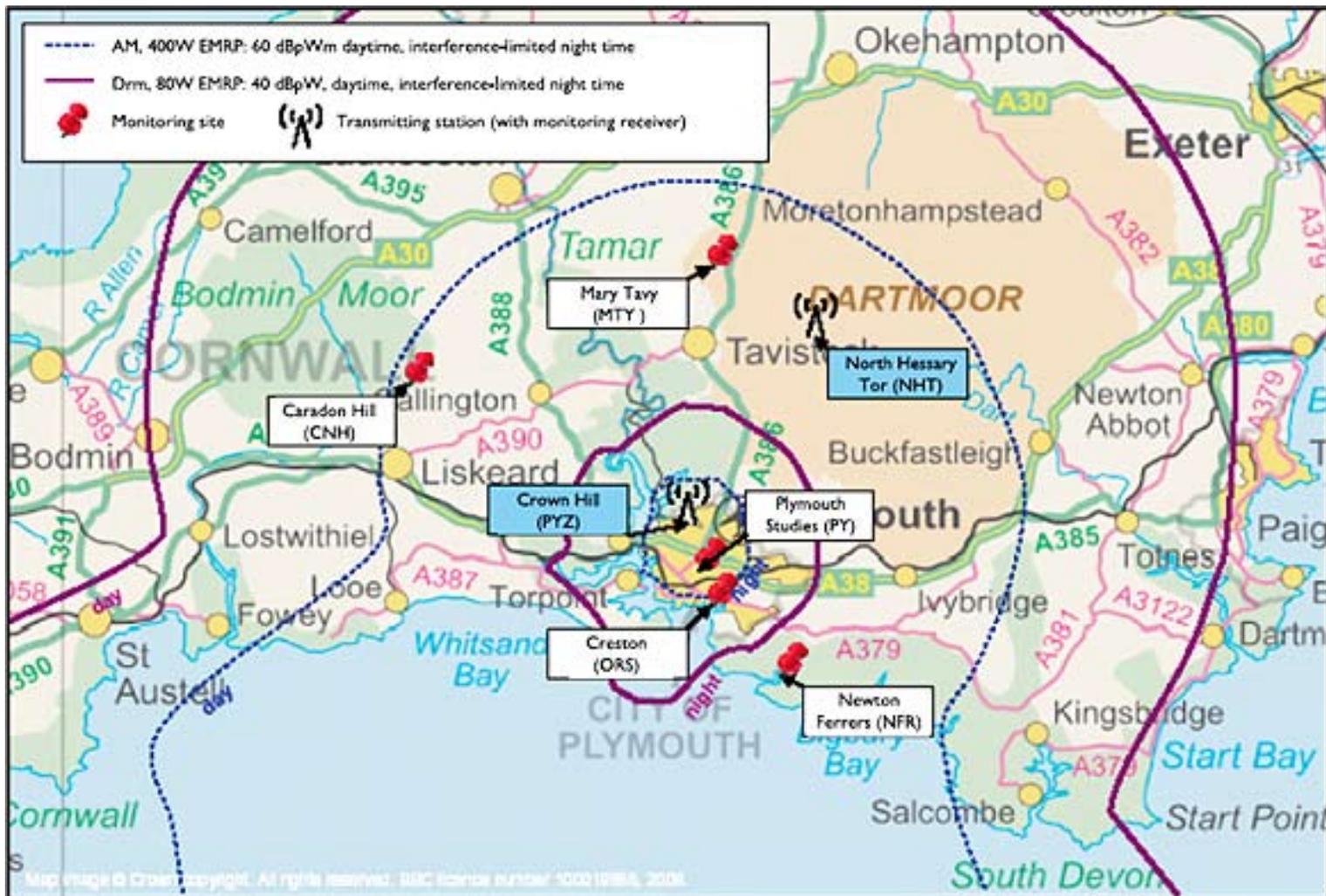
**Figure 5: DRM compared to AM, ground wave propagation in the MW Band, differences day/night (source [3])**

the use of lower transmitter power per site. Program diversity to target individual listener groups is provided by a multitude of broadcasters and radio stations.

The satellite-based systems follow a different concept. A multiplex offers in a single set many (typically 30 -100 or even more) programs usually combined with various data applications. The program formats can be coordinated to ensure that each program to a certain extent offers a unique content. The user has a choice between different genres or talk channels addressing dedicated subjects or selected interest groups. However, offering a high variety of programs also has drawbacks. To be commercially successful, services offering many programs as a package should also target large coverage areas to reach a sufficient number of listeners per program. Using one carrier frequency for a multiplex of many programs also allows the parallel reception of many sub channels. This is especially attractive for data services and

future radio services based on forward and store concepts. Innovative user interfaces offering functions such as time shift (repeat stored data, record a program while listing to another program, etc.) allows attractive combinations of listening to favorite music and getting up-to-date information via real-time broadcasting.

## Conclusions

Today, AM and FM broadcast is characterized by many small stations partly targeting only local areas. The DRM standard, with its DRM30 and DRM+ configurations, is a powerful technology enabling these traditional radio stations to benefit from the advantages of digital broadcast. Significantly higher audio quality and additional listener benefits are offered together with more reliable coverage or lower required transmit power.

Satellite-based systems target rather a new type of service and offer a broadband service including a

multiplex with many data streams. The broadband concept allows transmission of a bouquet of audio programs combined with attractive wideband data applications, and even video services can be added.

The two system approaches — DRM as the terrestrial individual-station digital radio standard and satellite-based broadband multiplex services — should therefore be considered as complementary and not as direct competitors. It even may be partly feasible to combine the systems. If large coverage areas have to be combined with local information, a combined solution may become attractive. Core technologies like the audio coding schemes and, increasingly, data applications are very similar. Audio broadcasting today benefits from combinations of attractive music, up-to-date information for all users and information channels focusing on special interest groups.

## References

[1] ETSI ES 201 980 (DRM system specification)
[2] ETSI TS 102 979 (Journaline specification) which can also be found online at: www.worlddab.org/introduction_ to_digital_broadcasting/applications_list/journaline
[3] Digital Radio Mondiale (DRM) - A Broadcaster's Guide, June 2010, available on www.drm.org
[4] EN302583, TS 102585 (DVB-SH standard)
[5] TS 102550, TS102551-1, TS102255-2 (ESDR standard)

### About the author

**Ernst Eberlein is head of the communications department at Fraunhofer IIS, which develops technologies for various systems, including DRM and satellite based systems. Ernst joined in 1985 and was involved in projects such as mp3, DAB, WorldSpace, S-DARS, ESDR and DVB-SH. His current focus is on targeting two-way communications and full integration of satellite and terrestrial networks.**

# SatBroadcasting™

# *The Global Importance Of Politics*

*author: John Graham, Commercial Manager, GlobeCast Australia*

*Australia's 2010 Election Campaign became the most watched political event ever experienced by GlobeCast Australia, with interest from all corners of the globe drawing upon the resources of the Company.*

organisations would cover the event at peak levels for several more weeks into September. During the campaign itself, **GlobeCast Australia** mobilised more than 30 DSNG deployment days — one for almost every day of the campaign — and booked hundreds of hours of satellite space over two months.

When Prime Minister *Gillard* was finally able to form a Government after weeks of negotiations, GlobeCast Australia broadcast live from Canberra to the world and domestically for **Network Ten** and **SKY News Australia**.

**Australian Prime Minister Julia Gillard**

The appeal of the coverage for viewers around the world was enhanced due to that day in June when Prime Minister *Kevin Rudd* was deposed in a coup by Australia's first female Prime Minister, *Julia Gillard*. The election campaign kicked off in earnest in July, with Australians heading to the polls in late August. The outcome of a hung parliament ensured that news

GlobeCast Australia DSNG Director *Greg Littrich* said, "We uplinked three carriers from one DSNG to Optus D2 as Ten went live simultaneously with anchored reports into their three East Coast markets, showing the power of a live presence in news coverage in 2010. After our extensive experiences covering last

# SatBroadcasting™

year's bushfires [in Australia], we have noticed news organisations are now using much more live location reporting — we are ready to roll at all hours.

"News is certainly much more last minute than the global sporting coverage we are well known for delivering. But networks come to us because they recognise we have an inherent understanding of the immediacy of broadcast," he said.

Feeds of the political milestone were also uplinked over Asia for **Reuters**; and material from the Australian Broadcasting Corporation travelled via GlobeCast Australia fibre to **APTN London**; and material from the **Nine Network** went via fibre to **CNN** in the US.

The global interest in the story followed unprecedented distribution of coverage on Election Day itself to 98 percent of the globe. GlobeCast Australia was proud to assist Australia's news channel **SKY NEWS** to deliver the nation's *Election Day 2010* coverage live, worldwide. The broadcast was via a seven-satellite network created for the day by SKY NEWS and used GlobeCast Australia's own global resources and its access to leading satellite platforms.

The content was distributed internationally free-to-air (FTA) and unencrypted to multiple digital satellite, cable, and terrestrial television systems, as well as live to online and on mobile platforms.

*Angelos Frangopoulos*, the CEO of Australian News Channel (ANC — which owns the SKY NEWS group of channels) said, "Australia's international relations and representation are more important than ever. Election Day 2010 was a pivotal event that should be available worldwide and SKY NEWS made it happen on an unprecedented scale. This was a service for the international business and diplomatic community, trade missions and embassies, Australian expatriates and travellers, and citizens of other countries on every continent who had an interest."

GlobeCast Australia daily assists SKY NEWS with its global content supply for its channels, including SKY Business and A-PAC, Australia's only public affairs channel. GlobeCast Australia switched the Election Day 2010 coverage through satellites deployed by **Intelsat**, **Eutelsat**, and **AsiaSat**, as follows:
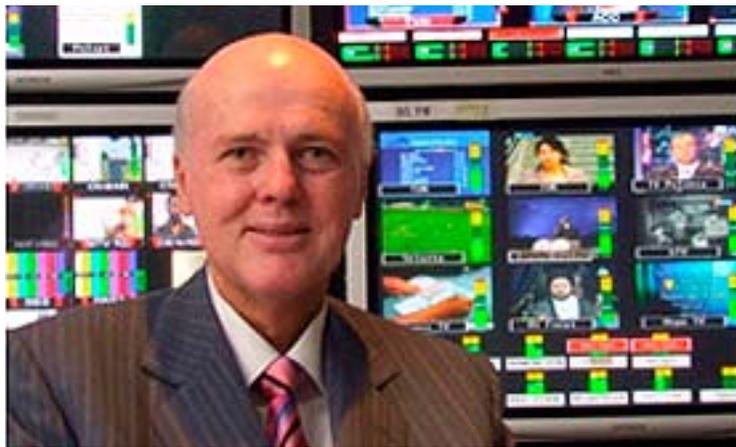


**Mike Lattin, CEO, GlobeCast Australia**



**(L) Commercial Manager (author), John Graham, & (R) Commercial Director, Andrew Nealon**



**(L) GlobeCast's DSNG Director, Greg Littrich, & (R) DSNG Manager, Chris Wright**

- » *INTELSAT-9 at 302 degrees East*

- » *INTELSAT-805 at 304.5 degrees East*

- » *INTELSAT-10 at 68.5 degrees East*

- » *INTELSAT-8 at 166 degrees East*

- » *INTELSAT-5 at 169 degrees East*

- » *ASIASAT-5 at 100.5 degrees East*

- » *EUTELSAT W2A at 10 Degrees East*

To mount such ground-breaking delivery solutions as evidenced on Election Day and on Decision Day, GlobeCast Australia draws on its every day experience delivering more than 150 full time services globally, and supporting daily Occasional Use bookings and events. GlobeCast Australia operates the nation's largest DSNG fleet, recently upgraded to include 4 HD units. It has also upgraded and expanded its 24/7 Master Control and Teleport over the past year, tripling the monitoring space, quadrupling floor space, and providing enhanced rack space and uplink and downlink capability.

### *About the author*

**John Graham is GlobeCast Australia's Commercial Manager. He joined the Company in July 2008 after 20+ years at five major Asia Pacific broadcasters, most recently as General Manager Production and Sales for the Australian Broadcasting Corporation until June 2008. Before he joined the ABC in 2001, he was Head of Programming at Optus Television, and he has also worked as a TV news executive and journalist at Australia's Ten Network and Television New Zealand.**

# Solving Satellite Interference...
## VSAT Terminal Commissioning

*author: Bob Estus, Vice President of Operations, Glowlink Communications Technology*

*Traditionally, the process for commissioning VSAT terminals tends be labor-intensive and time consuming, prone to causing unintentional yet highly disruptive interferences. The underlying causes are many: Multiple parties that must be involved and well coordinated; complexity of the tasks themselves; the need for relatively high skill-levels; and extensive training for the installers and others.*

These on-the-ground realities are further exacerbated by the rapid and sustained social and economic changes worldwide: rapid deployment for VSAT infrastructure in both developed and developing regions of the world coupled with the constant pressure to do more with less. The consequences of these changes are two-fold: the push to deploy VSAT on a massive scale, and the need to do this as cheaply as possible while trying to improve the quality of the underlying services promised by a VSAT infrastructure. These inherent agenda cross currents make the simultaneous accomplishment of all these objectives a nearly impossible challenge, thus necessitating new thinking and new technology to overcome them.

## The Existing Challenges

Today's VSAT installers are highly dependent on extensive interactions with satellite *Network Operations Center* (**NOC**) and VSAT Hub personnel to commission each VSAT terminal.

The installer often follows a tedious, time consuming procedure to point/peak the antenna, align its polarization, and then set the transmit power. Almost without exception, these steps are done in the blind. The installer is completely dependent on NOC and/or Hub personnel who serve as the installer's 'eyes and ears' and who orchestrate the installer's activities based on what they hear and what others see. The resultant high degree of coordination needed and the total lack of transparency for the installer make it nearly impossible to ensure optimal performance and avoid causing satellite interferences.

Adding to this situation is the enormity of activating an entire VSAT network. Often hundreds or even thousands of terminals need to each go through the same laborious commissioning process over a short period for the network to be fully activated — with each and every terminal installation job representing a time-consuming and costly undertaking.
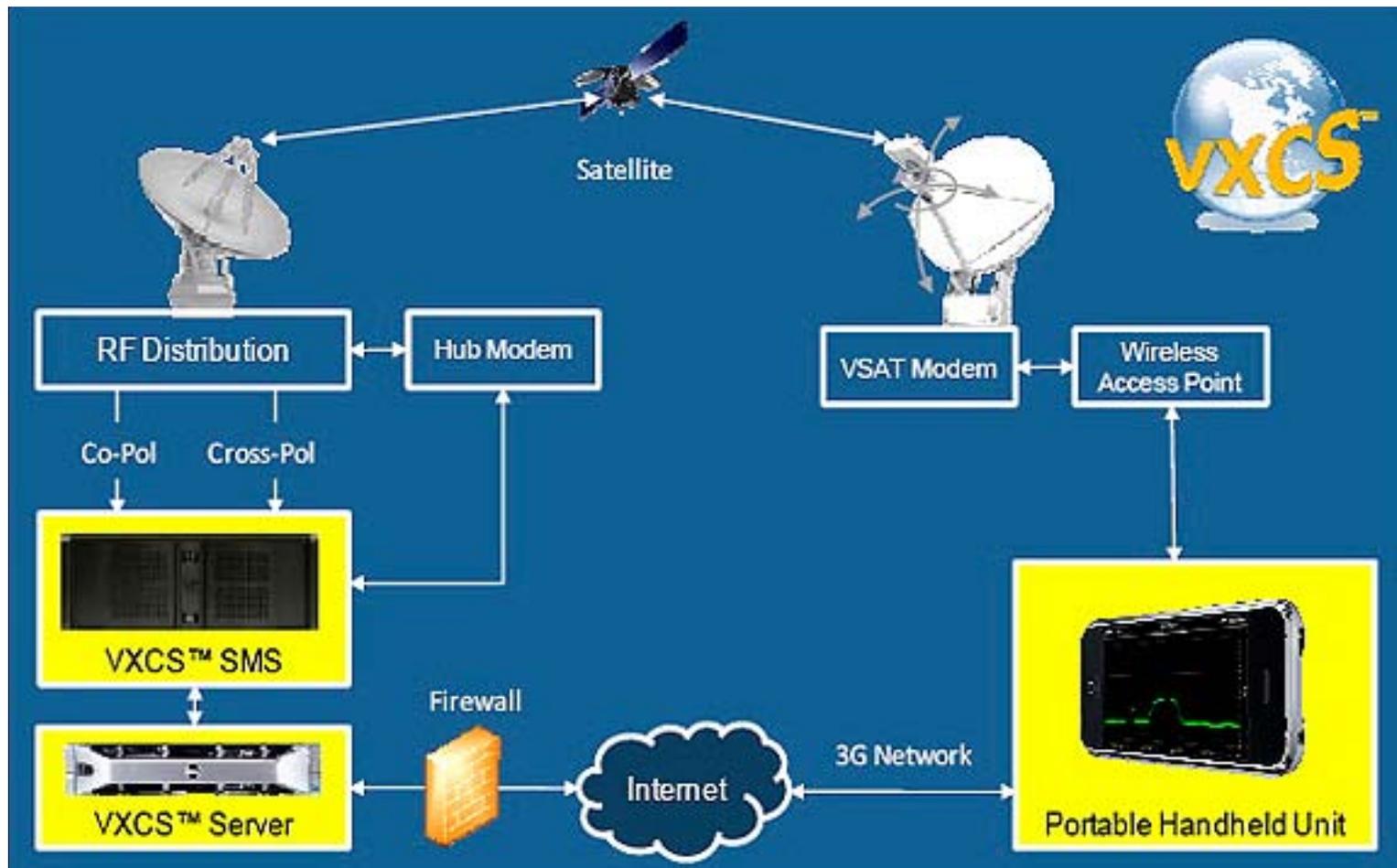
**Figure 1: How VXCS™ Fits Into A VSAT Network**

## To The Rescue.. A Secret Ingredient

New advances in technology have emerged that offer the VSAT industry an upper hand in dealing with these problems and these challenges, resulting in effective, efficient and interference-free VSAT network roll-out.

The secret ingredient to making VSAT commissioning short and sweet is simple: *empower the installer and remove the dependency on NOC and Hub*. This results in two compelling value propositions: more reliable and interference-free VSATs; and dramatically reducing — essentially zeroing out — the workload of NOC and Hub personnel.

One of the best and most recent examples imbued with this ingredient is the *VXCS*™ system, an automated VSAT commissioning system introduced by **Glowlink Communications Technology** in September, 2010. VXCS™ is specifically designed to simplify the most labor-intensive, intricate, and time-consuming parts of VSAT commissioning, lower the skill levels required, simplify training, and dramatically

reduce the extent of NOC or Hub personnel involvement. Key VSAT terminal commissioning tasks that are dramatically simplified by VXCS™ include:

- *Antenna Pointing/Peaking*
- *Polarization Alignment*
- *Uplink Power Adjustment*

## How VXCS Fits Into A VSAT Network

VXCS™ is comprised of three elements:

- » *Hub-based Spectrum Measurement System (SMS)*
- » *Hub-based VXCS™ Server*
- » *Portable Handheld Unit (PHU), such as a smart phone the installer usually carries*

*Figure 1* above illustrates how these three elements typically fit into a VSAT network.

The *VXCS SMS* is a digital spectrum measurement system that performs the measurements and number

crunching in support of automating all the traditionally labor-intensive, time-consuming tasks involved in VSAT terminal commissioning: antenna pointing/peaking, polarization alignment, and uplink power adjustment. The SMS also provides spectrum analyzer functions that the installer can remotely access for reference during installation.

The **VXCS Server** provides the Installer managed remote access and control of the SMS functions. It also stores VSAT terminal commissioning results and data that can be used in centralized Hub functions such as verification of proper terminal installation and authorization of traffic activation.

The *Portable Handheld Unit* (**PHU**) is carried by the installer and can be either a laptop PC or smart phone (*e.g.*, an *iPhone*). The Installer uses the PHU to directly access the Hub-located VXCS equipment and to guide installation via visual, graphical display of measurement results without involving the NOC or Hub personnel. The PHU connects to the Hub-located VXCS™ equipment via standard networking infrastructure, such as the Internet, Wi-Fi, 3G wireless, or over the satellite via the VSAT terminal/ hub link — a crucial alternative especially in remote areas where terrestrial communications infrastructure may be unavailable and where satellite phones can be costly.

Together, the VXCS SMS, VXCS Server and PHU revolutionize the approach to VSAT terminal installation by making it easy, accurate and reliable. VXCS enables direct visibility of the terminal commissioning actions the installer takes to perform the installation, and in the process minimizes and even eliminates the amount of direct involvement necessary from the NOC and Hub personnel.

## How VXCS Helps...

Prior to commissioning a VSAT terminal, an installer assembles the antenna with the associated RF electronics, connects the modem, and positions the antenna's azimuth and elevation settings to predicted coordinates based on the intended satellite and the terminal's location. With the initial VSAT terminal setup in place, the installer then proceeds to perform



**VXCS™ gives installers direct feedback via Portable Handheld Units**

the following three tasks:

- *Antenna Pointing/Peaking*
- *Polarization Alignment*
- *Uplink Power Adjustment*

### — Antenna Pointing/Peaking

This task involves adjusting AZ and EL antenna pointing to find the overall best setting for maximum transmission gain. Traditionally, VSAT installers would rely heavily on NOC and/or VSAT Hub personnel for the process via measurement feedback from the NOC/Hub. In other words, the installer basically performs the task in the blind. Problems such as language barriers, dropped calls, background noises, and constant interruptions are common occurrences that can impact the progress or success of antenna pointing/peaking.

Sometimes the lack of any terrestrial communications altogether can mean using costly satellite phones, assuming they are available at all, for a task that could consume many minutes if not an hour or more. The consequence is increased workload and frustration for all parties involved, not to mention the high potential for adjacent satellite interference — an increasingly significant problem as the antennas

| Task | Traditional | VXCS™ | Performance Gain |
|---|---|---|---|
| Antenna Pointing/Peaking | 30 minutes or more | 7 minutes or less | 1-3 dB increased transmission gain |
| Polarization Alignment | 35 minutes or more | 4 minutes or less | 3-5 dB increased isolation |
| Uplink Power Adjustment | 30 minutes or more | 5 minutes or less | 1-3 dB improved transmit output |

**Table 1: Efficiency + Performance Gain Using VXCS™**

themselves become smaller and more ubiquitous. VXCS solves these problems by removing the Installer's blindfold.

A hand-held device such as a smart phone provides direct and immediate, visual, graphical feedback to the installer as the VSAT antenna is positioned. With VXCS, the antenna pointing process can be performed quickly and accurately. In addition, VXCS™ offers the significant benefit of minimizing the occurrence of interferences due to erroneously pointed VSAT antennas.



**Polarization alignment is quick, easy, and accurate with VXCS™**

## — Polarization Alignment

Polarization alignment is the second task to commissioning a VSAT terminal. In this task, the installer rotates the antenna feed (if not the entire antenna assembly) to best align the antenna's transmit polarization and match the satellite's receive polarization. An improperly aligned VSAT terminal polarization causes cross-polarization interference. Traditionally, the installer would rely heavily on NOC personnel to perform polarization isolation measurements, relaying the results back to the installer to adjust and fine tune the terminal's polarization. This back-and-forth exchange would continue until an 'acceptable' outcome is achieved.

To complicate things a bit more, the difference between an acceptable level of isolation and an unacceptable one (the latter of which will result in satellite interferences) could be as small as a couple of degrees in feed rotation, thus requiring a high degree of precision, accuracy and patience in carrying out this procedure. Yet, during the entire process the installer is completely in the blind and at the mercy of the NOC and its setup, monitoring, and interpretation of the signal.

VXCS provides the installer instant feedback without the aid of the NOC or VSAT Hub personnel. VXCS automatically measures signal strengths on both polarizations, computes the isolation amount, and displays this information graphically on the PHU as the

**With VXCS™, transmit power adjustment is established in a few, easy steps.**

feed is rotated. Thus, the installer gets accurate and timely feedback across the slightest adjustments to help make the necessary precise adjustments.

### — Uplink Power Adjustment

For the Uplink Power Adjustment task, the installer would perform a compression test to find the desired compression point in the uplink signal path (usually the 1-dB compression point) to ensure maximum VSAT transmission power without overdriving the *Block Up-Converter* (**BUC**).

Traditionally an Installer would perform this task with NOC assistance on the phone, adjusting, for instance, the modem output power one step at a time until the NOC advises they have reached the desired level. This can also be a labor-intensive process that can significantly increase the workload for both the installer and precious NOC resources.

VXCS automates measurement of the compression point via a direct, intuitive display on the installer's PHU, again significantly reducing/eliminating the need for NOC involvement. With the PHU, the installer sees a clear indication of the measurements he needs to reach the optimal transmission point. Furthermore, these measurements are stored in the Hub-located VXCS server, so the VSAT service provider can

retrieve and reference these measurements for power re-adjustments at a later date.

### Dramatic Improvements

*Table 1* on the previous page summarizes the quantitative improvement as a result of using the VXCS during field trials.

### Simplicity Today = Reduced Interference Tomorrow

Cutting-edge technology such as that offered by VXCS is an effective tool for improving the efficiency and productivity of VSAT terminal commissioning. Through automation and handheld tools, installers can perform the most complicated and labor-intensive commissioning tasks easily and autonomously, thus minimizing the dependency on NOC or VSAT Hub personnel involvement. Most significantly, by conducting the most demanding tasks quickly and accurately, VSAT commissioning can achieve substantial system performance while reducing costs, workload and the incidence of interferences.

### About the author

**Bob Estus is Vice President, Operations for Glowlink Communications Technologies, Inc., a leading developer and innovator of products and technology for mitigating interferences on communications satellites. Bob has a Bachelor degree in engineering from the University of Alaska and a Master degree in engineering from Michigan Technological University.**

# The ABCs Of The M2M Switch

*author: Stratton J. Nicolaides, CEO + Chairman of the Board, NUMEREX Corporation*

*Nicholas Negroponte is a fellow Greek-American best known as the founder and Chairman Emeritus of Massachusetts Institute of Technology's Media Lab, and, more recently, as the founder of the One Laptop per Child Association (OLPC). He is also recognized as a visionary who can aptly decipher telecom trends.*

In the early 1990s, he suggested that signals at the time traveling by wireless methods (e.g., television) would soon be transported by landline technologies, and signals that historically traveled by landline methods (*e.g.*, telephone) would soon be delivered wirelessly. *George Gilder* called this view the **Negroponte Switch** as it implies a reversal of traditional signal transport modes. Albeit challenged by the rise of direct broadcast satellite systems, this prediction correctly anticipated a great deal of the broad sweeping changes in the telecommunications landscape. At the very least, this universal and simple concept contained the seed of the global explosion of the mobile industry.
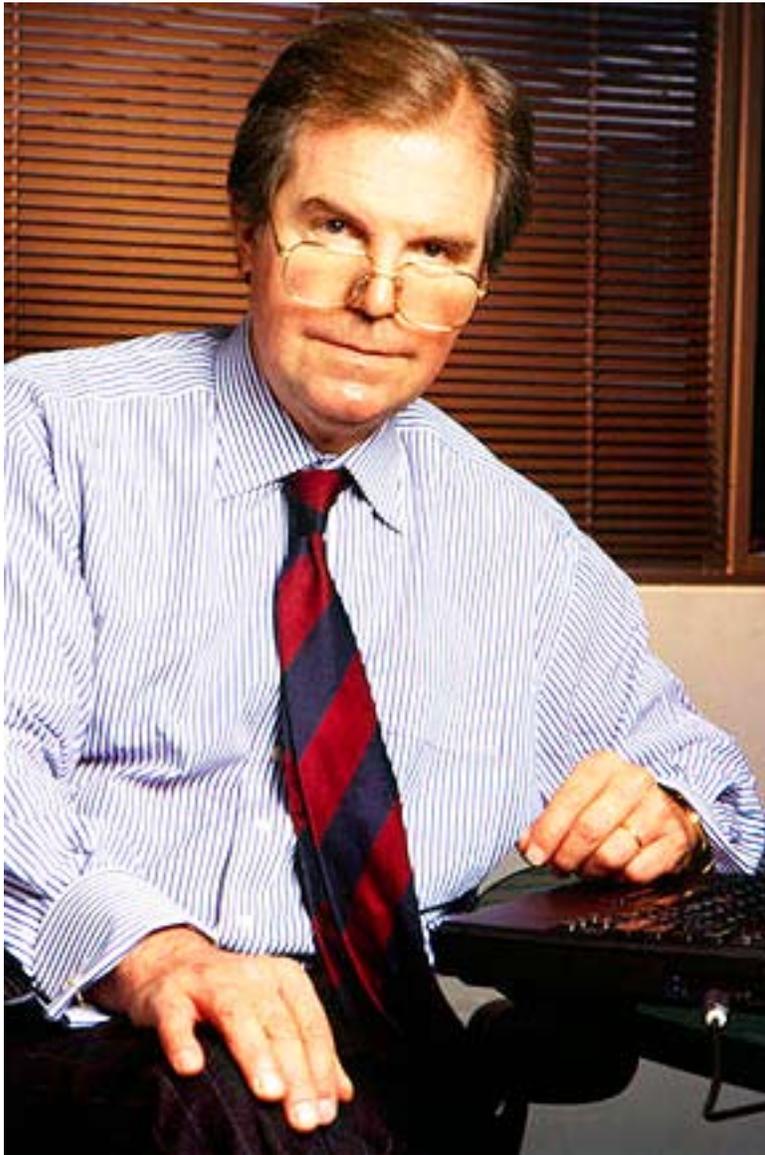
Almost 20 years after the Negroponte Switch was born, the wireless industry, with more than 90 percent cell phone penetration at the end of 2009, is now exploring new growth options as the penetration of voice services, which supported the spectacular wireless expansion, is now reaching a plateau, and voice-based income is falling rapidly. In short, where can new revenue come from? Is there an area replete with growth potential waiting to be tapped?

*Machine-to-machine* (**M2M**) communications is now viewed as such a frontier. What is it?

*M2M consists of using a device (e.g., sensor, meter, etc.) to capture an "event" (e.g., temperature, inventory level, location, environment status, etc.), relayed through a network (e.g., wireless, wired or hybrid) to an application (software program), translating the captured event into meaningful information (there is a breach, vending machine is empty, tank level is low, etc.).*

**Nicholas Negroponte**

This is a technology that is pervasive and invades all kinds of venue of our daily lives.

As the Negroponte Switch announced a new era in telecommunications, it would not be farfetched to claim that, likewise, the shift to machine-based communications also has the same type of fundamental consequences. Without being too presumptuous, I would submit that we are currently witnessing the dawn of the *M2M switch*.

The ABCs of the mobile carrier business model is that *1) ARPU, i.e., average revenue per unit is high (voice, data and video); 2) Bandwidth consumption per user is high; and 3) Churn, in a very competitive market, is high.*

M2M flips this model on its head: in the M2M market, *1) ARPU is low, 2) Bandwidth used is low and the 3) Churn is low.*

According to data collected by research firm **Strategy Analytics**, in the second quarter of 2010, the top 10 U.S. wireless carriers posted blended ARPU ranging from $37.61 to $52.71. Regarding bandwidth, a June 2010 **Nielsen** study showed that average data consumption of smartphones increased from about 90 MB per month during the first quarter of 2009 to 298 MB per month during the first quarter of 2010. This data consumption is not evenly distributed, in addition, with about 23 percent smartphone penetration in the United States; the market is still in the early adopter phase.

However, we can very well imagine the network problems looming on the horizon for the wireless carriers. Finally, monthly churn in the second quarter of 2010 ranged from 1.27 percent to 5.0 percent for the top 10 U.S. wireless carriers.

In comparison, the M2M market, deals with extremely different numbers. Depending on the application, ARPU is in the low single digit range, the need for bandwidth access is limited (the 'bread and butter' exception-based M2M solutions use only tens of kilobytes), and churn is an order of magnitude lower than what is observed in the traditional cellular market.

Therefore, the trade-off is to offset the income reduction with lower overall costs due to revenue stability and less congestion in the network. What makes this business model attractive is, of course, the often-quoted market dimension: There are about 10 times as many machines as people on this planet. Quite a potential, but also quite a shift!

Now, one tenth of the revenue becomes acceptable as bigger volume makes up for lower unit rates. Also, it is less costly riding the market growth than fighting for market share. An important catalyst of the M2M switch is the considerable decrease in cost of the modules, modems and other sensors, in a nutshell the technological paraphernalia vital to the capture of the events I mentioned earlier.

Tremendous improvements in price and miniaturization have been achieved in the RFID space. Satellite trackers, (2G) cellular modules and sensors have seen their prices dramatically reduced in the last couple of years.

In parallel, since the beginning of 2009, a global awareness of the imperative need for the M2M industry to work on standards to generate the economies of scale necessary to support the market expansion has led to several related initiatives on different continents.

The *European Telecommunications Standards Institute* (**ETSI**) now has a *Technical Committee* exclusively focused on M2M; the *Chinese Communications Standards Association* (**CCSA**) is currently exploring the definition of M2M standards for China, and the Geneva-headquartered *International Telecommunications Union* (**ITU**) is working on "mobile wireless access systems providing telecommunications for a large number of ubiquitous sensors and/or actuators scattered over wide areas in the land mobile service", which are at the center of the M2M ecosystem.

The *US Telecommunications Industry Association* (**TIA**) has also launched a new engineering committee centered on *Smart Device Communications* (**TIA TR-50**). Incidentally, at *Global Standards Collaboration 15* (**GSC-15**), which was held on August 30 to September 2, 2010 in Beijing and hosted by

# Insight

**CCSA**, the world's leading telecommunications and radio standards organizations met to promote innovation and collaboration on a broad spectrum of standards topics, among which M2M has been identified as a "High Interest Subject".

## *Archimedes Before Negroponte . . .*

Well before *Negroponte*'s insightful prediction, another Greek thinker highlighted an elementary and yet powerful principle, which we must bring back into our M2M discussion.

"Give me a place to stand and I will move the Earth," famously said **Archimedes** of Syracuse to underline the power of leverage. With a long enough arm and an appropriate fulcrum, a small force can lift a huge load. For the M2M switch to succeed to the fullest extent, or more precisely for the sizable market of machines around the world to be profitably exploited, the "force" of the above outlined "ABCs" must be applied to a suitable lever.

I would submit that the metaphorical lever that can efficiently take advantage of the ABCs and propel the M2M growth is the integration capabilities of the M2M service providers. The M2M ecosystem is a complex one and will remain so for the years to come. Process simplification, time-to-market acceleration, innovation fostering and through-and-through customer support are central to a powerful leverage of the ABCs. M2M end-to-end integrators with thorough knowledge of the intricate M2M value chain and able to provide smart, secure as well as network and technology-agnostic products and services can bridge the ABCs with the enormous M2M opportunities, transforming the appetite-whetting market potential into a financially attractive reality.

### *About the author*

**In 1992, Stratton J. Nicolaides co-founded Numerex Corp, a telecommunications business, which initially served the wireless eWeb telemetry networks and solutions markets before expanding into broader machine-to-machine (M2M) communications. He participated as a member of the board of directors in 1993 through 1994 before rejoining the Company in April 1999 as a director and COO. Since 2000, he has held the positions of CEO and Chairman of the Board. Prior to his present role at Numerex, Mr. Nicolaides managed and provided strategic planning services to a closely-held investment group. In addition, he served on the boards of a**

**variety of technology, manufacturing and security companies and has spent two decades building, restructuring, and merging a number of public and private businesses. As an active member of the community, Mr. Nicolaides is a director and patron of a number of educational and scholarship programs affiliated with both public and private organizations. He has organized and participated in several cultural, arts, and community events in support of classical studies and a number of scholarship programs. Amongst other philanthropic activities, he is on the board of directors of the Taylor Hooton Foundation for Fighting Steroid Abuse, a non-profit organization incorporated in Washington, DC, with headquarters in McKinney, TX. He earned his Bachelor's Degree in Business Administration from St. Joseph's University in Philadelphia, Pennsylvania and his CPA certification in Pennsylvania where he was a member of the AICPA and PICPA. He is a long-standing member of the Institute of Directors in the United Kingdom, and annually participates in a variety of trade council and commerce activities.**

# *Maritime Interoperability*

*author: Christian Bergan, Director of Maritime Marketing, iDirect*

*Over the past five years, the use of VSAT technology to support mobility applications has expanded greatly. High-speed broadband communications has become a constant, universal requirement for end-users who need to stay connected from demanding and remote locations on land, at sea, or in the air.*

# Focus

During this period of growth, service providers have had to address key mobility challenges in order to deliver seamless and guaranteed connectivity that supports voice, data, and video applications in any business, geographical, or communications environment.

One of these challenges was the fact that VSAT equipment manufacturers were separate companies from those that produced stabilized VSAT antennas. This meant that custom integration work often needed to be done by a service provider or network integrator to make certain the solution's components offered to a maritime customer would work as designed.

Today, however, new developments make it easier for maritime service providers to implement an onboard VSAT solution. After detailed and

continuous work between **iDirect** and several leading, stabilized antenna manufacturers to ensure their systems successfully interoperate with one another, iDirect developed the ***OpenAMIP*** protocol as an industry-wide, open-source standard to simplify antenna-router integration.

OpenAMIP is an IP-based protocol that facilitates the exchange of information between an *Antenna Controller Unit* and a satellite router. The protocol allows the router to command the antenna and enables the use of *Automatic Beam Switching* (**ABS**), which transfers connectivity from one satellite beam to the next as a vessel passes through multiple footprints.

In addition, OpenAMIP and ABS enable service providers and their customers to meet government

## Cobham Sea Tel

| Antenna type/model | Antenna Software | Antenna Controller | ACU Software |
|---|---|---|---|
| USAT 24, USAT 30, 2406, 4010C, 4010W, 5010C, 5010W, 4006, 5006, 6006, 4009, 5009, 6009, 9707, 9597, 9797, 14600 | N/A | 2202 2302 | 6.06, 7.06, CommIF 1.11 or higher |

## Intellian

| Antenna type/model | Antenna Software | Antenna Controller | ACU Software |
|---|---|---|---|
| V110 | PCU v5.21 STAB 5.23 | V110 ACU GYRO v1.07 | MAIN v.112 Modem v1.08 |

## Jotron

| Antenna type/model | Antenna Software | Antenna Controller | ACU Software |
|---|---|---|---|
| SATURN B120 ADE | 1.102 | SATURN B120 BDE | N/A |

regulations by commanding the antenna to mute the signal in no-transmit zones.

Since introducing OpenAMIP in 2006, iDirect has integrated the open-source code into its mobility VSAT platform and today has established a formalized qualification program for satellite antenna manufacturers. The OpenAMIP protocol eliminates the need for proprietary coding to ensure that new antennas or routers introduced into the market will all work together. The protocol allows maritime organizations to select from a wider selection of hardware to best suit their needs.

iDirect is antenna agnostic and the platform is designed to work with all major stabilized VSAT manufacturers' products. Four leading manufacturers — **Sea Tel**, **Intellian**, **Jotron** and **Navisystem** — have already adopted iDirect's OpenAMIP protocol and completed successful interoperability testing with iDirect's broadband satellite routers. Numerous additional manufacturers are currently in the implementation and testing phase to receive qualification.

Through the OpenAMIP protocol, iDirect hopes to remove some of the complexity of implementing maritime VSAT solutions and promote a shared standard within the industry for technology providers to work together on making networks more reliable, manageable and affordable for end users.

### *About the author*

**Christian Bergan is responsible for the maritime market strategy at iDirect, working closely with iDirect's global network of service providers to promote the value of VSAT technology throughout the maritime industry. With a background in both the satellite and maritime industries, Christian offers a unique blend of knowledge and experience to help educate the maritime market on the expanding capabilities of satellite communications. Prior to joining iDirect, Christian spent 20 years with IC Bergan, Inc., a family-owned business engaged in manufacturing of sensors and controls for liquid cargo handling for the global commercial shipping markets. He currently resides outside Oslo. For more information on the qualification process for OpenAMIP, or to learn more, please contact Christian Bergan at cbergan@idirect.net**

# The Obama Space Policy, 2010

author: Victoria Samson, Secure World Foundation

The Barack Obama administration's new National Space Policy (NSP), released on June 28, 2010, strives to ensure that outer space remains usable over the long-term for the benefit of all, thus setting the stage for future, cooperative efforts in space. Specifically, the NSP sets forth the challenge to make space sustainability a priority through global engagement and cooperation, as well as through responsible space behavior. However, the policy's ultimate success will depend on how the rest of the U.S. government interprets and implements the principles contained within the NSP. Furthermore, its efficacy is tied to both how much cooperation the United States receives internationally, and what bilateral and multilateral transparency and confidence-building measures are undertaken.

*Presidential Policy Directive* (**PPD**)-*4*, the **NSP**, is the fourth policy directive to come out of the *Obama* administration and is intended to provide broad guidance on how the United States intends to conduct activities in outer space. Ultimately, it will be up to the various governmental departments to decide how to implement the policies included in the NSP.

**Secure World Foundation** (**SWF**) has long supported building an increased understanding of how to best protect the space environment and improve space security for the United States and other space actors. Moreover, SWF focuses on three key areas: *sustainability*, *international engagement*, and *stability* in outer space. The new NSP places a heavy emphasis on these objectives, recognizing the extent that space activities have penetrated the economic, political and military framework of today's world.

## Space Sustainability

In one of its opening principles, the NSP states, "The United States considers the sustainability, stability, and free access to, and use of, space vital to its national interests." Sustainability is not defined by the NSP, but it could be described as ensuring that human activities in space do not negatively affect our ability to use the space environment in the future. Thus, the goal of space sustainability should not be to reduce usage of the space environment, but rather, to ensure the expansion of the use of the global commons of space does not harm the long term ability to derive benefit from it. As opposed to many commons issues on Earth, which must deal with extraction of a finite resource (for example, monitoring fish populations so they are not overly depleted), space sustainability revolves around efficient use of limited orbital zones and radio frequencies, and preventing actions that could have long-term negative impacts.

Given that the U.S. military is currently tracking more than 21,000 objects on orbit, with potentially hundreds of thousands of smaller pieces of debris that could prove damaging or even catastrophic to space assets that are not yet being tracked, it is crucial that the international community work together to limit the creation of new pieces of man-made debris. Debris mitigation is a key part of ensuring that space can continue to be used for decades to come. Otherwise, using certain orbits will become prohibitively

expensive and/or dangerous. International coordination to improve global space situational awareness has been one of SWF's core efforts.

The NSP gives many debris mitigation guidelines, including:

- *"Lead the continued development and adoption of international and industry standards and policies to minimize debris, such as the United Nations Space Debris Mitigation Guidelines."*

- » *"Develop, maintain, and use space situational awareness (SSA) information from commercial, civil, and national security sources to detect, identify, and attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment."*

- » *"Continue to follow the United States Government Orbital Debris Mitigation Standard Practices, consistent with mission requirements and cost effectiveness, in the procurement and operation of spacecraft, launch services, and the conduct of tests and experiments in space."*

- » *"Pursue research and development of technologies and techniques, through the Administrator of the National Aeronautics and Space Administration (NASA) and the Secretary of Defense, to mitigate and remove on orbit debris, reduce hazards, and increase understanding of the current and future debris environment."*

- » *"Require the head of the sponsoring department or agency to approve exceptions to the United States Government Orbital Debris Mitigation Standard Practices and notify the Secretary of State."*

The NSP's focus on debris monitoring and mitigation demonstrates how crucial it is that the United States and others use space in a sustainable manner.

Most of these debris mitigation techniques listed in the policy document already exist as voluntary international guidelines and mandatory U.S. regulations. However, the NSP formalizes the priority and importance of limiting space debris creation and exploring debris removal technologies; as such, it opens the way for increased international cooperation on these issues. It also may give some momentum to international efforts to ensure that all space actors carry out responsible space practices in their space operations. Though the legal, policy and political aspects of debris removal are not explicitly mentioned in the policy, it lays the underpinnings for the United States to address these important matters in international fora.

## International Cooperation

Increased international outreach would also shore up the sustainable use of space. The NSP demonstrates a clear understanding by the U.S. government of the changed realities of operating in the global commons of space. With the financial stress of paying for two ongoing wars and undergoing a global economic depression, the United States simply cannot afford to develop, buy, and maintain exquisite and expensive space systems by itself. And even if the United States had unlimited resources to spend on its space



**Artistic rendition of the US Air Force' SBSS Constellation**

systems, it would need cooperation from others, due to the physics of the space environment and the fact that actions by one entity in space can negatively affect others. Thanks to the rapidly growing number of space actors, the United States must accordingly expand its international outreach. This builds on cooperation that is already occurring. Outer space is already highly internationalized – for example, more than 80 percent of the U.S. military's satellite bandwidth is provided by commercial entities that are owned by largely non-U.S entities.

In the final paragraph of the introduction of the NSP, the call to action for international cooperation in space is very clear: "**The United States hereby renews its pledge of cooperation in the belief that with strengthened international collaboration and reinvigorated U.S. leadership, all nations and peoples — spacefaring and space-benefiting — will find their horizons broadened, their knowledge enhanced, and their lives greatly improved**." In addition, the policy indicates that the United States strives to use its national space programs to "**[e]xpand international cooperation**" in order to "**extend the benefits of space; further the peaceful use of space; and enhance collection and partnership in sharing of space-derived information.**" A very tangible result of increasing the number of actors who receive benefits from space is that it gives them a stake in pursuing responsible behavior and increases their willingness to cooperate in space (or at least lessens the chances of hostile or irresponsible actions in space).

An international approach to cooperative space efforts, as outlined in the NSP, also represents the United States' renewed interest in working within international fora on space security and sustainability issues. For example, the State Department is charged with coordinating U.S. government efforts to "**Strengthen U.S. Space Leadership**" in order to "**reassure allies of U.S. commitments to collective self-defense; identify areas of mutual interest and benefit; and promote U.S. commercial space regulations and encourage interoperability with these regulations**." The NSP demonstrates that the United States also wants to "**Lead in the enhancement of security, stability,**

**and responsible behavior in space.**" While the U.S. plans to take a leadership role, it does not intend to exclude other space actors. Rather, the United States wants to "**Promote appropriate cost and risk-sharing among participating nations in international partnerships**." Finally, the NSP encourages U.S. departments and agencies to "**Augment U.S. capabilities by leveraging existing and planned space capabilities of allies and space partners**."

When discussing U.S. activities in and attitudes toward space, it is important to distinguish the difference between leadership and dominance. There are many space actors and those dependent upon the continued benefits from space that fear that the United States might attempt to dominate the space domain by limiting access to and use of space. "**Dominance**" implies a unilateralist approach to space and a level of control of systems and space environment that would solely benefit the United States, possibly to the detriment of others. Despite the concern about space dominance, it has never been an official or unofficial goal of any *U.S. National Space Policy*, but rather a course of action promoted by a few outspoken thinkers, both within and outside of the U.S. military. Contrast this with space leadership, which assumes that there will be some sort of collective approach to space, and implies that the United States will work to ensure some sort of international response to these challenges.

One of the most striking changes from the current NSP to the one developed during the previous *Bush* administration is how the United States now envisions formalizing efforts to ensure responsible space behavior. Previously, the *Bush* administration NSP stated that the United States would not accept legal restrictions on its space activities. However, the new NSP calls for the United States to "**pursue bilateral and multilateral transparency and confidence building measures to encourage responsible actions in, and the peaceful use of, space.**" The NSP continues with the guidance, "**The United States will consider proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies.**"

# Beam

What the policy envisions transparency and confidence building measures to be is not spelled out, which could affect how much of a presence they have in international negotiations. On the other hand, it may give diplomats more flexibility when dealing with allies on these issues. At any rate, the wording used in this NSP about the need for arms control measures to be "equitable, effectively verifiable, and enhance the national security" goes back to variations on arms control options in earlier NSPs — specifically, it is fairly close to how the NSP developed during the *Reagan* administration worded the phrase. The NSP does not clarify what the standards are for "**equitable and effectively verifiable**," nor does it include specific proposals.

Additionally, the policy may provide an avenue for tackling the current deadlock in the *Conference on Disarmament* over how to discuss responsible behavior in space by attempting to create norms for the sustainable use of space. This would, for the time being, help focus discussions on the most practical actions and avoid confrontation over a potential space treaty, which would be extremely difficult to achieve. In fact, Deputy Assistant Secretary of State *Frank Rose* told the *Conference on Disarmament* in July 2010 that while the United States is still not interested in a "**space 'arms control treaty,'**" it is working to reach out to other countries to see how best to establish confidence building measures and increase stability and security. According to *Rose*, this outreach is not limited to more traditional U.S. allies, as he named specifically Russia and China as potential partners for creating stability in space.

The NSP's specific emphasis on establishing norms of behavior does provide some clues as to how these international discussions might move forward. In the space policy community, there is an emerging shift away from space arms control towards space "**behavior control**," in large part to sidestep the issues of unambiguously defining what space weapons are. Whether this behavior control takes the form of a code of conduct or rules of the road, or simply spells out sustainable norms of behavior, establishing consensus on responsible and irresponsible actions in space is an essential step in creating stability and security in the space environment.

The NSP includes guidance for the **U.S. Geological Survey, Department of Defense**, **Department of Homeland Security**, and the intelligence community to collaborate on "**providing remote sensing information related to the environment and disasters that is acquired from national security space systems to other civil government agencies.**" It also requires the **Department of Defense, NASA**, and the intelligence community to "**maintain and improve space object databases; pursue common international data standards and data integrity measures; and provide services and disseminate orbital tracking information to commercial and international entities, including predictions of space object conjunction**." These are all solid steps toward increasing transparency and thus smoothing the way for increased cooperation, both inside and outside the U.S. government.

Finally, under guidelines for civil space, the NSP includes a directive to NASA to "**Pursue capabilities, in cooperation with other departments, agencies, and commercial partners, to detect, track, catalog, and characterize near-Earth objects to reduce the risk of harm to humans from an unexpected impact on our planet and to identify potentially**
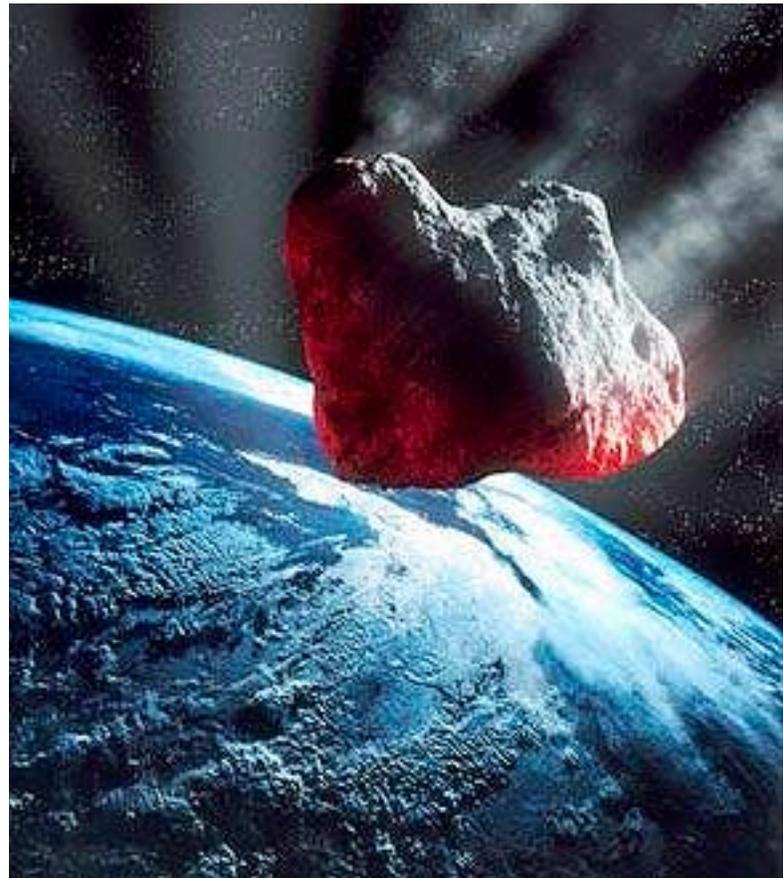
resource-rich planetary objects." *Near-Earth Objects*, or **NEOs**, represent a type of threat that is very remote, yet has the potential to be extremely destructive. The threat posed by NEOs is more and more being seen by the international space policy community as a way in which to determine how it can work out the governance issues for a host of international threats beyond the NEO one. At any rate, because the threat of potentially hazardous NEOs can affect a large portion of the planet, the response to them must be approached from a cooperative, international perspective, which includes mechanisms to detect and track them. Subsequently, the response by the international space community to a planetary threat should be executed in a coordinated way such that potential impact areas are informed and evacuated, if need be.

## Stability In Space

The NSP is correct in identifying security as one of the stratagems for creating a sustainable space environment. How the United States defines "security" in terms of the space domain is not spelled out in the new NSP, but this may be elucidated by later policy decisions and budgetary allocations. The NSP does list how the United States wishes to strengthen stability in space, through:

> **"[D]omestic and international measures to promote safe and responsible operations in space; improved information collection and sharing for space object collision avoidance; protection of critical space systems and supporting infrastructures, with special attention to the critical interdependence of space and information systems; and strengthening measures to mitigate orbital debris."**

The NSP states, "The United States will employ a variety of **measures to help assure the use of space for all responsible parties, and, consistent with the inherent right of self-defense, deter others from interference and attack, defend our space systems and contribute to the defense of allied space systems, and, if deterrence fails, defeat efforts to attack them.**" Security for space assets may be improved by undertaking efforts to deter interference. Part of how space deterrence can

be effectively undertaken is illustrated by the NSP's emphasis on responsible use of space. It notes, "**All nations have the right to use and explore space, but with this right also comes responsibility. The United States, therefore, calls on all nations to work together to adopt approaches for responsible activity in space to preserve this right for the benefit of future generations**." And in a later principle, the NSP argues, "It is the shared interest of all nations to act responsibly in space to help prevent mishaps, misperceptions, and mistrust."

For space to be used responsibly, space actors must agree as to what responsible space behavior entails. Currently, the international community has not yet agreed on what proper norms of behavior in space are. When a global set of responsible space behavior norms are defined, and agreed upon, the issue of deterrence in space can be more closely addressed. This would also ensure that there are common definitions as to what deterrence means so that different space actors are not making assumptions about how final others perceive escalatory steps to be. Clarifying common definitions would also improve the chances of strategic communications being both received and understood by a variety of space actors.

Over the past year or so, the Department of Defense has been changing how it envisioned deterring attacks on U.S. space assets. This shift in thinking coincides nicely with the NSP's emphasis on responsible space behavior. Along those lines, the Department of Defense is focusing more now on the establishment of norms of behavior, international partnerships, denial of benefits (deterring attacks by making U.S. space systems more resilient), and imposition of costs (typically seen as a military
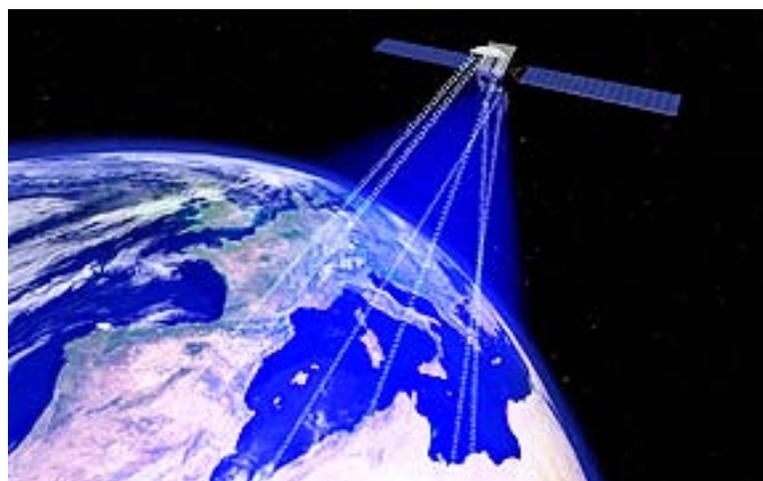
response to attacks). This last step is now the lowest priority of all levels of deterrence, a downshift in priority that is a change from earlier deterrence thinking, which had placed it as the first response to threats to U.S. space assets. For example, the 2001 *Rumsfeld* commission report on space and its warning of a "space Pearl Harbor" did much to shape earlier thinking on how best to handle space security issues – namely, in a manner that tried to impose costs first and carry out other deterrent steps later, if ever.

Another NSP goal requires the United States to "**Increase assurance and resilience of mission essential functions enabled by commercial, civil, scientific, and national security spacecraft and supporting infrastructure against disruption, degradation, and destruction, whether from environmental, mechanical, electronic, or hostile causes**." By working to ensure that U.S. capabilities will not be immediately lost should a particular space asset be targeted, this policy, if followed through with programs to carry it out, would remove much of the incentive an enemy might have to attack U.S. space assets.

Per the NSP, the United States is striving to "**Develop and implement plans, procedures, techniques, and capabilities necessary to assure critical national security space-enabled missions**." Again, the administration clearly highlights, through the NSP, that a cooperative approach to assuring space stability could have a large payoff by emphasizing, that "Options for mission assurance may include rapid restoration of space assets and leveraging allied, foreign, and/or commercial space and non-space capabilities to help perform the mission." Furthermore, the U.S. Secretary of Defense is directed by the NSP to "**Be responsible, with support from the Director of National Intelligence, for the development, acquisition, operation, maintenance, and modernization of SSA capabilities**," as well as "**Develop capabilities, plans, and options to deter, defend against, and, if necessary, defeat efforts to interfere with or attack U.S. or allied space systems.**" This directive works to impose costs on those who would try and render unusable U.S. space assets. It is within the right to self-defense as spelled out in *Article 51* of the United Nations charter.

## Next Steps

The *Obama* administration's new NSP clearly identifies the core challenges and priorities of space security and sustainability for the United States and provides the policy framework to allow the United States to deal with those challenges. However, much depends on how the branches of the U.S. government carry out the mandates presented in the new NSP. The *Space Posture Review*, being worked on at present by the Department of Defense and the *Office of the Director of National Intelligence*, will provide some insight on how the United States intends to implement the NSP's guidelines when the *Space Posture Review* is released, potentially later this year.

The *Obama* administration's Fiscal Year 2012 budget request, scheduled for release in early February 2011, will give some indication of the programmatic actions that can result from the new NSP. Efforts by the State Department will further illustrate whether or not the United States is truly serious about international cooperation or if Washington is only paying lip service to the concept.

The NSP sets the stage for potentially long-lasting effects that will allow the world to continue enjoying benefits from space. As the international space community continues to move towards creating and sustaining a stable outer space environment, it has the opportunity to use the NSP as both a guide post and as a starting point for international discussions for how best to do so. This major opportunity should not be bypassed.

### About the author

**Victoria Samson is the Washington Office Director for Secure World Foundation, where she engages Congressional staffers and agency officials on matters related to space security and governance. Previously, she was a Senior Analyst with the Center for Defense Information (CDI), where her areas of interest included missile defense, nuclear reductions, and space security issues. Prior to her time at CDI, Samson was the Senior Policy Associate at the Coalition to Reduce Nuclear Dangers, a consortium of arms control groups in the Washington, D.C. area.**

# Insight

# *Aviation Safety... Enhanced*

*author: Viraf Kapadia, CEO + Acting Chairman of the Board, Star Navigation*

*STAR-ISMS™ has been tested and certified for airworthiness by world transport authorities including the United States Federal Aviation Authority (FAA) and Transport Canada. Star owns the worldwide license — ground, air and marine — for this technology and Star is actively developing new applications for in-flight medical monitoring, environmental monitoring, and ground-based systems.*

The company's proprietary patented technology provides real-time data transmissions that enhance aviation safety, facilitates the reduction of maintenance and fuel costs, reduces carbon footprint, and provides the opportunity to dramatically increase airline profits.

## STAR-ISMS™ Overview

**STAR-ISMS**™ is an on-board monitoring system that provides a "**virtual window into an aircraft**." It is a proven and cost-effective system that automatically and securely transmits flight data and incident alerts in real-time. STAR-ISMS™ continuously monitors selected avionics systems on the aircraft as it flies, instantly analyzing the data, and transmitting desired data and incident alerts via satellite to the operator. STAR-ISMS is a patented technology. It reads data from the aircraft avionics buses (**ARINC 717/573** and **ARINC 429**) and monitors aircraft parameters provided by a variety of avionics including essential systems such as:

- » *Flight Management Computers (FMC)*
- » *Inertial Reference Systems (IRS)*
- » *Air Data Computers (ADC)*
- » *Flight Control Computer (FCC)*
- » *Flight Guidance System (FGS)*
- » *Flight Warning Computer (FWC)*
- » *Digital Flight Data Recorder (DFDR)*

Flight data is stored on solid state storage inside the **Star Server Unit** (SSU), the centerpiece of the STAR-ISMS hardware on board the aircraft. The data is analyzed in real-time and sends alerts about abnormal parameters and events to the ground along with selected data. STAR-ISMS uses satellite communication when in the air and WLAN (IEEE 802.11) when on the ground. Time-critical information is sent right away; other information is stored on board and transmitted at lower cost on the ground.

The STAR-ISMS system gives airline ground personnel the ability to monitor trends, predict possible failures, schedule repairs, and assist the flight crew to take preventive action as required. It acts as an early warning system, detecting the earliest signs of potential problems. As a result, airlines can reduce aircraft downtime and flight delays due to unscheduled maintenance, increase compliance to standard operating procedures and gain efficiencies from the many reports and data feeds available.

## STAR-ISMS Capabilities

### On-Board Data Analysis + Real-Time Reporting

In addition to acquiring flight and aircraft data from the aircraft avionics busses, STAR-ISMS analyzes the data on the aircraft in real-time. Contrary to ground-based systems, the data does not need to be downloaded from the aircraft before it is analyzed. This avoids the high cost of large data transfers through satellite or ACARS while the aircraft is in flight. It also eliminates time delays in reporting characteristics for systems that store the data on the aircraft and only transmit it once the aircraft is on the ground and within reach of a ground based communication network such as WLAN.

The on-board data analysis capabilities range from simple bound checking (*e.g.*, aircraft pitch within -15° and + 25°), to multi-parameter combination checking (*e.g.*, aircraft speed less than 250 kts below FL 100) to complex equations with multiple parameters. A set of the most common analyses are pre-defined and airlines can specify additional analysis to be performed independently for each aircraft or aircraft type.

Once on-board analysis identifies an abnormal parameter or combination of parameters, it generates and transmits an alert. The ground station receives the alert and then transmits it to the airline and/or ground personnel (*e.g.*, PDA) via email, subject to local network capabilities. This enables the airline's maintenance department to know the status of the aircraft before it arrives and gives it the opportunity to prepare tools, parts and resources. As a result, costly flight delays and aircraft downtimes are reduced. (S*ee Figure 1 on the next page.*)

The STAR-ISMS on-board data analysis configuration is designed to be flexible to meet the needs of a constantly changing operating environment. This is achieved through the dynamic automated

# Insight
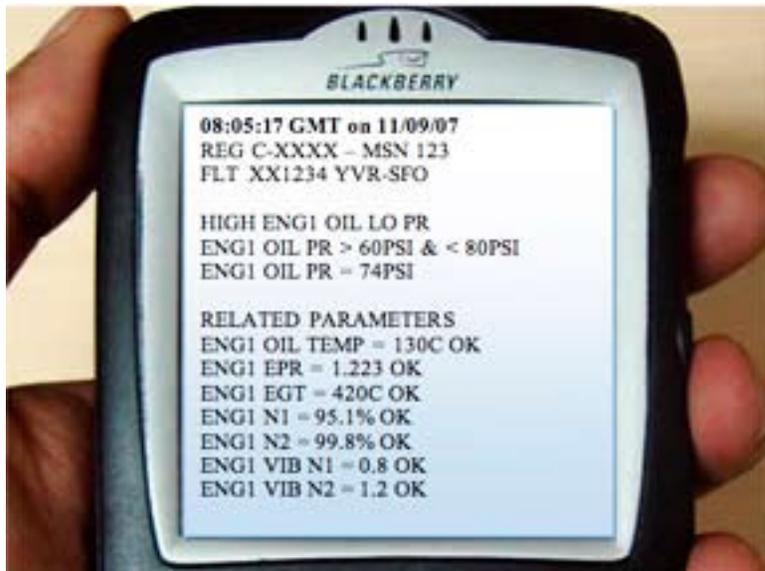


**Figure 1: Sample Real-time Alert sent from the aircraft**

end-of-flight configuration change feature. Updated and customized analysis configurations are uploaded to the aircraft and activated remotely when necessary.

For example, if "over water" routes such as on the North Atlantic require a closer monitoring of ETOPS relevant parameters, a separate data analysis configuration is pre-activated for such flights automatically, without human interaction.

At the end of each flight, STAR-ISMS creates a set of reports for various departments within the airline. These reports are available as both formatted reports and as raw data feeds. Formatted reports in ".pdf" format are sent by email and are also available through the secure *Customer Internet Portal*. Raw data feeds are transmitted to the airline's systems through email or *file transfer protocol* (**FTP**).

A comprehensive pre-defined report set covers the most common and most relevant parameters that are required for awareness, transparency and decision support, by various departments:

- » *Flight Operations*
- » *Flight Safety*
- » *System Operations Control*
- » *Maintenance*
- » *Engineering*
- » *Engine Condition Monitoring (ECM)*
- » *Finance / Administration*
- » *Payroll*

## On-Board Data Analysis + Automated Engine Condition Monitoring (ECM)

Data acquisition and transmission is fully automated for *engine condition monitoring* (**ECM**). All relevant engine parameters are read at various stages of the flight and can be set up to automatically upload into the airline's or engine manufacturer's ECM database via IP Internet communication either through satellite communication when in the air or through WLAN when on the ground. Airlines can specify the set of parameters transmitted, the number of samples recorded during a flight, and the flight phase and/or time at which the samples are recorded. With automated ECM, the airline can collect engine data more frequently and with greater accuracy while reducing pilot workload.

## Real-Time Flight Tracking

STAR-ISMS offers real-time flight tracking via satellite communication. The system submits position reports at a user-specified rate (default – every 2 min; max rate – every 30 sec). The parameters typically transmitted for tracking are:

- » *Position Report Date/Time*
- » *Registration/Flight Number*
- » *Latitude*
- » *Longitude*
- » *Altitude*
- » *Ground Speed*
- » *Track*

Tracking messages are received and processed either by the Star Data Center or by the airline. The tracking data is available through the Customer Internet Portal as position reports as well as plotted on an interactive map (See *Figure 2 on the next page*). In addition, with some STAR-ISMS flight tracking configurations, the tracking data can be interfaced with third party tracking and/or plotting software, such as **Google Earth (Figure 3, p.100)**.

**Figure 2: Illustration of web-based Tracking Position Report (may not be exactly as shown)**

### Data Acquisition + Retrieval For Flight Data Analysis (FDA)

During operation, data from the aircraft systems is recorded and monitored and is stored on solid state storage in the SSU. Once on the ground, the flight data set is transmitted automatically to the airline or the airline's flight data analysis provider for processing and analysis using IP Internet communication via WLAN. This capability eliminates the risk of data loss from media handling and human error present in traditional manual data recovery. It also eliminates the need for maintenance personnel to access the aircraft, and thus resource requirements, and significantly reduces data delivery delays. Data is typically available within minutes from the aircraft arrival at a WLAN-enabled gate.

### Out Off On In (OOOI) Time Reporting

STAR-ISMS provides automated and accurate timekeeping for block and flight times. Timekeeping uses the high precision atomic clocks on GPS satellites and can, therefore, reach an accuracy unmatched by manual timekeeping. The data can be transmitted in real-time through satellite communication or through WLAN when on the ground after the flight. OOOI times are also available through the Customer Internet Portal. Aircraft maintenance intervals, part lifetimes and often payroll of crew relies on accurate and timely OOOI time reporting. Eliminated is the airlines' necessity of the manual handling of OOOI times and the potential sources of error associated with it is reduced.

### Two-Way Text Messaging + Voice Communication

STAR-ISMS offers two-way text messaging and voice calls through satellite communication. The *Mission Management Unit* (**MMU**) lets aircraft crews send pre-set or customized messages, such as number of passengers, special service requests such as wheelchairs upon arrival, etc. Ground personnel can send pre-set or free-form text messages to the aircraft. In addition to text messaging, satellite voice calls are available to or from the aircraft.

# Insight



**Figure 3: Flight Tracking Data Display in Google Earth™
(may not be exactly as shown)**

## Customer Internet Portal

Airlines are offered an easy and convenient way to access key information through the Customer Internet Portal. The following information is accessible via the Internet from anywhere in the world:

- » *Alerts messages*

- » *OOOI times*

- » *End-of-flight reports*

- » *Tracking position reports and tracking on map*

- » *Selected parameters monitored from the aircraft systems*

For added security, the Customer Internet Portal is protected behind a firewall and uses a password login scheme.

## Certification

The STAR-ISMS system is currently certified via *Supplemental Type Certificate* (**STC**) by **Transport Canada** for the following aircraft types:

- » *Airbus A340-311-312-313*

- » *Airbus A310-300*

- » *Boeing 727-277*

- » *Boeing 737-7CT*

- » *Boeing 737-76N, 737-7CT, 737-832, 737-8Q8*

Additional aircraft types will  be certified (typically using a two-stage certification process). First, an Installation STC is applied to obtain approval for installation of the equipment on the aircraft. The Installation STC is typically issued within weeks

(however this schedule is dictated and under the control of Transport Canada). Once the Installation STC is provided and the equipment is installed, Transport Canada requires operational certification testing (*e.g.*, EMI, EMC, etc.), which will need to be scheduled and usually takes from one to a few days. When operational certification testing is completed satisfactorily, Transport Canada will issue an Operational STC — typically within several weeks.

The *United States Federal Aviation Authority* (**FAA**) or the *European Aviation Safety Agency* (**EASA**) usually issues certification of equipment such as STAR-ISMS, based on the Transport Canada STC. Such certification can take from a few weeks up to months.

### Installation

The hardware installed on the aircraft depends on which version is installed. The SSU that houses the STAR-ISMS Plus system on board the aircraft is installed in the avionics bay. It has standard avionics dimensions and requires space of two *modular concept units* (**MCUs**). In addition, a data transceiver unit is usually installed in the avionics bay, requiring space of approximately one MCU. The



**Figure 4: The Star Server Unit**

SSU and transceiver weights are 12 lbs. and 4 lbs., respectively. Installing the SSU, data transceiver and cable harness typically takes between 20 and 40 man hours (according to the aircraft) and can usually be completed in one or two night shifts.

In addition to the data transceiver, a dual channel satellite antenna is required for satellite communication capabilities. Many aircraft today have satellite antennas already installed, and



**Figure 5: Dual and Single Channel Satellite Antennas**

if compatible and not used by other equipment, STAR-ISMS uses the existing antenna. If an antenna must be installed, it typically takes 20 to 30 man hours (according to aircraft) and requires 24 hours for "curing". This is usually done when the SSU and data transceiver are installed.

The flight tracking feature is part of STAR-ISMS Ultralite and STAR-ISMS Lite. It requires an additional tracking transceiver and a separate antenna channel. Installing the tracking feature, including the antenna, typically takes 15 to 30 man hours (according to aircraft) and can typically be done over two night shifts.



**Figure 6: The STAR-ISMS™ Mission Management Unit (Illustration)**

# Insight

The two-way text messaging feature is part of **STAR-ISMS Lite**, and an option for **STAR-ISMS Ultra Lite**. It requires a *Mission Management Unit* (**MMU**) installed in the flight deck. The MMU installation typically takes 15 to 30 man hours (according to aircraft) and can typically be done over two night shifts.

To sum up, Star has that technology for the aviation world. Modern day aircraft are outfitted with the most up- to-date technology with computerized systems onboard they are almost capable of flying and landing by themselves.

### But something is wrong!

How is it possible that some aircraft are failing and crashing? How is it possible that it is not known until an airplane does not arrive as scheduled that something happened? How is it possible that technology that is almost 60 years old is still being used today on these most sophisticated of aircraft? How is it possible that an airplane that crashed in Pakistan killing all passengers on board and the black box that was found could not be read in that country because they did not have the technology to decipher it? How is it possible that they could know anything was wrong with that aircraft before it started that flight if they cannot monitor results of every flight? There are just too many questions regarding reactionary reporting.

Current black box technology is extremely limited. They are capable of about 300 parameters. In the event of a crash, the black boxes can be recovered and sent, still sealed, to the *National Transportation Safety Board* (**NSTB**) for analysis. This is completely reactionary and good only *if* the box is found and *if* it is not damaged. Forecasts of increased air travel for the future are galvanizing the nexgen system which completely compliments the Star ISMS — or you could say that STAR ISMS compliments it.

Take a look at the technology that Star Navigation has created. It is capable of reading as many as 18,000 parameters and streaming live data on demand, knowing exactly where the aircraft is at all times live on screen, and knows exactly what is happening on the aircraft as it happens. It is, quite literally, a virtual window into the aircraft. Governing bodies have been calling for better monitoring systems. Star Navigation recognized that need more than 10 years ago and spent that time perfecting technology. Fully patented, the technology is the "one and only" and in a class of its own. Even today, some industry members were looking to enhance the signals from the black box beacon — at Star Navigation, the belief is that a complement to the black box is the STAR-ISMS.

The R&D stage is never truly completed. The next big step is in the marketing of this product to the world. A recent technology partnership with a major European conglomerate has been a tremendous accomplishment for the company. Saving a single life is more important to our firm than any other considerations. Over the past 15 months, hundreds of lives have been lost, affecting thousands, from friends and families to businesses. If Star Navigation is able to reduce such calamities over and over again, the efforts is more than worthwhile. It is distressing that such events have taken place, but it also forces all to note where aviation safety is failing. The difference is that of reactive versus proactive.

**The old technology is no longer good enough**.

### About the author

**Mr. Viraf Kapadia is Star Navigation's acting Chairman of the Board and Chief Executive Officer. He brings more than 37 years of executive level experience in Europe, Asia, the Middle East and North America in the fields of accounting, aviation, steel, and the building industry.**

# Executive Spotlight

## Jaime Dickinson
## President + CEO, NewCom International

*Jaime Dickinson, the guiding force at NewCom, was recently honored as the World Teleport Association's 2010 Teleport Executive of the Year for his global vision and commitment to fostering education and development through 21st century communications. As president and COO, Jaime oversees all operations and drives the company's strategic partnership efforts — working to expand NewCom's presence around the globe. Under his direction, NewCom has emerged as a leading force in the global telecommunications marketplace to be recognized as the second fastest growing teleport operator in the world.*

*Jaime got his start in the telecom sector in the early 1990s as a founding partner of Vannamei, a satellite equipment distribution company. While at Vannamei, he was instrumental in launching sister companies, Publicom and Networldtron, which offered installation and Internet services and gave Vannamei customers a one-stop communications solution.*

*In the late 1990s, Jaime, together with his family, sold the companies to American Tower and joined the telecom giant's newly formed Verestar. In 2004, Jaime returned to his entrepreneurial roots by launching NewCom International.*

# Executive Spotlight

### SatMagazine (SM)
*Mr. Dickinson, what initially prompted you to enter the SATCOM business?*

### Jaime Dickinson
It stems back to the demand we were receiving from the Latin American market 18 years ago. At the time, I was in the export business — exporting products to Latin America. We started to experience demand for satellite equipment and we recognized an underdeveloped situation that needed to be optimized so we became resellers. From there, our customers began requesting telecom services, so we stepped in to fill that need as well. Ultimately, it was the huge demand for SATCOM services that triggered our entry into this market segment.

### SM
*Would you please tell us about your background and how such helps you with your current endeavors?*

### Jaime Dickinson
I come from Latin America but have an American father who gave us the opportunity to live and go to school in the U.S. Because of my Latin American heritage, I understand the culture, the language and the needs.

We knew there was a demand for U.S. resources, so we created an outlet to help people and corporations buy resources from the U.S. by becoming purchase agents for them. That, in turn, opened a lot of doors in Latin America and gave us access to many opportunities to sell the satellite equipment we represented. In addition to the contacts we had and knew in Latin America, becoming part of Verastar in the late 1990s helped us to grow our footprint to other regions such as Africa and the Middle East, and helped strengthen our name in the market.

### SM
*Your current company, NewCom International, has been involved in the African continent for a number of years. What opportunities did you see that prompted you to engage in this market segment?*

### Jaime Dickinson
The African market is similar to Latin America in that it's an underdeveloped continent that has a lot of

needs. With all of our experience in Latin America, we were prepared to come into the African market and duplicate some of our programs and successes. We also feel that we have an advantage in Africa as we have already experienced the challenges of having fiber coming into a market and understand the cycle.

### SM
*In your opinion, how has SATCOM influenced the average African citizen?*

### Jaime Dickinson
They now have a gateway to communicate with the outside world. Thanks to the competition and the abundance of satellite communications resources and better technology, prices have dropped substantially. This makes it easy and affordable for them to remain in touch with friends and loved ones around the globe as well as to access the latest global information through the Internet.

### SM
*What are the biggest market opportunities for SATCOM providers in Africa?*

### Jaime Dickinson
Government and GSM operators. GSM operators represent one of the fastest growing business opportunities for SATCOM providers because they are aggressively growing their wireless networks and must also grow their footprint throughout an entire region — not just in cities — and that requires satellite communications. Government projects are also a big growth area because, as we have seen in Latin America, it has become extremely important to governments in Africa to provide their citizens with access to education by bringing 21st century communications to rural areas throughout their countries.



> Oil & Gas Data & Voice    > Rural Access to Data & Voice

## SM

*What are the biggest challenges to market entry?*

## Jaime Dickinson

In Africa, the biggest challenge is the stability of the country. In countries such as the Congo and Sierra Leone, there is a great deal of political turmoil. This makes it a big risk to invest in satellite communications technology. While the budget might be there for the project today, it's not certain that it will be there tomorrow. To help minimize the risk, we always team up with local partners who are willing to share the burden with us. But we still sometimes have to say "no" to the opportunity if we feel the risk is too great.

## SM

*What do you see as the differentiators between satellite and fiber connectivity?*

## Jaime Dickinson

The biggest differences are reach and dependability. With satellite, you can cover a full territory at multiple connection points and it's fast. You just point the antenna to the target satellite, and you're connected.

With fiber, in many cases, you are limited to point-to-point connections in the larger population centers. Usually it's too expensive to bring fiber to remote areas of the country. It's also extremely costly and time-consuming to build a fiber network, and reliability can be an issue as well. Accidents happen.

Things aren't as regulated in Africa as elsewhere and city workers don't always know where the fiber is located or connected. There have been a lot of situations where someone digs a hole, breaks the fiber, and then it's down for a week.



> Government & Military IP    > Health Data & VoIP

## SM

*Do you see the abundance of undersea fiber connectivity coming to the African continent — and the lower costs associated with fiber — as a threat to the SATCOM marketplace?*

## Jaime Dickinson

It definitely affects it. We saw it happen in Latin America, when our large customers didn't come back and renew their satellite solutions. But what it also did is open our eyes to all the niche market opportunities.

We started shifting some of our resources to markets where fiber didn't reach, such as the rural market sector. We also started investigating satellite-dependent applications, such as video distribution and multi-cast. We believe the pattern will repeat itself in Africa and our experience in Latin America has us prepared to serve these enormous niche markets and access their opportunities.

## SM

*What is currently driving the demand for capacity in Africa? How do you predict this will evolve over the next few years?*

## Jaime Dickinson

In a word: *Globalization*. There are a lot of multinationals coming in from all over Europe to tap into the vast natural resources, such as cement, asphalt, oil and gas. They are setting up operations in Africa and these companies need to be connected to their headquarters. The multinational employees are also used to accessing communications and video and are hungry for better service. There is also a demand from the local people who see they need to be better connected with the world to expand their business operations.

## SM

*How is the cellular market affecting the SATCOM industry in Africa?*

## Jaime Dickinson

I think there are probably a few solutions where cellular is the way to connect rather than satellite. I think the impact is minimal and I believe the positive far outweighs the negative as celluar providers all need international backhaul, and satellite is, in many

# Executive Spotlight



> Tourism Sector Data & VoIP    > Video Up/Downlink

cases, the key for growth. All in all, I view cellular providers as strategic partners for us because they are doing the local market work to develop the customer base. As they accomplish that, there is a growing demand for more capacity — which is where satellite comes in.

## SM

*Where do you see the majority of capacity being used in Africa now and over the next few years?*

## Jaime Dickinson

The Northwest Africa region, in places like Nigeria, all of the West Africa regions and in central regions such as the Congo. It's all being driven by companies that are tapping into the vast natural resources in these regions.

## SM

*What are the major markets, in your estimation, as far as regional appetite for SATCOM?*

## Jaime Dickinson

Northwest and Central Africa. We also see demand in the Middle East and Southeast Asia.

## SM

*Do you feel the African military environment is going to start to absorb much of today's available capacity?*

## Jaime Dickinson

We haven't seen much of that. Maybe they should become a big player for capacity so they gain better control of national security, but that's not what we've experienced so far. Where we are noting governments using capacity is in the social arena — bringing communications to rural communities.

## SM

*With the FIFA WORLD CUP having enjoyed such global prominence, do you expect to see communication companies expressing greater interest in serving the African markets?*

## Jaime Dickinson

The way I see it, the World Cup focused on South Africa and I think it mainly helped the tourist business there and has attracted people who want to invest in South African real estate. As far as helping with expansion throughout the continent, I don't see that as much. I think overall interest in the African continent is being driven by local resources, such as mining and oil.

## SM

*What has been NewCom's key to success in the Africa market?*

## Jaime Dickinson

Being persistent and providing quality service at a good price. For us, it has always been about servicing our clients in the best way possible and providing excellent quality. Many of the vendors outside Africa don't like dealing with Africa — sometimes they send opportunities to us to take over because they are afraid of the risk. However, we travel to Africa often and we know our clients and have been able to build the confidence and trust necessary on both sides to make these projects a true success.

# *Securing Hybrid Digital TV Networks*

*author: Bo Ferm, Director of Product Marketing, Verimatrix*

*The rapid growth in broadband and mobile communications is creating new opportunities, while also posing interesting challenges, for digital TV operators at large, not least the traditional broadcasters. In this era of users increasingly demanding "everything, here and now," consumers expect more control over the viewing experience, taking a cue from PCs and other connected devices. Technology is advancing continuously to assure subscriber loyalty while, if operators are successful, increasing average revenue per user (ARPU). Subscriber churn can thus be reduced, improving business results.*

# SatBroadcasting™
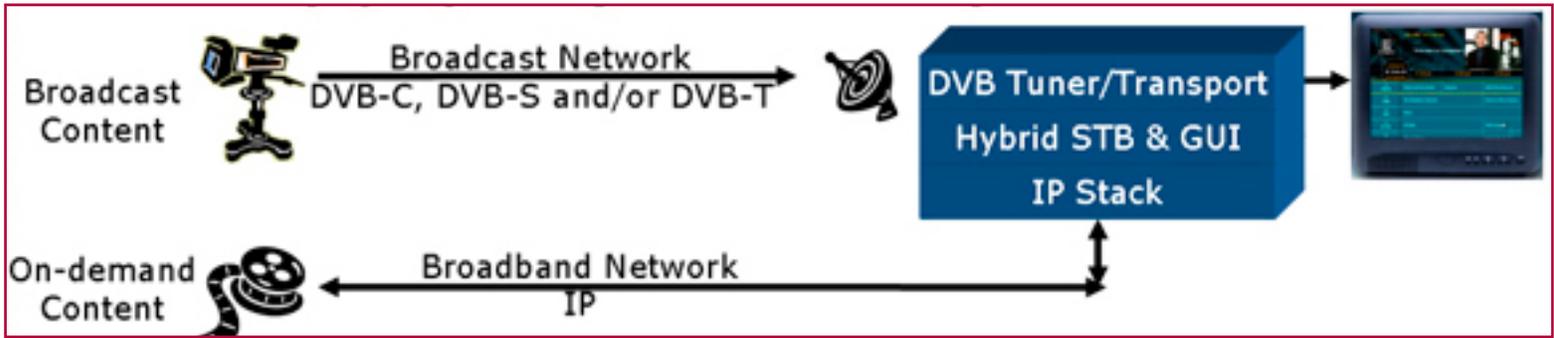


**Figure 1: Hybrid Networks Delivery**

Technically, multi-service deployments combine linear broadcast channels, via satellite or terrestrial networks, with interactivity such as *video-on-demand* (**VOD**) and on-screen chat over an IP network. Such hybrid approaches combine service delivery in a receiver with multiple network adapters, supported by an interactive electronic program guide that provides a unified user experience.

By delivering broadcast channels efficiently in a one-to-many approach over satellite, and providing individualized services over ground-based IP networks, operators can broaden services from mainstream linear programming, to blockbusters on-demand, introduce catch-up and go-back TV, and add niche content delivered over broadband, while giving viewers more control in the process.

Moreover, subscribers appreciate the convenience of service self-provisioning. Features like checking account status, ordering new channels, pre-booking events and managing DVR recording, online or from a mobile device in addition to the TV, all promote loyalty while reducing back-end costs. By empowering users with tools plus time and location independence, customer loyalty improves.

## Common Hybrid Scenarios

### — Satellite Broadcasters

Satellites excel at broadcasting multi-channel content across countries, even continents. However, they are capacity constrained to deliver thousands of concurrent on-demand streams. Without the structural advantage of cable and IPTV operators, where linear content and interactive services come over the same network, satellite broadcasters need to operate parallel broadband networks, deliver *over the top* (**OTT**) using the subscriber's existing Internet service, or partner with ISPs.

### — IPTV Operators

While an IPTV managed network is inherently better suited for interactive services compared to one-way networks, it is not ideal for broadcast services unless using a high-bandwidth (*fiber-to-the-home*) infrastructure. Bandwidth is a constraint in xDSL networks, particularly for multi-channel HD. Therefore, adding terrestrial or satellite delivered content to the IPTV offer, using a hybrid **DVB-IP** receiver, is gaining traction.

### — Cable TV Operators

Cable operators traditionally include terrestrial broadcast content in the base package and have ample spectrum for premium pay-TV programming. As cable plant is transitioned from analog to digital, the opportunity for additional revenue grows significantly. Moreover, two-way cable enables IP-based interactive services. Therefore, cable operators are well positioned to offer hybrid services and many already do. The key challenge is to optimize the spectrum for broadcast vs. on-demand delivery, and whether to deliver IP-based video via **DOCSIS 3.0** or through direct-to-edge (*CMTS bypass*) approaches.

### — Terrestrial Broadcasters

Similar to satellite, **DVB-T** and **ISDB-T** operators broadcast multi-channel linear content over-the-air in designated territories, whereby the ability to offer on-demand services requires a parallel broadband network. However, terrestrial broadcasters have much less spectrum at their disposal compared to their satellite brethren, posing yet another challenge. Hence the ultimate terrestrial hybrid receiver sports three network adapters: one each for terrestrial, satellite and IP connectivity.

## Hybrid Network Content Security Challenges

While the multi-network approach clearly is promising, it also presents challenges in regard to content security and usage rights enforcement, *i.e.,* how to optimize revenue security. This is especially true when the hybrid network approach is extended with multi-screen, anytime anywhere objectives.

Except for analog operators that have yet to transition to digital, the multi-network challenges will invariably include legacy *conditional access* (**CA**) systems, designed for one-way broadcasting protection but not for IP-based services. Also, many CE devices are pre-equipped with a native *digital rights management* (**DRM**) client, adding another challenge.

While it is possible to deploy several, network specific security platforms, that approach would create financial and operational challenges of their own (*See Figure 2 below*).

## 3-Dimensional Approach To Revenue Security

As much as business models in the digital, multi-network world must be multi-dimensional, so must the supporting digital asset security architecture. A multi-dimensional security approach is required to address the three key challenges of this new pay-TV world — secure delivery over multiple networks, support for diverse consumer devices, and a multi-layered ability to detect and combat threats of different kinds before they impact the bottom line.

Modern software-based content security solutions are now shifting the central value proposition for payTV operators beyond that of single network content protection towards an all-encompassing, multi-screen revenue security objective. A multi-layered security foundation is vital to optimize content monetization for different service models, delivery networks and client devices, through a single content authority. **Verimatrix** has pioneered the *3-Dimensional Security* approach that offers flexible layers of protection techniques to address these evolving business needs and revenue threats (*See Figure 3 on the next page*).

### — Network Dimension

This dimension is addressed by best-of-breed encryption and key management for the widest range of delivery networks, including broadcast satellite, cable and terrestrial, IPTV and DVB hybrid, VOD, mobile and Internet TV/OTT.

### — Device Dimension

Beyond the living room to computers and on-the-go applications, the technology approach should include a hardened, downloadable security core for set-top boxes (STBs), PCs and Macs in IPTV and hybrid applications, as well as mobile/CE devices.

### — Threat Dimension

Since not all threats to digital TV security look alike, a layered set of tools and techniques enable a flexible system protection profile. Features such as client hardening, fingerprinting, video watermarking and
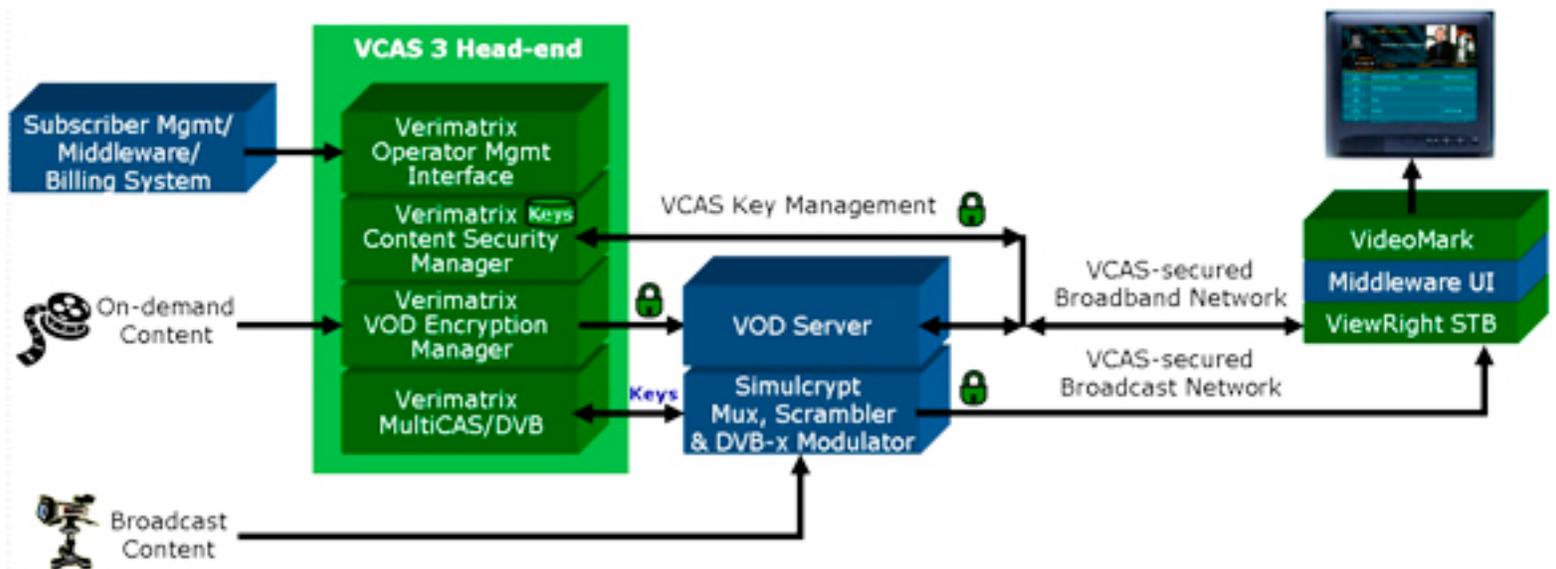


**Figure 2: Example Of Unified Revenue Security For Hybrid Networks**

**Network Dimension** – beyond broadcast, cable, telco, mobile network distribution silos, leveraging advantages of proven IP technologies

**Device Dimension**
Portability & transparency with network-centric key management for flexible mix of devices

**Protection Dimension**
Multi-layer security to enable rich business models, copy traceability and combat theft of service

**Figure 3: Verimatrix 3-Dimensional Security Approach**

clone detection help operators prevent revenue loss from theft of service, while rapid renewability provides a fast countermeasure capability. Video watermarking is especially effective as a piracy deterrent tool – the video can be traced back to the last authorized recipient, supported by a watermark insertion log that can be used as evidence in legal proceedings (*See Figure 4 below*).

### — Software-based Security
Digital video security is a virtual arms race against potential piracy. Renewability of security subsystems



**Figure 4: Example Of Video Watermarking Extraction**

is imperative to address rapidly evolving opportunities and threats. The use of hardware-based security in this context is simply impractical and results in a higher total cost of ownership, especially when including loss of revenue due to slower counter measures and the need to exchange smart cards periodically. Therefore, software-based security provides the most flexibility for operators to address all types of devices in a multi-network world, yielding competitive advantages and reducing costs.

### — Transitioning Security

The **DVB Simulcrypt** standard enables two or more security systems to work side by side, independently, which facilitates the transition from legacy STBs to hybrid receivers without disrupting operations. By capping the legacy STB population, while adding hybrid receivers with software-based security that protects both broadcast and IP-delivered programming, operators can transition and grow their subscriber base — and ARPU — more rapidly. By implementing this "cap-and-grow" strategy,

operators may transition to hybrid and multi-network services gradually (*See Figure 5 below*).
With this strategy in place, new opportunities to address mobile devices and OTT delivery can be readily supported as well, including multi-DRM support.

### Unified Revenue Security Approach Across Networks

Operators benefit from a unified revenue security architecture, which not only brings significant CAPEX and OPEX savings from managing a single platform, but also enables the deployment of a transparent security regime across all the network and device permutations that subscribers demand. Whether delivering to *set-top boxes* (**STBs**), *Macs*, *PCs*, *iPhones*/*iPads*, *Android* devices, *Blu-ray* players, games consoles, and so on, a single platform to manage entitlements, devices, content and subscribers is required to optimize user satisfaction and business results.
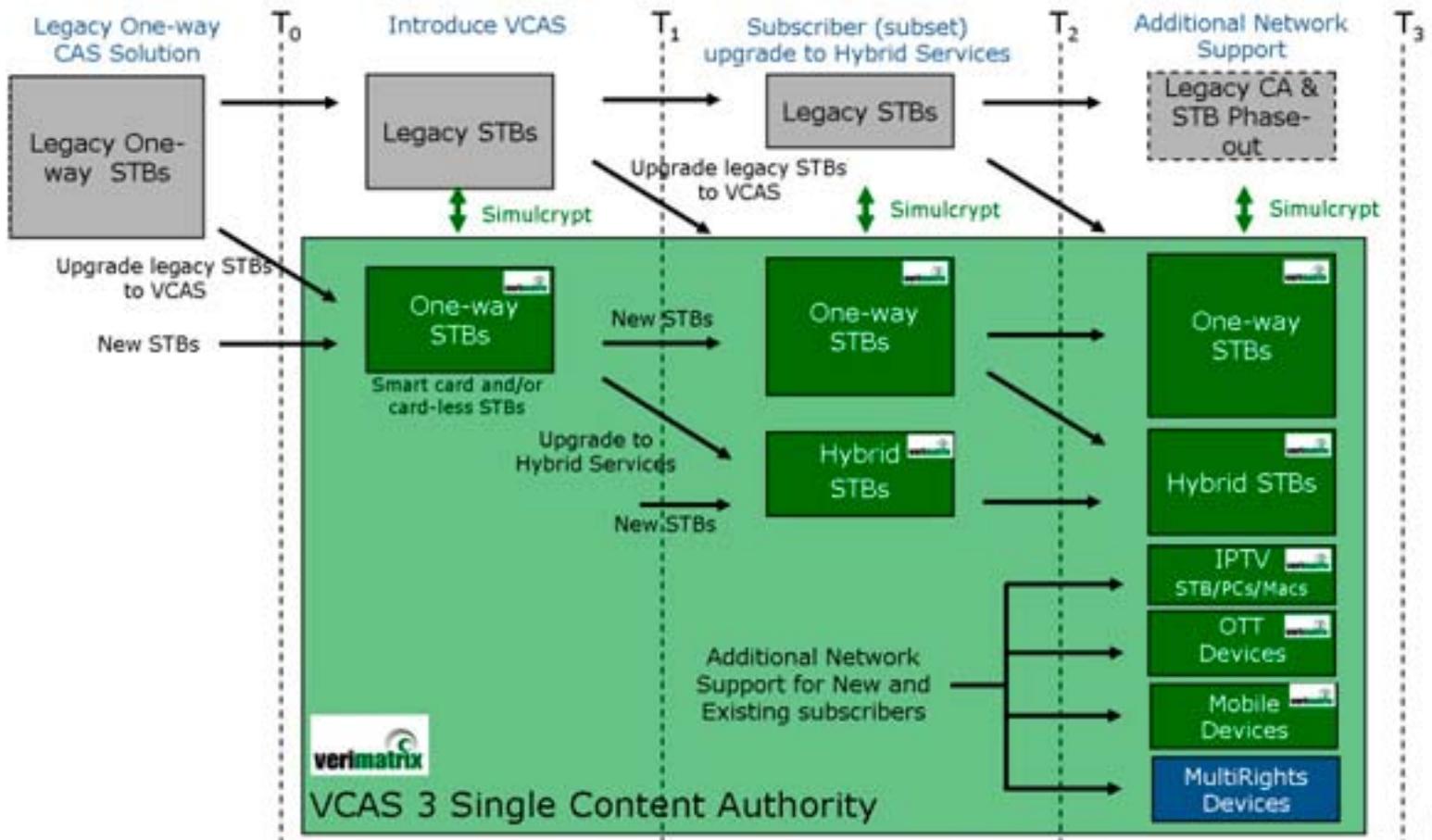


**Figure 5: Illustration of Cap-and-Grow Network Evolution**

within new business models, and provide a platform that satisfies the transmission requirements of each equally. A single content authority platform, plays a vital role in this transition towards hybrid networks and multi-screen services by supporting multi-layered protection and transparent usage rights.

While OTT and mobile services continue their rapid ascent and enable operators to address new frontiers, it is very important for digital TV service providers to keep the digital TV cash register operating. Applying a uniform revenue security across networks and screens streamlines operations and maximizes the return on investment.

### About the author

**Bo Ferm is the Director of Product Marketing at Verimatrix, the specialist in securing and enhancing revenue for multi-screen digital TV services, and has more than 25 years of international management experience in the digital video market from positions in Europe, Asia and North America. A native of Sweden, Ferm began his career after graduating from the University of Gothenburg with a B.Sc. in Mathematics and Computer Science.**

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Most consumers are simply looking for device and network transparency for the content they have paid for. A unified revenue security approach eliminates the potential impact of disparate usage rights policies, allowing consumers to simply enjoy what they have acquired. Cable, satellite, terrestrial and IPTV operators alike are deploying hybrid networks in order to exploit the synergy between broadcast and on-demand services

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